



Response to Letter to the Editor: Typhoid fever in Pakistan: a recurrent challenge?

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Dear Editor

We thank Modesto dos Santos et al. (1) for drawing our attention to a recently published study (2), conducted in a different tertiary care center in the same city of Karachi to that of our own research discussed in *Microbes, Infection and Chemotherapy* (3). The findings corroborate our conclusions regarding patterns of sensitivity and resistance by *Salmonella enterica* subspecies *enterica* serovar Typhi (*S. Typhi*) to antibiotic therapy among pediatric patients (4).

As the study of Saleem and colleagues indicates, the formerly effective drugs ampicillin, cotrimoxazole, chloramphenicol and ceftriaxone are now each ineffective in treating four in every five children presenting with typhoid fever (TF) (2). The knock-on effect is this will impose a massive selection pressure for bacterial resistance to emerge to those antibiotics that are now used as first-line replacements; meropenem, azithromycin and ciprofloxacin.

Collectively, these investigations highlight the pressing need for a coordinated and multifaceted national policy for antimicrobial stewardship of TF in countries where multidrug-resistant (MDR) strains of *S. Typhi* are endemic and where extensively drug-resistant (XDR) strains are increasingly emerging. Pakistan is foremost among these nations.

S. Typhi is constantly evolving to evade the twin threats of the human immune response and antibiotic treatment. The take-home message could not be clearer: what is a tailored regimen today may not be as effective tomorrow. Hence, vigilance should be maintained by treating physicians in known hotspots for TF to confirm the sensitivity of a patient's specimen to the prescribed antibiotic.

To use a football analogy, we need to stay in a game in which the goal posts are constantly moving. This extreme task requires commitment by individual hospitals and concerted effort by local health authorities. This process should be orchestrated as an ongoing public health response at regional and national levels, with provision for data collection of notified cases of MDR and XDR *S. Typhi*.

Conflict of interest

The authors declare that there is no conflict of interest.

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Authors' contributions

Both authors wrote the draft, reviewed the manuscript, and approved the final version.

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