

Over-the-counter medicine and antibiotic misuse in Pakistan: Patterns, risks, and regulatory gaps

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Dear Editor,

Pakistan has high rates of self-medication, making it a major public health concern in the Eastern Mediterranean Region. Surveys show that many people, especially in rural areas, use over-the-counter (OTC) medicines as their first choice of treatment. Self-medication raises significant concern in Pakistan, where around 79% of primary health care services are delivered by the private sector [1]. In Karachi, almost 90% of participants consumed medications without seeking advice from health care professionals, with those earning less than 50,000 PKR or having no more than a high school education being most affected [2]. Similarly, 93.8% of pharmacy students and 78.3% of medical students reported engaging in self-medication practices [3], reflecting the extent to which this behaviour is normalized across the population.

Self-medication is fuelled by long consultation waits, limited affordable healthcare, and easy OTC medicine access. Cultural attitudes, past experiences, and advice from peers or chemists further encourage it. While seemingly convenient, self-treatment poses serious risks, including misdiagnosis, drug resistance, harmful interactions, and delayed proper care. Weak regulation and poor pharmacy monitoring worsen the problem. This letter to the editor aims to analyse the trends, causes, and consequences of self-medication to support safer practices and stronger health policies.

Multiple interlinked factors drive self-medication. These include high consultation costs (90.3%), transportation barriers (81.0%) [2], limited access to health care professionals, knowledge gaps among pharmacy staff, aggressive pharmaceutical marketing, and weak enforcement of existing regulations [1].

The use of OTC drugs presents considerable dangers that should not be ignored, as highlighted by the World Health Organization. Misdiagnosis, inappropriate dosing, and failure to recognize contraindications can lead to adverse drug reactions, dependency, and drug shortages [4]. The most frequently used drugs are paracetamol (93%), acetylsalicylic acid (69%), antibiotics (52%), and anti-allergic medications (51%). The dangers of excessive use of these medicines are well-documented [2]. Nearly 48% of adolescents report self-medication with paracetamol [5], far exceeding

the 13–30% in Norway [6]. Such misuse is clinically alarming, as overdose depletes glutathione, accumulates toxic N-acetyl-p-benzoquinone imine (NAPQI), and precipitates fulminant hepatic failure. A fatal case in a young adult underscores the urgent need for stricter regulation, timely antidote therapy, and public awareness [7].

Dextromethorphan, commonly found in OTC cough syrups, has also been repeatedly misused as a recreational drug in Pakistan, often mixed with alcohol or opioids. This dangerous trend has led to numerous deaths, particularly among youth. Misuse can result in fatal outcomes when such medications are openly distributed without regulation [8].

The COVID-19 pandemic further exacerbated the issue by intensifying antimicrobial resistance (AMR) and normalizing risky behaviours such as self-medication, largely driven by an “infodemic.” The widespread, unsupervised use of azithromycin during the pandemic was a significant factor contributing to the rise of extensively drug resistant (XDR) strains of *Salmonella Typhi*, the causative agent of typhoid fever [9][10].

Although the Drug Regulatory Authority of Pakistan (DRAP) Act (2012) legally restricts prescription-only medicines to dispensing on a valid physician’s prescription, antibiotics are still being routinely sold over-the-counter without proper authorization in many pharmacies, undermining the regulation and promoting inappropriate antimicrobial use, which adds to the issue of antibiotic resistance. Addressing this concern requires enforcement of existing regulations through regular inspections and penalties. Only certified pharmacists should dispense drugs, and pharmacies should display their licenses prominently. Additionally, using mass media to raise awareness about the dangers of self-medication and conducting training sessions for pharmacists on their legal and ethical responsibilities can further improve pharmaceutical practices in Pakistan.

Strengthening regulation, empowering pharmacists, and raising public awareness are essential steps if Pakistan is to address the persistent challenge of self-medication. These lessons are not only relevant for Pakistan but also for other low- and middle-income countries across Africa and Asia, where comparable patterns of antibiotic self-medication further weaken global efforts to contain antimicrobial resistance.

Competing Interest

The authors of this work declare no competing interests.

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Authors' contributions

AR: conceptualization, literature review, drafting the manuscript; QA: literature review, drafting support, editing; AB: critical review, editing; WF: critical review, editing; RA: supervision, editing, final approval.

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