EVAUATION OF ANTIMICROBIAL UTILISATION PATTERNS ACCORDING TO WORLD HEALTH ORGANISATION Aware CLASSIFICATION IN A MULTI- SPECIALTY HOSPITAL

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Abstract:
INTRODUCTION: - Inappropriate use of antibiotics has become one of the biggest drivers for antimicrobial resistance [AMR] which has become an expanding public health warning. To improve the usage of antimicrobials, the World Health Organization grouped antibiotics into three categories which include Access, Watch, Reserve group antibiotics [AWaRe]. The compulsion of WHO is that Access group of antibiotics should be widely used and at low cost and to reduce the usage of watch and reserve groups of Antibiotics. Combination of factors such as changing prescribing practices, increasing AMR to other antibiotics classes and lack of availability of first line penicillin antibiotics included in Access groups could lead to the increasing usage of second and third generation cephalosporins of Watch group.

OBJECTIVES: - The Purpose of this study is to evaluate the pattern of antibiotic consumption in patients admitted in different departments according to WHO AWaRe group classification and The Secondary objective is to find out the Medication Errors such as wrong dose, wrong dosage form, wrong route of administration and potential drug interactions caused due to prescribed antibiotics.

METHODOLOGY: - A prospective observational study was conducted over a period of six months at Star multispecialty hospital, Hyderabad. The study was conducted to evaluate the use of antibiotics according to WHO AWaRe group classification. Total 150 prescriptions were analyzed for antibiotic consumption in inpatient departments of hospital.

RESULTS: - In our study we evaluated the overall antibiotic consumption pattern and found that the share of Access, Watch and Reserve group were 24.66%, 68.02% and 5.96% respectively. In our study we observed that the antimicrobial consumption pattern changed drastically without culture test and after culture. It was found that without the culture test Access group were 27.94% Watch group were 69.23%, Reserve group were 2.43% and Unclassified were 0.40% while after culture test the share of Access group changed to 18.03%, Watch group changed to 65.57%, Reserve group changed to 13.11% and Unclassified to 3.28% respectively.

KEYWORDS: Antimicrobial resistance, Essential Medicine List, Empirical therapy, Medication errors, Drug interaction

I. INTRODUCTION:
WHO AWARE CLASSIFICATION

WHO has divided antibiotics into three groups namely: Access, Watch, Reserve group

• Access – antibiotics that represent first or second-line for empirical treatment of common infectious syndromes based on a systematic assessment of the available lab data and other factors and that have a good safety profile with a low resistance potential. All access antibiotics are part of the Essential medicine list, that is these antibiotics should be widely available in all settings (while still making efforts to ensure their appropriate use). many penicillins belong to this class.
Examples include: - penicillins, first and second generation cephalosporins, doxycycline, clindamycin etc.

• Watch – antibiotics that present a higher resistant potential that negatively impact Anti microbial resistance. some watch group antibiotics are also included in the eml core list since they are the most effective options for a limited group of well-defined clinical syndromes, but their use should be tightly monitored and restricted to the limited indications. fluoroquinolones, which are unfortunately commonly used in many settings, belong to the watch group as their use should be avoided for indications for which they are no longer first or second choice.
Examples include: - third and fourth generation cephalosporins.

• Reserve - “last-resort” antibiotics, that have activity against multi (Mdr)- or extensively (Xdr) resistant bacteria, and their use should become accessible but tailored to highly specific patients and, in those situations, where all alternatives have failed to work. Examples include: - carbapenems, linezolid, colistin etc. [12,13,14]

II. METHODOLOGY

Study site:
Multispecialty Hospital (Star Hospitals, Banjara Hills, Hyderabad)
Study Design: It is a Prospective Observational Study
Study period: 6 months (October 2021 to March 2022)

Study criteria:

Inclusion criteria:
- All patients prescribed with antibiotics who are above the age of 18 years, irrelevant of the gender disease condition and availability of microbial tests.
- Patients prescribed with both oral and parenteral antibiotics are taken into consideration.
- All patients who are at a risk of developing infections after the surgery and organ transplant are taken into consideration.
- Patients who have to undergo surgery prescribed with prophylactic antibiotics and post operative patients receiving antibiotics.

Exclusion criteria:
- Patients with incomplete profile and patient therapy data for which proper guidelines are not available.
- Pregnant women were excluded in the study.
- Neonates, Infants and children were excluded in the study.

Sources of data:
- All the relevant and necessary data was collected from:
  - Patient case notes/ Treatment charts/ Operation charts.

