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A RETROSPECTIVE STUDY ON ANTIBIOTIC USAGE IN A TERTIARY CARE HOSPITAL

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Abstract

Antibiotics are one of the most commonly prescribed drugs today. Rational use of antibiotics is therefore extremely important as their injudicious use can adversely affect the patient. Drug Utilization Evaluation (DUE) is a system of ongoing systematic criteria based evaluation of drug that will help to ensure that medicines are used appropriately. It is drug/disease specific and can be structured so that it will assess the actual process of prescribing, dispensing, or administration of drug. The retrospective study was conducted At Pk Das Institute of Medical Sciences, Palakkad, Kerala for a duration of 6 months (February 2017 - January 2018). A source of data includes Patient case sheets &medication charts, nursing charts, culture & sensitivity reports. The inclusion criterion includes Patients aged between 18- 80 year, prescribed with oral and parenteral antibiotics. . On analyzing the gender, male gender (n= 111, 55.5%) were higher in numbers as compared to female counterparts (n=89, 44.5%). In our study the majority of the patients prescribed with antibiotics were with the clinical assessment of COPD (n=39, 19.5%), UTI (n=37, 18.5%) and LRTI (n=28, 14%), Bronchial asthma (n=19, 9.5%) respectively. On analyzing the data based on antibiotic sensitivity test, antibiotic test were performed and followed in (n=64,32%)prescriptions and in (n=47,23.5%)prescriptions were test is not followed respectively. In (n=89,44.5%) prescriptions, antibiotic sensitivity test is not performed. On analysis of antibiotics prescribed, the most commonly prescribed antibiotics were cephalosporins, of these ceftriaxone was highly prescribed of all (n=95). The high percentage of antibiotic prescriptions may indicate a high probability of irrational use. This study also point out irrational use of antibiotics are more leading to resistance, misuse and serious problems. So certain strategies should be put forward to strengthen rational use of antibiotics.

Keywords: Antibiotics, Antibiotic Susceptibility Test, Irrational use, Resistance

Introduction

Antibiotics are natural, semi synthetic or synthetic substances produced by microorganisms which selectively suppress the growth or kill other microorganisms at very low concentrations. Antibiotics are the powerful, effective and widely used medication utilized for treatment and prevention of numerous bacterial infections. [1] Antibiotics are usually taken orally, intravenously or applied directly to the affected part of the body. Most antibiotics start its effect on an infection within a few hours, and should complete the whole course of medication to prevent infection from coming back. If antibiotics are over used or used incorrectly there is a risk that the bacteria will become resistant. Antibiotics can also be given before surgery. This is called prophylactic use of antibiotics. [2] Antibiotics are one of the most commonly prescribed drugs today. It has been estimated that up to 1/3rd of hospitalized patient receive a course of antibiotics and antibiotics can account for up to 40% of the hospital drug budget. Rational use of antibiotics is therefore extremely important as their injudicious use can adversely affect the patient. [3] Antibiotics are generally used for the treatment of bacterial infection. It is important to remember that not all fevers are due to infection and not all infections are caused by bacteria. The majority of infections seen in general practice are of viral infection. The clinician should have adequate knowledge of the pharmacokinetic properties of the antibiotics used. Antibiotics vary in their oral absorption or their ability to cross the BBB and these factors affect their route of administration. The ability of antibiotic to achieve their concentration at the site of infection is another important consideration. Some antibiotic have very severe toxic effect and are best avoided in certain conditions. The physician should be aware of drug – drug interaction since many antibiotics can interact with other non-antibiotic drugs. Many antibiotics are often prescribed for duration of 5 – 7 days. Nevertheless it is reasonable to discontinue therapy even after 3 – 5 days, if the patient have resolved. Antibiotics

