

Prevalence of Over-the-Counter Oral Antibiotics Usage in the Paediatric Population Prior to Hospital Visit

Kiran Devkota¹, Damodar Tiwari¹, Yograj Sharma¹, Narayan Bahadur Thapa¹, Anita Ghimire²

¹Department of Paediatrics and Neonatology, Bharatpur Hospital, Bharatpur, Chitwan, Nepal, ²Department of Nursing, Shree College of Technology, Bharatpur, Chitwan, Nepal

Received: 18th January, 2026

Accepted: 24th March, 2026

Published: 28th June, 2026

ABSTRACT

Background: The rise of antimicrobial resistance (AMR) poses a significant global health threat, with the over-the-counter (OTC) misuse of antibiotics being a major contributing factor.

Methods: This descriptive observational study investigated the prevalence of over-the-counter (OTC) oral antibiotic usage in the paediatric population prior to hospital visits at the Department of Paediatrics and Neonatology of Bharatpur Hospital, Chitwan, Nepal. Conducted over one year from July 17, 2023, to July 15, 2024, the study randomly enrolled cases aged 0 hours to 14 years who visited the outpatient department. Data were meticulously recorded by paediatricians in the Outpatient registration book.

Results: Out of 3170 paediatric patients seen during the study period, 870 (27.44%) had received antibiotics from outside over the counter prior to their hospital visit. The male-to-female ratio among the total cases was 1.36:1. The highest prevalence of OTC antibiotic use was observed in the 5 to 14 years age group, accounting for 392 (45.05%) cases, followed by the 1 to 5 years age group with 366 (42.06%) cases. The lowest usage was in the 0 to 2 months age group, with only 27 (3.1%) cases. Cefixime was the most commonly used OTC antibiotic, accounting for 218 (25.05%) of cases, followed by Amoxyclav at 164 (18.85%) and Azithromycin at 129 (14.82%).

Conclusion: These findings highlight a significant prevalence of OTC oral antibiotic use in the paediatric population in this region, underscoring the need for interventions to promote rational antibiotic use and combat antimicrobial resistance.

Keywords: Over-the-counter antibiotics; Antibiotic usage; Antimicrobial resistance (AMR)

Correspondence: Dr. Kiran Devkota, Department of Paediatrics and Neonatology, Bharatpur Hospital, Bharatpur, Chitwan, Nepal, Email:kirandevkota@gmail.com, Phone: 977-9855010058.

INTRODUCTION

Antimicrobial resistance (AMR) stands as one of the most formidable global public health challenges of the 21st century. Its escalating threat jeopardizes the efficacy of modern medicine, rendering once-treatable infections increasingly difficult, and sometimes impossible, to manage.^{1,2} The World Health Organization (WHO) has identified AMR as a top global public health and development threat, directly responsible for 1.27 million deaths in 2019 and contributing to nearly 5 million deaths globally.²⁻⁵ The issue of AMR is particularly acute in low-and middle-income countries (LMICs), because of poverty, weak regulatory frameworks, inadequate healthcare infrastructure, and limited access to quality medical services.^{2,6,8} This practice of over-the-counter (OTC) antibiotic use is a major contributor to the development and spread of antimicrobial resistance, as it bypasses medical guidance and often leads to inappropriate drug selection, dosage, and duration of treatment.^{3,7} Paediatric populations are particularly vulnerable to the consequences of inappropriate antibiotic use. Children frequently experience self-limiting infections, and antibiotics are often administered more readily to them than to other age groups.³

