

Bacterial Resistance: Continuous Threatening in Iraq

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ABSTRACT

Antimicrobial resistance (AMR) threatens the effectiveness of antibiotic treatment and increases the clinical and economic burden of bacterial infections. In Iraq, self-medication, non-prescription dispensing, inappropriate prescribing and gaps in stewardship complicate efforts to contain AMR. This narrative review examines published evidence on antibiotic use and bacterial resistance in Iraq, drawing on literature identified through Google Scholar in February 2026. The reviewed publications report inappropriate antibiotic consumption and the occurrence of resistant bacterial pathogens in healthcare settings, while pointing to weaknesses in surveillance and regulatory implementation. An effective response requires coordinated action across human health, animal health and environmental sectors. Priorities include evidence-based prescribing, microbiological testing when indicated, public education, infection prevention and effective enforcement of antimicrobial-use policies. Because a formal systematic search and study-selection protocol was not documented, this narrative synthesis should not be interpreted as a systematic estimate of resistance prevalence.

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INTRODUCTION

Antimicrobial resistance (AMR) occurs when microorganisms are no longer susceptible to medicines that were previously effective against them. Increasing bacterial resistance threatens routine infection management and highlights the need for a One Health approach linking human, animal and environmental health (Ventola, 2015; Salam et al., 2023). Freshwater environments can also serve as reservoirs and dissemination pathways for antibiotic resistance genes, particularly through wastewater discharge and agricultural runoff (Ndrukwe & Ibrahim, 2024).

The failure of infectious agents to respond to antibiotic regimens renders common therapies ineffective. Evidence consistently links antimicrobial resistance with an elevated risk of mortality, protracted hospitalization, increased financial costs, disrupted elective surgery schedules, heightened risk for immunocompromised patients undergoing organ transplantation or chemotherapy (Poudel et al., 2023; Dadgostar, 2019).

A publication by the Iraqi Ministry of Health (MOH) underscores a critical public health concern, reporting widespread resistance among common bacterial pathogens alongside increasing resistance to many antibiotics including meropenem (Nahi et al., 2022).

Antimicrobial stewardship programmes aim to optimise clinical outcomes by promoting rational antibiotic use, discouraging inappropriate prescribing, ensuring accurate dosing, and encouraging culture and susceptibility testing when indicated (Dyar et al., 2017).

A systematic understanding of antibiotic practices across human healthcare, agriculture and veterinary medicine, and residue monitoring in food and beverage supplies are crucial for identifying key contributors to bacterial resistance in Iraq. To address this need, this review summarises published Iraqi antibiotic-related literature, outlining challenges and strategies for improvement (Al-Jumaili & Ahmed, 2024).

Scope and Approach of the Review

This narrative review examines published literature addressing antibiotic use, bacterial resistance, and antimicrobial stewardship, with particular emphasis on Iraq. Relevant publications were identified through a Google Scholar search conducted in February 2026. The literature was examined to identify major themes related to antibiotic misuse, contributing factors to antimicrobial resistance, associated public health challenges, and potential control strategies. The findings were synthesized qualitatively to provide an overview of the available evidence and highlight key challenges facing antimicrobial resistance control in Iraq.

Causes of Antimicrobial Resistance

Misuse of Antibiotics

Antibiotic misuse is a major public health concern worldwide. In Iraq, self-medication with antibiotics may contribute to the selection of resistant bacteria, with potential health and economic consequences (Salim et al., 2021). Antibiotic use that does not follow clinical guidelines can promote resistance in bacterial pathogens (Salim et al., 2021). Inappropriate use includes stopping prescribed treatment prematurely, missing doses, reusing leftover antibiotics, or taking antibiotics without a prescription (Akande-Sholabi & Oyesiji, 2023). Self-medication, overuse, and misuse of antibiotics are among the contributing factors to antimicrobial resistance (AMR). According to the World Health Organization (WHO), AMR occurs when microorganisms no longer respond adequately to antimicrobial medicines (Leung et al., 2011). The consequences include prolonged illness, additional healthcare visits, longer hospital stays, higher treatment costs, and mortality (Leung et al., 2011). Studies involving Iraqi populations have documented inappropriate antibiotic use (Hashim et al., 2024), underscoring the need for targeted public health interventions.

Social and Institutional Influences on Prescribing

Expectations from patients and communities, organisational pressures and limited diagnostic resources may influence antibiotic prescribing decisions. A study conducted in northern India demonstrated how social and institutional factors can shape prescribing behaviour (Mukherjee et al., 2024). Such findings are relevant when considering possible pressures in Iraq, but they do not establish that particular local practices, including tribal threats, are prevalent among Iraqi clinicians. Country-specific investigations are needed before drawing that conclusion.

Impact of Antibiotic Misuse

Antibiotic misuse leads to antimicrobial resistance (AMR), which makes some bacterial infections more difficult and costly to treat. In addition, resistance is associated with an increased risk of serious complications and mortality, as well as a substantial economic burden (Dadgostar, 2019; Poudel et al., 2023).

Solutions and Strategies

To combat antimicrobial resistance (AMR), a multifaceted approach is needed, including improved sanitation and hygiene, prudent antimicrobial use in human and animal health, investment in diagnostic tools and vaccines, and international collaboration under the One Health framework (Salam et al., 2023). Additional priorities include reducing unnecessary antibiotic use, evaluating safe and effective alternatives without replacing clinically indicated treatments with unproven compounds, and improving public awareness through education and social media (Gupta & Sharma, 2022). The Iraqi government should strengthen oversight of antibiotic dispensing (Al-Jumaili & Ahmed, 2024). Antimicrobial residues in animal-derived food products should also be monitored in accordance with applicable safety standards.

Limitations of this Review

This review has several limitations that should be considered when interpreting its findings. As a narrative review, it did not employ a systematic literature search strategy, predefined study selection criteria, or formal quality assessment of the included publications. Consequently, some relevant studies may not have been identified. Furthermore, differences in study designs, populations, and healthcare settings may limit the generalizability of the reported findings. Evidence from international studies was included to provide broader scientific context but may not fully reflect the situation in Iraq. Therefore, the conclusions should be interpreted descriptively rather than as definitive estimates of national antimicrobial resistance prevalence or causal relationships.

CONCLUSION

Antibiotic resistance is considered a major global threat, posing a profound challenge to human health. In Iraq, the problem is not limited to the ability of bacteria to develop resistance to antibiotics, but is further aggravated by dangerous practices and misuse. Excessive and unjustified consumption of antibiotics without medical need or prescription has fueled the crisis. Furthermore, patients often discontinue treatment prematurely, while a lack of education and awareness in certain communities continues to facilitate the distribution of resistant bacteria.

The situation is particularly concerning in the livestock and poultry sector, where antibiotics may be used inappropriately, potentially selecting for resistant strains. Moreover, the marketing of poultry before the withdrawal period of

antibiotics has passed may increase the risk of antimicrobial residues entering the human food chain.

Addressing this crisis requires a multi-level approach: strengthening regulations on the sale and use of antibiotics, raising awareness among healthcare providers and the public, and implementing coordinated surveillance programmes to monitor antimicrobial resistance. Equally important is investing in scientific research to develop alternative therapies and innovative strategies to contain resistance.

Antibiotics are among the most important medical discoveries of the twentieth century, and preserving their effectiveness is a collective responsibility. Without timely, coordinated action, infections that are currently treatable could become substantially harder to manage.

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