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ORIGINAL RESEARCH ARTICLE

AVAILABILITY OF ACCESS, WATCH, AND RESERVE GROUP ANTIBIOTICS IN PHARMACIES SURROUNDING TERTIARY HOSPITALS IN CHITWAN, NEPAL

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ABSTRACT

Background: Antimicrobial resistance, a global health challenge, threatens the effective prevention and treatment of infections caused by bacteria, fungi, parasites and viruses no longer susceptible to the common medicines used to treat them. AMR can render infections challenging to treat, leading to severe illness and potential fatalities. Present study was conducted to investigate the availability of Access, Watch, and Reserve (AWaRe) group antibiotics in pharmacies proximal to tertiary hospitals in Chitwan, Nepal.

Methods: The study employed a descriptive cross-sectional design with a quantitative approach, focusing on demographic and awareness variables as independent factors and the availability of AWaRe group antibiotics as the dependent variable. Conducted in Bharatpur, Chitwan, Nepal, the research targeted pharmacies within a 2 km radius of Chitwan Medical College, totaling 96 pharmacies, utilizing a complete enumeration technique for sampling. Data collection involved structured questionnaires and observational checklists. Ethical consideration was followed throughout the study.

Results: The study's findings regarding the AWaRe classification reveal that Access and Watch antibiotics collectively constitute 45% of the total antibiotics surveyed. This indicates a substantial reliance on these categories for treatment in the region. Notably, Reserve antibiotics, vital for serious infections, represent 24% of the surveyed antibiotics, suggesting a significant consideration for their judicious use amidst their lower availability compared to Access and Watch antibiotics.

Conclusions: Findings from this study are expected to contribute valuable insights into the antibiotic landscape in the study area, offering recommendations for enhancing the rational use of antibiotics and combating antimicrobial resistance.

INTRODUCTION

Antimicrobial resistance (AMR) is a major global health threat. Approximately 0.7 million individuals are projected to lose their lives each year as a result of the rise in drug resistance. Without interventions to address this issue, the death toll could escalate to 10 million by the year 2050.[1] One of the main drivers of AMR is the overuse and misuse of antibiotics. Antibiotics are essential medicines for the treatment of many infections, but they should only be used when necessary and as prescribed by a healthcare professional. Antimicrobial stewardship (AMS) emerged as a strategy to optimize antibiotic use, and its implementation guidelines have been disseminated worldwide.[2,3] To promote the conscious use of antibiotics, the Choosing Wisely campaign was launched in the USA in 2012, aiming to improve medical practices by discouraging unnecessary diagnostic and therapeutic procedures. Presently, it has expanded to more than 25 countries.[4,5] The World Health Organization (WHO) has developed the Access, Watch, and Reserve (AWaRe) classification of antibiotics in 2017 to help promote the rational use of antibiotics and combat AMR.[6] The AWaRe classification sorts antibiotics into three groups: Access (essential for common infections), Watch (to be used cautiously), and Reserve (last resort).[7] Access antibiotics are vital, watch antibiotics require caution, and Reserve antibiotics are for last resort situations.[8] The AWaRe framework has gained traction in various parts of the globe since its inception.[9,10] The primary challenge concerning antimicrobial resistance (AMR) in Nepal is the significant lack of data on AMR within the community.[11]

Bharatpur, a thriving city in Chitwan, has established itself as Nepal's medical hub, with Bharatpur Hospital and a network of tertiary hospitals readily accessible within the city.[12] This study primarily aimed to evaluate the presence of AWaRe group antibiotics in pharmacies near tertiary hospitals in Chitwan, Nepal, exploring factors affecting their availability.

METHODS

The study followed the descriptive cross-sectional study design. The study was conducted in pharmacies surrounding Chitwan Medical College (A tertiary hospital in Bharatpur) Chitwan, Nepal. Bharatpur is a significant urban center in Chitwan,

known for its medical facilities. The choice of this location was driven by the reasons that Bharatpur is considered as medical hub, many hospitals are present here. Data was collected from 19 Feb 2024 to 31 March 2024.

