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AN EVALUATION OF DRUG UTILIZATION PATTERN IN DIABETES ASSOCIATED INFECTIONS

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ABSTRACT

Objectives: The goal of the study was to assess antibiotic prescribing pattern in the management of infections in diabetes patients and to estimate the prevalence of infections in diabetic patients. The present study aims at improving the patient's health care. ***Materials and Methods:*** A prospective observational study was carried out for a period of six months at General Medicine department of Basaveshwara Medical College & Hospital, Chitradurga. ***Results:*** Out of 187 Patients 102 were females and 85 were males. Majorly the age groups between 46-60years are admitted with Diabetes. The prevalence of infections in diabetic patients was 67(35.83%). Among 67 patients, 32 and 35 were infected males and females respectively. 24 patients were more prevalent with Diabetic foot followed by 23 with cellulitis, 19 with UTI and 1 patient with Diabetic foot with cellulitis. 65(97.01%) were prescribed with class of Cephalosporin's followed by Proton pump inhibitors, Betalactam Antibiotics and other class of drugs. 65.67% were Ceftriaxone, 17.91% were Cefaperazone, 8.95% were Cefuroxime, 55.22% were pipericillin+Clavulanic acid, 35.82% were Amoxicillin+clavulanic acid, 7.46% were Doxycycillin, 25.37% were Amikacin, 7.46% were Gentamicycin, 19.40% were Metranidazole, 23.88% were Nitrofurantoin, 5.77% were Trimethaprime+sulphamethaxazole, 46.26% were Clindamycin, 8.955% were Ofloxocin, 22.38% were Azithromycin. ***Conclusion:*** The prescribing pattern could be improved by reducing the number of drugs per prescription. Prescription indicators recommended by the WHO can help the Health Care Centres to obtain better organization and improve health care attention to the public. Thus the present study may be propitious for the physicians for optimizing rational use of drugs to

reduce or prevent the drug related problems and also to improve the quality of life and better patient care.

KEYWORDS: Diabetes Mellitus, Infections, Antibiotics, Prescription Pattern.

INTRODUCTION

Diabetes mellitus is characterized by poor control of serum glucose levels that result in hyperglycemia either due to insufficient insulin or poor response to available insulin, altered metabolism of lipid, carbohydrates, and proteins with increased risk of cardiovascular diseases.[1]

Diabetic foot infections are infections that can develop in the skin, muscles, or bones of the foot as a result of the nerve damage and poor circulation that is associated with diabetes. People with diabetes are more susceptible to developing infection, as high blood sugar levels can weaken the patients immune system defence. In addition, some diabetes related health issues such as nerve damage and reduce blood flow to the extremities increase the body's vulnerability to infection. The middle-age population is affected that may be due to their more sedentary life style and adiposity in the developed and under developing countries. The prevalence of this disease across the world was estimated to be 2.8% in the year 2000 and 4.4% in 2030. In diabetes, the infections can be prevented only if the patient maintains strict glycaemic control.[2]

Drug utilization study has been defined by the World Health Organization (WHO) in 1977 as "study of marketing, distribution, prescription, and use of drugs in society, with special emphasis on the resulting medical, social, and economic consequences. Objectives of drug utilization includes description of different patterns of drug use in specific populations, identification and definition of likely problems, general analysis of the problem, establishment of decisions on problems solving, assessment of the effects of the action taken and the type of drug utilization studies are quantitative and qualitative current state of drug use, study state of drug use by indication, daily dose and length of stay and study appropriateness of drug utilization.[3]

Diabetic subjects probably have a higher risk of the following infections: asymptomatic bacteriuria, lower extremity infections, cystitis, pyelonephritis, Fournier's gangrene, diabetic foot, infections in surgical wounds after sternotomy and total hip replacement. Local and

systemic immunologic defects probably account for higher infection rates in diabetic patients.[4]

Antibiotics are the most frequently prescribed drugs among the hospitalized patients especially in Intensive care and Surgical departments. Programs designed to encourage appropriate antibiotic prescriptions in health institutions are an important element in quality of care infection control and cost containment.[5]

The fact that antibiotic sensitivity changes with time. Therefore knowledge of common bacteria involved and their current sensitivity pattern will help us not only in providing the best initial empirical therapy but also in preventing the long term morbidity.[6]

Therefore, this study is aimed to evaluate the drug utilization pattern in diabetic associated infections.

METHODOLOGY

Study design: This was a prospective observational study.

Study site: The study was conducted on In-patient of Medicine and Surgery department of Basaveshwara Medical College & Hospital, Chitradurga.