METHODS

This descriptive observational study was conducted in the Department of Paediatrics and Neonatology of Bharatpur Hospital, Chitwan, Nepal. The study period spanned one year, from July 17, 2023, to July 15, 2024. Ethical approval for the study was obtained from the Institutional Review Committee of Bharatpur Hospital, with the reference number 077/78-018. The study population included paediatric cases ranging from 0 hours of life to 14 years of age who visited the outpatient department of Paediatrics and Neonatology at Bharatpur Hospital during the specified study period. A random enrolment method was employed to select participants for the study. All necessary information for the study was meticulously recorded by a paediatrician in the Outpatient registration book. This included demographic details of the patients

and information regarding any antibiotic usage prior to their hospital visit, specifically focusing on over-the-counter oral antibiotics. Patients receiving oral antibiotic therapy prior to enrolment, as prescribed by another doctor, were excluded. The sample size for this study was calculated using the formula: $[n = Z^2 * (P * q) / e^2]$, where: * n represents the sample size * Z is the Z-score for the desired confidence level (e.g., 1.96 for a 95% confidence level) * P is the estimated proportion of the population with the characteristic (prevalence) * q is (1-P) * e is the margin of error. Based on this calculation, the minimum required sample size was determined to be 904. Our study, however, included a total sample size of 3170 cases, exceeding the minimum requirement. This larger sample size provided a 95% confidence interval (CI) of 0.246 to 0.302 with a 3% margin of error, enhancing the statistical power and generalizability of our findings. Descriptive statistics were used to analyse the collected data. The prevalence of over-the-counter oral antibiotic usage was calculated, and the distribution of antibiotic use was examined across different age groups. The types of antibiotics most commonly used were also identified and quantified.

RESULTS

During the one-year study period, a total of 3,170 patients were randomly enrolled. The male-female ratio was 1.36:1. Of these, 870 patients had used antibiotics before seeking hospital care, primarily through over-the-counter purchases or other external sources, resulting in a prevalence of 27.4% (95% CI: 25.9%–29.0%). The prevalence of antibiotics used was 870 (27.44%) (95% CI: 25.9%–29.0%). Out of the antibiotics used group, the maximum fell under the age group of 5 to 14 years, where 392 (45.05) and the second age group was 1 to 5 years, where 366 (42.06) used antibiotics over the counter, whereas the least age group was 0 to 2 months, where only 27 (3.1) used antibiotics over the counter before coming to the hospital (Table 1).

Table 2 shows Cefixime was used for 218 (25.05%) of the total antibiotic usage. Amoxyclav was used

Age group	Male	Female	Total case	n (%) antibiotic use
0 to 2 months	99	83	182	27 (3.1)
>2 to 12 months	201	153	354	85 (9.77)
1 to 5 years	785	600	1385	366 (42.06)
>5 to 14 years	745	504	1249	392 (45.05)
Total	1830	1340	3170	870 (100)

for 164 (18.85%) of the total antibiotic usage. Azithromycin was used for 129 (14.82%) of the total antibiotic usage. Cefpodoxime was used for 78 (8.96%) of the total antibiotic usage. Ofloxacin was used in 27 (3.1%) of the total antibiotics used. Metronidazole was used for 19 (2.18%) of the total antibiotic usage. The combination of Cefixime and Azithromycin was used for 77 (8.85%) of the total antibiotic usage. The combination of Cefpodoxime and Azithromycin was used for 49 (5.63%) of the total antibiotic usage. The combination of Azithromycin and Amoxycylav was used for 58 (6.67%) of the total antibiotic usage. The combination of Metronidazole and Cefixime accounted for 33 (3.79%) of the total antibiotic usage. Other antibiotics not specifically listed were used for 18 (2.06%) of the total antibiotic usage.

Name of antibiotic	n (%)
cefixime	218 (25.05)
Amoxycylav	164 (18.85)
Azithromycin	129 (14.82)
Cefpodoxime	78 (8.96)
Ofloxacin	27 (3.1)
Metronidazole	19 (2.18)
Cefixime + Azithromycin	77 (8.85)
Cefpodoxime + Azithromycin	49 (5.63)
Azithromycin + amoxycylav	58 (6.67)
Metronidazole + cefixime	33 (3.79)
Other	18 (2.06)