Designing of data collection form:
- The data collection form was designed as per the inclusion criteria, which consists of:
  - Demographic data.
  - Vitals.
  - Provisional diagnosis.
  - Laboratory investigations.
  - Culture sensitivity reports.
  - Final diagnosis.
  - Antibiotic treatment chart (from admission to discharge)

Tools:
- Data collection form.
- Prophylactic data collection form.
- Standard antibiotic prescribing guidelines and Hospital antibiotic prophylactic policy.

Study procedure:
- The study team visited IPD everyday on regular basis.
- Patients meeting the inclusion criteria were selected for the study.
- All the relevant patient data was collected from the patient case notes and documented suitably designed data collection form.
- All collected data was analyzed using relevant methods.

Methodology:
- The study was done in Star Hospitals, Banjara Hills, Hyderabad, which contains all major services and departments including medical and surgical specializations, neonatal, pediatric, medical and surgical intensive care units. The antibiotic prescribing patterns for most frequently encountered conditions, including treatment and prophylaxis are based on recommendations considered by experienced physicians.
- Evidences provided by the culture sensitivity reports shows empirical and specific treatment of various microorganisms along with resistant and sensitive patterns.
- For the matter of surgeries, a policy has been framed for the prophylactic use of antibiotics by the Hospital Antimicrobial Stewardship Committee which is concise and easy to use table format arranged categorically for various available surgery departments.
- This study was prospective and observational (non-interventional) and was conducted for 6 months (i.e., from October to March). Each department was enrolled for the review during the above-mentioned study period. All the inpatients of various departments who were prescribed with at least one antibiotic were included.
- A total number of 195 patient’s data was collected out of which 150 patients were included in the study and the remaining 45 were omitted as per the exclusion criteria.
- Out of 150 patients, all 150 patients were reviewed for the appropriateness and justification of antibiotic use. Data was collected and recorded in specially designed data entry format during daily regular ward rounds. The clinical records of patients receiving antibiotics was reviewed for pertinent demographic, clinical, diagnostic and laboratory investigations which were extracted and entered into the patient specific form. Obtained data included: Age, Gender, DOA, DOD, Final diagnosis, Culture sensitivity reports, laboratory data and antibiotic treatment patterns including Brand name, Generic name, dose dosage form, duration, ROA of each antibiotic. Patients were followed until all the antibiotic therapy was discontinued. Uniformity in the usage of each antibiotic in course of therapy was documented appropriately.

Remaining surgical cases were monitored for adherence to prophylactic policy. Specially designed data collection form for this parameter included: Age, Gender, DOS, NOS, Name and dose of antibiotic, antibiotic given time, procedure start time, start and stop dates of antibiotic therapy. One of the investigators, clinical pharmacist, visited the respected OPT and appropriately recorded all the necessary data. Necessary follow-up was done for duration of antibiotic therapy.
Data was entered into a computer program (MS Excel) in two formats. One consisting of all relevant data in word and other figures consisting of codes for possible calculations. Standard Antibiotic prescribing guidelines developed by World Health Organization (WHO) and electronic databases (E.g., Drug bank) w.r.t. dose, indication, frequency, duration of antibiotics was considered as reference for the evaluation. Appropriateness of antibiotic treatment was determined according to compliance with the guidelines and then the use of antibiotic was justified to be rational or irrational. Each patient case notes were reviewed to see whether culture sensitivity tests were performed or not and if performed, were these considered to prescribe an antibiotic. Patients found to be treated with inappropriate antibiotics were specially documented to see the extra expenses (Cost burden) imposed on individual patient.

In case of patients who have undergone surgery, the prophylactic antibiotic prescribed was evaluated considering the hospital’s policy. Policy suggests the choice of antibiotic decided from the specified surgical procedure, its specified dose, dosage form, site of administration of antibiotic, the time lapse between antibiotic given time and the time of incision and specified duration of its usage. Finally, each case was observed whether the policy has been followed.

III. RESULTS:
In the six months study period, a total of 150 patients prescribed with Antibiotics were evaluated, out of which 75 patients were treated for surgical prophylaxis while other 75 patients had infectious diagnosis.

1. GENDER WISE DISTRIBUTION OF PATIENTS:
Among the total number of patients, Males were 85(56.67%) in number and Females were about 65(43.33%).

![Figure 1: Gender wise distribution of patients](image)

2. AGE WISE DISTRIBUTION OF PATIENTS:
The oldest patient included in the study aged 88 years and the youngest patient included in the study aged 22 years. The median age of the patients involved in the study was found to be 60.7 years. In this study more cases were found from the age group of 60-69 years i.e., 49(32.67%).

