HSR (LONDON),
HOUGHTON STREET REVIEW JOURNAL
ISSN: 2058-5519|Impact factor-15.9
http://houghtonstreetreview.com/index.php/hsr

THE PROBLEM OF UNJUSTIFIED ANTIBIOTIC PRESCRIBING IN CHILDREN WITH ACUTE RESPIRATORY VIRAL INFECTIONS

Abdullayeva Zuhra Normamat qizi

Termez Branch of Tashkent State Medical University

Email: zuxraabdullaeva22227@icloud.com

Doi: https://doi.org/10.5281/zenodo.21932554

Abstract: Acute respiratory viral infections (ARVI) remain the leading driver of unjustified antibacterial prescribing in paediatric practice. The aim of the study was to assess antibiotic prescribing practice in children with ARVI at the primary care level and to identify factors associated with inappropriate prescribing. A retrospective analysis of 412 outpatient records of children aged 0–14 years attending family polyclinics of Termez city was performed, complemented by an anonymous survey of 120 parents and 45 physicians. Antibacterial agents were prescribed to 64.8% of children; 80.9% of these prescriptions (52.4% of the whole sample) were classified as unjustified according to international criteria. The "Watch" group of the WHO AWaRe classification accounted for 64.4% of prescriptions and the parenteral route for 27.7%. Independent predictors of unjustified prescribing were parental demand (OR=4.15), fever lasting more than 3 days (OR=3.42), purulent rhinorrhoea (OR=2.88) and the absence of C-reactive protein testing (OR=2.73). The findings substantiate the need to implement antimicrobial stewardship programmes, expand point-of-care diagnostics and improve communication with parents.

Key words: acute respiratory viral infection, children, antibacterial therapy, inappropriate prescribing, antimicrobial resistance, AWaRe classification, C-reactive protein, primary care.

INTRODUCTION

Acute respiratory viral infections (ARVI) occupy the leading position in the structure of childhood infectious diseases, accounting for more than 90% of all acute infectious pathology. A child of preschool age falls ill on average 6–8 times a year. The aetiological structure is dominated by rhinoviruses, respiratory syncytial virus, adenoviruses, influenza and parainfluenza viruses, metapneumovirus and seasonal coronaviruses; bacterial pathogens as a primary agent account for no more than 5–10% of cases. Nevertheless, antibacterial agents are widely used in everyday practice.

Cochrane reviews have shown that in the common cold and acute purulent rhinitis antibiotics provide no clinically meaningful benefit but significantly increase the risk of adverse effects. They do not shorten the duration of the illness and do not prevent bacterial complications; on the contrary, they lead to disruption of the intestinal microbiota, allergic reactions, antibiotic-associated diarrhoea and the development of antimicrobial resistance.

Antimicrobial resistance (AMR) is one of the most serious threats to global health. According to the GBD study, in 2021 1.14 million deaths worldwide were directly attributable to bacterial resistance, and it was recorded as a contributing factor in a further 4.71 million deaths; by 2050 these figures are projected to reach 1.91 million and 8.22 million respectively. At the same time, deaths

HSR (LONDON),
HOUGHTON STREET REVIEW JOURNAL
ISSN: 2058-5519|Impact factor-15.9
http://houghtonstreetreview.com/index.php/hsr

directly attributable to AMR in children under 5 years of age decreased from 488,000 to 193,000 (by almost 60%) between 1990 and 2021 — which demonstrates the potential of vaccination, infection control and the rational use of antibiotics.

The meta-analysis by H. Dillen et al. published in 2024 (40 studies) showed that even in high-income countries between one fifth and one half of the antibiotics prescribed to acutely ill children are inappropriate. Among the factors associated with inappropriateness, a diagnosis of acute otitis media (OR=2.02), consultation with a general practitioner (OR=1.38) and rural location (OR=1.47) were highlighted.

The regional context also deserves attention. In a randomised trial conducted in Kyrgyzstan (n=1204), 60% of the children in the control group received an antibiotic; point-of-care C-reactive protein testing reduced this figure to 36%. In Uzbekistan, the over-the-counter sale of antibiotics and self-medication remain an important part of the problem. Published analytical data on the primary care level of the Surkhandarya region are practically absent — which determines the relevance of the present study.

