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# Situation analysis of antimicrobial resistance control, policy and regulation - a reflection of Pakistan

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**Abstract**: Antimicrobial resistance (AMR) is a global threat that affects 700,000 lives every year and could lead to 10 million deaths every year by 2050. World Health Organization (WHO) has instituted a global action plan in 2015 to deal antimicrobial resistance in the 68th World Health Assembly. This paper aimed to review the situation analysis of current bottlenecks of the health system and provision of recommendations to improve the current regulatory mechanism for antimicrobial drugs in Pakistan. Antimicrobial Resistance (AMR) emerged as a threat practically in all nations of the world including Pakistan which is the world's sixth most populous country. This qualitative document analysis has been done by using Pakistan's National Policy on AMR. In 2004, total expenditure on pharmaceuticals was 1844 million US$ with a total pharmaceutical expenditure per capita of 11.3US$. Total number of pharmacists licensed was10,000 technician and assists were 20,000 and licensed pharmacies were 7000. There are only 0.9 pharmacists per 100000 populations are deployed. The health system and society are at risk of an emerging epidemic of AMR. This investigational analysis of AMR control, policy and regulation in Pakistan highlights some facts about misuse, availability of over the counter medicine, self-medications and low effect of existing approaches. Drug prescription monitoring law and policy investment is needed in the regulation of drugs to reduce unnecessary drug consumption and prescription, and strengthening quality parameters at several levels to control epidemic of AMR.

**Keywords**: Antimicrobial resistance, therapeutic use, antimicrobial stewardship, drug resistance, prescription policy.

## INTRODUCTION

Antimicrobial resistance (AMR) is a global health threat that affects approximately 700, 000 lives every year and could lead to 10 million deaths every year by 2050.WHO has instituted a global action plan in 2015 to deal with antimicrobial resistance in the 68th World Health Assembly. Global action was planned and endorsed by all countries.(Jasovský D, 2016) Antimicrobial resistance (AMR) is a health right violation because safe health care is everyone's right especially when it is from patients' out of pocket money. In Pakistan there is no concept of risk pooling and health is purchased which makes the case even worse. It is the responsibility of health system and providers to protect the health rights of population (Mohrs, 2015). Health care system issues also include other parameters such as; poor regulation of drugs, non-functioning pharmacist, misuse and overdose of antibiotics, self-medication, hand writing errors and even the use of expired antibiotics (Atif *et al*., 2017). Due to Antimicrobial drug resistance many lives over the globe are suffering where antibiotics are no more functional and effective. (Saleem *et al*., 2018) The rate of antibiotic misuse is alarming (88.9%) and practiced widely in all public and private sectors of Pakistan (Khan *et al*., 2019).

Pakistan has highest numbers of drugs prescribed more than 3 drugs per patient, half of the population take medicine without consultation. Furthermore 76000-88000 registered drugs, many of which are unnecessary drug products (Ministry of National Health Services Regulations and Coordination, 2017). In 2004, total expenditure on pharmaceuticals was 1844 million US$ with a total pharmaceutical expenditure per capita of 11.3US$. (MOH and WHO, 2010) Antimicrobial Resistance (AMR) rose as a significant emergency in practically all nations of the world including Pakistan, bringing about a disturbing increment in the burden of diseases while limiting the resources for treatment because of healthcare constraints. It is very obvious that poor regulation of medicines leads to antimicrobial resistance. While antimicrobial resistance is assumed as a natural evolutionary phenomenon which is developed with the antibiotics exposure with microorganisms; thereby decreasing the efficacy of the later to treat infections and eventually making them terminated over time. Higher rates of resistant pathogens are directly linked with the increased antibiotic consumption in a population because of which even the Universal health coverage (UHC) and access to essential medicines will remain a struggle to deal in lower middle income countries (LMICs) including Pakistan. (Khan *et al*., 2019) A survey of first level care facilities, district hospitals and tertiary hospitals conducted as part of Emergency Drug Supply Project in NWFP, Punjab and Balochistan, highlighted issues related to drug storage and dispensing. (Zaidi *et al*., 2013) Dispensing time on average is merely half a minute which is inadequate for good dispensing