![Figure 2 Graphical representation of age statistics](image)

3. ANTIMICROBIAL CONSUMPTION IN HOSPITAL:
The total number of antimicrobials prescribed by physicians were 369 of which Access group were 91(24.66%), Watch group were 251(68.02%), Reserve group were 22(5.96%) and Unclassified were 5(1.36%).

![Figure 3. Graphical representation of age distribution](image)
4. ANTIMICROBIAL WITHOUT CULTURE (AWC):
The antimicrobial without culture consumption pattern shows the total number of antimicrobials prescribed were 247, among which Access group were 69(27.94%), Watch group were 171(69.23%), Reserve group were 6(2.43%) and Unclassified were 1(0.40%).

5. ANTIMICROBIAL AFTER CULTURE (AAC):
The antimicrobial after culture consumption pattern shows the total number of antimicrobials prescribed were 122, among which Access group were 22(18.03%), Watch group were 80(65.57%), Reserve group were 16(13.11%) and Unclassified were 4(3.28%).

IV. DISCUSSION
- Threat of Antimicrobial resistance is increasing at an alarming level all around the world. The key reason behind this is believed to be irrational prescribing pattern of antimicrobials.
- In our study conducted over the period of six months, we collected data for 150 patients which included 75 prophylactic cases and 75 infectious cases. This data was evaluated for analyzing the consumption pattern of antimicrobials. In current prospective study, out of 150 patients, Males were 85(56.67%) in number and Females were 65(43.33%) and the predominant age group was from 60-69 years that had 49(32.67%) patients.
- In our study the total number of antimicrobials prescribed by physicians were 369 of which Access group were 91(24.66%), Watch group were 251(68.02%), Reserve group were 22(5.96%) and Unclassified were 5(1.36%). It was observed that the most prescribed antimicrobials were from Watch group 251(68.02%) while the least were from Reserve group 22(5.96%).
In current prospective study the antimicrobial without culture consumption pattern shows the total number of antimicrobials prescribed were 247, among which Access group were 69(27.94%), Watch group were 171(69.23%), Reserve group were 6(2.43%) and Unclassified were 1(0.40%).

In our study the antimicrobial after culture consumption pattern shows the total number of antimicrobials prescribed were 122, among which Access group were 22(18.03%), Watch group were 80(65.57%), Reserve group were 16(13.11%) and Unclassified were 4(3.28%).

V. CONCLUSION
Antimicrobial resistance is increasing at an alarming rate leading to increasing morbidity, mortality and treatment cost. Antimicrobial stewardship programs were introduced to promote the rational use of antimicrobials and also to put a halt on increasing antimicrobial resistance.

Antimicrobial resistance can be controlled with better clinical and laboratory diagnosis, proper regulatory bodies, education and consultation with infectious disease specialists. There is a vital need for culture sensitivity investigations before treatment of infections.

The WHO AWaRe classification of antimicrobials consists of three groups which include Access, Watch and Reserve groups respectively. In This Study, we have found the antimicrobial consumption pattern to be 24.66%, 68.02%, 5.96% respectively for Access, Watch and Reserve groups. Ideally the percentage consumption of Access group antimicrobials should be the highest followed by Watch group and Reserve group respectively. But this Prescription pattern obtained can be due to the physicians thought to act in Accordance with WHO’s goal of antibiotics usage improvement.

In our study we observed that the antimicrobial consumption pattern changed drastically without culture test and after culture. It was found that without culture test Access group were 27.94% Watch group were 69.23%, Reserve group were 2.43% and Unclassified were 0.40% while after culture Access group were 18.03%, Watch group were 65.57%, Reserve group were 13.11% and Unclassified were 3.28% respectively.

In this study we also studied the antimicrobial consumption patterns for discharge antibiotics that showed Access group were 17.69%, Watch group were 74.83% and Reserve group were 7.48%. There were no unclassified antimicrobials prescribed.

he requisite tools and insight necessary to predict or suppress microbial virulence are at hand. We have to use antibiotics “RATIONALLY”. Efforts should be put in by various medical associations, physicians, global leaders and pharmaceutical companies to optimize the use of antibiotics in various Healthcare setups. This will lead to improvement in the quality of healthcare accompanied by decreased antimicrobial resistance, risk of super infections and severe hospitalizations. More research Is required to better understand which key messages and which types of interventions work best in different setting.

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