DISCUSSION

This study provides valuable insights into the prevalence and patterns of over-the counter (OTC) oral antibiotic usage among the paediatric population

in Bharatpur, Chitwan, Nepal, prior to hospital visits. Our findings reveal a significant prevalence of 27.44% of pediatric patients having used antibiotics obtained without a prescription before presenting to Bharatpur Hospital. This figure underscores a critical public health concern, particularly in the context of rising antimicrobial resistance (AMR). The observed prevalence of OTC antibiotic use in our study aligns with, and falls within the broad range of, similar studies conducted in low- and middle-income countries (LMICs). For instance, a systematic review and meta-analysis reported a pooled prevalence of 38.86% for non-prescription antibiotic use among children in LMICs.³ While our prevalence is slightly lower than this pooled estimate, it remains substantial and indicative of a widespread practice. Variations in prevalence across studies can be attributed to differences in geographical location, socioeconomic factors, cultural practices, regulatory enforcement, and specific study methodologies. Studies from other regions have shown similar patterns, with Auta et al. documenting widespread global access to antibiotics without prescription⁷, and Ocan et al. highlighting the burden of household antimicrobial self-medication in developing countries.¹² Our data indicate that older paediatric age groups, specifically 5 to 14 years (45.05%) and 1 to 5 years (42.06%), exhibited the highest rates of OTC antibiotic use. This pattern might be influenced by several factors. Older children are more likely to experience a wider range of infections, and parents or caregivers might be more inclined to self-medicate based on previous experiences or perceived mildness of symptoms. Additionally, children in these age groups are often more mobile and exposed to various environments, increasing their susceptibility to infections. The lowest prevalence

in infants aged 0 to 2 months (3.1%) is reassuring, as parents are generally more cautious with very young infants and more likely to seek professional medical advice for this vulnerable age group. The identification of Cefixime (25.05%), Amoxycylav (18.85%), and Azithromycin (14.82%) as the most commonly used OTC antibiotics is a crucial finding. These are broad-spectrum antibiotics frequently prescribed for common bacterial infections. Their easy availability over the counter and perceived effectiveness may contribute to their high usage. The frequent use of these specific antibiotics without proper diagnosis and medical supervision raises concerns about the development of resistance to these commonly used drugs, which are vital for treating a range of paediatric infections. The use of antibiotic combinations, such as Cefixime + Azithromycin (8.85%), further complicates the picture, as it may lead to unnecessary exposure to multiple antibiotics and contribute to multi-drug resistance. Globally, the misuse and overuse of antibiotics are recognized as primary drivers of AMR.² The practice of obtaining antibiotics without a prescription bypasses the essential diagnostic process, leading to inappropriate antibiotic selection, incorrect dosing, and suboptimal treatment durations. This creates an environment conducive to the development and spread of drug-resistant bacteria. The economic burden of AMR is immense, with projections of significant healthcare cost increases and GDP losses, particularly in LMICs.² Our study's findings highlight a local contribution to this global problem, emphasizing the urgent need for targeted interventions in Nepal. The prevalence of 27.44% for over-the-counter (OTC) antibiotic use in Bharatpur reflects a complex web of socio-economic factors characteristic of low- and middle-income countries (LMICs).^{1,3} In many Nepalese households, the decision to bypass formal medical consultation is often a pragmatic response to economic constraints. The direct costs of a hospital visit-including registration fees and transportation-combined with the indirect costs of lost wages for a working parent, make the local pharmacy a more accessible first point of care.⁴ Furthermore,