All the pharmacies which are established within 2 km perimeter of the Chitwan Medical College was enrolled in the study. The study followed the complete enumeration technique.[13] There were altogether 96 pharmacies operating within approx. 2 km perimeter of the Chitwan medical College.

Structured questionnaire was designed to gather comprehensive information. Observational Checklist was used for collecting AWaRe information. The validity of the data collection tool was ensured through a rigorous process of content validation, involving subject matter experts in pharmacy management and antimicrobial stewardship. The tool's reliability was established by conducting a pilot study to assess the consistency of responses and making necessary adjustments to enhance clarity and coherence, ensuring the instrument's ability to consistently measure the intended variables across different community pharmacies in Bharatpur, Chitwan, Nepal.

Ethical clearance was obtained from Chitwan Medical College Institutional Review Committee (CMC-IRC-080/081-093). Ethical considerations were rigorously followed throughout the study including obtaining informed consent from participating pharmacy operators/staffs, while ensuring confidentiality of collected data.

RESULTS

Among the pharmacists surveyed, the majority were aged between 20-39 years (70.8%) and were male (71.9%). Regarding education, most pharmacists had qualifications other than pharmacy, which comprised short-term training (26.1%) and non-pharmacy degree (29.1%), followed by diploma pharmacy (33.3%). Additionally, the data show that the majority of pharmacists had 4-6 years of experience (43.8%) and had not received specific training on antibiotic stewardship (95.8%). The table presents the demographic and professional characteristics of pharmacists surrounding tertiary hospitals in Chitwan (Table 1).

Table 1: Socio-demographic description of pharmacy workers of pharmacies in Bharatpur, Chitwan

Parameters	Frequency (%)
Age	
20-39	68 (70.8)
40-59	28 (29.2)
Sex	
Male	69 (71.9)
Female	27 (28.1)
Education	
Short term (less than a year) training on pharmacy	25 (26.1)
Non-pharmacy degree	28 (29.1
Diploma Pharmacy	32 (33.3)
Bachelor pharmacy	6 (6.3)
Postgraduate and above	5 (5.2)
Experience	
Less than 3 years	24 (25.0)
4-6 years	42 (43.8)
7-9 years	23 (24.0)
10 years and above	7 (7.3)
Training taken	
Yes	4 (4.2)
No	92 (95.8)
Total	96 (100%)

*Other than pharmacy comprises the people who have less-than a year training in phayrmacy and non-pharmacy degrees. e.g, commerse, arts, etc.

Antibiotics like Amoxicillin Clavulanic Acid and Azithromycin is found among 100% of pharmacies. Similarly, antibiotics such as Doxycycline, Flucloxacillin Oral, and Levofloxacin have relatively widely found, with 61 (63.5%), 68 (70.8%), and 70 (72.9%) respectively, suggesting their widespread use in the region. On the other hand, some antibiotics have lower frequencies, indicating less availability in the area. Antibiotics like Tetracycline and Gatifloxacin have frequencies of 8 (8.3%) and 4 (4.2%) respectively. Additionally, it's notable that certain Reserve antibiotics, such as Colistin and Linezolid, have frequencies of 13 (13.5%) and 26 (27.1%) respectively. There was not a single pharmacy who have kept following access group of antibiotics: benzathine benzyl penicillin, benzylpenicillin (penicillin G), Cephalexin, Gentamicin, Nalidixic acid, Phenoxymethylpenicillin (Penicillin V), Procain benzylpenicillin, Sulfamethoxazole and Triethoprime (Table 2).

The pie chart illustrates the distribution of antibiotics based on their classification into the Access, Watch, and Reserve categories, along with those not listed in the National Essential Antibiotics list. Both Access and Watch antibiotics account for 15 (45%) of the total, while Reserve antibiotics represent 8 (24%). Notably, antibiotics not listed in the National Essential Antibiotics list of Nepal were constituted 15 (39%) of total (Figure 1).

