

The Role of Patients with Addressing Inappropriate Dispensing of Antibiotics without a Prescription Especially in Developing Countries



Antimicrobial resistance (AMR) is a growing global concern, significantly impacting on morbidity, mortality and healthcare costs, especially in low- and middle-income countries (LMICs).^[1-4]

Consequently, rapidly becoming the next pandemic if key drivers are not addressed.^[5] A recognised major driver of AMR in LMICs is the excessive use of antibiotics in ambulatory care where antibiotic consumption can account for up to 95% of total antibiotic use in humans.^[6,7]

A critical issue to address in LMICs is the widespread sale of antibiotics without a prescription.^[8-14]

This is often for self-limiting conditions such as upper respiratory tract infections (URTIs), with dispensing without a prescription occurring in up to 100% of pharmacies in some LMICs.^[8,9,11,14-16]

Along with this, the appreciable dispensing of antibiotics from the World Health Organization (WHO) ‘Watch’ list of antibiotics, with their greater resistance potential.^[17-20] We are already seeing increased utilisation of antibiotics from the WHO ‘Watch’ list generally amongst LMICs, and this needs to be urgently reversed to reduce AMR.^[21,22]

Patients in LMICs typically visit community pharmacies and drug stores for their ailments, especially ailments such as URTIs, as there can be high copayments to see a healthcare professional (HCP) in primary care clinics, alongside travel costs and often considerable waiting times to see an HCP, in addition to the cost of medicines.^[8,11,23] We are already seeing that pharmacists are playing an increasing role across countries providing patients with treatment advice for their conditions, especially self-limiting conditions, exacerbated in LMICs by the scarcity of physicians and nurses.^[24-26]

This role will continue with pharmacists’ roles enhanced by their convenience versus the challenges of seeing HCPs in public healthcare clinics in LMICs.^[23,27] However, there can be concerns with inappropriate recommendations for antibiotics by pharmacists in LMICs to treat conditions such as acute diarrhoea and URTIs.^[28] Variable knowledge

regarding antibiotics and AMR amongst community pharmacists and their assistants in LMICs further exacerbates the situation.^[17,29-31] Alongside this, patient requests can exacerbate the dispensing of antibiotics without a prescription with their beliefs regarding the curative power of antibiotics, enhanced by previous experiences; however, there can be considerable issues concerning their knowledge of antibiotics and AMR.^[15,32-38]

There is currently conflicting evidence regarding the extent of dispensing of antibiotics without a prescription in South Africa. Anstey Watkins *et al.* and Do *et al.* found little or no evidence of purchasing of antibiotics without a prescription.^[39,40] However, Mokwele *et al.* ascertained that antibiotics were being dispensed without a prescription in some privately owned pharmacies in South Africa.^[41] This was not the case in corporate (franchised) pharmacies in the country.^[41] Similarly, Sono *et al.* (2024) in their pilot study in a rural province in South Africa found that 10 of the 21 pharmacists, or their assistants, taking part in the study admitted to dispensing antibiotics without a prescription. All were from independent pharmacies.^[42] In addition, antibiotics were being offered before over-the-counter (OTC) medicines where OTC medicines should have been dispensed, enhanced by patient demand.^[42] There were also concerns with pharmacist assistants regarding their knowledge of antibiotics and AMR.^[42]

In view of the influence of patients and concerns that pharmacists may under report the extent of selling antibiotics without a prescription,^[14,23,43] a follow-on pilot study was undertaken by Sono *et al.*^[44] The principal objective of this pilot was to assess patient behaviour regarding antibiotics and their knowledge concerning antibiotics, their use and AMR.^[44] Twenty-one patients were approached, with 16 completing the structured questionnaire. Notably, 3 out of 5 patients who were dispensed antibiotics received them without a prescription, all again from independent pharmacies.^[44] Key reasons for self-purchasing included costs and convenience, similar to other studies in LMICs.^[8,9,11,44]

