ORIGINAL RESEARCH PAPER
Volume - 11 | Issue - 05 | May - 2022 | PRINT ISSN No. 2277 - 8179 | DOI : 10.36106/ijsr
INTERNATIONAL JOURNAL OF SCIENTIFIC RESEARCH

A PROSPECTIVE CROSS-SECTIONAL DRUG UTILIZATION STUDY ON COMPARISON OF PRESCRIBED DAILY DOSE AND DEFINED DAILY DOSE RATIO OF ANTIBIOTICS AT TERTIARY CARE CENTRE

Pharmaceutical Science

Rahul Meena* Associate Professor, Government Medical College, Kota, Rajasthan. *Corresponding Author

Vimlesh Kumar Meena Assistant Professor RNT Medical College, Udaipur, Rajasthan.

ABSTRACT

Background - Drug utilization research as defined by WHO in 1977 is 'the marketing, distribution, prescription and use of drugs in a society with special emphasis on the resulting medical, social and economic consequences. The principal aim of drug utilization research is to facilitate the rational use of drugs in populations.

Aiims & Objectives - The primary objective of the study is to calculate the PDD and secondary objective of the study is to compare the PDD with DDD (WHO DDD) and also to identify the commonly prescribed antibiotics in various indications.

Materials & Methods - Total 200 patients admitted in medicine department included in hospital based Cross-Sectional study from March 2019 to April 2020.The data collected was statistically analyzed and entered in the 'prescribing indicator form' manually.

Results & Conclusion - Mean number of drugs prescribed per patient in our study was 7.35 ± 2.36. In our study Cephalosporin were the most commonly used antibiotics (28.91%) Prescribed daily dose of antibiotics were compared with Defined daily dose and it was found that most of the drugs were prescribed in appropriate dose except Doxycycline where PDD/DDD ratio was 2.0 and for amoxicillin-clavulanic acid combination the ratio was 2.94.It indicates that these drugs have been used in higher doses.

KEYWORDS

rational use, Prescribed daily dose, Defined daily dose.

INTRODUCTION

Drug utilization review/evaluation (DUR/DUE) is defined as the marketing, distribution, prescription and use of drugs in a society with special emphasis on the resulting medical, social and economic consequences [1]. It was defined by the WHO in 1977. It is a powerful tool to evaluate present patterns/fashion of drug use and appropriateness of prescriptions. It is a descriptive and analytical method of collection, quantification, understanding and evaluation of the prescribing pattern and also dispensing and consumption for the advancement of existing treatment and enhancement of patient safety [2]. It provides information about pattern, quality and outcome of drug use and to promote rational and appropriate use of drugs of narrow therapeutic index [3]. The anatomical and therapeutic chemical classification systems are recommended by the WHO. The system is also used by International Drug Monitoring Center, Uppsala, for classifying adverse drug reactions (ADRs) [3].Defined daily dose (DDD) is the average of the maintenance dose per day which is used as a comparable unit. Prescribed daily dose (PDD) is not always equal to DDD. They both are a rough estimate of drug utilization. The primary outcome of the study is to calculate the PDD and secondary outcome of the study is to compare the PDD with DDD (WHO DDD) and also to identify the commonly prescribed antibiotics in various indications [4,5].

PDD: DDD method of DUR

For each and every drug, DDD is defined by the WHO collaborating for drug statistics and methodology as the assumed average maintenance adult dose per day for its main indication. Therefore, DDD is an international unit serving for regional and international comparisons. DDD is assumed average maintenance dose per day for a drug which is used for its main indication only in adults. It is a unit of measurement and does not correspond to PDD. Individual dosage regimen will differ based on patient groups, age and weight; hence, they differ from DDD [6,7].

PDD is defined as the average dose prescribed according to a representative sample of prescriptions. It is important to relate the PDD to the diagnosis on which the dosage is based. The PDD will give the average daily amount of a drug that is actually prescribed. When there is a substantial difference between the PDD and the DDD, it is important to take this into consideration when evaluating and interpreting drug utilization figures, particularly in terms of morbidity [8].

MATERIALS AND METHODS :

This is a prospective observational study conducted over a period of one year (March2019–March2020). All the patients those are admitted in medicine department reviewed on daily bases. Those are reached my inclusion criteria such as receiving prescribed therapy, all age groups, either of sex. Patients who are non-cooperative, cancer patients, psychiatric patients, patients on hemodialysis receiving treatment, patients suffering from end-stage renal disease and hepatic impairment are excluded from the study. A total of 200 patients enrolled into the study and collected all necessary information such as patient demographic information age, sex, area and past medical history by interviewing the patients and patient's caretakers. Laboratory reports collected to identify the diagnosis as well as rolled out exclusion criteria from the case sheet also collected medication information such as active ingredient name, dose, frequency and duration of treatment taken by patient. All the information was collected in well-designed data collection form. We calculated PDD (=total dose divided by the number of days) and expressed them as the PDD: DDD ratio (=amount of DDD per day and person).The DDDs for the selected antibiotics were taken from pre calculated DDD from the WHO. The calculated PDD of the antibiotics is compared with DDD using simple t-test. All the collected data were entered into Microsoft Excel. The raw data were taken into SAS software using Proc Import and data were redesigned/ reorganized with number and character function and PDD was calculated using Proc means and compared PDD with DDD using Proc t-test (simple t-test). In Proc t-test, H_0 was considered as DDD. The minimum level of statistical significance was considered as p = 0.05.

RESULTS/DISCUSION :

During the study period, 2500 patients were reviewed, out of which 200 (8.00%) cases were enrolled into the study according to the inclusion criteria, the remaining 2300 (92.00%) patients were excluded based on the exclusion criteria.