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while communication with patients was poor and is a cause for low awareness level of patients. Preparation of prescriptions by dispensers is often unhygienic, prone to mistakes and every one in five prescriptions is dispensed without validation. Preparation of drugs, labeling of drugs and record keeping were also inadequate. Besides overuse of drugs there are other issues which also contribute to the emergence of AMR such as, 18% drug advertisements being unjustified or misleading, only15% promotional brochures meet WHO criteria (Zaidi *et al*., 2013). Antimicrobial resistance threatens health and increases morbidities. AMR restricts the therapeutic options for treatment of infection, and limits the social benefit from disease prevention more in LMICs. It has been reported that Antibiotic resistance is one of the significant emergencies in Pakistan (Kumarasamy *et al*., 2010). There is a need to analyze existing policies for identifying the gaps and potential ways of addressing policy implementation. This paper aimed to review the situation analysis of current bottlenecks of the health system and provision of recommendations to improve the current regulatory mechanism for antimicrobial drugs in Pakistan.

## MATERIALS AND METHODS

We included peer reviewed published articles, reports and policy documents related to AMR in Pakistan. Data from each reviewed study and policy documents were systematically extracted and analyzed using grids based on the systematic approach and Policy analysis triangle framework.

***Analysis of AMR rules and regulations in Pakistan***

The federal Ministry of National Health Services Regulations & Coordination (MNHS&RC) and Provincial health authorities are responsible for product licensing, drug testing, drug registration, pricing, trade and market surveillance. Access to essential medicines, as part of the fulfillment of the right to health, is recognized in the national constitution.(Khan, 2017) The updated National Essential Medicines List (NEML) of 2016 exists, but prescriptions may not contain medicine from NEML and only one fourth of medical practitioners are aware of NEML (Bazargani Y, 2015).

Drug regulatory authority of Pakistan (DRAP) is an independent body under the MNHS&RC and it provides for effective coordination and enforcement of The Drugs Act, 1976. It regulates manufacturing, import, export, packing, supply and sale of therapeutic goods including 80,000 drug products (60,000 local and 20,000 imported). However, there is poor registration and regulation of products (Atif *et al*., 2017). DRAP has recently in 2018 developed a National Pharmacovigilance Center with the support and enforcement of WHO but it lacks capacity, human resource and even infrastructure. They have made national guidelines of Pharmacovigilance for Pakistan but even this document seems ambitious to deliver the commitments appended (Syed *et al*., 2018). National guidelines of treatments exist, however, these need to be broader in scope and should promote the measures for preventing disease spread. National AIDS Control Program and National TB program are also facing multi drug resistance (MDR) issue due to lack of trained Human resources and knowledge among users and provider (Irfan *et al*., 2006).