Knowledge about antibiotics and AMR varied amongst participating patients, with some demonstrating a satisfactory understanding of these concepts while others struggled with certain concepts.^[44]

However, there were concerns that patients may not fully understand complex healthcare terms such as antibiotics and AMR when they discuss their infectious disease with pharmacists or their assistants unless these issues are conveyed in a language they can understand, including the local language, similar to other studies.^[39,45-47] Consequently, a follow-up pilot study was undertaken to translate the English language questionnaire into the three common languages spoken in this rural province. Subsequently, to assess the outcome to guide future activities to reduce inappropriate use of antibiotics in rural settings.^[48]

This second study involved 15 patients, with 11 receiving antibiotics, including 8 without a prescription. Again, only independent pharmacies were the source of non-prescription antibiotics.^[48] Similar to the initial pilot with patients, there were significant gaps in their knowledge regarding antibiotics and AMR, with terms such as ‘antibiotic’ and ‘AMR’ posing comprehension challenges. For example, one patient self-purchased antibiotics for ‘cleansing’ sexually transmitted infections (STIs). This was after engaging in unprotected sexual activity, with patients believing they needed cleansing to prevent getting an STI.^[48]

Both these pilot studies with patients highlighted issues with the prevalence of antibiotic self-purchasing in rural South Africa, particularly amongst independent pharmacies, building on the previous pilot studies with pharmacists and their assistants.^[42,44] The findings also underscore the need for improved patient and dispenser education on antibiotics, AMR and antimicrobial stewardship (AMS), similar to other studies involving LMICs.^[8,13,15,49,50] However, we are aware that targeted educational programmes can be challenging amongst patients across countries, including LMICs, given concerns with the language surrounding AMR.^[39,51,52] In addition, the need to address any misinformation, which was very prevalent during the recent COVID-19 pandemic.^[53-55] There also needs to be consistent and reliable reporting on AMR and its consequences orchestrated by health authorities.^[56]

Key issues, especially regarding the need to convey messages that antibiotics are not effective in treating viral infections such as URTIs, and ways to reduce AMR, will be explored further in the main study involving patients in this rural province in South Africa. As a result, help with formulating pertinent policies amongst all key stakeholders in South Africa and beyond to enhance appropriate dispensing of antibiotics for patients with infectious diseases. Some self-purchasing of antibiotics is inevitable in LMICs given concerns and costs with accessing HCPs in primary healthcare clinics.^[8,23,27]

However, the goal should be to ensure their appropriate use, especially following the publication of the AWaRe book giving guidance on the management of common infectious diseases, including when not to prescribe antibiotics.^[57,58] This includes reducing antibiotic use for self-limiting conditions such as URTIs with the help of increased knowledge amongst patients across LMICs given their considerable influence

with directing treatments.^[8,23,46] Alongside this, improved knowledge of pharmacists and their assistants regarding antibiotics, AMR and AMS through training courses and guideline provision.^[29,50,59,60] Current government antibiotic lists in LMICs must also align with suggested antibiotics in the AWaRe book, which is not always the case.^[61]

Overall, the findings from our pilot studies and other published papers underscore the need for targeted interventions to address inappropriate dispensing of antibiotics across LMICs. This includes enhancing patient education on antibiotics and AMR as well as improving the knowledge of community pharmacists and their assistants regarding these key issues. Alongside this, implementing strategies to reduce inappropriate dispensing of antibiotics generally, which could include quality targets and improved monitoring of dispensing habits through mobile and other technologies.

Addressing these issues is crucial to mitigating the threat of AMR, especially in LMICs thereby ensuring the effectiveness of current antibiotics for future generations. We will continue to monitor the situation.