Mean number of drugs prescribed per patient in our study was 7.35 ± 2.36. In our study Cephalosporin were the most commonly used antibiotics (28.91%)Total number of antibiotics prescribed was 332, Total number of patients to whom antibiotics were prescribed was 168(84%). Total number of antibiotics prescribed per prescription was 1.97. Appropriate dose and duration is one of the major determinants to control development of bacterial resistance. The PDD and DDD of prescribed antibiotics were compared. Most of the antibiotics were prescribed appropriately except Doxycycline and combination of Amoxicillin and Clavulanic acid, where the PDD/DDD ratio was 2.0 and 2.94 respectively.(Table-1 and Table-2)

Table 1 : PDD and DDD of Prescribed Antibiotics

Antibiotics prescribed	Total Dose	Total Days	PDD= (T Dose/T Day)	DDD	PDD-DDD Ratio
Doxycycline	32400	162	200	100	2
Amoxicillin-Clavulanic	318300	108	2947.22	1000	2.94
Cefixime	8400	21	400.00	400	1.00
Cefotaxime	71000	15	4733.33	4000	1.18
Ampicillin	50000	25	2000.00	2000	1.00
Clindamycin	100800	112	900.00	1200	0.75
Metronidazole	229200	127	1804.72	1500	1.20
Ceftriaxone	7668000	361	2127.42	2000	1.06
Ciprofloxacin	80000	80	1000.00	1000	1.00
Ofloxacin	10800	22	490.91	400	1.22
Norfloxacin	16000	17	941.18	800	1.17
Amikacin	36500	30	1216.67	1000	1.21
Clarithromycin	6000	6	1000.00	1000	1.00

Table 2 : Antibiotics prescribed among patients

Antibiotics Prescribed	No. of Patient	Percentage (n = 332)
Cephalosporin	96	28.91
Antimalarial	71	21.38
Penicillin	41	12.34
Fluroquinolones	30	9.03
Antiprotozoal	28	8.43
Tetracycline	27	8.13
Clindamycin	24	7.22
Aminoglycoside	6	1.80
Macrolide	5	1.5
Vancomycin	4	1.2

CONCLUSIONS :

Antibiotics are important category of drugs and its improper use can result in antibiotic resistance. The widespread use of antibiotics has lead to the emergence of several resistant strains of microbes. In our study Cephalosporin's were the most commonly used antibiotics (28.91%) These contribute significantly towards rise in the escalating health care costs and patient morbidity and mortality. Therefore monitoring and evaluation of prescribing patterns of antimicrobial agents are one of the recommended strategies to control resistance and also to improve the prescribing practices. Drug utilization study is a process of medical audit that involves monitoring and evaluation of the prescribing patterns of drugs and it helps to make the necessary modifications in prescribing practices to achieve rational therapeutic practice as well as prevent the economic burden which will improve health care system [9, 10]

REFERENCES :

[1] Parthasarthy G, Nyfort-Hansen K , Nahata M.(2011) Drug utilization evaluation. Sathvik B.S.A Textbook of Clinical Pharmacy Practice. Hyderabad: Universities Press; 2011.p. 447-59.

[2] WHO. Introduction to Drug Utilization Research. Available fro :https:// www.whocc.no/ filearchive/ publications /drug utilization _ research. pdf. [Last accessed on 2016 Sep10].

[3] Mukesh K ,Vicky D, Shruti M , Dinesh S, Neha M , Lahkar M.(2016) Cardiovascular disease prevalence and drug utilization patterns at a tertiary care hospital in Northeastern India. Int. Pharm. Sc 2016;8:116-9.

[4] Sutharson L, Hariharan RS, Vamsadhara C.(2003) Drug Utilization Study India diabetology outpatient setting of a tertiary hospital. Ind J Pharmacology; 2003;35:237-40.

[5] Shalini S, Ravichandran V, Mohanty BK, Dhanaraj SK, Saraswati R.(2010) Drug utilization studies – an overview. Intern J Pharma Sci Nanotech 2010;3(1):803-10.

[6] Chaudhary PK, Maurya AK, Jain A, Pathak A, Sharma N.(2015) Drug utilization pattern in medicine department in a tertiary care teaching hospital in UttarPradesh. Indo American Journal of Pharmaceutical Research, 2015 ISSNNo:2231-6876.

[7] Vinod S. Deshmukh, Vyankatesh V. Khadke, Arun W. Patil,Pravin S. Lohar.(2003) Study of prescribing pattern of antimicrobial agents in indoor patients of a tertiary care hospital. Intern Journal of Basic & ClinPharmacol. ISSN: 2319-2003 | Online ISSN: 2279-0780.

[8] World Health Organization. The pursuit of responsible use of medicines:sharing and learning from country experiences.Geneva:World Health Organization.2012.

[9] Deshmukh VS, Khadke VV, Patil AW, Lohar PS.(2013) Study of prescribing pattern of antimicrobial agents in indoor patients of a tertiary care hospital. Intern Journal of Basic & Clincal Pharma col 2013;2(3):281-285.

[10] Kaur S, Rajagopalan S, Kaur N, Shafiq N, Bhalla A, Pandhi P,and Malhotra S.(2014) Drug utilization study in medical emergency unit of a tertiary care hospital in North India. Hindawi Publishing Corporation, Emergency Medicine International, 2014; 1-5.

[11] Meher B.R., Mukharjee D, Udayshankar.(2014) A study on antibiotic utilization pattern in a general medicine ward of a tertiary care teaching hospital. Journal of Chemand Pharma Res, 2014;6(7):1847-9.

[12] Haitham M, El Bingawi, Motaz B. Hussein, Mohamed Y.Bakheet.(2015) Characteristics of Patients Admitted to Medical Ward of a Referral Hospital in a Developing Country. IJSBAR 2015;14:(1).