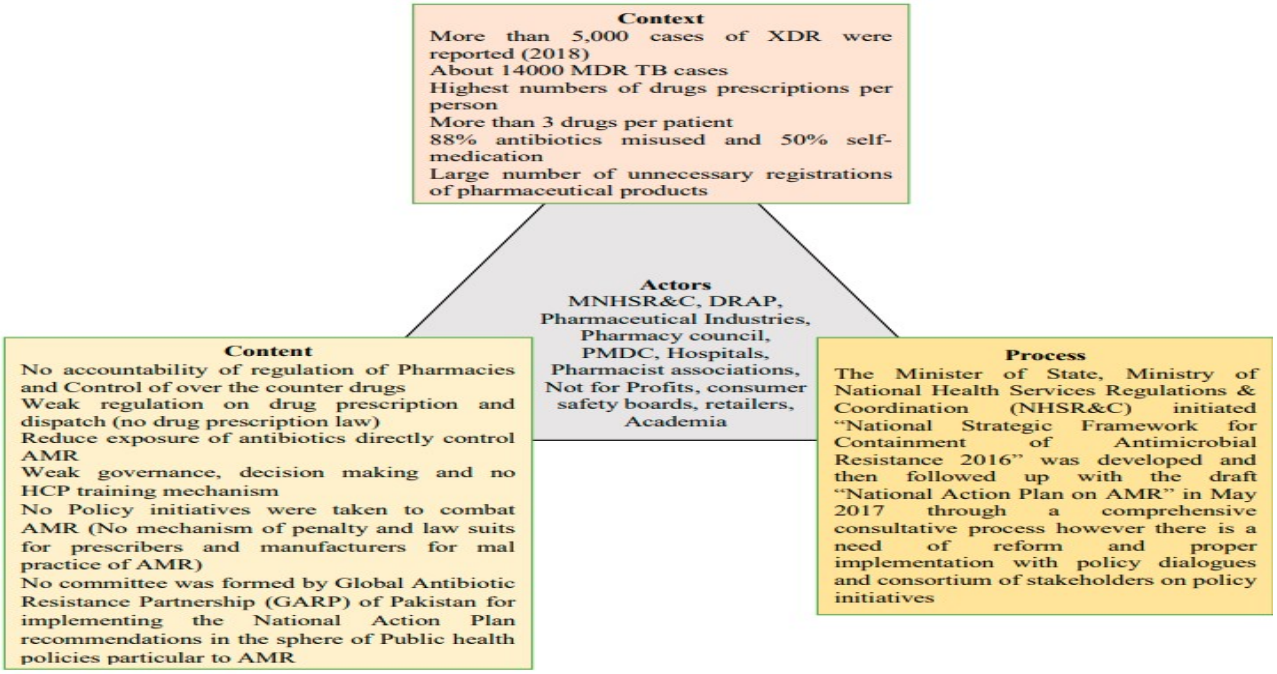
***The analysis of National AMR action plan by applying Policy analysis triangle framework***

The National AMR action plan has been initiated under the Global Action Plan for control of AMR however this was ineffective draft. It has defined the following five strategic objectives for containment of AMR:

- Raising knowledge and understanding about AMR
- Reinforcing awareness with the support of research and surveillance
- Curtail chances of infection
- Antimicrobial agents should be utilized to the best of capacity
- Draw plans for economically sustainable investments with respect to the needs of a country and meticulously choose areas of investments like vaccines, R&D, diagnostics etc.

Multiple research studies were analyzed around AMR, still there is a dearth of effective implementation of these studies' outcomes. This calls for a strong need to bridge the research and policy gaps in LMICs to make a robust implementation plan for AMR at national level. In Pakistan, there has been substantial work in sphere of policies, regulatory frameworks and guidelines but there have been suboptimal use of these regulations. Lack of implementation and practice has suppressed the health system influence.

Furthermore, issues of medicines like consumption of adulterated, expired, counterfeit antimicrobials are also contributing in AMR surge and unfortunately the only regulatory body DRAP has also its own limitations in terms of operational capacity and finances to deploy all technical expertise to control this threat. Regulation of the over usage of drugs consumption for reducing the burden of antimicrobial resistance needs a consortium of multi sectoral stakeholders who are involved in diaspora of Anti-microbial drugs control, manufacturing, prescriptions, retailing and policymaking. We analyzed AMR action plan in the light of Walt and Gilson's policy analysis framework (given below). Walt and Gilson (1994) framework is for policy analysis and provides an understanding of broader context such as social cultural and political context, content of the policy and process through which policy was developed. Their policy triangle system is grounded in a political economy viewpoint and thinks about how each of the four of these




components connects to shape policy making (Walt *et al*., 2008).