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REFERENCES

- Poudel AN, Zhu S, Cooper N, Little P, Tarrant C, Hickman M, *et al.* The economic burden of antibiotic resistance: A systematic review and meta-analysis. *PLoS One* 2023;18:e0285170.
- Antimicrobial Resistance Collaborators. Global burden of bacterial antimicrobial resistance in 2019: A systematic analysis. *Lancet* 2022;399:629-55.
- Kariuki S, Kering K, Wairimu C, Onsare R, Mbae C. Antimicrobial resistance rates and surveillance in Sub-Saharan Africa: Where are we now? *Infect Drug Resist* 2022;15:3589-609.
- Sulis G, Sayood S, Gandra S. Antimicrobial resistance in low-and middle-income countries: Current status and future directions. *Expert Rev Anti Infect Ther* 2022;20:147-60.
- Gautam A. Antimicrobial Resistance: The next probable pandemic. *JNMA J Nepal Med Assoc* 2022;60:225-8.
- Godman B, Egwuenu A, Haque M, Malande OO, Schellack N, Kumar S, *et al.* Strategies to improve antimicrobial utilization with a special focus on developing countries. *Life (Basel)* 2021;11:528.
- Duffy E, Ritchie S, Metcalfe S, Van Bakel B, Thomas MG. Antibacterials dispensed in the community comprise 85%-95% of total human antibacterial consumption. *J Clin Pharm Ther* 2018;43:59-64.
- Sono TM, Yeika E, Cook A, Kalungia A, Opanga SA, Acolatse JE, *et al.* Current rates of purchasing of antibiotics without a prescription across sub-Saharan Africa; rationale and potential programmes to reduce inappropriate dispensing and resistance. *Expert Rev Anti Infect Ther*

