CLINICAL AND EPIDEMIOLOGICAL CHARACTERISTICS OF ACUTE RESPIRATORY VIRAL INFECTIONS IN CHILDREN AND RISK FACTORS FOR SEVERE DISEASE

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Abstract: Acute respiratory viral infections (ARVIs) are among the most common infectious diseases affecting children and remain a significant public health concern due to their high incidence, seasonal variation, and potential for complications. The clinical presentation and severity of these infections may vary according to age, epidemiological conditions, underlying health status, and the presence of additional risk factors. This study aims to evaluate the clinical and epidemiological characteristics of ARVIs in children and identify factors associated with severe disease progression.[1,5] Particular attention is given to age-related differences in clinical manifestations, seasonal patterns, the frequency of respiratory symptoms, and the relationship between patient characteristics and disease severity. Potential risk factors, including young age, pre-existing medical conditions, nutritional status, and epidemiological exposure, are considered in assessing the likelihood of severe clinical outcomes. A comprehensive analysis of these factors may contribute to the early identification of children at increased risk, improve clinical assessment, and support the development of evidence-based preventive and management strategies. The findings are expected to provide a scientific basis for optimizing the diagnosis, risk stratification, and clinical management of pediatric ARVIs.

Keywords: acute respiratory viral infections, children, clinical characteristics, epidemiology, disease severity, risk factors, pediatric infections, prevention.

КЛИНИКО-ЭПИДЕМИОЛОГИЧЕСКАЯ ХАРАКТЕРИСТИКА ОСТРЫХ РЕСПИРАТОРНЫХ ВИРУСНЫХ ИНФЕКЦИЙ У ДЕТЕЙ И ФАКТОРЫ РИСКА ТЯЖЁЛОГО ТЕЧЕНИЯ ЗАБОЛЕВАНИЯ

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Аннотация: Острые респираторные вирусные инфекции (ОРВИ) относятся к числу наиболее распространённых инфекционных заболеваний у детей и остаются актуальной проблемой общественного здравоохранения в связи с высокой заболеваемостью, сезонными колебаниями и риском развития осложнений. Клинические проявления и тяжесть течения этих инфекций могут различаться в зависимости от возраста ребёнка, эпидемиологических условий, состояния здоровья и наличия дополнительных факторов риска. Цель настоящего исследования — оценить клинико-эпидемиологические особенности ОРВИ у детей и выявить факторы, связанные с тяжёлым течением заболевания.[1,5] Особое внимание уделяется возрастным различиям клинических проявлений, сезонной динамике, частоте респираторных симптомов, а также взаимосвязи характеристик пациентов с тяжестью заболевания. При оценке вероятности неблагоприятного клинического исхода рассматриваются потенциальные факторы риска, включая ранний детский возраст, наличие сопутствующих заболеваний, состояние питания и особенности эпидемиологического контакта. Комплексный анализ этих факторов может способствовать раннему выявлению детей с повышенным риском тяжёлого течения заболевания, совершенствованию клинической оценки состояния пациентов и разработке научно обоснованных стратегий профилактики и ведения больных. Ожидается, что результаты исследования послужат научной основой для оптимизации диагностики, стратификации риска и клинического ведения детей с ОРВИ.

Ключевые слова: острые респираторные вирусные инфекции, дети, клиническая характеристика, эпидемиология, тяжесть заболевания, факторы риска, детские инфекции, профилактика.

BOLALARDA O‘TKIR RESPIRATOR VIRUSLI INFEKSIYALARNING KLINIK-EPIDEMIOLOGIK XUSUSIYATLARI VA KASALLIKNING OG‘IR KECHISHIGA OLIB KELUVCHI XAVF

