

Gaps and Barriers to the Implementation of Antimicrobial Stewardship Programmes in Hospitals of Pakistan

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ABSTRACT

Antimicrobial-resistant bacteria are particularly prevalent in Southeast Asia, mainly due to inadequate infection prevention and control (IPC) and the widespread and uncontrolled use of antibiotics. Pakistan is the third largest low-middle-income country (LMIC) user of antibiotics. Antibiotic consumption increased by 65%, from 800 million to 1.3 billion defined daily doses (DDD). Antimicrobial consumption is high and poorly regulated, and an estimated 300,000 people die because of bacterial antimicrobial resistance (AMR) annually. Due to the changing government priorities, antimicrobial stewardship programmes (ASP) implementation is not compulsory for hospitals to acquire national accreditation, which has led to de-prioritisation among hospital managers and clinical teams. Additionally, lack of support from hospital administration, limited nationwide health insurance coverage for bacterial cultures, and a lack of surgical centres and microbiology laboratories, information technology (IT) support to collect and analyse AS-related data, reduced availability of pharmacists, ID physicians, and IPC staff for ASP events are the primary contributing factors creating hindrance to the long-term viability of ASP. Briefly, strong hospital leadership support is the major factor for allocating the resources for ASP structures and activities and also for establishing the key performance indicators (KPIs), enforcing compliance with hospital-specific clinical practice guidelines, as well as addressing friction between ASP team members and prescribers.

Key Words: Antimicrobial resistance, Antimicrobial stewardship programmes, Infection prevention and control.

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Antimicrobial-resistant bacteria are particularly prevalent in Southeast Asia, due to inadequate infection prevention and control (IPC) and the widespread and uncontrolled use of antibiotics, among other reasons.^{1,2} Antimicrobial resistance (AMR) prevention and control initiatives must include the implementation of Antimicrobial stewardship programmes (ASPs) in hospitals, even though the majority of the data currently available is from high-income nations.³ With a population of 242.8 million, Pakistan is a LMIC with a highly diverse range of socioeconomic and health indicators as well as with a decentralised public healthcare system, with a considerable private health industry. Antimicrobial consumption is high and poorly regulated, and an estimated 300,000 people die because of bacterial AMR annually.⁴

After China and India, Pakistan is the third-largest LMIC user of antibiotics. Antibiotic consumption increased from 3.2 billion to 6.5 billion defined daily doses (DDDs) with a 103% growth rate in India between 2000 and 2015.

In China, it increased from 2.3 billion to 4.2 billion DDDs with a 79% growth rate; and in Pakistan, it increased by 65%, from 800 million to 1.3 billion DDDs. These increases contributed to the exponential rise in AMR.⁵ Due to the changing government priorities, ASP implementation is not compulsory for hospitals to acquire national accreditation, which has led to de-prioritisation among hospital managers and clinical teams. As a result, a deeper comprehension of the principal behavioural and organisational obstacles to successful ASP implementation is required. To support the expansion of ASP, hospital administration ought to allocate funds, create key performance indicators (KPIs), and resolve conflicts that arise between prescribers and the ASP team.

A collaboration between the ASP team and the pre-existing IPC programme and/or the pharmacy and therapeutics committee should promote the ASP implementation. High employee turnover in all ASP roles, though, may be seen as a hindrance to the long-term viability of ASP. Mostly, ASP activities incur substantial additional workload, without financial incentives, which can limit the dedicated time availability. Hospitals in remote areas frequently face additional difficulties because key members of the ASP team, such as clinical microbiologists and pathologists, are part-time or only occasionally available. Hospitals in remote settings in Pakistan have limited access to microbiology, including slow and costly specimen referral to major cities. The primary contributing factors are a lack of

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support from hospital administration, limited health insurance coverage for essential microbiology testing, imbalance in revenue generation, and uneven inter-professional dynamics among clinical units and microbiology laboratories. Additionally, many hospitals lack IT support to collect and analyse the AS-related data, including electronic prescribing, automatic stop orders, and tracking of antibiotic use for surveillance. Apart from this, there is a reduced availability of pharmacists, ID physicians, and IPC staff for ASP.

ASP interventions, such as pre-authorisation of watch and reserve antimicrobials, are effective in reducing the irrational antibiotic prescribing and improving guideline adherence, provided that the ASP team actively engages all stakeholders (clinical microbiologists, pharmacists, and clinicians) in addressing friction with prescribers. For instance, an ASP programme that aimed to educate physicians in a university hospital in Taiwan, documented a 13% reduction in in-patient antibiotic consumption.⁶ While the average cost saving due to the implementation of an AMS programme in the USA was \$732 per patient, this cost-saving was mainly driven by a reduction in the length of hospital stay. Similarly, a systematic review and a meta-analysis by Wubishet *et al.* and Karanika *et al.* reported that implementation of the ASP programmes was associated with reductions of 8.9% in the length of hospital stay, 19.1% in antimicrobial consumption, and 33.9% in antimicrobial cost.^{7,8} Multidisciplinary activities are often impeded by hierarchical relationships and the fear of prescriber autonomy being lost, particularly in private hospitals.

Furthermore, hospital-specific antimicrobial susceptibility data, availability of treatment guidelines for common infections, and the implementation of national ASP guidelines and antibiotic prescribing guidelines from professional societies are important enablers. The most crucial element to promote ASP implementation can be its inclusion in the national hospital accreditation standard as well as monitoring, reporting, and feedback on antibiotic consumption (DDDs and duration of treatment). For this reason, surveys or audits of antibiotic prescribing should be performed along with the availability of an institutional antibiogram. Hospital management should support ASP-related training and healthcare personnel should highlight specific knowledge needs, including how to use ASP metrics to achieve behaviour change. Along with this, educational initiatives incorporating both technical and behavioural aspects, using the patient safety as a framework, will prove successful in improving antibiotic prescribing.

During the COVID-19, many ASP activities were limited or on hold due to the reallocation of human and financial resources. Antibiotic consumption increased overall, backed up by COVID-19 treatment guidelines. By contrast, improvements made during the COVID-19 include updated treatment guidelines for common infections, and improved IPC practices, particularly the use of alcohol-based hand rub, personal protective equipment, and hand hygiene.

In conclusion, strong hospital leadership support is an important factor, not only for allocating resources for ASP structures and activities but also for establishing KPIs, enforcing compliance with hospital-specific clinical practice guidelines, as well as addressing friction between the ASP team members and prescribers. There is an urgent need for culture-resonant strategies to strengthen technical (e.g., consequences of antibiotic over-use, best treatment practices) and ASP-related behavioural skills (e.g., effective communication, teamwork, and quality improvement), which are fundamentals for the success of any ASP programme. Moreover, several barriers can be feasibly addressed in the short-term (e.g., education, hospital administrators' engagement, and making a business case for ASP), whereas additional barriers will require longer-term efforts and investments (e.g., improving microbiology and IT resources, staff compensation, cross-disciplinary collaborations, and ASP inclusion in hospital accreditation).

COMPETING INTEREST:

The authors declared no conflict of interest.

AUTHORS' CONTRIBUTION:

MK: Conception, designing, acquisition, analysis and interpretation of data for the work.

SK: Drafting the work and revising it critically for important intellectual content.

SB: Final approval of the version to be published.

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