- 2023;21:1025-55.
9. Nepal AG, Bhatta S. Self-medication with Antibiotics in WHO Southeast Asian Region: A systematic review. *Cureus* 2018;10:e2428.
 10. Torres NF, Chibi B, Kuupiel D, Solomon VP, Mashamba-Thompson TP, Middleton LE. The use of non-prescribed antibiotics; prevalence estimates in low-and-middle-income countries. A systematic review and meta-analysis. *Arch Public Health* 2021;79:2.
 11. Yeika EV, Ingelbeen B, Kemah BL, Wirsy FS, Fomengia JN, van der Sande MA. Comparative assessment of the prevalence, practices and factors associated with self-medication with antibiotics in Africa. *Trop Med Int Health* 2021;26:862-81.
 12. Edessa D, Assefa N, Dessie Y, Asefa F, Dinsa G, Oljira L. Non-prescribed antibiotic use for children at community levels in low- and middle-income countries: A systematic review and meta-analysis. *J Pharm Policy Pract* 2022;15:57.
 13. Sachdev C, Anjankar A, Agrawal J. Self-medication with antibiotics: An element increasing resistance. *Cureus* 2022;14:e30844.
 14. Batista AD, A Rodrigues D, Figueiras A, Zapata-Cachafeiro M, Roque F, Herdeiro MT. Antibiotic dispensation without a prescription worldwide: A systematic review. *Antibiotics*, 2020;9:786.
 15. Godman B, Haque M, McKimm J, Abu Bakar M, Sneddon J, Wale J, *et al.* Ongoing strategies to improve the management of upper respiratory tract infections and reduce inappropriate antibiotic use particularly among lower and middle-income countries: Findings and implications for the future. *Curr Med Res Opin* 2020;36:301-27.
 16. Nguyen TT, Do TX, Nguyen HA, Nguyen CT, Meyer JC, Godman B, *et al.* A national survey of dispensing practice and customer knowledge on antibiotic use in vietnam and the implications. *Antibiotics*, 2022;11:1091.
 17. Dharanindra M, Shiriram Dhanasekaran K, Rayana S, Noor SM, Bandela P, Viswanadh RP, *et al.* Antibiotic-dispensing patterns and awareness of anti-microbial resistance among the community pharmacists in South-Central India. *Cureus* 2023;15:e47043.
 18. Islam MA, Akhtar Z, Hassan MZ, Chowdhury S, Rashid MM, Aleem MA, *et al.* Pattern of antibiotic dispensing at pharmacies according to the WHO access, watch, reserve (AWaRe) classification in Bangladesh. *Antibiotics*, 2022;11:247.
 19. Saleem Z, Hassali MA, Godman B, Fatima M, Ahmad Z, Sajid A, *et al.* Sale of WHO AWaRe Groups antibiotics without a prescription in Pakistan: A simulated client study. *J Pharm Policy Pract* 2020;13:26.
 20. Sharland M, Gandra S, Huttner B, Moja L, Pulcini C, Zeng M, *et al.* Encouraging AWaRe-ness and discouraging inappropriate antibiotic use-the new 2019 Essential medicines list becomes a global antibiotic stewardship tool. *Lancet Infect Dis* 2019;19:1278-80.
 21. Sulis G, Sayood S, Katukoori S, Bollam N, George I, Yaeger LH, *et al.* Exposure to World Health Organization's AWaRe antibiotics and isolation of multidrug resistant bacteria: A systematic review and meta-analysis. *Clin Microbiol Infect* 2022;28:1193-202.
 22. Klein EY, Milkowska-Shibata M, Tseng KK, Sharland M, Gandra S, Pulcini C, *et al.* Assessment of WHO antibiotic consumption and access targets in 76 countries, 2000-15: An analysis of pharmaceutical sales data. *Lancet Infect Dis* 2021;21:107-15.
 23. Li J, Zhou P, Wang J, Li H, Xu H, Meng Y, *et al.* Worldwide dispensing of non-prescription antibiotics in community pharmacies and associated factors: A mixed-methods systematic review. *Lancet Infect Dis* 2023;23:e361-70.
 24. Al-Worafi YM, editor. Healthcare workforce issues in developing countries: Public health and others. In: *Handbook of Medical and Health Sciences in Developing Countries: Education, Practice, and Research*. Cham: Springer International Publishing; 2023. p. 1-25.
 25. Adepoju P. Healthcare workforce shortages exacerbated by poaching from the global South. *Nat Med* 2024;30:311-4.
 26. Marković-Peković V, Grubiša N, Burger J, Bojanić L, Godman B. Initiatives to reduce nonprescription sales and dispensing of antibiotics: Findings and implications. *J Res Pharm Pract* 2017;6:120-5.
 27. Sono TM, Markovic-Pekovic V, Godman B. Effective programmes to reduce inappropriate dispensing of antibiotics in community pharmacies especially in developing countries. *Adv Hum Biol* 2024;14:1-4.
