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Editorial

Antimicrobial resistance (AMR): From aggravation to alleviation

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As we grapple with a visible pandemic and global health crisis, antimicrobial resistance (AMR) quietly emerges as a silent pandemic, threatening the very core of healthcare systems.[1] AMR poses a growing threat to global health, transforming from a source of aggravation to a pressing concern with collaborative efforts towards its alleviation.[2,3] The misuse and overuse of antibiotics have accelerated the rise of multidrug-resistant (MDR) bacteria challenging the effectiveness of antibiotics, rendering conventional treatments ineffective.[4] Routine surgeries, cancer treatments, and even childbirth become fraught with increased risks as antibiotics lose their effectiveness. The prospect of a post-antibiotic era looms large, where common infections could spiral into life-threatening scenarios. This shift from aggravation to a critical health challenge has spurred research, policy initiatives, and public awareness campaigns with a concerted effort to address the root causes of AMR and explore innovative combating solutions.[5]

One key factor contributing to AMR is the inadequate sanitation practices and indiscriminate use of antibiotics in healthcare, agriculture, aquaculture, and animal husbandry is playing a pivotal role in accelerating the emergence of drug-resistant strains of bacteria.[6,7] Widespread prescriptions of antibiotics for even viral infections, where they are ineffective, incomplete antibiotic treatment, and the routine use of antibiotics in livestock for growth promotion contribute to the proliferation of resistant strains.[8] Recognizing this, global health organizations have intensified efforts to educate healthcare professionals, farmers, and the general public about responsible use of antibiotics. Alleviating AMR thus requires a shift in prescribing practices, emphasizing rational and targeted use of drugs.[9]

In recent years, a multifaceted approach has emerged to tackle AMR. The global community's collective efforts are gradually shifting the narrative from aggravation to alleviation, emphasizing the need for sustainable solutions to safeguard the effectiveness of antibiotics for future generations. In the realm of pharmaceuticals, research and development of new classes of antibiotics have gained momentum in combatting resistant strains, driven by the understanding that the current arsenal of drugs is increasingly becoming obsolete due to the complex microbial evolution. Novel anti-AMR vaccines, and alternative therapies (herbal, folklore medicines, phage therapy, RNA interference, nanomedicine, CRISPR-based antimicrobials, and clinical artificial intelligence strategies etc.) are also being explored to reduce reliance on traditional antibiotics. Encouraging innovation in the development of rapid diagnostic tools can aid in prescribing

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the right antibiotics for specific infections, reducing their irrational use and thus mitigating the emergence of resistant strains.[10,11] In the agricultural sector, promoting sustainable farming practices that reduce reliance on antibiotics is crucial. Implementing biosecurity measures, developing alternative treatments, and adopting precision agriculture techniques can contribute to reducing the selective pressure that drives AMR. Additionally, fostering international cooperation to regulate antibiotic use in agriculture is essential for a comprehensive approach.[12]

Global collaboration, the establishment of antimicrobial stewardship networks, and policy interventions are pivotal in tackling the AMR menace across borders. The World Health Organization (WHO) and other global health agencies are implementing regulations and guidelines for the controlled use of antibiotics in healthcare and agriculture while also investing in surveillance systems to track resistance patterns.[9] These international bodies are advocating for a 'One Health' approach, recognizing the interconnectedness of human, animal, and environmental health in the fight against AMR.[13,14] Public awareness campaigns have played a crucial role in transforming the global AMR threat from a silent pandemic to a strident priority. From healthcare professionals to the general public, understanding the consequences of overuse and misuse of antibiotics is paramount. Governments and healthcare organizations are investing in educational initiatives advocating responsible practices to inform individuals about the importance of completing antibiotic courses, the consequences of self-medication, and the role of each person in preventing the spread of drug-resistant infections.[15]

AMR jeopardizes not only individual health but also the entire healthcare system. In conclusion, the journey from aggravation to alleviation of AMR underscores the significance of a coordinated global response and collaboration which is the cornerstone of tackling this silent menace. Through research, policy, and public awareness, the world is striving to mitigate the impact of antimicrobial resistance and ensure that our ability to treat infections remains effective. The future depends on fostering a global understanding of the implications of AMR and implementing comprehensive strategies to preserve the efficacy of antibiotics, ensuring a healthier and more resilient world.

