



Research Article

MONITORING ANTIBIOTIC USAGE AND ADHERENCE TO ANTIBIOTIC POLICY IN A SPINE SUPERSPECIALITY INSTITUTE-GOVERNMENT ORGANIZATION IN WESTERN INDIA

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Abstract- Background: Resistance though a natural phenomenon of microbes, has seen an increase in prevalence and spread over the years largely due to inappropriate use of antibiotics both in health facilities and the community. The present study was conducted to know the usage of antibiotics and the adherence to antibiotic policy in a chronic health care setting. Methods: Antibiotic usage monitoring and the adherence to the antibiotic policy was done by the survey based on the predetermined criteria. All the indoor patients on antibiotics were monitored till the antibiotic was stopped on daily basis. The monthly analysis was done. Results: The major gaps in starting the antibiotic therapy without the culture and sensitivity testing done and hence the awareness to escalate and deescalate was also less. Conclusion: The present study has shown that Antibiotic usage monitoring has direct relationship to the Antimicrobial resistance development. Hence Antimicrobial Stewardship Programme to optimize antimicrobial therapy administered to patients and to reduce the antimicrobial resistance.

Keywords- Antimicrobial Usage- AMU, Antimicrobial Resistance-AMR, Defined Daily Dosage-DDD, Prescribed Daily Dosage-PDD, Antibiotic Policy, Antimicrobial Stewardship

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Introduction

Introduction of the antimicrobial drugs in 1940 have played an essential role in decreasing morbidity and mortality due to infectious diseases. About 11 million deaths are due to infectious diseases worldwide in 2000 [1]. Antimicrobial resistance (AMR) has increased and spread over the years which is largely due to inappropriate use of antibiotics both in health facilities and the community and is not limited to developed countries [1, 2]. Study shows, many economies are also experiencing accelerating rates of AMR, including the spread of new multi-drug resistance strains of pathogenic microbes [3]. AMR increases the economic burden on individuals in society, health systems and governments. The patients infected with antimicrobial-resistant organisms have higher costs as compared to patients having infections due to antimicrobial susceptible organisms [4,5]. The standard antibiotic treatments become ineffective when there is increase in AMR which is threat to public health. Infections with antibiotic-resistant bacteria are associated with a higher risk of death. Hundreds of thousands of deaths per year are estimated to be attributable to antibiotic resistance [6]. That number is likely to rise to many millions per year by 2050. The misuse and overuse of antibiotics is a key contributor to this problem.

Materials and Methods

The study was carried out from January 2019 to July 2019 at Spine Superspeciality Institute A Government Organization.

Criteria to be measured

Based on the Infection Prevention and Control handbook for Public Health Facilities of Gujarat, Health and Family Welfare Dept, Govt of Gujarat 2017, National Treatment Guidelines for Antimicrobial Use in Infectious Diseases by National

Center for Disease Control 2019, WHO, CDC guidelines for antimicrobial usage, Infection Control Manual and Antibiotic Policy Govt Spine Institute 2019 standards, references and guidelines. The Institute has developed and implemented antibiotic policy and monitors the rational usage of antimicrobial agents. It captures the parameters for monitoring of antimicrobial usage in the antimicrobial usage form. It monitors antibiotic therapy as well as prophylaxis.

For antibiotic therapy following parameters are monitored

- The clinical conditions in which antimicrobial agents are used
- Culture and sensitivity performed
- Name of antimicrobial agents
- Generic name used
- Antimicrobial used from formulary or not
- Dosage form and strength
- Dosage and frequency per day
- Was as per antibiotic policy
- Duration of antimicrobial therapy.
- Defined Daily Dosage (DDD) and Prescribed Daily Dosage (PDD)
- Monotherapy vs combination therapy
- Escalation and de-escalation of therapy

For antibiotic prophylaxis following parameters are monitored

- Diagnosis
- Name of surgery
- Prophylaxis Antimicrobial prescribed (name dose form strength)
- -Time of prophylaxis and time of incision
- -Was as per antibiotic policy

The deviations are brought in notice of clinician and corrective preventive actions are taken and documented.