***Situation analysis of implementation outcomes***

In 2018, Pakistan had first outbreak of drug-resistant (XDR) typhi which created an emergency in the health care settings all over the country. The Regional Disease Surveillance and Response Unit (RDSRU) reported 64% typhoid cases of XDR till December 2018. The risk of drug–resistance typhi is still high in all over Pakistan predominantly caused by unsafe water source systems, poor hygiene and sanitation practices, neglected infection control mechanisms and low vaccination coverage (Syed *et al*., 2018). At the same time antibiotics are not being prescribed properly to not just humans but animals as well. In clinical practice 70% of the patients are prescribed antibiotics in Pakistan (Cox J, 2017). Such unprecedented and unpredictable use is quite common among General Physicians (GPs) and unregulated pharmacies with a predisposition towards expensive broad spectrum antibiotics (Rehman *et al*., 2018). Most of essential drugs like antibiotics, psychotropic, narcotics, anti-cancers and hormones are being misused by un-trained doctors, quacks or through self-medication due to lack of coordination among the relevant professionals (Zaidi *et al*., 2013). Additionally, there is unnecessary registration of antibiotics and pharmaceutical products which could be regulated by government. In contrast to WHO's recommended ratio of 1:2000 pharmacists per population in Pakistan only 0.9 pharmacists per 100000 population are deployed, of which 70% are engaged in industry with a very small chunk serving in health service delivery (Azhar *et al*., 2009) and the total number of pharmacists licensed is 10,000, technician and assists are 20,000 and while there are only 7,000 licensed pharmacies. The utilization of fake, poor quality and unreliable antimicrobials is increasing complications for patients (Azhar *et al*., 2009). Pakistan has probably the most noteworthy number of medications endorsed (>3 drugs/patient), 60% of patient experiences, for the most part by private professionals or quacks and regular infusion re-use with exceptionally poor disinfection practices. (Ministry of National Health Services Regulations and Coordination, 2017) More than half of the population practice self-medication (Atif *et al*., 2017). Availability of over the counter (OTC) without physician endorsed prescriptions, particularly antibiotics is a typical practice and utilization of strong antibiotics is additionally a common phenomenon. (Ministry of National Health Services Regulations and Coordination, 2017)

***Recommendations to control AMR: What needs to be changed?***

*Use of essential medicines*

The Pakistani health care system has to ensure the rational use of essential medicine to reduce AMR by utilizing provincial health care commissions. Irrational medication use is a common issue in the Eastern Mediterranean and South Asian nations in spite of ample requirement for drugs in healthcare settings (WHO, 1977).

***Prescription monitoring and control***

Prescription monitoring policy is required at provincial level to control the use of antibiotics and similarly amendments should be made in Drug rules and laws. The health care providers should carefully provide

prescriptions and mention validity date so that the end user may not face issues and pharmacist can also dispatch right medication till valid date.

***Improved communication strategies and plans***

A proper communication plan/strategy is the need of hour to address the concerns of antimicrobials and for raising awareness about antimicrobial resistance. It should be formulated cohesively converging for population engagement and understanding.

***Multi-sectoral initiatives***

As this paper has highlighted that AMR issues are not easy to be resolved, but it is controllable by multi-sectoral development of public regulatory bodies.(Ministry of National Health Services Regulations and Coordination, 2017) The DRAP, Provincial Health Care Commission (SHCC), National AIDS Control Program and National TB program Pakistan, Expanded Program on Immunization (EPI) and academia should play role in safety measures and provide evidence to control the AMR.

***Regulation of Hospitals/Pharmacies***

There must be a system to regulate hospitals to ensure use of antibiotics rationally with the help of provincial health care commissions. Furthermore, local pharmacies and the drug distributor agency should be allocated a defined quota of medicines according to catchment area population. Also, the excessive usage must have proper justification or must be subjected to penalty.

***Reform needs for addressing policy implementation concerns***

A policy is needed for regulation of drugs to reduce unnecessary proliferation and prescribing and strengthening quality parameters at several levels. Investment is also needed in standardized surveys on rational use, formative research on consumer demand, and collation of all these measures for a successful policy document. Regulation plan for all of the systemic errors in the prescription monitoring procedure should be taken in consideration to improve the quality of prescription and prescriber by using mobile technology.

AMR control program should be mobilized through electronic technology; it has potential to control antibiotics exposure and use. It can monitor from prescribing a medicine or antibiotic to its dispatch and compliance in both public & private hospitals in Pakistan through the health commissions and DRAP.

The Second level will control patient compliance with electronic prescriptions in which there is validation of prescription mentioned and pharmacists shall control dispatching errors. While in the third level the process will be made more rigorous by involving DRAP so that electronic registration and regulation of pharmacies and pharmacists would be enabled.

