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## ANTIMICROBIAL STEWARDSHIP: A POWERFUL APPROACH

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### ABSTRACT

Antimicrobial resistance is increasing however antimicrobial drug development is slowing. In the era of COVID19, antimicrobial resistance causes an additional challenge to the therapeutic medicine, particularly in the vulnerable elderly population. Antibiotic are highly prescribed drugs in clinical practice, and it is estimated that around 50% of antibiotic use in the hospital (in both the outpatient and inpatient) is not prescribed correctly, either not necessary or are not optimally effective as recommend to the patient.

**Keywords:** Antimicrobial Stewardship Programme, World Health Organization, Antimicrobial Resistance, Clinical Practice, Resistance.

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### I. INTRODUCTION

Antimicrobial stewardship has been defined as the optimal selection, dosage and duration of antimicrobial treatment that result in the best clinical outcome for the treatment or prevention of infection, antimicrobial drug with minimal toxicity to the patient and minimal impact on subsequent resistance. Antimicrobial stewardship according to the WHO is a “framework to protect antimicrobial drugs by taking steps to enhance their control, optimal distribution, and appropriate usage” Antimicrobial stewardship has three folds.

- The primary goal is to collaborate with the health care provider's nurse to ensure that each patient receives the most appropriate antimicrobial treatment at the right dosage and for right duration.
- The second goal is to prevent the overuse, misuse and abuse of antimicrobials. In both the hospital inpatient and outpatient context, physicians use antibiotics when they are not necessary.
- Third goal is to reduce the emergence of resistance, both at the level of the individual patient and the community<sup>1</sup>.

There has been an increased emphasis on the wise use of antibiotics due to the evolution of resistance and the paucity of novel medicines. 14 new classes of antibiotics were introduced between 1935 and 2003. Only 10 novel antibiotic have been approved since 1998, and only linezolid and Daptomycin have new target of action.<sup>2</sup> 11 new antibiotic have been licensed since 2017, According to the world health organization's Antibiotic pipeline data report 2021. Only two of them have new target of action and represent a new class this is most likely because developing antibiotics is expensive and risky and less profitable then the drugs to treat chronic diseases. Antimicrobial stewardship is crucial to maximizing the use of currently available antibiotics due to the sluggish development of antibiotics and the rapid emergence and spread of resistant organisms.<sup>2</sup>

#### A. Antimicrobial resistance:-

Antimicrobial resistance has emerged as one of the most pressing dangers to public health, posing substantial obstacles to the effective prevention and treatment of chronic disease<sup>3</sup>.

The world health organization (WHO) has developed a global action plan to combat antimicrobial resistance by, among other things, lowering the prevalence of infectious diseases, raising awareness and knowledge levels, and supporting the prudent use of antibiotics. Although the fundamental components of effective antimicrobial stewardship programs are well known, their implementation in environments with limited resources is riddled with difficulties<sup>4</sup>.

#### B. AMR: clinical and financial burden:-

Every year at least 700,000 people succumb to AMR. Global public health is at risk from COVID -19. The use of antibiotics which is not advised by health authorities is common among covid-19 patients with mild or moderate disease. It was discovered when examining the anti -microbial prescribing for covid-19 patients, that 72% of 2,010 COVID patients received broad - spectrum antimicrobial therapy in the hospital, despite the fact that only 8% of them suffered bacterial and fungal co-infection<sup>5</sup>. An increase in the incidence of pathogens that

are resistant to antibiotics has been observed globally during the past few decades. Prolonged hospital stay, more expensive treatment, and most critically, substantially worse patient outcome, including a higher mortality rate, are all consequences of these pathogen caused infections<sup>6</sup>. A significant public health challenge that calls for the involvement of the entire medical community is presenting, reducing and controlling the emergence of antimicrobial resistant organism in hospitals, long term care facility, and other institution as well as in the community<sup>6</sup>.

## II. IMPLEMENTATION

Antimicrobial stewardship is a logical sequence of steps that encourages the prudent application of antibiotics. These definition can be used to guide individual decisions as well as those that affect the environment and human health on a national and global level<sup>7</sup>. Antibiotics are often administered drug in clinical practice, although it is estimated that 60% of antibiotic use in hospitals is incorrect, either because it is not essential or because it is not as effective as would be best for the patient<sup>8</sup>. In the outpatient department, there were significantly fewer unnecessary antibiotic prescriptions (25.6% before the program vs. 17.4% after the program) following the implementation of an antimicrobial stewardship program in the emergency department<sup>9</sup>. For instance, the standard treatment for the sexually transmitted disease gonorrhea is azithromycin and ceftriaxone. However, such improper clinical use of antimicrobial agents resulted in increased resistant with higher no. of deaths from treatable and curable infection before the emergence of resistance. However, gonorrhea is becoming a challenging illness to treat as a result of antimicrobial resistance<sup>8</sup>.