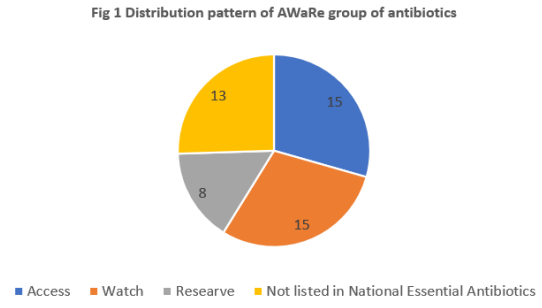

Figure 1: Distribution pattern of AWaRe group of antibiotics at pharmacies surrounding tertiary hospital of Bharatpur

Table 2: Availability of AWaRe group antibiotics at pharmacies of Bharatpur, Chitwan

Name of the Antibiotics	Frequency (%)	WHO AWaRe Group	National List of essential medicine
Amikacin	54 (56.3)	Watch	Listed
Amoxicillin	87(90.6)	Access	Listed
Ampicillin	33 (34.4)	Access	Listed
Chloramphenicol	13 (13.5)	Access	Listed
Cloxacillin	39 (40.6)	Access	Listed
Doxycycline	61 (63.5)	Access	Listed
Gentamicin	30 (31.3)	Access	Listed
Flucloxacillin Oral	68 (70.8)	Access	Not Listed
Metronidazole Oral	94 (97.9)	Access	Listed
Metronidazol IV	43 (43.8)	Access	Listed
Nitrofurntoin	52 (54.2)	Access	Listed
Ampicillin+Cloxacillin	38 (39.6)	Access	Not Listed
Tetracycline	8 (8.3)	Watch	Not listed
Amoxycillin Clavulanic Acid	96 (100)	Watch	Listed
Clindamycin	32 (33.3)	Watch	Listed
Azithromycin	96 (100)	Watch	Listed
Cefixime	52 (54.2)	Watch	Listed
Ceftriaxone	52 (54.2)	Watch	Listed
Ciprofloxacin	41 (42.7)	Watch	Listed
Clarithromycin	48 (50)	Watch	Listed
Erythromycin	15 (15.6)	Watch	Listed
Gatifloxacin	4 (4.2)	Watch	Not Listed
Levofloxacin	70 (72.9)	Access	Listed
Tobramycin	18 (18.8)	Access	Not Listed
Vancomycin IV	26 (27.1)	Reserve	Not Listed
Colistin	13 (13.5)	Reserve	Listed
Linezolid	26 (27.1)	Reserve	Listed
Cefuroxime	27 (28.1)	Access	Not Listed
Meropenam	25 (26.0)	Reserve	Listed
Piperacillin+Tazobactam	25 (26.0)	Reserve	Listed
Cefepime	24 (25.0)	Access	Not Listed
Ceftazidime	18 (18.8)	Access	Not Listed
Tigicycline IV	20 (20.8)	Watch	Not Listed
Cefotaxime IV	36 (37.5)	Watch	Listed
Targocid IV	10 (10.4)	Reserve	Not Listed
Impenam+Cilastatin IV	18 (18.8)	Reserve	Not Listed
Clindamycin	32 (33.3)	Watch	Listed
Neomycin	16 (16.5)	Watch	Not Listed

DISCUSSION

The present study explored various aspects, including the demographic and professional profiles of pharmacists, alongside an analysis of the availability of different classes of antibiotics within the surveyed pharmacies.

The demographic snapshot of pharmacists reveals a predominant presence of males within the age bracket of 20-39 years, comprising 71.9% of the surveyed population. Interestingly, a substantial proportion of pharmacists, accounting for 25 (26.1) and 28 (29.1%) had short term training and non-pharmacy degree respectively, Moreover, it's noteworthy that a significant percentage of pharmacists, 95.8%, lacked specific training on antibiotic stewardship, highlighting a potential gap in knowledge regarding the judicious use of antibiotics. Antibiotic stewardship is the effort to measure and improve how antibiotics are prescribed by clinicians and used by patients.[14] Given the sluggish pace of antimicrobial development alongside the rapid rise and dissemination of resistant organisms, ensuring effective antimicrobial stewardship becomes paramount for maximizing the utility of available antimicrobials.[15]

In terms of antibiotic availability, certain antibiotics like Amoxicillin Clavulanic Acid and Azithromycin were universally accessible across all surveyed pharmacies, with a prevalence of 100%. Similarly, antibiotics such as Doxycycline (63.5%),

