Review Article

DOI: 10.56412/gmcp.2023.6.01.139

Antimicrobial Stewardship to curb menace of growing antimicrobial resistance

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Background:

Antimicrobial resistance has been recognized as one of top ten threats to public health by the World Health Organization.[1] Although emergence of antimicrobial drug resistance is inevitable but it is accelerated several folds by overuse and misuse of antibiotics.[2] Currently about 700,000 people die globally owing to drug resistant infections. If the current situation prevails; these figures could rise to 10 million by 2050.[3] Growing AMR resistance and dried up pipeline of newer effective antibiotics has made possibility of post antibiotic era a real one.[4] By post antibiotic era we mean a situation where antibiotics will lose their effectiveness against microbes. This would mean that people could soon start dying of trivial microbial infections which are currently curable with short courses of appropriate antibiotic therapy. Given the gravity of situation; it is understandable that there is global need to preserve effectiveness of available antibiotics for a longer time span. Through the present review, which is intentionally kept concise; we aim to sensitize practising physicians, resident doctors and nursing staff about key concepts of Antimicrobial Stewardship Programs (ASPs/AMSP) which are hospital-based programs to promote judicious use of antibiotics. We shall briefly discuss what is meant by antimicrobial stewardship; goals of AMSPs and impact of ASP interventions on health outcomes besides outlining stepwise approach to starting ASP in your hospital setting.

What is Antimicrobial Stewardship?

Antimicrobial stewardship refers to the "responsible use" of antimicrobials by healthcare professionals. This involves multidisciplinary team approach to promote actions that balance both the individual's need for appropriate treatment and longer societal need for sustained access to effective antimicrobial therapy. [5]

What are the goals of Antimicrobial Stewardship Programs (ASPs)?

The primary goal of ASPs is to promote rational use of antimicrobials by assisting clinicians in selection of right antimicrobial agent in right dose for the right duration through appropriate route and initiating timely de-escalation of antimicrobial therapy so as to optimize health outcomes for the patient. This indirectly also leads to reduction in misuse and overuse of antibiotics. Other goals of ASPs include reducing antibiotic induced collateral damage such as selection of drug resistant pathogens, antibiotic associated adverse effects and reducing healthcare costs. [6]

Is there any scientific evidence to suggest that ASPs really impact healthcare outcomes?

Antimicrobial stewardship programs have shown promising results in different health care settings across numerous scientific studies. The benefits include improved infection cure rates; decreased mortality rates; decreased consumption of antimicrobials; reduced incidence of nosocomial infections, reduced Clostridium difficile infection rates, reduction in antimicrobial resistance rates and hospital cost savings. [7-10]

How to start AMSP in your hospital?

Building process of AMS program [11,12] can be split into following components:

1. Gathering prerequisites
2. Setting out goals of AS program
3. Selection of strategies to achieve the set goals
4. Monitor and evaluate the AS program

1. Prerequisites:

For understanding what all prerequisites are required to start ASP; one needs to be familiar with core elements of AS program. The know-how of these elements could be gained either through literature review or visiting and collaborating with established AS teams in other hospitals or a combination of both. In general, building an AMSP team in your own hospital is most important. AMSP team is typically multi disciplinary in composition. It brings together various stakeholders such as hospital administrators, infectious disease physicians, clinical pharmacists/ pharmacologists, microbiologists and clinicians with common interest in improvising antimicrobial use. Some of the other prerequisites include existence of antimicrobial standard treatment guidelines, adequate diagnostic support among available human and IT resources.

2. Delineating goals of ASP

Local situation SWOT analysis (strengths, weakness, opportunities and threats) needs to be conducted first. This helps identify priority problem areas and thus aids in setting out clear ASP goals in the given facility.

3. Selection of AMSP Strategies:

AMSP strategies or interventions can be broadly classified as active and supplemental strategies. [11,12] They can be employed separately as well as in combination depending upon available resources and expertise in the given healthcare setting. Commonly employed active strategies include Prospective audit and feedback and Preauthorization.

a) Prospective audit and feedback: This approach involves concurrent review of antimicrobial prescription orders by the AMSP team. Feedback is provided to the prescribing physician regarding the suitability of antibiotic use with respect to selection, dose, dosing regimen and duration of antibiotic therapy based on diagnostic workup and clinical condition of the patient. This approach mainly focuses on rapid de-escalation of antimicrobial therapy.

b) Formulary restriction/ Preauthorization: This strategy involves pre-prescription restrictions on use of certain selected antibiotics. Prior authorization or approval is required from designated AMSP team members before prescribing these antibiotics. This approach has the advantage of targeting specific antimicrobials based on local resistance patterns.

In addition to above; there are various supplemental strategies for AMSP. These include organising didactic education events; developing facility specific standard treatment guidelines for infectious syndromes; antibiotic cycling; antibiotic time outs; dose optimization; timely de-escalation and employing computer assisted decision support systems.

4. Monitoring and evaluating ASP:

Development of ASP infrastructure and selection of strategies for implementation are just not enough. It is equally important to evaluate the impact of selected interventions in achieving ASP goals. If the goals are not met-analyse the barriers and enablers; review the strategies and adapt accordingly.

Conclusion:

Growing AMR represents global health emergency. Antimicrobial Stewardship programs represent core components of many national action plans to combat AMR and optimize healthcare outcomes in multiple ways. Therefore, building and implementing ASPs across hospitals is the need of the hour. We are hopeful that this article would encourage interested healthcare professionals to take their first step in the fight against antimicrobial resistance.

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