**Combating Antibiotic Over-Prescription in Pakistan's Primary Care Sector**

**Executive Summary**

The problem of antibiotic overprescription is considered a severe public health issue in Pakistan that contributes to challenges with antimicrobial resistance (AMR) and the loss of the effectiveness of currently used treatment options. The evidence suggests that there is irrational use of antibiotics that has been perpetuated by unrestricted prescription of antibiotics in pediatric outpatient and even dental practice settings, which is common even though there are clinical guidelines that advocate limited use of antibiotics. At the Combined Military Hospital, Lahore, a study was conducted in which it was found that 61% of those children who were febrile were given antibiotics, which were mostly of second line, and were usually without reasonable bacterial indications. Older age, high temperature, seasonal presentation and clinical manifestation of respiratory distress were found to significantly contribute to the prescription of antibiotics significantly. A sample of the Pakistani dentists demonstrated that the most common antibiotic, amoxicillin-clavulanate, is frequently prescribed to the Pakistani dentists even in endodontic emergencies where the use of antibiotics is unlikely.

An existing framework of rational use of antibiotics in the form of current policies, such as the National Action Plan on AMR and prescription rules, has a problem of implementation, observation, and addition to the primary care level. The over-the-counter sale of antibiotics and conditions within the culture further hampers efforts to limit misuse. Walts & Gilson's policy analysis highlights the need to ensure the context of the policy by plugging contextual concerns, involving stakeholders and enforcing implementation as a way of guaranteeing policy performance. To address this problem, the creation and expansion of antibiotic stewardship programs at healthcare facilities, increased regulatory enforcement to limit the unauthorised sale of antibiotics, and a more thorough education effort for professionals and the general population should be encouraged. These measures are intended to develop evidence-based prescribing, reduce unnecessary consumption of antibiotics, and, in the long term, reduce transmission of AMR in Pakistan. The efficacy of antibiotics needs to be safeguarded by the close interaction of policymakers, healthcare professionals, and communities.

**Description of Overprescription of Antibiotics**

Overuse of antibiotics within the primary health care of Pakistan and predominantly in the children outpatient units is a major subject of concern when it comes to public health concerns. A study conducted at the Combined military Hospital (CMH), Lahore revealed that, 61% of febrile children aged between two months and ten years were prescribed antibiotics of which the overwhelming majority (90%) patients were taking second-line antibiotics versus the first-line antibiotics to which the clinical guidelines are supporting (Asmaa et al., 2023). The development signifies a lack of observation of evidence-based prescribing behaviours, and modifying factors tend to affect them; they include the following: the elements of perceived severity of illness, season, clinical presentation of high fever, tachycardia, tachypnea, or the concept of a person looking ill (Asmaa et al., 2023).

One of the factors that led to overuse of antibiotics was respiratory tract infection (RTIs), most, in this condition, were upper RTIs especially those caused by virus. Medics would tend to prescribe antibiotics in cases where there were small risks of a bacterial presence (Asmaa et al., 2023). Such risk factors as possible bacterial diagnosis, minor RTI classification, and respiratory distress predispositions were identified as meaningful predictors of an antibiotic prescription, despite most of them were unlikely to fit the clinical definition of a bacterial case (Asmaa et al., 2023).

Such irrationality in antibiotics promotes the development of antimicrobial resistance (AMR), the consequences of which make the treatment of subsequent infections more difficult and costly. There can also be the unnecessary side effects of prescribing children, which increases healthcare wastefulness (Asmaa et al., 2023). The research points out that without the term nosocomial applied to the antibiotic stewardship program the problem of inappropriate prescription is only going to thrive due to diagnosability, patient demand, and seasonal patterns of respiratory lengthenings.

**Overview of Research**

Over-prescription of antibiotics is an urgent healthcare concern in Pakistan and includes both medical and dental practices, which leads to the multinational healthcare problem of antimicrobial resistance (AMR). Asmaa et al. (2023) interrogated knowledge, attitude, and practice among dental practitioners in secondary and tertiary care hospitals and clinics dealing with endodontic emergencies. The survey of 409 people on the web showed a desire to give multi-visit root canal procedures, both in irreversible pulpitis (73.59%) and necrotic pulp/periapical lesion (79.95%) (Asmaa et al., 2023). Of particular concern was the high percentages of dentists prescribing antibiotics in conditions that do not commonly require them- 45.48% in irreversible pulpitis and 37.9% in acute apical periodontitis, even though most of the cases could be addressed using local treatment and pain relievers (Asmaa et al., 2023). It was found that acute cases of apical abscess triggered the most frequent use of antibiotics. However, most favoured amoxicillin-clavulanate (83.6%), with most suggesting at least a five-day protocol (69%). This evidence demonstrates a disparity between advice on guidelines and real-life prescribing and among patients, at least the cognizant ones, who also understand the danger of AMR. Yaqoob et al. (2024) conducted a study at the Combined military hospital and found that among the 225 children examined, 61% were given antibiotics, of which 90% were second-line agents. Older age, high fever, seasonal concern (autumn/winter), ill appearances, and abnormal vital signs (tachycardia, tachypnea) were the factors that significantly contributed to increased prescription rates (Yaqoob et al., 2024). Probable viral diseases in managing respiratory tract infection (RTI) presented a complex picture of uncertainty that resulted in antibiotic prescription with a broader scope of over-treatment.