Exclusion criteria

Patient no on antimicrobial therapy and not undergoing surgery, OPD patients

Sample & sampling technique

All indoor patients on antimicrobial therapy and undergoing surgery during January 2019 to July 2019. The Monitoring of Antibiotic Usage and Adherence to antibiotic policy is done by capturing the data on antimicrobial usage in Antibiotic usage for therapy and prophylaxis. In daily rounds the monitoring of the therapy is done and depending upon the culture and sensitivity reports escalation/ deescalation as per antibiotic policy. At the end of the month all the antibiotic usage form is evaluated and monitored and corrective and preventive actions are taken accordingly. Onsite Daily monitoring during round Antibiotic usage audit monthly

Data Collection tool

Antibiotic usage form, patient case file and laboratory reports of culture and sensitivity and are obtained by the staff nurse every month and daily feedback during rounds

Data validation

First 10 % all the antibiotic usage form was double reviewed by the consultant, infection control officer and ICN and the results were compared before continuing with data collection.

Results

In the study period 835 antibiotics prescribed all were from the formulary, with generic name and as per antibiotic policy.

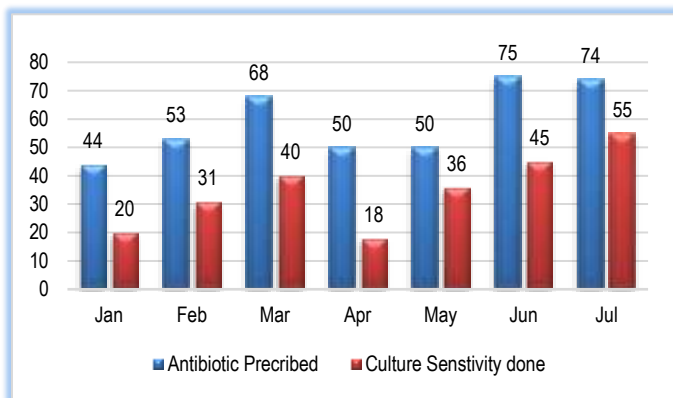


Fig-1 Antibiotic prescribed Vs culture sensitivity performed

Hence the antibiotics are prescribed in 40.8 % patients without the Culture and sensitivity testing. But in all patients have been antibiotic prescribed after doctor's prescription antibiotic and then only started. In the month of April, the Culture Sensitivity rate was very low as the resident doctors on rotation changed. They were trained to increase the adherence to antibiotic policy

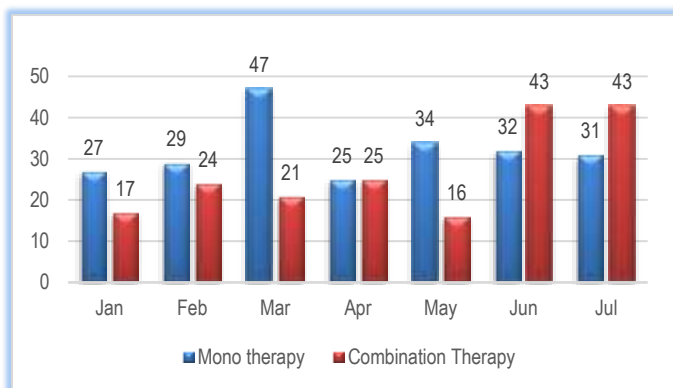


Fig-2 Monotherapy Vs Combination Therapy

In 45.6 % cases combination therapy started.

After the culture and sensitivity testing escalation and deescalation was not done in January as lack of training and awareness but from month of February it was

observed as per the culture and sensitivity. In 40.8% cases the antibiotics were started without culture and sensitivity testing. In 100% cases antibiotic prophylaxis was given within 2 hours of incision time in operation theater. All the other parameters monitored were 100% compliant. The DDD and PDD was also 100% compliant.