AIM OF THE STUDY

To assess the practice of prescribing antibacterial agents for acute respiratory viral infections in children aged 0–14 years in the primary health care institutions of Termez city, to determine the frequency of unjustified prescribing and to analyse the clinical, organisational and social factors influencing it.

MATERIAL AND METHODS

Study design. A retrospective, cross-sectional study was carried out on the basis of three family polyclinics in Termez city over the period from 1 January to 31 December 2025. A total of 412 outpatient records (form 025/u) of children aged 0–14 years were selected for analysis by random sampling.

Inclusion criteria: a principal diagnosis corresponding to the ICD-10 categories J00–J06 (acute infections of the upper respiratory tract), J20–J21 (acute bronchitis and bronchiolitis) and H65.0–H65.1 (acute otitis media); an interval from the onset of the illness to the consultation of no more than 7 days; complete documentation of the history, physical examination and prescriptions in the record. Exclusion criteria: radiologically confirmed pneumonia (J12–J18), bronchial asthma and other chronic bronchopulmonary diseases, primary immunodeficiency states, oncohaematological pathology, antibiotic intake within the 30 days preceding the study, and cases of hospital admission.

Appropriateness criteria. The prescription of an antibacterial agent was considered justified if at least one of the following criteria, developed on the basis of the WHO AWaRe (Access, Watch, Reserve) guidance and international clinical recommendations, was documented in the outpatient record: 1) acute tonsillopharyngitis of group A beta-haemolytic streptococcal aetiology (a McIsaac score of 3 points or more, or a positive rapid test or bacteriological culture); 2) acute otitis media confirmed by otoscopy, bilateral in children under 2 years of age or accompanied by otorrhoea; 3) acute bacterial rhinosinusitis lasting more than 10 days or accompanied by the phenomenon of “double worsening”; 4) clinical or radiological signs of pneumonia; 5) a C-reactive protein level above 40 mg/l or a procalcitonin level above 0.5 ng/ml; 6) severe underlying pathology or a state of immunosuppression. Prescriptions in which none of these criteria was recorded were classified as

HSR (LONDON),
HOUGHTON STREET REVIEW JOURNAL
ISSN: 2058-5519|Impact factor-15.9
http://houghtonstreetreview.com/index.php/hsr

unjustified. The assessment was carried out independently by two specialists; disagreements were resolved with the participation of a third expert (level of agreement κ=0.84).

Survey. In parallel, an anonymous questionnaire survey was conducted among 120 parents and 45 primary care physicians (family doctors and paediatricians). The questionnaires were aimed at assessing the level of knowledge about antibiotics, self-medication practices and the factors influencing the prescribing decision.

Statistical analysis. The data were processed in Microsoft Excel 2019 and IBM SPSS Statistics 26. Qualitative variables were presented as absolute and relative (%) values, and quantitative variables as M±SD. Between-group differences were assessed using Pearson's χ^2 test (Fisher's exact test where the expected frequency was less than 5). The strength of the association was expressed through the odds ratio (OR) and the 95% confidence interval (95% CI). Differences were considered statistically significant at $p<0.05$. The study was approved by the local ethics committee, and personal data were anonymised.

RESULTS OF THE STUDY AND THEIR DISCUSSION

Of the 412 children examined, 224 (54.4%) were boys and 188 (45.6%) were girls, and the mean age was 4.3±3.1 years. The distribution of the sample by age and sex is presented in Table 1.

Table 1

Distribution of the children examined by age and sex (n=412)

Age group	Boys, n	Girls, n	Total, n	Share, %
0–12 months	44	34	78	18.9
1–3 years	74	60	134	32.5
4–6 years	59	53	112	27.2
7–14 years	47	41	88	21.4
Total	224	188	412	100.0

Acute nasopharyngitis and other acute infections of the upper respiratory tract predominated in the nosological structure. Antibacterial agents were prescribed to a total of 267 children (64.8%), and 216 of these prescriptions (80.9% of the prescriptions and 52.4% of the whole sample) were assessed as unjustified according to the established criteria (Table 2).