Flucloxacillin Oral (70.8%), and Levofloxacin (72.9%) were prevalent, indicating their popularity and frequent prescription in the region. However, disparities in availability were observed, with certain antibiotics like Tetracycline (8.3%) and Gatifloxacin (4.2%) being less commonly stocked, suggesting a lower demand or preference for these medications among prescribers or patients. Similar study by Jha et al reported high availability of Ampicillin, Amoxicillin, and Flucloxacillin (all at 100%) among Access antibiotics, which aligns with our findings.[16] Same study reported that Azithromycin (97.6%) was available in all pharmacies, consistent with our findings. Identical finding regarding Ampicillin and Amoxicilling was observed from Namugambe et al as well.[17] They also found high availability of Cefixime, Levofloxacin, and Ofloxacin, although the percentages differed slightly from ours.[18]

Of particular interest is the accessibility of Reserve antibiotics like Colistin (13.5%) and Linezolid (27.1%), which were found in a noteworthy proportion of pharmacies despite their reserved status for serious infections. This raises questions about the appropriateness of their use and the potential implications for antimicrobial resistance. Furthermore, the presence of antibiotics not listed in Nepal's National Essential Antibiotics list, constituting 39% of total antibiotics, highlights potential discrepancies between international classifications and local prescribing practices, emphasizing the need for alignment and adherence to evidence-based guidelines.

Comparisons with previous studies conducted by Jha et al. and Steward Mudenda et al. shed light on the consistency and variation in antibiotic availability and prescribing patterns across different settings.[16,18] A similar study by Rafi et al. reported a mean percentage on-spot availability of 23.76% ± 5.19 for public facilities and 59.20% ± 4.45 for private sector retail pharmacies.[18] In contrast, our study did not specifically differentiate between public and private sector pharmacies but provided an overall analysis of antibiotic availability in pharmacies surrounding tertiary hospitals.

While some antibiotics consistently demonstrated availability, variations were observed in the prevalence and classification of specific antibiotics. This underscores the necessity for context-specific research and tailored interventions to effectively address antimicrobial resistance.[14]

The limitation of the study may be the fact that this study only focused on pharmacies within a 2 km radius of Chitwan Medical College. This might not be representative of the entire antibiotic availability and usage patterns in Chitwan, Nepal, or other regions. Furthermore, there is no comparison between public and private pharmacies in this study.

CONCLUSION

The study highlights the significant reliance on Access and Watch group antibiotics in pharmacies around tertiary hospitals in Chitwan, Nepal, with these groups constituting 45% of the total antibiotics surveyed. The substantial presence of Reserve antibiotics (nearly one-fourth) indicates their importance for serious infections, despite their lower availability. The findings underscore the critical need for context-specific research and tailored interventions to promote the rational use of antibiotics and combat antimicrobial resistance effectively. Additionally, the study emphasizes the importance of enhancing antibiotic stewardship and ensuring adherence to evidence-based guidelines to address discrepancies between international classifications and local prescribing practices.

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REFERENCES:

1. O'Neill J. Tackling Drug-Resistant Infections Globally: Final Report and Recommendations, May 2016. Available online: https://amr-review.org/sites/default/files/160518_Final%20paper_with%20cover.pdf [LINK]
2. Barlam TF, Cosgrove SE, Abbo LM, MacDougall C, Schuetz AN, Septimus EJ, et al. Implementing an antibiotic stewardship program: guidelines by the infectious diseases society of America and the society for healthcare epidemiology of America. Clin Infect Dis. 2016;62:e51-e77. [DOI]
3. S3- Leitlinie Strategien zur Sicherung rationaler Antibiotika Anwendung im Krankenhaus. 2019. Available from: https://register.awmf.org/de/leitlinien/detail/092-001.
4. Morden NE, Colla CH, Sequist TD, Rosenthal MB. Choosing wisely-the politics and economics of labeling low-value services. N Engl J Med. 2014;370:589-592. [DOI]
5. Wolfson D, Santa J, Slass L. Engaging physicians and consumers in conversations about treatment overuse and waste: a short history of the choosing wisely campaign. Acad Med. 2014;89:990-995. [DOI]
6. Sharland M, Zanichelli V, Ombajo LA, Bazira J, Cappello B, Chitatanga R, et al. The WHO essential medicines list aware book: from a list to a quality improvement system. Clin Microbiol Infect 2022;28:1533-1535.[DOI]
7. Palanisamy PR. Stop antibiotic resistance - A roller coaster ride through "antibiotic stewardship," "prescription auditing" and "AWaRe" assessment tool. J Family Med Prim Care. 2023 Sep;12(9):1796-1801. [DOI]
8. Wieters I, Johnstone S, Makiala-Mandanda S, Poda A, Akoua-Koffi C, Abu Sin M, et al.,. Reported antibiotic use among patients in the multicenter ANDEMIA infectious diseases surveillance study in sub-saharan Africa. Antimicrob Resist Infect Control. 2024 Jan 25;13(1):9. [DOI]
9. Adekoya I, Maraj D, Steiner L, Yaphe H, Moja L, Magrini N, et al. Comparison of antibiotics included in national essential medicines lists of 138 countries using the WHO Access, Watch, Reserve (AWaRe) classification: a cross-sectional study. Lancet Infect Dis 2021;21:1429-1440. [DOI]
10. World Health Organization. AWaRe Classification Database of Antibiotics for evaluation and monitoring of use 21 November 2019. Who. Int.

2022. Available from: https://www.who.int/publications/i/item/WHOEMPIAU2019.11 (accessed 18 Feb 2024)

11. Parajuli A, Garbovan L, Bhattarai B, Arjyal A, Baral S, Cooke P, Latham S, Barrington DJ, Mitchell J, King R. Exploring community insights on antimicrobial resistance in Nepal: a formative qualitative study. BMC Health Serv Res. 2024 Jan 11;24(1):57. [DOI]

12. Subedi S, Adhikari K, Regmi D. Sharma H.K, Bolakhe N, Kandel M, et al.. Assessment of Community Knowledge and Practices towards Rabies Prevention: A Cross-Sectional Survey in Bharatpur, Chitwan, Nepal. Zoonotic Dis. 2023, 3, 203-214. [DOI]

13. Boness CL, Loeffelman JE, Steinley D, Trull T, Sher KJ. Using Complete Enumeration to Derive "One-Size-Fits-All" Versus "Subgroup-Specific" Diagnostic Rules for Substance Use Disorder. Assessment. 2020 Sep;27(6):1075-1088. [DOI]

14. Shrestha J, Zahra F, Cannady, Jr P. Antimicrobial Stewardship. [Updated 2023 Jun 20]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2024 Jan-. Available from: https://www.ncbi.nlm.nih.gov/books/NBK572068/

15. Doron S, Davidson LE. Antimicrobial stewardship. Mayo Clin Proc. 2011 Nov;86(11):1113-23.[DOI]

16. Jha N, Thapa B, Pathak SB, Kafle S, Mudvari A, Shankar PR. Availability of access, watch, and reserve (AWaRe) group of antibiotics in community pharmacies located close to a tertiary care hospital in Lalitpur, Nepal. PLoS One. 2023 Nov 20;18(11):e0294644. [DOI]

17. Namugambe JS, Delamou A, Moses F, Ali E, Hermans V, Takarinda K, Thekkur P, et al. National Antimicrobial Consumption: Analysis of Central Warehouses Supplies to In-Patient Care Health Facilities from 2017 to 2019 in Uganda. Trop Med Infect Dis. 2021 May 19;6(2):83. [DOI]

18. Mudenda S, Nsofu E, Chisha P, Daka V, Chabalenge B, Mufwambi W, et al. Prescribing Patterns of Antibiotics According to the WHO AWaRe Classification during the COVID-19 Pandemic at a Teaching Hospital in Lusaka, Zambia: Implications for Strengthening of Antimicrobial Stewardship Programmes. Pharmacoepidemiology 2023, 2, 42-53. [DOI]

19. Rafi S, Anjum SM, Usman M, Nawaz HA, Chaudhry M, Babar Z-U-D, et al. Availability of Access, Watch,and Reserve groups of essential antibiotics: across-sectional survey.Front. Public Health. 2024,11:1251434. [DOI]