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Annotatsiya: O‘tkir respirator virusli infeksiyalar (O‘RVI) bolalarda eng ko‘p uchraydigan yuqumli kasalliklar qatoriga kiradi. Ularning yuqori darajada tarqalishi, mavsumiy o‘zgarishlari va asoratlar rivojlanish ehtimoli ushbu kasalliklarni sog‘liqni saqlash tizimining dolzarb muammolaridan biriga aylantiradi. Mazkur infeksiyalarning klinik ko‘rinishlari va kechish og‘irligi bolaning yoshi, epidemiologik sharoitlar, umumiy salomatlik holati hamda qo‘shimcha xavf omillarining mavjudligiga qarab farqlanishi mumkin. Ushbu tadqiqotning maqsadi bolalarda O‘RVI ning klinik va epidemiologik xususiyatlarini baholash hamda kasallikning og‘ir kechishi bilan bog‘liq omillarni aniqlashdan iborat.[1,5] Tadqiqotda klinik belgilar va simptomlarning yoshga qarab farqlanishi, kasalliklarning mavsumiy tarqalishi, respirator simptomlarning uchrash chastotasi, shuningdek, bemorlarning individual xususiyatlari bilan kasallik og‘irligi o‘rtasidagi bog‘liqlikka alohida e’tibor qaratiladi. Kasallikning og‘ir kechish ehtimolini baholashda erta yosh, mavjud surunkali yoki hamroh kasalliklar, ovqatlanish holati hamda epidemiologik ta’sirlanish xususiyatlari kabi potensial xavf omillari ko‘rib chiqiladi. Ushbu omillarni kompleks tahlil qilish og‘ir kasallanish xavfi yuqori bo‘lgan bolalarni erta aniqlash, klinik baholash sifatini oshirish hamda ilmiy dalillarga asoslangan profilaktika va davolash strategiyalarini ishlab chiqishga yordam berishi mumkin. Tadqiqot natijalari bolalarda O‘RVI diagnostikasi, xavf darajasini tabaqalashtirilgan holda baholash va bemorlarni klinik boshqarish usullarini takomillashtirish uchun ilmiy asos bo‘lib xizmat qilishi kutilmoqda.

Kalit so‘zlar: o‘tkir respirator virusli infeksiyalar, bolalar, klinik xususiyatlar, epidemiologiya, kasallikning og‘irligi, xavf omillari, bolalar infeksiyalari, profilaktika.

Relevance of the Study

Acute respiratory viral infections (ARVIs) remain a significant public health concern among children worldwide due to their high incidence, seasonal variability, and potential to cause severe complications. Infants and young children are particularly vulnerable because of the immaturity of their immune systems and the presence of age-related physiological characteristics. The clinical course of ARVIs is influenced by several factors, including age, underlying medical conditions, nutritional status, environmental exposure, and the specific viral pathogen involved. Therefore, identifying the clinical and epidemiological characteristics of these infections and determining the risk factors associated with severe disease are essential for improving early diagnosis, risk assessment, and patient management. A comprehensive evaluation of these factors may facilitate the timely identification of high-risk pediatric patients, reduce the likelihood of complications, and support the development of effective preventive and therapeutic strategies. Accordingly, investigating the clinical and epidemiological characteristics of ARVIs and their association with disease severity is of considerable importance for contemporary pediatric practice and public health.

Aim of the Study The aim of this study is to comprehensively assess the clinical and epidemiological characteristics of acute respiratory viral infections in children, examine age-related variations in disease presentation and severity, and determine the key risk factors associated with severe clinical outcomes to improve early identification of high-risk patients and optimize preventive and clinical management strategies.

Objectives of the Study

To characterize the clinical manifestations of acute respiratory viral infections (ARVIs) in children and assess their variability across different age groups.

To analyze the epidemiological characteristics of ARVIs, including seasonal distribution, age-specific patterns, and factors influencing infection prevalence.

To identify and evaluate the principal risk factors associated with severe disease progression in pediatric patients. To examine the association between clinical symptoms, demographic characteristics, comorbidities, and the severity of respiratory viral infections.[2,4]

To assess the clinical significance of identified risk factors in the early recognition of children at increased risk of complications. To formulate evidence-based recommendations for improving early diagnosis, clinical risk assessment, and preventive approaches to reducing the burden of ARVIs in children.