Table 2

Nosological structure and frequency of antibacterial prescribing

Nosological form (ICD-10)	Number of children, n (%)	Antibiotic prescribed, n (%)	Unjustified prescription, n (%)
Acute nasopharyngitis and acute	189 (45.9)	108 (57.1)	102 (94.4)

HSR (LONDON),
HOUGHTON STREET REVIEW JOURNAL
ISSN: 2058-5519|Impact factor-15.9
http://houghtonstreetreview.com/index.php/hsr

Nosological form (ICD-10)	Number of children, n (%)	Antibiotic prescribed, n (%)	Unjustified prescription, n (%)
URT infections (J00–J06)			
Acute tonsillitis and pharyngitis (J02–J03)	84 (20.4)	71 (84.5)	46 (64.8)
Acute laryngitis and laryngotracheitis (J04–J05)	61 (14.8)	34 (55.7)	31 (91.2)
Acute bronchitis and bronchiolitis (J20–J21)	58 (14.1)	39 (67.2)	34 (87.2)
Acute otitis media (H65.0–H65.1)	20 (4.9)	15 (75.0)	3 (20.0)
Total	412 (100.0)	267 (64.8)	216 (80.9)

The highest rate of inappropriateness was recorded in the groups with acute nasopharyngitis (94.4%) and laryngotracheitis (91.2%) — nosological forms that are of viral aetiology in almost all cases. The lowest figure was observed in acute otitis media (20.0%), since in this group prescriptions were mainly supported by otoscopic findings.

Analysis of the structure of the agents prescribed showed a predominance of broad-spectrum drugs (Table 3).

Table 3

Structure of the antibacterial agents prescribed and their distribution according to the WHO AWaRe classification (n=267)

Drug group	n	Share, %	AWaRe group
Third-generation cephalosporins (cefixime, ceftriaxone)	96	36.0	Watch
Macrolides (azithromycin, clarithromycin)	71	26.6	Watch
Aminopenicillins (amoxicillin)	52	19.5	Access
Inhibitor-protected aminopenicillins	36	13.5	Access
Co-trimoxazole	7	2.6	Access
Fluoroquinolones (ciprofloxacin)	5	1.9	Watch
Total	267	100.0	—

HSR (LONDON),
HOUGHTON STREET REVIEW JOURNAL
ISSN: 2058-5519|Impact factor-15.9
http://houghtonstreetreview.com/index.php/hsr

According to the WHO AWaRe classification, the share of agents belonging to the "Access" group was only 35.6% (n=95), while the "Watch" group accounted for 64.4% (n=172). This figure is considerably below the target level set by WHO (at least 70% of all prescriptions should come from the "Access" group). Particularly noteworthy is the recording of 5 prescriptions (1.9%) of fluoroquinolones, which are not recommended for use in children without strict indications. Seventy-four prescriptions (27.7%) were administered by the parenteral route, mainly as ceftriaxone; the mean duration of the treatment course was 6.8±1.4 days.

The level of laboratory support proved to be low: a complete blood count was performed in only 214 children (51.9%), C-reactive protein in 96 (23.3%), and a throat swab or rapid streptococcal test in 18 (4.4%), while procalcitonin was not measured at all. Of the 267 children who received an antibiotic, only 71 (26.6%) had a C-reactive protein result available.

Univariate analysis made it possible to identify the factors significantly associated with unjustified prescribing (Table 4).

Table 4

Factors associated with unjustified antibiotic prescribing (n=412)

Factor	OR	95% CI	p
Antibiotic requested by the parents	4.15	2.51–6.86	<0.001
Fever lasting more than 3 days	3.42	2.18–5.37	<0.001
Purulent (green) rhinorrhoea	2.88	1.79–4.63	<0.001
Absence of C-reactive protein testing	2.73	1.71–4.36	<0.001
Child's age under 3 years	1.96	1.28–3.01	0.002
Weekend or on-call consultation	1.62	1.04–2.53	0.033
Presentation from a rural area	1.47	1.02–2.12	0.041

The survey conducted among parents (n=120) revealed the social dimension of the problem: 79 respondents (65.8%) believed that antibiotics act on viral infections, 68 (56.7%) regarded a high body temperature as a direct indication for prescribing an antibiotic, 51 (42.5%) had given their child an antibiotic without a doctor's prescription during the previous year, and 44 (36.7%) had directly asked the physician at the consultation to prescribe an antibiotic. Twenty-nine respondents (24.2%) reported that they had stopped the course of treatment prematurely as soon as the child's condition improved — which is an additional factor in the development of resistance.