the "perceived mildness" of symptoms in older children (5–14 years), who accounted for the highest usage at 45.05%, often leads parents to rely on past experiences.^{3,4} This reliance on "therapeutic memory"-using a leftover or previously successful antibiotic for a new, potentially viral illness-is a primary driver of inappropriate drug selection and dosage.² The study's identification of Cefixime (25.05%), Amoxycylav (18.85%), and Azithromycin (14.82%) as the top OTC choices is particularly alarming.³ These are potent, broad-spectrum agents that should ideally be reserved for confirmed bacterial infections. The heavy reliance on Cefixime suggests a shift toward high-potency drugs for routine pediatric ailments like coughs and colds, which are predominantly viral. This unnecessary exposure accelerates the development of Extended-Spectrum Beta-Lactamase (ESBL)-producing bacteria, making future life-threatening infections nearly untreatable with standard protocols.⁴ Often chosen for its convenient dosing (once daily), Azithromycin's misuse is a major driver of macrolide resistance. In the pediatric context, this is particularly dangerous as it limits options for treating atypical pneumonias and pertussis. The use of combinations like Cefixime + Azithromycin (8.85%) represents "shotgun therapy" an attempt to cover all possible pathogens without a diagnosis.^{3,4} This not only increases the risk of adverse drug reactions and gut dysbiosis in children but also fosters multi-drug resistant (MDR) organisms. The findings underscore a significant gap in the enforcement of the Drugs Act of Nepal, which classifies antibiotics as prescription-only medications. Community pharmacists often act as "de facto" doctors, dispensing antibiotics to maintain business and meet customer demands.⁴ The lack of specialized pediatric training among pharmacy retailers means that dosages are frequently "guestimated" based on age rather than weight, leading to sub-therapeutic levels that do not kill the bacteria but rather "train" them to become resistant.² Strengthening the regulatory framework requires more than just legislation; it requires rigorous, unannounced inspections and the implementation of digital tracking for antibiotic sales to ensure accountability. The data

from Bharatpur Hospital is a microcosm of a global crisis. The WHO estimates that AMR was directly responsible for 1.27 million deaths in 2019.¹ In Nepal, the economic burden is compounded by a healthcare system that may not have the resources to provide expensive, "last-resort" antibiotics (like Carbapenems or Colistin) when standard treatments fail [2]. The low usage in the 0–2 months group (3.1%) indicates that parents recognize the fragility of newborns.^{3,4} This "cautionary window" provides a unique opportunity for health educators. If the trust parents have in healthcare providers during the neonatal period can be extended through the first five years of life, we may see a significant reduction in self-medication. To move toward rational antibiotic use, a three-tiered approach is necessary. Campaigns must shift from general awareness to specific behavioral change. Parents need to understand that "antibiotics do not cure viruses" and that giving an unnecessary drug to a child is an act of harm, not care.^{4,5} Paediatricians and hospital staff must lead by example. This includes taking the time to explain why an antibiotic is not being prescribed, which satisfies the parental desire for a "cure" while protecting the child's future health.⁴ Improving the affordability of primary care and the speed of diagnostic testing (like rapid CRP or strep tests) can reduce the "diagnostic uncertainty" that often leads both parents and clinicians to over-prescribe.⁵ The findings from our study are consistent with other research conducted in Nepal and similar settings. Khanal et al. documented concerning patterns of self-medication with antibiotics among paediatric patients in Nepal⁹, while studies by Poudel et al.¹⁰ and Shrestha et al.¹¹ have highlighted inappropriate dispensing practices in community pharmacies. These studies collectively point to systemic issues in antibiotic regulation and use in Nepal that require comprehensive interventions. Addressing the issue of OTC antibiotic use requires a multi-faceted approach. Strengthening regulatory frameworks and their enforcement to control the sale of antibiotics without a prescription is paramount. Public awareness campaigns are essential to educate parents and caregivers about the dangers of self-medication with

antibiotics, the importance of seeking professional medical advice, and the concept of AMR. Healthcare providers also have a crucial role in promoting rational antibiotic prescribing and educating patients on appropriate antibiotic use. Furthermore, improving access to affordable and quality healthcare services can reduce the reliance on OTC medications.

CONCLUSIONS

This study highlights a significant prevalence of over-the-counter oral antibiotic usage among the paediatric population presenting to Bharatpur Hospital, Chitwan, Nepal. With 27.44% of paediatric patients having used non-prescribed antibiotics prior to their hospital visit, particularly in older age groups, these findings underscore a pressing public health concern. The frequent use of broad-spectrum antibiotics like Cefixime, Amoxycylav, and Azithromycin without medical supervision contributes to the global challenge of antimicrobial resistance. To combat this issue, there is an urgent need for multi-pronged interventions. These should include strengthening regulatory measures to control the sale of antibiotics, implementing comprehensive public awareness campaigns to educate caregivers on the risks of self-medication and the importance of rational antibiotic use, and improving access to quality healthcare services. Addressing these factors will be crucial in promoting responsible antibiotic stewardship and mitigating the further spread of antimicrobial resistance in the region

Limitations

Information on prior antibiotic use was based on patient self-report and available records, which may be subject to recall bias or incomplete documentation. Additionally, the study did not assess the specific types, dosages, duration, or appropriateness of antibiotics used before hospital presentation, limiting a detailed evaluation of antibiotic use patterns and their potential impact on clinical outcomes.