Study period: The study was conducted over a period of six months from November 2016 to April 2017.

Study subjects: All diabetics patients with any infections admitted in medicine and surgical units of tertiary care hospital during the study period was eligible for enrollment. Patient who met the following criteria will be enrolled.

Inclusion Criteria

- Diabetic patients associated with secondary infections admitted to general medicine ward and surgical ward.
- Both genders.
- Age greater than 30 years.

Exclusion Criteria

- Out patients.

- Gestational diabetes.

Ethical approval

The study was approved by the Institutional Ethical Committee of Basaweshwara Medical College Hospital & Research Centre, Chitradurga.

Vide number: SJMCP/IEC/20/2016-17 (ANNEXURE -1)

Sources of data

- Medical records of In-patients
- Interviews with patient & care takers.

Study procedure

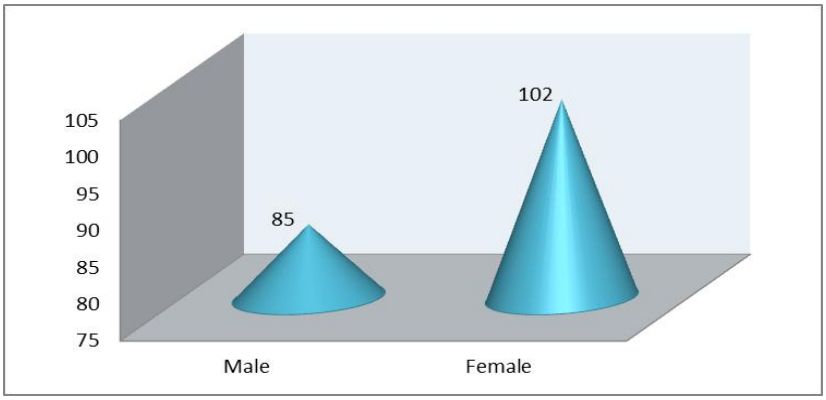
• Subjects with diabetic infections who are admitted to medicine and surgical wards, age above 18 years of both genders will be enrolled into the study. Informed consent form is issued and explained to the subjects and their representatives in the vernacular language. Demographic details includes name, age, gender, weight, BMI, medical and medication history, chief complaints, laboratory values, diagnosis and drugs prescribed are collected in a pre desingned data collection form. Patient follow up will be done for update of antibiotics in current therapy. The collected data will be analysed by using XL Sheet and SPSS statistical methods.

Statistical analysis: Using the Statistical Package for Social Service (SPSS), XL Sheet.

RESULTS

1. **Gender: Among the whole 187 patients 85 were males and 102 were females. The result are shown in table 1 and graphically represented in figure 1.**

Gender	Number of patients	% of patients
Female	102	54.54%
Male	85	45.45%
Total	187	100%

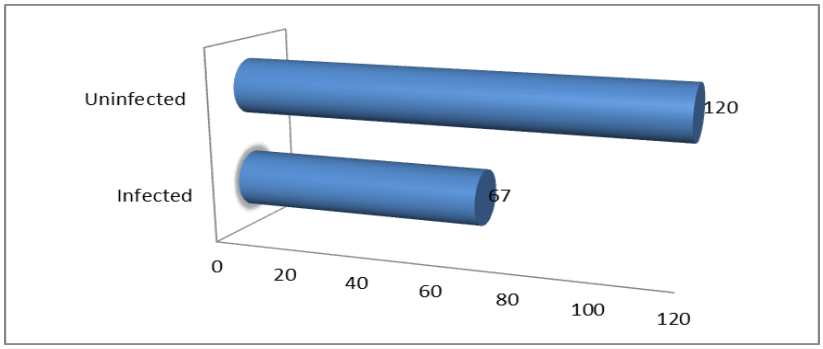


2. Distribution According to Prevalence

In this study population among 187 patients 67 members were having infections like UTI, Diabetic foot, Cellulitis, 120 with no infections,. The Results are shown in Table 3 and graphically by Figure 3.

Prevelence: Distribution of Patients According to Prevalence of Disease.

Prevalence	No of Patients	Percentage
Infected	67	35.83
Un-infected	120	64.17



3. Distribution According to Type of infections.

In this study population 67 Infected Patients 35.82% were Diabetic Foot, 34.32% were Cellulitis, 28.35% were UTI, 1.49% were Diabetic foot with cellulites. The result are shown in table 3 and graphically represented in figure 3.

Table 3: Distribution According to Type of infections.