Study Procedure The study is designed to investigate the clinical and epidemiological characteristics of acute respiratory viral infections (ARVIs) in children and identify factors associated with severe disease progression. A structured clinical-epidemiological approach should be used to evaluate demographic characteristics, clinical manifestations, seasonal distribution, underlying medical conditions, and disease outcomes.[3,6]

The study population may include children diagnosed with ARVIs in a pediatric healthcare setting. Data collection should include age, sex, symptom onset, fever, cough, nasal congestion, sore throat, respiratory distress, comorbidities, laboratory findings, hospitalization, and complications. Disease severity should be classified using predefined clinical criteria. The collected information should be organized into a standardized database. Data quality should be assessed by checking missing observations, duplicate entries, and inconsistencies. Ethical requirements, patient confidentiality, and parental or guardian consent should be addressed in accordance with applicable institutional procedures.

Statistical Analysis Statistical analysis should include descriptive and inferential methods. Categorical variables should be presented as frequencies and percentages, whereas continuous variables should be summarized using means and standard deviations or medians and interquartile ranges, as appropriate. Associations between age groups and disease severity may be assessed using the chi-square test or Fisher's exact test. Logistic regression may be used to evaluate independent risk factors for severe disease when the dataset and number of outcomes are sufficient. Results should include effect estimates, 95% confidence intervals, and p-values. Statistical significance should be defined before analysis, commonly at \(p<0.05\).

3. Illustrative Results

The following example assumes a hypothetical sample of 150 children. These values are provided solely to demonstrate the presentation of research findings.

Table 1. Distribution of participants by age

Age group	Number (n)	Percentage
Under 1 year	30	20.0%
1–3 years	45	30.0%
4–6 years	40	26.7%
7–12 years	35	23.3%
Total	150	100%

The hypothetical distribution shows that children aged 1–3 years constitute the largest age group, accounting for 30.0% of the sample. In an actual study, this distribution should be interpreted in relation to the recruitment setting and the age structure of the population examined.[4,6]

Clinical Manifestations

Table 2. Frequency of clinical symptoms

In this illustrative dataset, cough and fever are the most frequently reported manifestations. Respiratory distress is less frequent but clinically important because it may indicate lower respiratory tract involvement and the need for prompt clinical assessment. These observations are hypothetical and require verification against actual patient records.

5. Disease Severity and Age-Related Differences

1–3 years			
4–6 years			
7–12 years			

Statistical interpretation In the hypothetical dataset, severe disease occurs in 28.7% of participants. The highest proportion is observed among children younger than one year, while the lowest is observed among those aged 7–12 years.

A chi-square test of the illustrative data gives:

$X^2(3)=14.28$

P=0.003

Cramers V= 0.31

These example calculations suggest an association between age group and disease severity in the simulated dataset. They do not establish a real clinical association or prove causation. Actual conclusions require analysis of verified patient data and consideration of potential confounding factors.[7]

Conclusion Acute respiratory viral infections (ARVIs) remain a significant public health concern in children, particularly during infancy and early childhood. According to the World Health Organization (WHO), respiratory syncytial virus (RSV) causes an estimated 3.6 million hospitalizations and approximately 100,000 deaths annually among children under five years of age worldwide. Approximately 97% of RSV-associated pediatric deaths occur in low- and middle-income countries, highlighting the importance of timely diagnosis and access to appropriate medical care [1].

The available evidence indicates that infants, especially those younger than six months, are at increased risk of severe RSV infection. Prematurity, underlying cardiopulmonary conditions, immunodeficiency, and other relevant clinical factors may further increase the risk of complications. The US Centers for Disease Control and Prevention also identifies young children and individuals with certain underlying medical conditions as populations at increased risk of severe respiratory viral illness [1,2]. These findings emphasize the importance of a comprehensive clinical and epidemiological assessment of pediatric ARVIs, including age-specific clinical manifestations, seasonal distribution, underlying health conditions, and indicators of disease severity. Early recognition of respiratory distress, rapid breathing, and other warning signs is essential for identifying children who require urgent medical evaluation [3].

In conclusion, strengthening early diagnosis, applying evidence-based clinical assessment, promoting recommended immunization, improving nutritional status, and reducing exposure to indoor air pollution are important strategies for preventing severe respiratory complications in children. Further epidemiological and clinical studies using verified patient data and appropriate multivariable statistical analyses

are needed to identify independent predictors of severe disease and improve preventive and therapeutic approaches in pediatric practice.

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