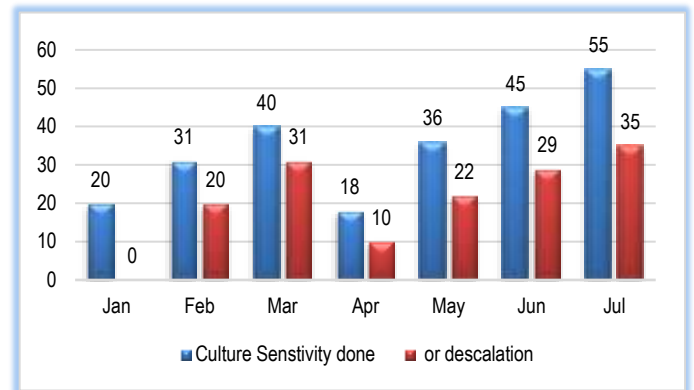


Fig-3 Culture Sensitivity Vs Escalation/ Deescalation

Discussion

Our study has shown the major gaps in starting the antibiotic therapy without the culture and sensitivity testing done and hence the awareness to escalate and deescalate was also less. This practice leads to the development of the antimicrobial resistance-AMR due to inadvertent use of antibiotics. Antibiotic usage monitoring has direct relationship to the Antimicrobial resistance development [7]. As the patient of our Institute are being chronic patients and most of them are on antimicrobial therapy. Many of these patients are infected with multidrug resistant organism. The current antibiogram of common isolates also confirms the same. Monitoring of antibiotic usage, Surveillance of Antimicrobial Resistance (AMR) and the adherence to antibiotic policy will help in appropriate and judicious use of antibiotics a step toward developing Antimicrobial Stewardship Programme to optimize antimicrobial therapy administered to patients and to reduce the antimicrobial resistance. Similar studies are conducted in Poland by Jadwiga Wojkowska-Mach, *et al.*, [8] and in Ghana by Saviour Kwame Yevutsey, *et al.*, [9] and WHO Report on Surveillance of antibiotic consumption [1] but the parameters were different and the studies were done at country level hence not comparable.

Conclusion

Antimicrobial resistance is a matter of global concern as well as for India. A major factor responsible for this is the widespread inadvertent use antimicrobial agents. The heavy antibiotic pressure and the presence of compromised individuals in an environment with a variety of pathogens results in the emergence and spread of resistant organisms to other patients by cross-infection leading to increased ALOS, cost of therapy, morbidity, mortality and increased risk of transmission of infection in the community. Appropriate and judicious use of antibiotic by diagnosis and reporting of resistant microorganisms helps in clinical decision making, designing infection control interventions and antimicrobial resistance containment strategies. Appropriate antimicrobial therapy administered to patients and monitoring its usage can reduce the antimicrobial resistance can be a step toward developing Antimicrobial Stewardship Programme to optimize antimicrobial therapy administered to patients and to reduce the antimicrobial resistance Also implementation of the restricted antibiotic usage for the reserved drugs is much needed. More and more training is to be needed along with the sharing of the antibiograms among the clinicians to change in the mindset. Many low- and middle-income countries (LMICs) do not have robust systems for collecting and analyzing data on AMR and AMU because of lack of resources and capacity. Challenges to the surveillance are weak laboratory infrastructure, lack of trained laboratory and clinical personnel and substandard antimicrobials and diagnostics have been cited as challenges to surveillance in countries [10,11]. Hence an effort are needed to set up national surveillance systems to collect and report data on antimicrobial consumption in these countries including India.

Application of research: This study helped to know the antibiotic usage and the adherence to the antibiotic policy in a Super speciality setting a step toward developing Antimicrobial Stewardship Programme to optimize antimicrobial therapy administered to patients and to reduce the antimicrobial resistance

Research Category: Medical Microbiology

Abbreviations:

AMR- Antimicrobial Resistance
AMU- Antimicrobial Usage
LMIC- low- and middle-income countries
DDD- Daily Defined Dosages
PDD- Prescribed daily dosages
CDC- Centers for Diseases Control
WHO- World Health Organization

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Study area / Sample Collection: Government Spine Institute Ahmedabad

Conflict of Interest: None declared

Ethical approval: The study was approved by Ethics Committee of Government Spine Institute Ahmedabad and study number was GSI-EC-9-1-2019.
Ethical Committee Approval Number: GSI-EC-9-1-2019.

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