are usually grouped together based on their action. Each type of antibiotic only work against certain types of bacteria. Main types include: Penicillin, Cephalosporin, Tetracycline, and Amino glycosides. The antibiotic misuse or overuse can lead to bacterial resistance. Resistance to antibiotic is a biological phenomenon that can accelerate by a variety of factors including human practices. Resistance can be of drug tolerance, drug destruction, drug impermeability and cross resistance. [4] The monetary cost of treating antibiotic resistance infection worldwide is estimated to be many billions of dollars per year. According to the researchers, the resistance to antibiotics is increasing at a faster pace than it can be controlled. Antimicrobial resistance threatens the effective prevention and treatments of an ever increasing range of infection. Infections caused by resistant microorganism often fail to respond to standard treatments. This results in prolonged illness, higher health care expenses and a greater risk of death. [5] Drug Utilization Evaluation (DUE) is a system of ongoing systematic criteria based evaluation of drug that will help to ensure that medicines are used appropriately. Antibiotic resistance occurs when bacteria change in some way that reduces or eliminates the effectiveness of drugs, chemicals or other agents designed to prevent the infection. Thus the bacteria survive and continue to multiply causing more harm. Widespread use of antibiotics promotes the spread of antibiotic resistance. Mechanism of antibiotic resistance includes, Enzyme inhibition, Alteration of bacterial membrane, Bypass of antibiotic inhibition, Mutations, Alteration of target site, Genetic alterations in specific metabolic pathway of bacteria, Mutation. Antibiotic Susceptibility Test (AST) is the susceptibility of bacteria to antibiotics. AST helps in assisting clinician in the choice of drug for treatment of infection, reveal the changing trends in the local isolates, it helps the total pattern of antibiotic prescription, to control the use of antibiotics in clinical practice, to determine how effective antibiotic therapy against a bacterial infection. The overuse of antibiotic as well as the development of resistance in microbes is a global phenomenon. It concerns both the WHO and individual countries. The only way to reduce the resistance of antibiotic is through proper use and reducing abuse. In order to reduce the overuse of antibiotic, simultaneous training is needed for both doctors and patient. Studies showed that unilateral intervention is needed either by patient and physician. So it is now clear that the only way for the proper use of antibiotics is through intervention program by both doctors and patients. The purpose of this study mainly aims to determine the utilization of antibiotics in various departments of P K DAS Institute of Medical Sciences (PKDIMS), to analyze the commonly prescribed antibiotics for infections, to evaluate antibiotic resistance and to check whether the sensitivity test has been followed. By this study we may be able to examine whether the antibiotic usage followed is rational or not.

Aim: The Aim of the Study Is To Conduct A Retrospective Assessment On Antibiotic Usage In A Tertiary Care Hospital.

Objectives:

- To study antibiotic utilization in various departments.
- To evaluate antibiotic resistance and check whether sensitivity test has been followed.
- To analyze commonly prescribed antibiotics for infections.

Material and methods:

A retrospective study was conducted in P K DAS Institute of Medical Sciences (PKDIMS), Vaniyamkulam, Palakkad. Kerala from February 2017 to January 2018. Source of data was Patient's case sheet, Patient's medication chart, Prescription records, Nursing chart, Culture and sensitivity reports

STUDY CRITERIA

Inclusion Criteria

- Patients aged between 18 to 80 years.
- Patients prescribed with oral and parenteral antibiotics.

Exclusion Criteria

- Patients given topical antibiotics.
- Patients on dental treatment.
- Patients given prophylaxis.
- Pregnant and lactating women.

The study was approved by the Institutional Human Ethical Committee (IEC/ NOV/18/04) and the permission to use the prescription was granted from the medical superintendent and Head of the departments, PK DAS Hospital. In this study, we analyze antibiotic utilization in various departments for the most common infections and also evaluate the resistance patterns of different antibiotics. In this study we evaluate whether the sensitivity tests are performed or not for various antibiotics and analyze whether the current therapy has been switched over to a narrow antibiotic. We have examined and evaluated whether the antibiotic usage is appropriate and rational

Analysis of Data: The data obtained were analyzed statistically to arrive at meaningful interpretation of the collected data. Data was entered into Microsoft Excel 2007 datasheet and was analyzed using software SPSS 20 Version.

Results:

A total of 200 prescription profiles were reviewed. On analysis of age category , majority of patients were of the age group (60-69) & (70-80) with a percentage distribution of about (30.5%) and (30.5%) and others (40-49) years and (50-59) years age group with a percentage distribution of about (12%) and (13.5%)respectively.

On analyzing the gender, male gender (n= 111, 55.5%) were higher in numbers as compared to female counterparts (n=89, 44.5%).

Chart 1: Based On Diagnosis :

In our study the majority of the patients prescribed with antibiotics were with the clinical assessment of COPD (n=39, 19.5%), UTI (n=37, 18.5%) and LRTI (n=28, 14%), Bronchial asthma (n=19, 9.5%) respectively.