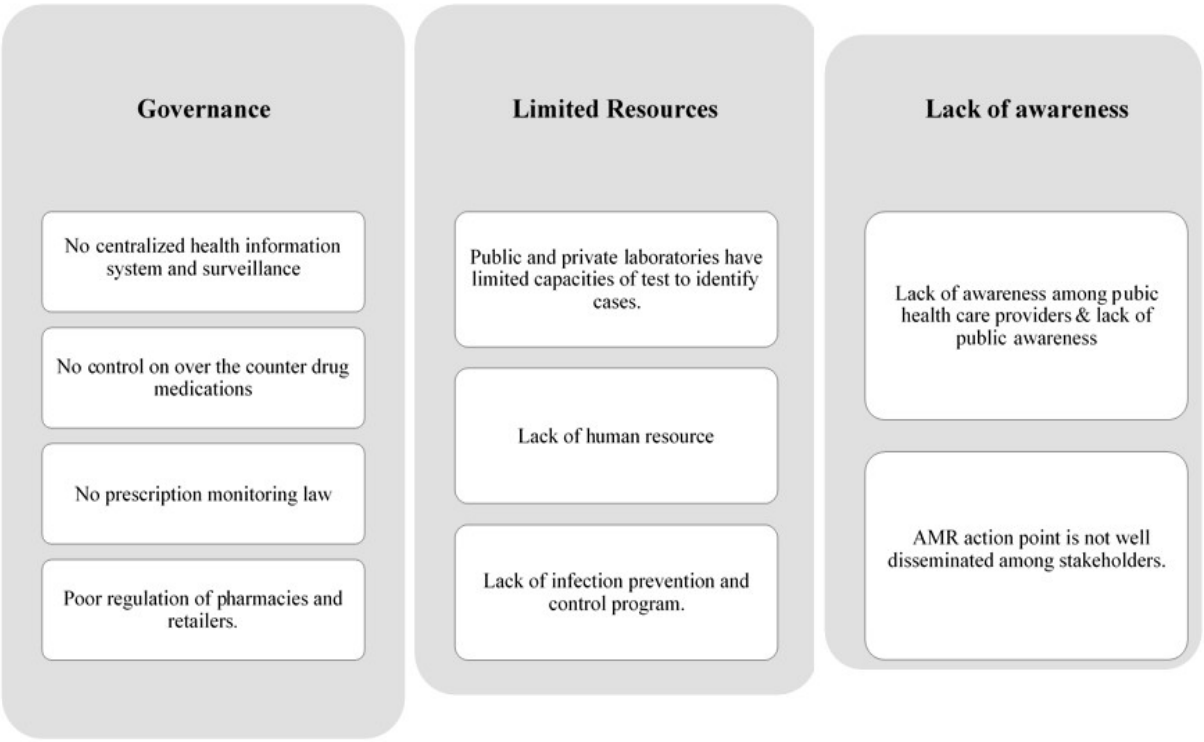



**Fig. 1**: Bottle necks for antimicrobial resistance in Pakistan

The implementation and practice of prescription monitoring regulation could directly lead to improving the quality of prescription, prevent misuse and overuse of medicines, turn down the side effects, over prescription, dispatch errors and through such measures the performance and accountability of their work will be possibly achieved. This will be done with the capacity building approaches of available health providers and improved culture of Continuous Medical Education. It is also a cost-effective measure. This integration will also help to bring transparency of the stakeholders' role and their responsibilities. The real time data and antibiotics utilization surveillance can help the decision makers to identify areas of intervention.

## CONCLUSION

This analysis of AMR control policy and regulation in Pakistan shows lack of health system's commitments, weak regulatory channels, and manifests that antibiotics are misused in all healthcare settings. Therefore, regulation and law amendment is needed to overcome this problem which includes multi sectoral approach, mass media campaign and also technology use as an opportunity. Uptake of data driven advocacy to address antimicrobial issues and the integration alliance needs to improve the current AMR control problem and enhance the quality of services. Notwithstanding that we have a weak health system and low health budget but in this exceptional era of digitalization, the health system is also evolving through technology; thereby health service delivery can be managed easily through it. However, this needs financial allocation and collaboration with ministry of science and technology to address the technological needs for such system. Tackling AMR should be a national priority to protect the health of people and avoid financial consequences.

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