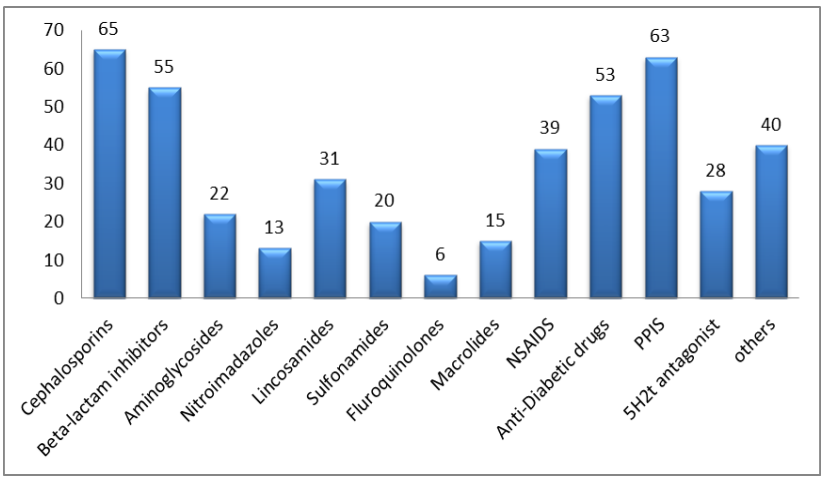
Type of infections	No of patient	Percentage
Cellulitis	23	34.32%
Diabetic foot	24	35.82%
UTI	19	28.35%
Diabetic foot with cellulitis	1	1.49%
Total	67	100%

4. Distribution of Patients According to Class of Drugs

In this study population 97.01% were Cephalosporins, 82.08% were Beta lactum inhibitors,32.83% were Aminoglycosides,19.40% were Nitrotimadazoles, 46.26% were Lincosamides, 29.8% were sulfonamides, 8.95% were Fluroquinolones, 22.38% were Macrolides, 58.20%n were NSAIDS, 79.10% were Anti-Diabetic Drugs, 94.02% were PPIS, 41.79% were 5H2t Antagonist, 59.70% were total. The result are shown in table 8 and grap hically represented in figure 8.

Table 4: Distribution of Patients According to Class of Drugs.

Class of drugs	No of patients	Percentage
Cephalosporin's	65	97.01%
Beta-lactam inhibitors	55	82.08%
Amino glycosides	22	32.83%
Nitroimadazoles	13	19.40%
Lincosamides	31	46.26%
Sulfonamides	20	29.85%
Fluroquinolones	6	8.95%
Macrolides	15	22.38%
NSAIDS	39	58.20%
Anti-Diabetic drugs	53	79.10%
PPIS	63	94.02%
5H2t antagonist	28	41.79%



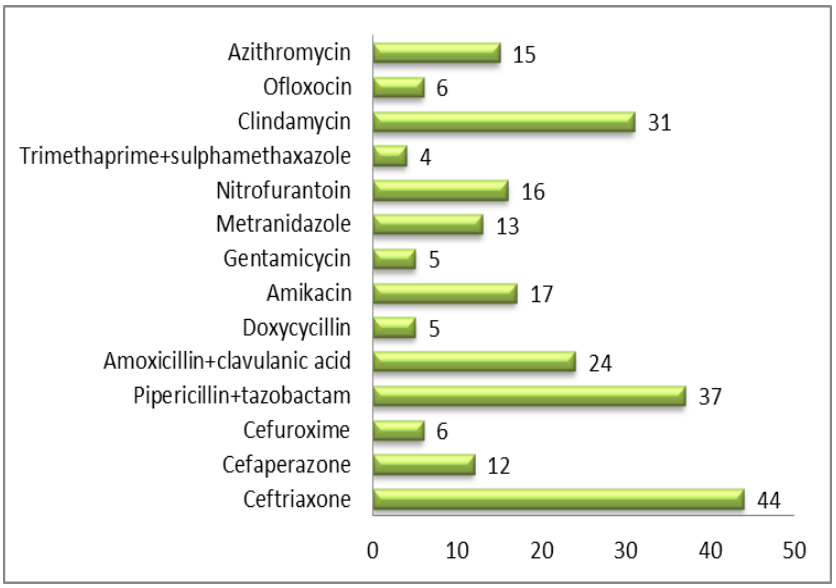
5. Distribution of Patients According to Antibiotics Prescribed.

