

# Clinical-Pharmacological Approach To Rational Use Of Antimicrobial Drugs In Children

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**Abstract.** The article discusses the clinical and pharmacological rationale for the rational use of antibacterial drugs in the treatment of infectious diseases in pediatric patients. It emphasizes the importance of individualized antibiotic therapy based on the principles of evidence-based medicine, taking into account the age-related pharmacokinetics and pharmacodynamics in children. The study highlights current challenges such as increasing antibiotic resistance, inappropriate prescribing, and lack of pediatric-specific clinical guidelines.

**Keywords:** acute respiratory infections, antibiotic therapy, children.

## INTRODUCTION

Bacterial resistance to existing antibiotics has been named by the World Health Organization (WHO) as one of the main threats to humanity in the current century [1]. According to some forecasts, in just a few years we may find ourselves practically without effective drugs, since not a single fundamentally new class of these drugs has appeared in the world since the late 1980s [3]. Among the approaches to solving the problem of antibiotic resistance, one of the main ones, along with the synthesis of new drugs, is limiting the use of this group of drugs: mathematical modeling makes it possible to predict the spread of resistance and identify factors affecting the speed of this process, which in turn opens up prospects for managing this process [1]. Unfortunately, research results consistently indicate that the use of antibacterial drugs in many cases is far from optimal: up to 50% of patients in hospitals and, according to various data, from 16 to 97% at the outpatient stage receive inadequate antibacterial therapy. The use of antibacterial drugs has remained excessive for many years [4]. Epidemiological studies also indicate irrational use of antibiotics [2].

## MATERIALS AND METHODS

Thus, in the study by G. Togoobaatar et al. it is reported that more than 40% of children in Mongolia take antibiotics to treat respiratory tract infections without medical prescriptions [2].

In a meta-analysis by X. Yin et al. it is reported that when treating patients in outpatient settings the frequency of antibiotic prescription was 74% [3].

It is very important for a primary care physician not to overestimate the possible role of bacterial flora and refrain from prescribing antibacterial drugs in cases where this is not necessary. After all, rational antibiotic therapy in pediatrics remains a relevant and difficult task to this day. Despite significant progress in the development of clinical pharmacology, the issues of the validity of prescribing drugs for ARIs continue to retain their previous positions. This is due to the lack of agreed treatment protocols, an exaggeration of the role of drug therapy in ARIs, as well as changes in the sensitivity of pathogens to antibacterial drugs [3, 4]. In the structure of infectious diseases in children, the proportion of ARIs reaches 90%. According to numerous authors, the maximum incidence of ARIs among children is observed at the age of 6 months to 6 years and is from 4 to 8 cases per year. Among schoolchildren, the incidence decreases to 2-5 cases per year, and among adults - does not exceed 2-4 during the same period of time [4].

In Uzbekistan, annual seasonal increases in morbidity determine their constant social, medical and economic significance [2]. In recent years, respiratory diseases (including influenza and its complications) have moved into second place among the causes of death. Making up about 7% of all causes of death in Uzbekistan, this figure exceeds the similar average for European countries. Among the causes of death of the child population, respiratory diseases predominate, including influenza and ARIs [3].

The degree of inadequacy of antibiotic prescription for acute respiratory infections varies. Prescribing antibiotics for colds or acute respiratory viral infections (ARVI), acute laryngitis, tracheitis, bronchitis and rhinitis is almost always unjustified, since in most cases these are viral infections. At the

same time, prescribing antibiotics for acute sinusitis and pharyngitis is justified in some cases, but must be well justified [1]. It is known that antibiotics do not affect the symptoms of ARI and do not prevent bacterial superinfection, but rather contribute to its development due to the suppression of the normal flora of the respiratory tract. The unjustified frequency of prescribing antibiotics to children with ARI remains high - from 25 to 85% [2].