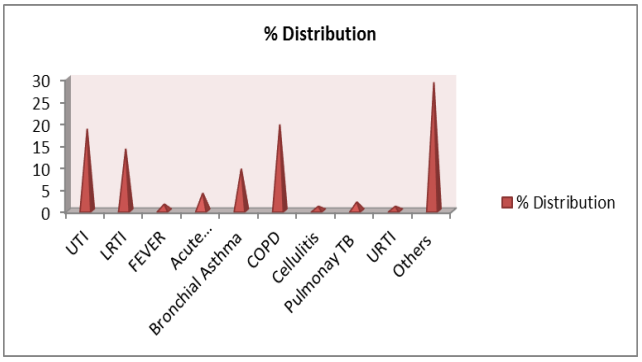


Chart 2: Based On Departments

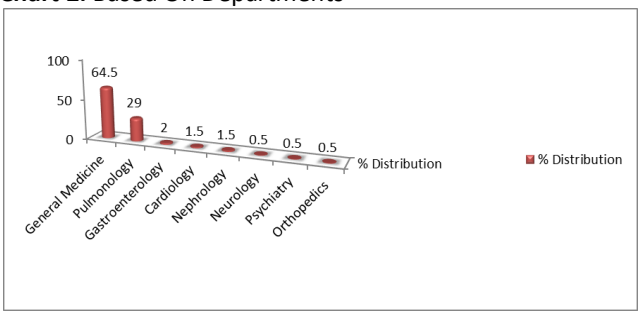


Chart 2 shows maximum use of antibiotics was by general medicine department followed by pulmonology and gastroenterology department

Chart 3: Based On No. Of Antibiotics Prescribed

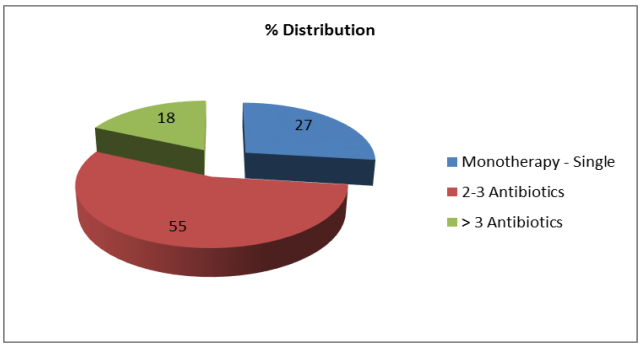


Chart 3 shows 27 % was single antibiotic therapy , 55% had used 2-3 antibiotics in treatment therapy and about 18 % had more than 3 antibiotics in treatment .

Chart 4: Based On Antibiotic Sensitivity

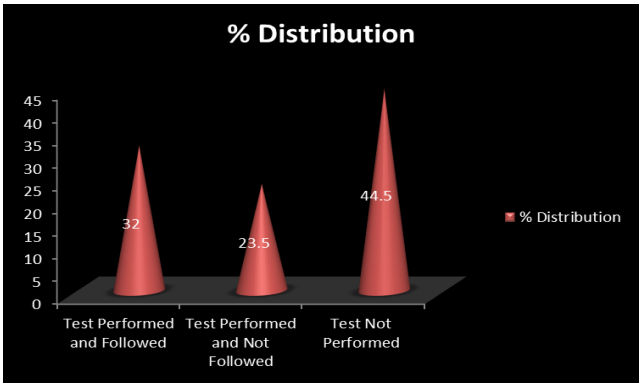
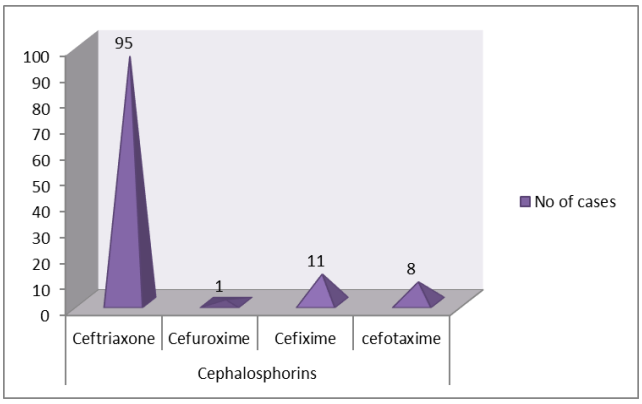
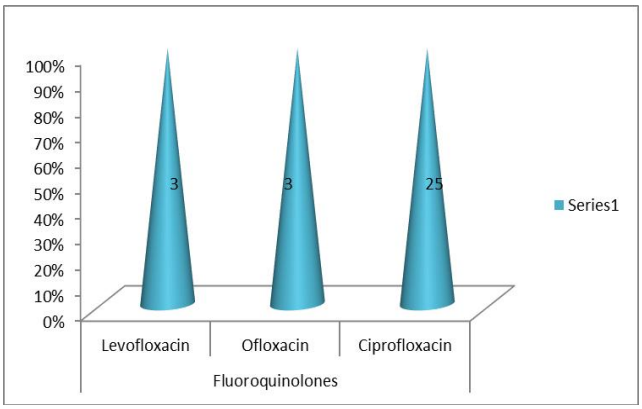