## III. STRATEGIES

**The two core strategies which provide the foundation of an antimicrobial stewardship program include:**

1. Formulary restriction with Preauthorization
2. Prospective audit with intervention and feedback to prescribers<sup>10</sup>.

## IV. CHALLENGES

Perceived clinical exposure is also crucial since suggestions made by clinical pharmacist frequently get dismissed as text book information and are replaced by experienced. A policy must be developed universally in order to standardize the protocol regardless of the doctor. The clinical pharmacist certifies that it is challenging to obtain an antibiogram, which is a true depiction of the community's pattern of resistance<sup>11</sup>.

## V. FUTURE PROSPECTIVE OF ANTI-MICROBIAL STEWAEDSHIP PROGRME

An antimicrobial stewardship program is a systemic approach for developing coordinated interventions to reduce the overuse and inappropriate selection of antibiotics and to achieve the best possible outcome for patients in a way that is both effective and affordable. With the establishment of a knowledge base and social structure that occasionally cooperates with conventional hierarchies of decision making and consultation, AMS processes are developed in hospitals. In order to construct AMA, This qualitative study fully examines the current existing mechanisms of surveillance and monitoring of the use of antimicrobial in specific contextual settings. It also looks at how these mechanism used as building blocks<sup>12</sup>.

The future contribution stewardship can make to fostering innovation, the necessity of eschewing an antibiotic use paradigm controlled by pharmacy budgets, and the effects of antimicrobial control programs ever rising sophistication and inter-disciplinary nature<sup>13</sup>.

## VI. CONCLUSION

The establishment of an antimicrobial stewardship program is effective in promoting the prudent use of antibiotics according to the studies. India must put in place a stewardship program and classify antibiotics in both public and private health facilities using the AWaRe (Assess, watch and Reserve) system.

The success of India's national action plan on antimicrobial resistance plan (NAP-AMR) depends on the government and all health care providers working together on stewardship programs. Antibiotics could be preserved for the current and future generations by conducting interventional research on antibiotic use in health care institutions and raising public knowledge of the negative effects of the self-medication.

## VII. REFERENCES

- [1] Doron S. and Davidson L, "Antimicrobial stewardship" Vol. 86, issue11, pp.1113-1123, 2011.
- [2] Shrestha J. and Zahra F., "Antimicrobial stewardship" vol. 11, issue 30, pp.1219-1288, 2021.
- [3] Dedgostar P., "Antimicrobial resistance: Implications and costs", vol.12, pp. 3903-3910, 2019.
- [4] Kakkar A.K., Singh G., Ray P. et. al. "Antimicrobial stewardship programs in resources constrained environments: understanding and addressing the need of the systems", vol. 8, pp. 140-143, 2020.
- [5] Majumdar M.A., Rahman S., Singh K. et.al. "AMS: fighting antimicrobial resistance and protecting global public health", vol. 20, pp. 4713-4738, 2020.
- [6] Septimus E.I. and Owenes R.C. "Need and potential of antimicrobial stewardship in community hospitals", vol.53, issue 1,pp.58-514, 2011.
- [7] Omari A.A., Mutair A.A., Subaie M.A., "The impact of antimicrobial stewardship program implementation at four tertiary private hospitals; results of a five year pre post analysis", vol. 95, issue 9, pp.3675-3778, 2020.
- [8] Razzaque M.S. "Implementation of antimicrobial stewardship to reduce antimicrobial drug resistance", pp. 559-562, 2020.
- [9] Dinh A., Duran C., David B. et.al. "Impact of an antimicrobial stewardship programme to optimize antimicrobial use for out patients at an emergency departments", vol. 97, issue 3, pp.288-293, 2017.
- [10] With K.D., Allerberger F., Kern W.V. et.al, "Strategies to enhance rational use of antibiotics in hospitals : a guideline by the German society for infectious disease", vol.44, pp.395-439, 2016.
- [11] Mathew p., Ranjalkar J., Chany S.J. C'hallenges in implementing antimicrobial stewardship programmes at secondary level hospitals in India : An exploratory study", vol. 18, issue 8,pp. 493-904,2020.
- [12] Mbugua S.M., Njoroge G., Gitaka J."Exploring perspectives on antimicrobial stewardship : a qualitative study of health manager in Kenya", vol. 49, pp. 1765-1779, 2020.
- [13] Vickers R. J., Bassetti M., Garey K.W. "Combating resistance while maintaining innovation : the future of antimicrobial stewardship", vol.14, pp. 1331-1341, 2019.