 28. Yusuf KB, Makhlof AM, Ibrahim MI. Community pharmacists' management of minor ailments in developing countries: A systematic review of types, recommendations, information gathering and counselling practices. *Int J Clin Pract* 2021;75:e14424.
 29. Belachew SA, Hall L, Selvey LA. Community drug retail outlet staff's knowledge, attitudes and practices towards non-prescription antibiotics use and antibiotic resistance in the Amhara region, Ethiopia with a focus on non-urban towns. *Antimicrob Resist Infect Control* 2022;11:64.
 30. Alkadhimi A, Dawood OT, Hassali MA. Dispensing of antibiotics in community pharmacy in Iraq: A qualitative study. *Pharm Pract*, 2020;18:2095.
 31. Bepari AK, Rabbi G, Shaon HR, Khan SI, Zahid ZI, Dalal K, *et al.* Factors driving antimicrobial resistance in rural Bangladesh: A cross-sectional study on antibiotic use-related knowledge, attitude, and practice among unqualified village medical practitioners and pharmacy shopkeepers. *Adv Ther* 2023;40:3478-94.
 32. Khan FU, Khan FU, Hayat K, Chang J, Saeed A, Khan Z, *et al.* Knowledge, attitude and practices among consumers toward antibiotics use and antibiotic resistance in Swat, Khyber-Pakhtunkhwa, Pakistan. *Expert Rev Anti Infect Ther* 2020;18:937-46.
 33. Antwi AN, Stewart A, Crosbie M. Fighting antibiotic resistance: A narrative review of public knowledge, attitudes, and perceptions of antibiotics use. *Perspect Public Health* 2020;140:338-50.
 34. Torres NF, Solomon VP, Middleton LE. Pharmacists' practices for non-prescribed antibiotic dispensing in Mozambique. *Pharm Pract*, 2020;18:1965.
 35. Miyano S, Htoon TT, Nozaki I, Pe EH, Tin HH. Public knowledge, practices, and awareness of antibiotics and antibiotic resistance in Myanmar: The first national mobile phone panel survey. *PLoS One* 2022;17:e0273380.
 36. Muloi D, Fèvre EM, Bettridge J, Rono R, Ong'are D, Hassell JM, *et al.* A cross-sectional survey of practices and knowledge among antibiotic retailers in Nairobi, Kenya. *J Glob Health* 2019;9:010412.
 37. Kretchy JP, Adase SK, Gyansa-Lutterodt M. The prevalence and risks of antibiotic self-medication in residents of a rural community in Accra, Ghana. *Sci Afr* 2021;14:e01006.
 38. Farley E, van den Bergh D, Coetzee R, Stewart A, Boyles T. Knowledge, attitudes and perceptions of antibiotic use and resistance among patients in South Africa: A cross-sectional study. *S Afr J Infect Dis* 2019;34:118.
 39. Anstey Watkins J, Wagner F, Xavier Gómez-Olivé F, Wertheim H, Sankoh O, Kinsman J. Rural South African community perceptions of antibiotic access and use: Qualitative evidence from a health and demographic surveillance system site. *Am J Trop Med Hyg* 2019;100:1378-90.
 40. Do NT, Vu HT, Nguyen CT, Punpuing S, Khan WA, Gyapong M, *et al.* Community-based antibiotic access and use in six low-income and middle-income countries: A mixed-method approach. *Lancet Glob Health* 2021;9:e610-9.
 41. Mokwele RN, Schellack N, Bronkhorst E, Brink AJ, Schweickerdt L, Godman B. Using mystery shoppers to determine practices pertaining to antibiotic dispensing without a prescription among community pharmacies in South Africa-a pilot survey. *JAC Antimicrob Resist* 2022;4:dlab196.
 42. Sono TM, Maluleke MT, Jelić AG, Campbell S, Marković-Peković V, Schellack N, *et al.* Potential strategies to limit inappropriate purchasing of antibiotics without a prescription in a rural province in South Africa: Pilot study and the implications. *Adv Hum Biol* 2024;14:60-7.
 43. Edessa D, Sisay M, Hagos B, Amare F. Antimicrobial use and management of childhood diarrhea at community drug retail outlets in Eastern Ethiopia: A matched questionnaire-based and simulated patient-case study. *Pediatric Health Med Ther* 2022;13:63-79.
 44. Sono TM, Maluleke MT, Ramdas N, Jelic AG, Campbell S, Markovic-Pekovic V, *et al.* Pilot study to evaluate the feasibility of a patient questionnaire for the purpose of investigating the extent of purchasing antibiotics without a prescription in a rural province in South Africa: Rationale and implications. *Adv Hum Biol* 2024;14:138-47.
 45. Charoenboon N, Haenssger MJ, Warapikuptanun P, Xayavong T, Khine Zaw Y. Translating antimicrobial resistance: A case study of context and consequences of antibiotic-related communication in three Northern Thai villages. *Palgrave Commun* 2019;5:23.