In this study population 65.67% were Ceftriaxone, 17.91% were Cefaperazone, 8.95% were Cefuroxime, 55.22%were pipericillin+Clavulanic acid, 35.82% were Amoxicillin+clavulanic acid,7.46% were Doxycycillin, 25.37% were Amikacin, 7.46% were Gentamicycin,19.40% were Metranidazole, 23.88% were Nitrofurantoin, 5.77% were Trimethaprime+sulphamethaxazole, 46.26% were Clindamycin, 8.955% were Ofloxocin,

22.38% were Azithromycin. The result are shown in table 9 and graphically represented in figure 9.

Table 5: Distribution of Patients According to Antibiotics Prescribed.

Antibiotics	No of patients	Percentage
Ceftriaxone	44	65.67%
Cefaperazone	12	17.91%
Cefuroxime	6	8.95%
Pipericillin+tazobactam	37	55.22%
Amoxicillin+clavulanic acid	24	35.82%
Doxycyclin	5	7.46%
Amikacin	17	25.37%
Gentamycin	5	7.46%
Metranidazole	13	19.40%
Nitrofurantoin	16	23.88%
Trimethaprime+sulphamethaxazole	4	5.77%
Clindamycin	31	46.26%
Ofloxacin	6	8.955%
Azithromycin	15	22.38%



DISCUSSION

The prospective observational study was conducted on In-patients of Medicine and Surgery department to assess the antibiotic prescribing pattern and prevalence of infections in diabetic patients. In the present study a total 187 patients are enrolled. 85 were males and 102 were females. The prevalence of infections in females are greater than males. The most disease are seen in the age group of 46-60years (45.45%). The major infections disease are seen in the study are (34.32%) cellulitis, (35.82%) diabetic foot, (28.35%) UTI and followed by (1.49%)

Diabetic foot with cellulitis. The mariorly prescribed antibiotics are (65.67%) ceftrixone, (55.22%) pipericillin+tazobactam, (35.82%) amoxicillin+clavulanic acid, (23.88%) nitrofurantoin, (46.26%) clindamycin, (22.38%) azithromycin (97.01%). Cephalosporins, (82.08%) beta lactum antibiotics, (94.02%) Proton pump Inhibitors, (58.08%) NSAIDS, (46.26%) Lincosemides, (79.10%) Anti-diabetic drugs are majorly prescribed drugs.

A prospective non interventional study conducted by **Brahmbhatt SV *et al.*,** on drug utilization pattern & rationality in treatment of type II diabetes mellitus: a population based analysis and found that Diabetes mellitus was observed to be highest in patients with the age group of 60-70 years, affecting 66% males and 34% females. Among the participants 42 (84%) were already on treatment for diabetes while 8 (16%) were diagnosed at the time of admission. We observed that 27 (54%) patients were treated with insulin + oral hypoglycemic agents, 13 (26%) were treated with only Insulin while 10 (20%) patients were prescribed only oral hypoglycemic agents. The most common co-morbid conditions observed by us were hypertension, chronic renal disease, diabetic foot, septicemia, urinary tract infections and other susceptible infections.[31]

Another prospective observational study conducted by **Massodi SR *et al.*,** on the Pattern of infections in patients with diabetes mellitus–Data from a tertiary care medical centre in Indian sub-continent shown that Diabetic patients with infections were older (50.5 years versus 46.6 years),had diabetes of longer duration (6.6 years versus5.5years), and had higher fasting glucose (282 mg/dl versus 210 mg/dl), triglycerides (192 mg/dl versus 174 mg/dl) and creatinine (1.1 mg/dl versus0.9 mg/dl). The prevalence of microvascular complications and coronary artery disease were significantly higher in the group with infections. The infections encountered included soft tissue infections (171, 42.8%), pulmonary infections (121, 30.2%), urinary tract infections (108, 28.4%) and more than one infection (20, 5.3%); two patients had rhino cerebral mucormycosis. Overall Staphylococcus aureus was the most frequently isolated pathogen, causing 62.93% of soft tissue infections and 20% of bacterial pulmonary infections. About one-fifth of the patients with infections.[49]