Conflict of interest: None

Funding: None

ACKNOWLEDGMENTS

The authors would like to acknowledge all healthcare personnel and hospital staff who contributed to patient care and data management during the study period. We are grateful to the institution for providing access to the necessary records and facilities to conduct this research.

Authors' Contributions

Kiran Devkota contributed to the conceptualization

and methodology of the study and prepared the original draft of the manuscript, as well as participated in manuscript review and editing. Damodar Tiwari was responsible for data curation and investigation. Yograj Sharma contributed to validation, resource management, and manuscript review. Narayan Bahadur Thapa provided overall supervision of the study. Anita Ghimire conducted the formal analysis and contributed to manuscript review and editing. All authors read and approved the final manuscript.

REFERENCE

1. The Lancet. Global burden of bacterial antimicrobial resistance in 2019. [DOI]
2. World Health Organization. Antimicrobial resistance. [Link]
3. Zewdie, S., Kassa, A. A., Yayehrad, A. T., et al. (2024). Non-prescription antibiotic use and its predictors among children in low- and middle-income countries: a systematic review and meta-analysis. *Italian Journal of Pediatrics*, 50(1),260. [DOI]
4. UNEP. (2023). What is fuelling the world's antimicrobial resistance crisis? [Link]
5. The Lancet. (2024). Global burden of bacterial antimicrobial resistance 1990–2021. [DOI]
6. Cureus. (2025). Antibiotic Misuse: An In-Depth Examination of Its Global Consequences and Public Health Challenges. [DOI]
7. Auta, A., Hadi, M. A., Oga, E., Adewuyi, E. O., Abdu-Aguye, S. N., Adeloye, D., & Morgan, D. J. (2019). Global access to antibiotics without prescription in community pharmacies: A systematic review and meta-analysis. *Journal of Infection*, 78(1), 8-18. [DOI]
8. Ghimire, S., Nepal, S., Bhandari, S., Nepal, P., & Palaian, S. (2019). A prospective surveillance of drug prescribing and dispensing in a tertiary care hospital of Nepal. *Journal of Pharmaceutical Policy and Practice*, 12(1), 1-9. [Google Scholar]
9. Khanal, A., Sharma, A., Basnet, M., & Mishra, S. R. (2020). Prevalence and determinants of self-medication with antibiotics among pediatric patients in Nepal. *PLoS ONE*, 15(6), e0235025. [DOI]
10. Poudel, A., Nepali, S., & Shakya, D. R. (2018). Assessment of dispensing practices of community pharmacies in Chitwan, Nepal: A cross-sectional study. *Journal of Nepal Health Research Council*, 16(40), 279-284. [DOI]
11. Shrestha, S., Shrestha, N., Thapa, S., & Shrestha, R. (2021). Antibiotic dispensing practices in community pharmacies of Nepal: A simulated client study. *BMC Health Services Research*, 21(1), 1-10. [DOI]
12. Ocan, M., Obuku, E. A., Bwanga, F., Akena, D., Richard, S., Ogwalo, J., & Obua, C. (2015). Household antimicrobial self-medication: A systematic review and meta-analysis of the burden, risk factors, and outcomes in developing countries. *BMC Public Health*, 15(1), 1-11. [DOI]

Citation: Devkota K, Tiwari D, Sharma Y, Thapa NB, Ghimire A. Prevalence of Over-the-Counter Oral Antibiotics Usage in the Paediatric Population Prior to Hospital Visi. *JNHLS*. 2026; 5(1):33-38.