Chart 4 shows that on analyzing the data based on antibiotic sensitivity test, antibiotic test were performed and followed in (n=64, 32%) prescriptions and in (n=47, 23.5%) prescriptions were test is not followed respectively. In (n=89, 44.5%) prescriptions, antibiotic sensitivity test is not performed.

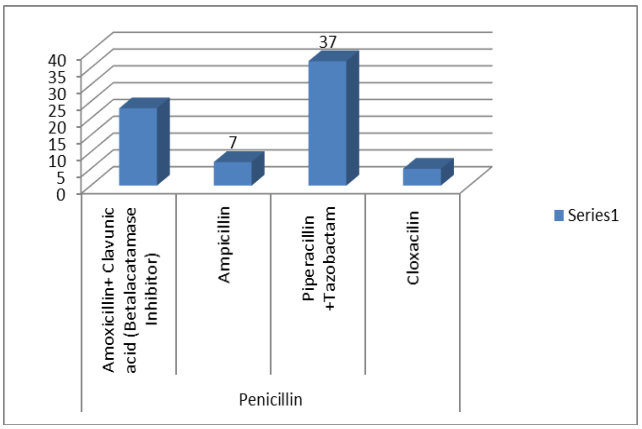
Chart 5: Based On Antibiotics Prescribed Cephalosporins



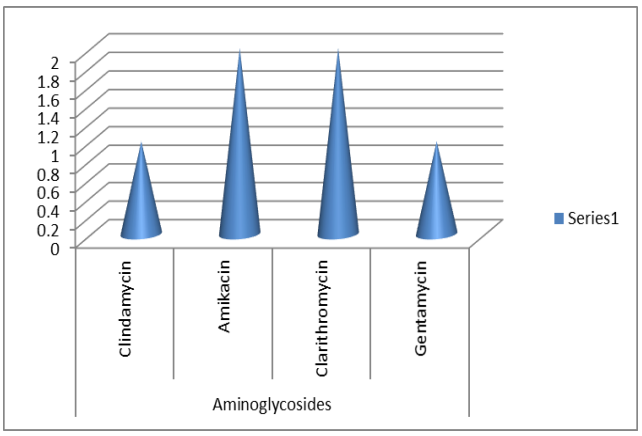
Fluoroquinolones



Penicillin



Aminoglycosides



On analysis of antibiotics prescribed, the most commonly prescribed antibiotics were cephalosporins, of these ceftriaxone was highly prescribed of all (n=95).

Discussion:

A total of 200 prescription profiles were reviewed during the entire study period. On analysis of age category, majority of patients were of the age group (60- 69) and (70-80) with a percentage distribution of about (30.5%) and (30.5%) respectively, which is almost similar to a study by kanishk kala *et al* (2017)[6] and others (40-49) years and (50-59) years age group with a percentage distribution of about (11.7 %) and (13.2%), which is similar to study by khade *et al* (2013)[7], who stated that majority of cases in study were between these age group and one of the plausible reason for this is that, it is the productive age group that is actively involved in socioeconomic activities. On analyzing the gender, male gender (n= 110, 55.3%) were higher in numbers as compared to female counterparts (n=89, 44.7%) which is similar to a study by kanishk kala *et al* (2017) respectively. In our study the majority of the patients prescribed with antibiotics were with the clinical assessment of COPD (n=38, 19%), UTI (n=37, 18.5%) and LRTI (n=28, 14%), Bronchial asthma (n=19, 9.5%) respectively, which is almost similar to a study by kanishk kala *et al* (2017) and shafinaz shamsuddin *et al* (2016) [8]. On department wise analysis of data, showed majority of antibiotics usage were seen in General medicine (n=129, 65%), and Pulmonology (n= 58, 29%) which is similar to a study by B. Rajalingam *et al* (2016) [9] respectively. On analyzing the data ,based on the no of antibiotics in prescription, majority of prescriptions showed combination of 2- 3 antibiotics (n= 110,55 %)and also showed monotherapy (n= 54, 27 %) and greater than 3 antibiotics (n=35, 18%) respectively. Combination therapies are commonly seen in this study which is almost similar to a study by Prakash katakam *et al* (2012) [10]. On analyzing the data based on antibiotic sensitivity test, In majority of prescriptions (n= 110,55%), Antibiotic sensitivity test were performed, and this shows irrational use of antibiotics, leading to development of resistance, misuse etc which is similar to a study by B.Rajalingam *et al* (2016). On analysis of antibiotics prescribed, the most commonly prescribed antibiotics were cephalosporins, of these ceftriaxone was highly prescribed of all (n=95) which is similar to a study by kanishk kala *et al* (2017) and B. Rajalingam *et al* (2016) followed by cefixime (n= 11), cefuroxime (n=1), cefotaxime(n=8) respectively. Apart from ceftriaxone, the most commonly prescribed antibiotic were Amoxicillin + clavulanic acid (n= 23) combination which is similar to a study by Prakash katakam *et al* (2012) followed by piperacillin (n= 25) + tazobactam (n= 32), ampicillin (n=7) and azithromycin (n= 33) were also prescribed