Another prospective study conducted by **Ali N *et al;*** on the Amongst the reported patients (Table 1, *n*=856), there were 82.2% type II and 17.46% type I diabetic patients. There were 410 patients with diabetic foot who were put on main drug therapy for the control of hyperglycemia and supportive antibiotic drug therapy for the control of concomitant foot ulcers in diabetic foot cases. In addition to that daily wound washing and other physical

measures were routinely performed for patients. foot care. To 69.48%of the admitted cases, insulin therapy was recommended for the management of hyperglycemia as main therapy (data not shown). The prescribed oral hypoglycemics were in the order of metformin (39.64%), glibenclamide (12.6%), glimepiride (9.5%), pregabalin (7.93%), and tolbutamide(1.8%). In 60.3% of the treated cases, combination of insulin and oral hypoglycemics was tried. In addition toother supportive measures advised for the management of diabetic foot, the antibiotic therapy (Table 2, *n*=410) was in the order of ceftriaxone (83.3%) > co-amoxiclav(36.66%) > clindamycin and ciproß oxacin (26.66%) >cefuroxime and levoß oxacin (10.0%)>clarithromycinand cefoperazone/sulbactam, cephradine and fusidic acid (6.6%) > cefotaxime sodium, and oxytetracyclin (3.33%). Placing ceftriaxone as the Þ rst choice in the antibiotic therapy carries no logic, as ceftriaxone has low activity against gram-positive organisms. It is recommended that an ideal antibiotic should cover staphylococcus and streptococcus species as their incidence is approximately 85.0 % of the culture.c Therefore, while going for the treatment of antimicrobial therapy on empiric basis till the arrival of laboratory culture sensitivity reports in diabetic foot, we shall consider the use of co-amoxiclav as a Þ rst choice as it is active against gram positive and beta-lactamase-producing strains. Similarly, the use of ciproß oxacin should be discouraged as a primary antibiotic therapy because there is 10.0 % involvement of coli form species in the foot ulcers and may be considered upon the laboratory culture sensitivity report.[39]

CONCLUSION

According to the analyzed results and from view of literature, the conclusions made are;

- The prevalence rate of infections among the diabetic patients founds 35.83%.
- Among 67 infected diabetic patients 47.76% were males and 52.23% were females
- and conclude that females are more prone to diabetic infections.
- Age above 45-60 age groups of diabetic patients with infections is more.
- Among 67 infected patients 100% were having past medical history of diabeties
- mellitus.
- Among 67 infected patients 79.10% were under past medication history.
- 1Diabeties with infections was more prevalent in study population followed by
- cellulitis, diabetic foot, UTI.
- Among 187 diabetic patients 67 patients diagnosed with diabetic infections.
- Among 187 patients 47.76% of males and 52.24% of females were diagnosed with

- diabeties mellitus.
- Majorly 97.01% cephalosporins, 82.08% beta lactams, 22% aminoglycosides, 19.40%
- nitroimadazoles, 46.2% lincosamides, 22.38% macolides are mainly prescribed
- antibiotics followed by other class of drugs in diabeties associated infections.
- Among 187 patients 79.10% Anti-diabetic, 29.85% sulfonamides, 22.38% macrolides,
- 58.20% NSAIDS, 94.02% PPIS, 59.70% other class of drugs.

The prescribing pattern could be improved by reducing the number of drugs per prescription. Prescription indicators recommended by the WHO can help the Health Care Centres to obtain better organization and improve health care attention to the public. Thus the present study may be propitious for the physicians for optimizing rational use of drugs to reduce or prevent the drug related problems and also to improve the quality of life and better patient care.

REFERENCES

1. Ali N, Rehman S, Imran M, Hussian I, Shehbaz N, Jamshed H, Hayat A, Khan S, Anwar MJ. The In-Practice Prescribing Pattern for Antibiotics in the Management of Diabetic Foot. J Young Pharm, 2009; 1(4): 375-78.
2. Raj K, Kamalesh K, Kajal HL. A study of drug prescribing pattern and cost analysis among diabetic patients in a tertiary care teaching institute in north India. Journal of Drug Delivery & Therapeutics, 2013; 3(2): 56-61.
3. Thomas Z, Narendra K, Swamy A CH, Mahendravarman P, Senthilvelan M. A study on drug utilization, prescribing pattern and use of antibiotics in management of diabetic foot ulcer. IJIPSR, 2015; 3(8): 1037-49.
4. Boyko EJ, Lipsky BA. Infections and diabetes. West J. Med., 1991; 130: 485-99.
5. Preeth M, Shobhana J. Study on prescribing patterns of antibiotics used in the management of various infectious diseases in Andhra Pradesh. IRJP, 2011; 2(7): 112 - 15.
6. Ijaz M, Ali S, Khan SM, Hassan M, Bangesh IH. Urinary tract infection in diabetic patients, causative bacteria and antibiotic sensitivity. J. Med. Sci., 2014; 22(3): 110-14.
7. Chen L, Smith GD, Harbord RM, Lewis SJ. Alcohol Intake and Blood Pressure: A Systematic Review Implementing a Mendelian Randomization Approach. PLoS Medicine, 2008; 5(3): 461-71.