46. Haenssge MJ, Charoenboon N, Zanello G, Mayxay M, Reed-Tsochas F, Lubell Y, *et al.* Antibiotic knowledge, attitudes and practices: New insights from cross-sectional rural health behaviour surveys in low-income and middle-income South-East Asia. *BMJ Open* 2019;9:e028224.
47. Nayiga S, MacPherson EE, Mankhomwa J, Nasuwa F, Pongolani R, Kabuleta R, *et al.* "Arming half-baked people with weapons!" Information enclaving among professionals and the need for a care-centred model for antibiotic use information in Uganda, Tanzania and Malawi. *Glob Health Action* 2024;17:2322839.
48. Sono TM, Mboweni V, Jelić AG, Campbell SM, Marković-Peković V, Remdas N, *et al.* Pilot Study to Evaluate Patients' Understanding of Key Terms and Aspects of Antimicrobial Use in a Rural Province in South Africa: Findings and Implications' - In Proof - DOI 10.4103/aihb.aihb_119_24. [In this issue].
49. Aslam A, Zin CS, Ab Rahman NS, Gajdács M, Ahmed SI, Jamshed S. Self-medication practices with antibiotics and associated factors among the public of Malaysia: A cross-sectional study. *Drug Healthc Patient Saf* 2021;13:171-81.
50. de Kock LJ. The importance of antimicrobial stewardship: An undergraduate perspective. *S Afr J Infect Dis* 2024;39:598.
51. Davis M, Whittaker A, Lindgren M, Djerf-Pierre M, Manderson L, Flowers P. Understanding media publics and the antimicrobial resistance crisis. *Glob Public Health* 2018;13:1158-68.
52. Karvanen M, Cars O. The language of antimicrobial and antibiotic resistance is blocking global collective action. *Infect Dis*, 2024;56:487-95.
53. Rocha YM, de Moura GA, Desidério GA, de Oliveira CH, Lourenço FD, de Figueiredo Nicolette LD. The impact of fake news on social media and its influence on health during the COVID-19 pandemic: A systematic review. *Z Gesundh Wiss* 2021:1-10.
54. Stewart R, Madonsela A, Tshabalala N, Etale L, Theunissen N. The importance of social media users' responses in tackling digital COVID-19 misinformation in Africa. *Digit Health* 2022;8:20552076221085070.
55. Schellack N, Strydom M, Pepper MS, Herd CL, Hendricks CL, Bronkhorst E, *et al.* Social media and COVID-19-perceptions and public deceptions of ivermectin, colchicine and hydroxychloroquine: Lessons for future pandemics. *Antibiotics (Basel)* 2022;11:445.
56. Haque T, Imtiaz SH, Hossain MI, Khan SH, Alam MM, Alam Z, *et al.* The portrayal of antimicrobial resistance in Bangladeshi newspapers during 2010-2021: Toward understanding the narrative. *PLoS One* 2024;19:e0304582.
57. Moja L, Zanichelli V, Mertz D, Gandra S, Cappello B, Cooke GS, *et al.* WHO's essential medicines and AWaRe: Recommendations on first- and second-choice antibiotics for empiric treatment of clinical infections. *Clin Microbiol Infect* 2024;30 Suppl 2:S1-S1.
58. Zanichelli V, Sharland M, Cappello B, Moja L, Getahun H, Pessoa-Silva C, *et al.* The WHO AWaRe (Access, Watch, Reserve) antibiotic book and prevention of antimicrobial resistance. *Bull World Health Organ* 2023;101:290-6.
59. McCormick JZ, Cardwell SM, Wheelock C, Wong CM, Vander Weide LA. Impact of ambulatory antimicrobial stewardship on prescribing patterns for urinary tract infections. *J Clin Pharm Ther* 2020;45:1312-9.
60. Mukokinya MM, Opanga S, Oluka M, Godman B. Dispensing of antimicrobials in Kenya: A cross-sectional pilot study and its implications. *J Res Pharm Pract* 2018;7:77-82.
61. Saleem Z, Sono TM, Godman B. Concerns with current drug laws regarding the purchasing antibiotics without a prescription in Pakistan; ways forward to assist the national action plan. *Expert Rev Anti Infect Ther* 2023;21:1163-5.

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