

# Effective Programmes to Reduce Inappropriate Dispensing of Antibiotics in Community Pharmacies Especially in Developing Countries



There are appreciable concerns with growing rates of antimicrobial resistance (AMR) across countries, increasing morbidity, mortality and costs.<sup>[1-4]</sup> As a result, AMR is increasingly seen as the next pandemic unless timely activities are instigated globally and within countries to reduce inappropriate prescribing and dispensing of antibiotics, thereby reducing AMR. Key activities within countries to reduce AMR include the instigation of the National Action Plans (NAPs); however, these are at different stages of development, implementation and monitoring.<sup>[5-7]</sup>

Amongst patients, the greatest utilisation of antibiotics is in ambulatory care as opposed to hospital care, potentially accounting for up to 95% of total utilisation, especially in low- and middle-income countries (LMICs).<sup>[8,9]</sup> Within ambulatory care, a critical area of concern is the current high rates of dispensing of antibiotics without a prescription, often for self-limiting conditions including acute respiratory illnesses (ARIs).<sup>[10,11]</sup> In some LMICs, such dispensing can occur in all community pharmacies.<sup>[12]</sup> These practices, especially appreciable dispensing of ‘watch’ and ‘reserve’ antibiotics from the World Health Organisation (WHO) Access, Watch, Reserve (AWaRe) list and classification without a prescription, need to be urgently addressed to reduce AMR.<sup>[13-15]</sup> We are already seeing increasing utilisation of ‘Watch’ antibiotics amongst LMICs, and this needs to be reversed to reduce AMR.<sup>[15]</sup>

However, in a number of LMICs where there are high copayments to see a healthcare professional (HCP) and pay for medicines, as well as travel costs, alongside considerable waiting times to see an HCP,<sup>[10]</sup> there can be challenges, especially for patients, if it is impossible to obtain antibiotics without a prescription from a community pharmacist. This especially where, on balance, an antibiotic is justified to improve patient outcomes based on the diagnosis and guidance in the recently launched WHO AwaRe antibiotic book.<sup>[9,16]</sup> Community pharmacists as well as team members including pharmacist assistants in some countries, with their convenience and training, are typically the first HCP that patients approach as a trusted source, especially for minor infectious diseases.<sup>[17]</sup> Their role in patient care is crucial, especially if there are

long waiting times to see a physician and associated costs, their condition is relatively minor including self-limiting viral infections, and there are major affordability issues with physician costs alongside the cost of medicines.<sup>[10,18,19]</sup> Their role further increased during the recent COVID-19 pandemic, with community pharmacists often the frontline HCP giving advice to patients on the prevention and management of COVID-19, addressing considerable misinformation, as well as being involved in vaccination programmes.<sup>[18,20-23]</sup> This is now likely to remain.

In view of this, especially in circumstances where it is challenging and financially difficult for a patient or their child to visit a primary care clinic and pay for any prescribed medicine, alternative approaches need to be found that build on successful exemplars across LMICs. We have seen in countries that extensive monitoring of regulations, coupled with appreciable fines and other consequences, can help to limit the purchasing of antibiotics without a prescription.<sup>[17,24,25]</sup> However, in some circumstances, there needs to be considerable fines for the pharmacy owner, and the pharmacies to be regularly monitored for such approaches to be effective.<sup>[24,26]</sup> This is because we have seen that the introduction of limited fines for not adhering to the current laws did not appear to reduce the extent of self-purchasing of antibiotics in Vietnam.<sup>[27]</sup> Having said this, where there are educated pharmacists behaving responsibly in LMICs, this has reduced inappropriate dispensing of antibiotics. In Kenya, in pharmacies where the pharmacist is allied to the local university, i.e. involved in teaching future pharmacists, there was little or no dispensing of antibiotics for self-limiting viral conditions including patients with suspected COVID-19.<sup>[28,29]</sup> This contrasts with pharmacists not involved in teaching activities where there was considerable dispensing of antibiotics without a prescription including during the recent pandemic.<sup>[30,31]</sup> In Namibia, there was limited or no evidence of dispensing antibiotics without a prescription, including patients with COVID-19, with well-trained pharmacists and regular monitoring of the pharmacy facilities.<sup>[22,32]</sup> In the Republic of Srpska, the introduction of guidelines to facilitate discussions with patients, especially for self-limiting conditions, coupled with greater awareness of the regulations, also appreciably reduced the purchasing of antibiotics without a prescription.<sup>[17]</sup>