According to the results of the physicians' survey (n=45, multiple answers allowed), the main reasons for the decision to prescribe an antibiotic were: fear of the development of bacterial complications — 29 (64.4%), pressure from parents — 22 (48.9%), the absence of point-of-care diagnostics (C-reactive protein, streptococcal test) at the consultation — 18 (40.0%), limited consultation time — 12 (26.7%) and the limited possibility of inviting the patient for follow-up — 9 (20.0%).

HSR (LONDON),
HOUGHTON STREET REVIEW JOURNAL
ISSN: 2058-5519|Impact factor-15.9
http://houghtonstreetreview.com/index.php/hsr

When the results obtained are compared with international data, a number of important conclusions emerge. The frequency of antibiotic prescribing in our sample (64.8%) is close to the control-group figure of the randomised trial conducted in the Kyrgyz Republic (60%) and reflects a general trend for the region. However, the share of unjustified prescriptions (80.9%) is considerably higher than the range of 20–50% reported for high-income countries. This difference is explained primarily by the shortage of point-of-care diagnostic tools in primary care, the low level of adherence to clinical protocols and the health literacy of the population.

The effectiveness of point-of-care C-reactive protein testing deserves particular attention: in the Kyrgyz study this method reduced the frequency of antibiotic prescribing from 60% to 36%, that is by 24 percentage points, while the children's recovery time and the hospitalisation rate remained unchanged. In our data, the fact that the absence of C-reactive protein testing almost tripled the likelihood of unjustified prescribing (OR=2.73) indirectly confirms this conclusion.

The strategy of delayed antibiotic prescribing is also promising. According to a Cochrane review, 93% of patients took an antibiotic under immediate prescribing, compared with 29% under the delayed-prescription strategy and 13% under the no-antibiotic observation approach; the frequency of complications did not differ between the groups, and the level of satisfaction remained almost the same (90%, 88% and 81%). Thus, the "fear of complications" reported by physicians can be addressed through rational alternatives.

The limitations of the study are its retrospective character, its restriction to a single city and its dependence on the completeness of the medical documentation. It would be appropriate to carry out multicentre prospective studies in the future.

CONCLUSIONS

1. In the primary health care system of Termez city, antibacterial agents were prescribed to 64.8% of the children who presented with an acute respiratory viral infection, and 80.9% of these prescriptions (52.4% of the whole sample) are considered unjustified according to international criteria.

2. The structure of prescriptions is dominated by the "Watch" group of the WHO AWaRe classification (64.4%), and the parenteral route of administration is chosen in 27.7% of cases, which constitutes an additional risk factor for the development of antimicrobial resistance.

3. The strongest predictors of unjustified prescribing are parental demand (OR=4.15), prolonged fever (OR=3.42), purulent rhinorrhoea (OR=2.88) and the absence of C-reactive protein testing (OR=2.73).

4. The level of laboratory support is insufficient: C-reactive protein was measured in only 23.3% of the children, and a rapid streptococcal test was performed in only 4.4%.

5. A total of 65.8% of parents are unaware that antibiotics are ineffective in viral infections, and 42.5% have given their child an antibiotic without a prescription — which indicates the need to improve health literacy.

Practical recommendations

1. To introduce antimicrobial stewardship programmes in primary care institutions and to carry out periodic audits of prescriptions.

HSR (LONDON),
HOUGHTON STREET REVIEW JOURNAL
ISSN: 2058-5519|Impact factor-15.9
http://houghtonstreetreview.com/index.php/hsr

2. To equip family polyclinics with point-of-care C-reactive protein testing systems and with rapid tests for group A streptococcus.