Conclusion:

This study gives an overview of the pattern of antibiotic use in the PK DAS Institute of Medical Sciences, Vaniyamkulam, Palakkad. The high percentage of antibiotic prescriptions may indicate a high probability of irrational use and we also found that there are prescriptions (n=89) in which antibiotic susceptibility test was not performed which may contribute towards resistance and misuse of antibiotics. Use of antibiotics usually broad spectrum cephalosporin was high in the study and also showed combination therapies of antibiotics was most followed especially Amoxicillin + clavulanic acid combination. This study also showed usage of antibiotics more in general medicine and pulmonology departments. Our study also showed antibiotics prescriptions are more in males and within the age group of (60- 80) years. The study also showed, majority of antibiotic usage was seen for COPD and UTI diseases. In conclusion, this study shows the importance of the following antibiotic guidelines by physicians, and implementation of Antibiotic stewardship program and Antibiogram in hospitals. This study also point out irrational use of antibiotics are more leading to resistance, misuse and serious problems. So certain

strategies should be put forward to strengthen rational use of antibiotics

References:

1. Antimicrobial drugs: General considerations, Chapter 49, Section 12; Essentials of Medical Pharmacology, VII edition, K D Tripathi :688.
2. www.slideshare.net
3. V K E Lim MBBS,The Rational Use of Antibiotics, Volume 13, Issue 2 June (1998):195 - 199
4. Naveed S, Qamar F, Maqsood A, Ayub A, Kauser H, Malik H, Fatima K and Hameed A, Prevalence and Consequences of Misuse of Antibiotics, Survey Based Study in Karachi, Journal of Bioequivalence & Bioavailability, Volume 7, Issue 5 (2015) :202 - 204
5. Lauren A. Richardson, Understanding and overcoming antibiotic resistance , Journal Pbio, August 23(2017) : 1 – 5
6. Kanishk Kala, Rupinder Kaur Sodhi, Upendra Kumar Jain. Drug utilization evaluation of antibiotics in Dh Uttarakashi . Journal of pharmacy, Volume 7, Issue 9, September 2017 : 01-05.
7. Ajay M. Khade1, M Shakeel M Bashir ,Savya George, Sheethal Annaldesh , Kishor A. Bansod. Prescription pattern of antimicrobial agents in a teaching hospital of South India,I nternational Journal of Basic & Clinical Pharmacology, volume 2, issue 5, September-October 2013 : 567 - 570
8. Shafinaz Shamsuddin, Muhammad Eid Akkawi, Syed Tabish RaziZaidi, Long Chiau Ming, Mohamed Mansor Manan. Antimicrobial drug use in primary healthcare clinics : a retrospective evaluation . International journal of infectious diseases 52 (2016) : 16 – 22.
9. B. Rajalingam, Achsah Susan Alex, Adreen Godwin* , Chinnu Cherian, Clincy Cyriac, Assessment of Rational Use of Antibiotics in a Private Tertiary Care Teaching Hospital, Indian Journal of Pharmacy Practice, Volume 9, Issue 1, Jan-Mar, 2016 :14 – 18
10. Prakash Katakam, Abdul baset A. Elfituri, Zaidoon H. Ramadan, Osama G. Abadi. A Retrospective Study on Antibiotic Use in Different Clinical Departments of a Teaching Hospital in Zawiya, Libya, Ibnosina Journal of Medicine and Biomedical Sciences (2012) : 13 – 19