The first step in any LMIC to try and enhance appropriate dispensing of antibiotics, especially where different studies in different years have provided different findings,<sup>[10]</sup> is to assess the current situation. This is particularly the case in LMICs striving for universal healthcare where we would expect reduced purchasing of antibiotics without a prescription.<sup>[10]</sup> We have seen for instance in Zimbabwe that as the economic situation deteriorated, most patients now obtain their antibiotics from the informal market.<sup>[10,33]</sup> This contrasts with the situation in the early 2000s in Zimbabwe where there was very limited purchasing of antibiotics without a prescription through strict enforcement of the regulations.<sup>[34,35]</sup>

In South Africa, where the selling of antibiotics without a prescription is illegal, there have been variable findings depending on the location of the study and those enrolled. In their studies, Anstey Watkins *et al.* and Do *et al.* found limited purchasing of antibiotics without a prescription.<sup>[36,37]</sup> This contrasted with the findings of Mokwele *et al.* who found that antibiotics were being dispensed without a prescription in some privately owned pharmacies but not in corporate (franchised) pharmacies.<sup>[38]</sup> We are aware though in the provinces, especially rural provinces where there are long waiting times to see an HCP at a public clinic, which can adversely impact patient income that patients can put pressure on pharmacists and their assistants, who can dispense medicines if a pharmacist is present, to dispense antibiotics without a prescription for themselves or family members. This was the situation in the recent pilot study of Sono *et al.* (2023) where at least 10 of the 21 pharmacists or their assistants taking part in the pilot admitted to dispensing antibiotics without a prescription representing five of the nine participating pharmacies.<sup>[39]</sup> This included both adults and children and occurred despite specific legislation banning such practices.<sup>[10,39,40]</sup> There were also pharmacist assistants who were unsure if this practice occurred in their pharmacy. There were also concerns that antibiotics were being offered before over-the-counter (OTC) medicines where OTC medicines should have been dispensed, enhanced by patient demand.<sup>[39]</sup>

In view of these findings, the emphasis particularly in LMICs should be on improving the knowledge and education of community pharmacists, their assistants and patients regarding the optimal management of especially self-limiting conditions including viral ARIs. This recognises their role as frontline HCPs across countries for managing patients with essentially viral infections. Alongside this, providing evidence-based guidelines that can easily be referred to by patients, pharmacists and pharmacy assistants when discussing appropriate management of especially self-limiting conditions and away from any dispensing of antibiotics without a prescription. This though requires thorough training of student pharmacists on the management of infectious diseases, including self-limiting conditions, during their university education and continued post-qualification with continuous professional development activities.

Well-trained pharmacists can subsequently provide educational support to their assistants, building on their initial professional qualification. Educational support should also include input on the appropriate management of infectious diseases, especially self-limiting viral infections.

The well-researched and endorsed WHO AWaRe antibiotic book of suggested treatment approaches, especially for patients in ambulatory care settings, is an important step in this endeavour now that the book and its guidance is available as an App.<sup>[9,16]</sup>

The next steps in South Africa include gaining greater knowledge of current antibiotic dispensing patterns and their rationale, as well as greater knowledge of pharmacists and pharmacist assistants regarding antibiotics, AMR and antimicrobial stewardship programmes. In parallel, a similar approach with patients to gain a greater understanding of their behaviour and knowledge. This research is ongoing in South Africa. The findings will subsequently be used to refine the curricula for both pharmacists and their assistants where pertinent. In addition, seek to introduce specific quality indicators for use amongst pharmacists and their assistants to enhance the appropriate management of infectious diseases, especially of self-limiting conditions, along with appropriate monitoring systems. This is important as the drug laws in some LMICs still contain antibiotics and other treatments for infectious diseases that need replacing based on the WHO AWaRe book and guidance.<sup>[41]</sup> Monitoring systems could be initiated and run with the help of mobile technologies,<sup>[42]</sup> providing rapid feedback to all key stakeholder groups. The overall findings, and suggested next steps in rural provinces in South Africa, are likely to be of considerable interest to other LMICs with similar issues to combat rising rates of AMR and help achieve NAP goals. We will continue to research and monitor the situation.