**Current and Proposed Policies**

1. National Action Plan on Antimicrobial Resistance (AMR) Pakistan is one of the many countries that have developed a National Action Plan on AMR, aimed at surveillance, infection prevention and rational use of antibiotics, in collaboration with the World Health Organisation (WHO). This policy encourages education of medical practitioners, training, and public education to minimize the use of prescriptions. Nonetheless, its implementation at the primary care and dental practices levels is slight; there are weak points in monitoring and enforcement.

2. Prescription Regulation and Essential Medicines List (EML): To date, antibiotics and, in particular, higher-generation antibiotics, have been sold on prescription only. The EML directs clinicians to first-line antibiotics, depending on cost-effectiveness and the overview of resistance. In practice, the regulation is unevenly applied, and access to antibiotics over the counter (OTC) is still widespread, which is against the purpose of the regulation.

3. Antibiotic Stewardship Programs(ASP) Proposed: In both hospital and outpatient settings, ASPs are being proposed as entity-based interventions to overcome misuse. Such programs would involve real-time prescription audits, feedback to the prescriber, diagnostic assistance tools, and uniform treatment procedures, especially in high-use settings such as paediatric OPDs and dental clinics. It is also suggested that stewardship training be integrated into medical and dental curricula, which would influence prescribing behaviour at the early stages of a career.

**Policy Analysis Using the Walt & Gilson Policy Triangle**

The Walt & Gilson Policy Triangle model looks at health policy in four interconnected elements: the context, the content, the process and the actor. When this model is put into force regarding antibiotic over-prescription policies in Pakistan, it highlights challenges and opportunities.

**Context:** Pakistan is already burdened with a large number of infectious diseases that, combined with a lack of diagnostic systems and self-medication through access to OTC antibiotics, represent a significant risk. There are cultural pressures that expect quick fixes, and the pressure of the patient affects the prescriber (Alimoradnori et al., 2023). Irrational prescribing takes place in both dental and medical settings because regulatory control is weak and because medical and dental healthcare systems remain fragmented.

**Content:** Measures in place at present have been demonstrated by the National Action Plan on AMR and the Essential Medicines List (EML), covering approaches to surveillance, rational prescribing and limited OTC sales(Alimoradnori et al., 2023). The suggested content involves the adoption of national Antibiotic Stewardship Programs (ASPs) that have prescription reviews, compliance with the guidelines, and the inclusion of AMR educational curricula in the health training.

**Process:** The Process formulation of policy is a collaboration that the Ministry of Health, the World Health Organisation and the professional associations have undertaken. Nevertheless, it is not uniform, and limited efforts are given to how it is being implemented, which is a poor connection between policy formation and a clinical setting (Alimoradnori et al., 2023). The newly proposed reforms give preference to top-down engagement- rotation of key role players in the development and compliance of guidelines, primary care physicians, dentists, and pharmacists.

**Actors:** National health agencies, medical and dental councils, professional groups, pharmacists, prescribers, and patients are the stakeholders. There is also technical guidance available from international bodies like the WHO and CDC (Alimoradnori et al., 2023). There should be a clear mechanism of accountability as well as harmonisation of the efforts of all the actors so as to achieve sound control over AMR.

**Policy Recommendations**

1. Increase and Enhance the Use of Antibiotic Stewardship Programs (ASPs) in all Healthcare Settings

Development of formal ASPs in hospitals, primary care facilities, and dental practices should be mandated as a way of monitoring antibiotic prescribing. Such programs are supposed to have prescription audits, feedback, clinical decision support systems, and frequent training for healthcare providers. Incorporating stewardship into everyday practice will facilitate the performance of evidence-based prescribing and implementation of the avoidance of inappropriate use of antibiotics.

1. Increase the Control and Defence of Dispensation of Antibiotics

Enhance control measures on antibiotic sales in the country so that they can only be distributed in the case of genuine prescriptions. Enhance inspection and vigilance structures in drug stores and therapeutic facilities to halt over-the-counter sales. Publish disciplinary actions against non-adherence to discourage inadherence, and liability to lessen self-medication and abuse.

1. Ensure Education Campaigns by Healthcare Providers and the Public

Provide countrywide educational programs aimed at working with healthcare professionals as well as ordinary people. Improve the teaching of AMR and antibiotic stewardship, including as part of medical and dental curricula and continuing professional development, as clinicians. Citizens, education and community outreach should promote awareness of the risks of antibiotic misuse and the consequences of not adhering to treatment recommendations using mass media. Attitude and knowledge change will facilitate a sustainable change in behaviour in the use of antibiotics.

**References**

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