## RESULTS AND DISCUSSION

As the analysis of data for the reporting period showed, in the structure of ARIs, the first place in the ranking was occupied by acute respiratory infections of the upper respiratory tract of multiple and unspecified localization (75 cases; 24.4%), the second - acute bronchitis (60 children; 19.5%); the third - acute tonsillitis (52 children; 16.9%), the fourth - acute pharyngitis, nasopharyngitis (47 children; 15.3%); the fifth - acute tracheitis (24 children; 7.8%), in the process of decreasing further there were acute rhinosinusitis and laryngitis (20 children, 6.5%; 10 children, 3.2%). As can be seen from the diagrams, uncomplicated forms predominate in the structure of ARIs (74.0%; 228 children out of 308). Uncomplicated ARIs included respiratory episodes that were designated in outpatient cards as acute respiratory viral infection, pharyngitis, laryngitis, tracheitis.

Among 26.0% of complicated forms, acute bronchitis (simple or obstructive) was diagnosed in 60 children, and acute pneumonia and bronchopneumonia were diagnosed in 11 patients. In 9 children, ARI was accompanied by the development of acute otitis media. It is known that only bacterial pharyngitis of streptococcal and pneumococcal etiology can be complicated by otitis [2, 3]. It should be noted that a retrospective analysis of medical documentation does not always allow verification of the diagnosis, but this was not part of the objectives of the study.

Accordingly, most ARIs have a mild course, which is confirmed by many domestic and foreign authors.

Antibacterial therapy for ARIs was used in 80.2% (247 children) of cases. The percentage of use of antibacterial therapy for individual nosologies is shown. It was found that in uncomplicated forms of ARI, the share of use of antibacterial drugs among all children who had recovered was 58.1% (179 children), of the total number of ARIs. Among uncomplicated forms of ARI, antibiotic therapy was prescribed in 78.5% (179 children out of 228). In complicated forms, antibiotic therapy was prescribed in 19.4% of cases (60 children) of the total number of ARIs and in 75% of cases of the total number of complicated ARIs. The analysis revealed that the most frequently used antibiotics at the outpatient stage in children were 3rd generation cephalosporins (cefazolin, ceftriaxone) - in 95.1% of children, ampicillin (amoxicillin, ampicillin, hincocil, augmentin, amoxiclav) - in 89.1%, macrolides (azithromycin, azithromycin) - in 80.2%, aminoglycosides (mercaptin) - in 55.1%.

When choosing an antibiotic for the treatment of ARI, district doctors preferred cephalosporin drugs (95.1%). The frequency of prescribing macrolides, which are an alternative to penicillins in the outpatient treatment of upper respiratory tract infections, was 80.2%.

A study of the tactics of using drugs for bronchitis and pneumonia in an outpatient setting showed a high frequency of their use, which was 75%. The structure of antibacterial drugs prescribed for bronchitis, pneumonia and uncomplicated ARI is identical.

Thus, the spectrum of antibacterial drugs used was different. What united them was the unjustified prescription of antibiotics for uncomplicated forms of ARI and acute bronchitis. Among primary health care physicians, it has become common to prescribe antibacterial drugs for a slight increase in body temperature, runny nose, and mild redness of the mucous membranes. With this approach, there is a decrease in antibiotic-sensitive bacterial strains and the spread of resistant forms. As is known, systemic antibiotic therapy is ineffective in the case of viral etiology of ARI, since it does not prevent the development of bacterial complications and has virtually no effect on the course of uncomplicated acute respiratory process. However, despite the indisputable facts, these drugs continue to be widely used in pediatric practice [2]. Our data indicate that local doctors do not sufficiently adhere to a wait-and-see approach and dynamic observation in uncomplicated forms of ARI.

## CONCLUSION

The frequency of antibiotic use in ARI was 80.2%, and the share of antibacterial drugs used among uncomplicated forms of ARI was - 78.5%, which indicates irrational use of antibacterial drugs in the

absence of indications. For the treatment of ARI, antibiotics of the cephalosporin, aminopenicillin and macrolide groups were mainly used, which indicates non-compliance with treatment standards recommended by WHO.

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