**Tiyani Milta Sono<sup>1,2</sup>, Vanda Markovic-Pekovic<sup>3</sup>, Brian Godman<sup>1,4</sup>**

<sup>1</sup>Department of Public Health Pharmacy and Management, School of Pharmacy, Sefako Makgatho Health Sciences University, Garankuwa, Pretoria, <sup>2</sup>Saselamani Pharmacy, Saselamani, South Africa, <sup>3</sup>Department of Pharmacy, Faculty of Medicine, University of Banja Luka, Banja Luka, Republic of Srpska, Bosnia and Herzegovina, <sup>4</sup>Department of Pharmacoepidemiology, Strathclyde Institute of Pharmacy and Biomedical Sciences, University of Strathclyde, Glasgow, UK

**Address for correspondence:** Prof. Brian Godman, Department of Public Health Pharmacy and Management, School of Pharmacy, Sefako Makgatho Health Sciences University, Molotlegi Street, Garankuwa, Pretoria 0208, South Africa. E-mail: brian.godman@smu.ac.za

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## REFERENCES

1. Antimicrobial Resistance Collaborators. Global burden of bacterial antimicrobial resistance in 2019: A systematic analysis. *Lancet* 2022;399:629-55.
2. Cassini A, Högberg LD, Plachouras D, Quattrocchi A, Hoxha A, Simonsen GS, *et al.* Attributable deaths and disability-adjusted life-years caused by infections with antibiotic-resistant bacteria in the EU and