3. To align the national clinical protocols on ARVI with the WHO AWaRe guidance and to raise the share of "Access" group agents to at least 70%.

4. To introduce into practice the tactics of delayed antibiotic prescribing and of "watchful waiting with a follow-up appointment".

5. To organise targeted educational programmes for parents and to strengthen control over the over-the-counter sale of antibiotics.

References

1. GBD 2021 Antimicrobial Resistance Collaborators. Global burden of bacterial antimicrobial resistance 1990–2021: a systematic analysis with forecasts to 2050 // The Lancet. – 2024. – Vol. 404, №10459. – P. 1199–1226.
2. Antimicrobial Resistance Collaborators. Global burden of bacterial antimicrobial resistance in 2019: a systematic analysis // The Lancet. – 2022. – Vol. 399, №10325. – P. 629–655.
3. World Health Organization. The WHO AWaRe (Access, Watch, Reserve) antibiotic book. – Geneva: WHO, 2022. – 512 p.
4. World Health Organization. Global action plan on antimicrobial resistance. – Geneva: WHO, 2015. – 28 p.
5. Dillen H., Wouters J., Snijders D., Wynants L., Verbakel J.Y. Factors associated with inappropriateness of antibiotic prescriptions for acutely ill children presenting to ambulatory care in high-income countries: a systematic review and meta-analysis // Journal of Antimicrobial Chemotherapy. – 2024. – Vol. 79, №3. – P. 498–511.
6. Isaeva E., Bloch J., Akylbekov A., et al. C-reactive protein testing in primary care and antibiotic use in children with acute respiratory tract infections in Kyrgyzstan: an open-label, individually randomised, controlled trial // The Lancet Regional Health – Europe. – 2025. – Vol. 51. – Art. 101184.
7. Kenealy T., Arroll B. Antibiotics for the common cold and acute purulent rhinitis // Cochrane Database of Systematic Reviews. – 2013. – №6. – Art. CD000247.
8. Spurling G.K.P., Del Mar C.B., Dooley L., Foxlee R., Farley R. Delayed antibiotic prescriptions for respiratory infections // Cochrane Database of Systematic Reviews. – 2017. – №9. – Art. CD004417.
9. Spurling G.K.P., Dooley L., Clark J., Askew D.A. Immediate versus delayed versus no antibiotics for respiratory infections // Cochrane Database of Systematic Reviews. – 2023. – №10. – Art. CD004417.
10. Zanichelli V., Sharland M., Cappello B., et al. The WHO AWaRe (Access, Watch, Reserve) antibiotic book and prevention of antimicrobial resistance // Bulletin of the World Health Organization. – 2023. – Vol. 101, №4. – P. 290–296.

HSR (LONDON),
HOUGHTON STREET REVIEW JOURNAL
ISSN: 2058-5519|Impact factor-15.9
http://houghtonstreetreview.com/index.php/hsr

11. Andrews A., Budd E.L., Hendrick A., et al. Surveillance of antibiotic prescribing for children with respiratory tract infections in primary care // Antibiotics. – 2023. – Vol. 12, №5. – P. 823.
12. Van Hecke O., Butler C.C., Wang K., Tonkin-Crine S. Parents' perceptions of antibiotic use and antibiotic resistance in children with respiratory tract infections: a qualitative synthesis // British Journal of General Practice. – 2019. – Vol. 69, №686. – P. e42–e51.
13. National Institute for Health and Care Excellence. Respiratory tract infections (self-limiting): prescribing antibiotics. NICE guideline. – London: NICE, 2019.
14. Yuldashev B.A., Akhmedova D.I. Rational use of antibacterial agents in paediatric practice // Pediatriya (Tashkent). – 2023. – №2. – P. 45–51.
15. Ministry of Health of the Republic of Uzbekistan. National Action Plan on Combating Antimicrobial Resistance. – Tashkent, 2023. – 42 p.
16. Hersh A.L., Shapiro D.J., Pavia A.T., Shah S.S. Antibiotic prescribing in ambulatory pediatrics in the United States // Pediatrics. – 2011. – Vol. 128, №6. – P. 1053–1061.