Conflict of Interest

None.

References

1. Rayan RA. Flare of the silent pandemic in the era of the COVID-19 pandemic: Obstacles and opportunities. *World J Clin Cases*. 2023;11(6):1267–74.
2. Samreen, Ahmad I, Malak HA, Abulreesh HH. Environmental antimicrobial resistance and its drivers: a potential threat to public health. *J Glob Antimicrob Resist*. 2021;27:101–11. doi:10.1016/j.jgar.2021.08.001.
3. Salam MA, Al-Amin MY, Salam MT, Pawar JS, Akhter N, Rabaan AA, et al. Antimicrobial Resistance: A Growing Serious Threat for Global Public Health. *Healthcare (Basel)*. 2023;11(13):1946. doi:10.3390/healthcare11131946.
4. Nwobodo DC, Ugwu MC, Anie CO, Al-Ouqaili MTS, Ikem JC, Chigozie UV. Antibiotic resistance: The challenges and some emerging strategies for tackling a global menace. *J Clin Lab Anal*. 2022;36(9):e24655. doi:10.1002/jcla.24655.
5. Majumder MAA, Rahman S, Cohall D, Bharatha A, Singh K, Haque M, et al. Antimicrobial Stewardship: Fighting Antimicrobial Resistance and Protecting Global Public Health. *Infect Drug Resist*. 2020;13:4713–38. doi:10.2147/IDR.S290835.
6. Ikhimiukor OO, Odih EE, Donado-Godoy P, Okeke IN. A bottom-up view of antimicrobial resistance transmission in developing countries. *Nat Microbiol*. 2022;7(6):757–65.
7. Samtiya M, Matthews KR, Dhewa T, Puniya AK. Antimicrobial Resistance in the Food Chain: Trends, Mechanisms, Pathways, and Possible Regulation Strategies. *Foods*. 2022;11(19):2966. doi:10.3390/foods11192966.
8. Antimicrobial resistance in Indian poultry: cause, concern and measure. Available from: https://www.onehealthpoultry.org/blog-posts/antimicrobial-resistance-in-indian-poultry-cause-concern-and-measure/.
9. A one health priority research agenda for antimicrobial resistance. Geneva: World Health Organization, Food and Agriculture Organization of the United Nations, United Nations Environment Programme and World Organisation for Animal Health; 2023. Available from: https://www.fao.org/documents/card/en?details=cc6213en.
10. Murugaiyan J, Kumar PA, Rao GS, Iskandar K, Hawser S, Hays JP, et al. Antimicrobial Resistance in the Food Chain: Trends, Mechanisms, Pathways, and Possible Regulation Strategies. *Antibiotics (Basel)*. 2022;11(2):200. doi:10.3390/antibiotics11020200.
11. Saeed U, Insaf RA, Piracha ZZ, Tariq MN, Sohail A, Abbasi UA, et al. Crisis averted: a world united against the menace of multiple drug-resistant superbugs -pioneering anti-AMR vaccines, RNA interference, nanomedicine, CRISPR-based antimicrobials, bacteriophage therapies, and clinical artificial intelligence strategies to safeguard global antimicrobial arsenal. *Front Microbiol*. 2023;14:1270018. doi:10.3389/fmicb.2023.1270018.
12. Kahn LH, Bergeron G, Bourassa MW, Vegt D, Gill B, Gomes J, et al. From farm management to bacteriophage therapy: strategies to reduce antibiotic use in animal agriculture. *Ann N Y Acad Sci*. 2019;1441(1):31–9.
13. Aslam B, Khurshid M, Arshad MI, Muzammil S, Rasool M, Yasmeen N, et al. Antibiotic Resistance: One Health One World Outlook. *Front Cell Infect Microbiol*. 2021;11:771510. doi:10.3389/fcimb.2021.771510.
14. Aseri GK, Jain N. 'Vasudhaiva Kutumbakam' and 'one health' approach towards sustainable healthcare to combat global AMR. *IP Int J Med Microbiol Trop Dis*. 2023;9(3):135–8.
15. Mathew P, Sivaraman S, Chandy S. Communication strategies for improving public awareness on appropriate antibiotic use: Bridging a vital gap for action on antibiotic resistance. *J Family Med Prim Care*. 2019;8(6):1867–71.

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