- the European Economic Area in 2015: A population-level modelling analysis. *Lancet Infect Dis* 2019;19:56-66.
3. Dadgostar P. Antimicrobial resistance: Implications and costs. *Infect Drug Resist* 2019;12:3903-10.
  4. Hofer U. The cost of antimicrobial resistance. *Nat Rev Microbiol* 2019;17:3.
  5. Chua AQ, Verma M, Hsu LY, Legido-Quigley H. An analysis of national action plans on antimicrobial resistance in Southeast Asia using a governance framework approach. *Lancet Reg Health West Pac* 2021;7:100084.
  6. Willemsen A, Reid S, Assefa Y. A review of national action plans on antimicrobial resistance: Strengths and weaknesses. *Antimicrob Resist Infect Control* 2022;11:90.
  7. Godman B, Egwuenu A, Wesangula E, Schellack N, Kalungia AC, Tiroyakgosi C, *et al.* Tackling antimicrobial resistance across sub-Saharan Africa: Current challenges and implications for the future. *Expert Opin Drug Saf* 2022;21:1089-111.
  8. 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.
  9. Sharland M, Zanichelli V, Ombajo LA, Bazira J, Cappello B, Chitanga R, *et al.* The WHO essential medicines list AWaRe book: From a list to a quality improvement system. *Clin Microbiol Infect* 2022;28:1533-5.
  10. 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.
  11. 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.
  12. Kalungia AC, Burger J, Godman B, Costa JO, Simuwelu C. Non-prescription sale and dispensing of antibiotics in community pharmacies in Zambia. *Expert Rev Anti Infect Ther* 2016;14:1215-23.
  13. 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* 2020;13:26.
  14. 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.
  15. 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.
  16. 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.
  17. 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.
  18. Talukdar D, Jankie S, Pancholi SS, Chatterjee A, Kumar P, Gupta MM. Strategic role and challenges of community pharmacists in SARS-CoV-2 outbreak. *J Res Pharm Pract* 2021;10:1-9.
  19. Dalton K, Byrne S. Role of the pharmacist in reducing healthcare costs: Current insights. *Integr Pharm Res Pract* 2017;6:37-46.
  20. Cadogan CA, Hughes CM. On the frontline against COVID-19: Community pharmacists' contribution during a public health crisis. *Res Social Adm Pharm* 2021;17:2032-5.
  21. Paudyal V, Cadogan C, Fialová D, Henman MC, Hazen A, Okuyan B, *et al.* Provision of clinical pharmacy services during the COVID-19 pandemic: Experiences of pharmacists from 16 European countries. *Res Social Adm Pharm* 2021;17:1507-17.
  22. Kibuule D, Nambahu L, Sefah IA, Kurdi A, Phuong TN, Kwon HY, *et al.* Activities in Namibia to limit the prevalence and mortality from COVID-19 including community pharmacy activities and the implications. *Scholars Acad J Pharm* 2021;5:82-92.
  23. Shen AK, Tan AS. Trust, influence, and community: Why pharmacists and pharmacies are central for addressing vaccine hesitancy. *J Am Pharm Assoc* (2003) 2022;62:305-8.
  24. Jacobs TG, Robertson J, van den Ham HA, Iwamoto K, Bak Pedersen H, Mantel-Teeuwisse AK. Assessing the impact of law enforcement to reduce over-the-counter (OTC) sales of antibiotics in low- and middle-income countries; a systematic literature review. *BMC Health Serv Res* 2019;19:536.
  25. Alrasheedy AA, Alsalloum MA, Almuqbil FA, Almuzaini MA, Aba Alkhayl BS, Albishri AS, *et al.* The impact of law enforcement on dispensing antibiotics without prescription: A multi-methods study from Saudi Arabia. *Expert Rev Anti Infect Ther* 2020;18:87-97.
  26. 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.
  27. 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 (Basel)* 2022;11:1091.
  28. 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.
  29. Opanga S, Rizvi N, Wamaitha A, Abebese Sefah I, Godman BB. Availability of medicines in community pharmacy to manage patients with COVID-19 in Kenya; pilot study and implications. *Scholars Acad J Pharm* 2021;3:36-42.
  30. 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.
  31. Kimathi G, Kiarie J, Njarambah L, Onditi J, Ojaka D. A cross-sectional study of antimicrobial use among self-medicating COVID-19 cases in Nyeri County, Kenya. *Antimicrob Resist Infect Control* 2022;11:111.
  32. Kamati M, Godman B, Kibuule D. Prevalence of self-medication for acute respiratory infections in young children in Namibia: Findings and implications. *J Res Pharm Pract* 2019;8:220-4.
  33. Dixon J, MacPherson EE, Nayiga S, Manyau S, Nabirye C, Kayendeke M, *et al.* Antibiotic stories: A mixed-methods, multi-country analysis of household antibiotic use in Malawi, Uganda and Zimbabwe. *BMJ Glob Health* 2021;6:e006920.
  34. Kumaranayake L, Mujinja P, Hongoro C, Mpembeni R. How do countries regulate the health sector? Evidence from Tanzania and Zimbabwe. *Health Policy Plan* 2000;15:357-67.
  35. Nyazema N, Viberg N, Khoza S, Vyas S, Kumaranayake L, Tomson G, *et al.* Low sale of antibiotics without prescription: A cross-sectional study in Zimbabwean private pharmacies. *J Antimicrob Chemother* 2007;59:718-26.
  36. 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.
  37. 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.
  38. 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:d1ab196.
  39. 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.
  40. South African Pharmacy Council. Pharmacist's Assistant Basic; 2023. Available from: [https://pharmcouncil.co.za/AssistantBasic\\_Scope](https://pharmcouncil.co.za/AssistantBasic_Scope). [Last accessed on 2023 Nov 01].
  41. 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.

42. Kalungia A, Godman B. Implications of non-prescription antibiotic sales in China. *Lancet Infect Dis* 2019;19:1272-3.

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