Importance of Surveillance of Antimicrobial Resistance with its Challenges: Bangladesh Perspective

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Antimicrobial Resistance (AMR) is a leading cause of death around the world, with the highest burdens in low-resource settings. It is a natural phenomenon that occurs when microorganisms are exposed to antibiotic drugs. Under the selective pressure of antibiotics, susceptible bacteria are killed or inhibited, while bacteria that are naturally (or intrinsically) resistant or that have acquired antibiotic-resistant traits have a greater chance to survive and multiply.

AMR is one of the most complex and multifaceted health challenges facing the global community today. Drug-resistant infections already contribute to at least 700,000 deaths a year. Given the current trajectory, drug resistance could lead to 10 million deaths annually and plunge 24 million people into extreme poverty by 2050[1].

World Health Organization (WHO) acknowledged AMR as global public health problem in 1998 and urged member states to take necessary measures to encourage appropriate use of antimicrobials. In May 2015, the 68th World Health Assembly adopted the Global Action Plan (GAP) on Antimicrobial Resistance. All countries are required to develop their own National Action Plan (NAP) based on the GAP and start implementing it at local level. One of the five strategic objectives of the Global Plan is to strengthen the knowledge and evidence of antimicrobial resistance base through surveillance and research.

According to Anti-Microbial Resistance Global Surveillance Report by WHO 2014, there is at present no global consensus on methodology and data collection for antibacterial resistance (ABR) surveillance. Although ABR surveillance has been undertaken for many years in a number of high-income countries, there are still large gaps in knowledge about the status of ABR surveillance capacities worldwide, particularly in resource-limited countries like Bangladesh. AMR surveillance is the cornerstone for assessing the burden of AMR and for providing the necessary information for action in support of local, national, and global strategies.

The WHO manual for GLASS describes three types of surveillance methods which are Laboratory-based surveillance without linkage to patient data, Case-finding based on routine clinical specimens and Case-based surveillance of clinical syndromes. Among these three, condu

There are several achievements of this surveillance system. Surveillance data, antibiogram has been disseminated to all the stakeholders of the sentinel sites as well as centrally to all the stakeholders including Clinicians and Policy Makers. National Human AMR Surveillance data of 2017, 2018, 2019 & 2020 is entered in Global Antimicrobial Resistance Surveillance System (GLASS) platform of WHO from Bangladesh.

The antibiogram of different sites is readily visible for physicians, microbiologists or other concerned personnel through IEDCR website. Link for dashboard: http://119.148.17.100:8080/amr/summary_graph.php IEDCR is designated by the Government as Sectoral Coordination Center (Human health) for AMR surveillance and National Reference Laboratory (NRL) for AMR is situated at IEDCR.

Fleming Fund country Grant, Bangladesh is supporting NRL for infrastructure development, equipment and logistics. It is to be noted that they are also supporting other five microbiology laboratories namely, Dhaka Medical College, Mymensingh Medical College, Chattagram Medical College, Khulna Medical College, and Rangpur Medical College.

At present a modern laboratory is being established at new building of IEDCR where a floor is dedicated for the reference laboratory with all the modern facility and equipped with latest technology and advanced equipment like VITEK-2, MALDI-TOF and molecular diagnostics. The software for data collection from sentinel site, monitoring of data from center as well as the dashboard- all are developed maintained by IEDCR IT team.

There are few future plans for this surveillance. Southern part of Bangladesh is yet to be covered under the existing surveillance sites. There is plan to include Sher-E-Bangla Medical College Hospital and Chattogram Medical College Hospital as AMR surveillance site. Capture and report the AMR data produced by the private sector in the national AMR data base for obtaining a more comprehensive picture of AMR prevalence and trends in the country. Development of local antibiogram is necessary in each site and sharing with the physicians. Regular and more frequent dissemination of surveillance findings will be performed in the sentinel sites as well as centrally. Enhancement of surveillance activities will be done by including more pathogens like *Neisseria gonorrhoeae*, fungal pathogens, molecular surveillance. Genome sequencing of the Multi Drug Resistant pathogen will be performed. Initiation of extensive research activities in National Reference Laboratory will be in future plan.

There are several challenges during performing the surveillance. The present program is mainly development partner dependent which is not good for the sustainability. The surveillance should be funded by Government budget where there should be scope of participation of development partners.

The human resource specially the Medical technologist working at the bench is inadequate in some of the sites. It should be ensured. Monitoring and supervision from the coordination committee at IEDCR is challenging. There should be active involvement of the sentinel site hospital and college authorities and diagnostic stewardship should be established for better performance and accountability of concern laboratory personnel and surveillance physician. The capability should be improved at the surveillance sites as well as responsibility of epi data and laboratory data collection, sharing with the coordination committee, data analysis and dissemination should be taken by the site authority so that they become self-dependent and have the ownership.

The Contribution of the AMR Surveillance System is already visible to achieve the GAP on AMR goal and the five strategic objectives. GHSA supported AMR surveillance of Bangladesh has been contributing to the understanding of AMR situation from its initiation and now in its no cost extension period which will be ended by September, 2022. It needs to be continued and made sustainable through government funding and development partner's support in the future to achieve success in the fight against AMR.

References

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