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ANTIBIOTIC UTILIZATION PATTERN AMONG ORTHOPAEDIC PATIENTS IN THE UNIVERSITY OF PORTHARCOURT TEACHING HOSPITAL, NIGERIA

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ABSTRACT

Antibiotics are the commonly prescribed medication in the Orthopedics Department both prophylactically (before orthopedics surgery etc.) or to treat ongoing infections (like septic arthritis, osteomyelitis etc.). Drug utilization studies play an important role in the evaluation of the rational use of drugs in the populations. The aim of this study is to assess the drug utilization pattern of antibiotics among orthopedic patients in University of Port Harcourt Teaching Hospital. An observational, cross-sectional retrospective review of hospital records of orthopedic unit of the University of Port Harcourt Teaching Hospital for five years spanning through January 2013 to January 2018. The sample size of this study was determined using Taro Yamane method resulting in 282 sample size. Data was collected using WHO well designed prescribing indicator which includes number of antibiotics, percentage encounter of these generics, percentage of essential drugs and diagnosis. A total of 282 prescriptions were studied; in which 48 prescriptions contained mono-antibiotic therapy (17.02%) and 234 prescriptions contained poly-antibiotics therapy (82.89%) and the beta-lactam antibiotics were most commonly prescribed (36.17%).Also there were more males (57.80%) than females (42.20%) admitted to the this units and road traffic accidents was the most common clinical situation found in the unit. Percentage of drugs prescribed from EDL is 95.2% while the percentage of antibiotics prescribed as injections was 38%.52.84% was prescribed generically and 47.16% was prescribed by brand name. Beta-Lactam antibiotics were most commonly prescribed antibiotics and poly-antibiotics prescriptions were the common pattern.

The findings from this study reveals that drug utilization pattern is still suboptimal in accordance with the standard values of WHO core prescribing indicators.

KEYWORDS: Drug utilization, Antibiotics, WHO Prescribing indicators, Orthopedics.

INTRODUCTION

World Health Organization (1977) has defined Drug utilization research as the marketing, distribution, prescription and use of drugs in a society, with special emphasis on the resulting medical, social and economic consequences. Drug utilization studies (DUS) are very important tool in the evaluation of healthcare systems as well as to curtail irrational prescribing and for logical healthcare planning. Irrational prescriptions cause adverse effects, potential drug interactions and increased cost of treatment, drug redundancy and poor drug compliance. Drug utilization research is broad but for convenience, it could be divided into descriptive and analytical studies. While descriptive drug studies describes patterns of drug utilization and identifying problems associated with drug use that may require more detailed studies, analytical studies is aimed at establishing any possible link between drug use and statistical data on morbidity and other outcomes of treatment and quality of care with the ultimate goal of assessing whether drug therapy is rational or not.

Antimicrobial resistance is a major public health problem for many reasons. It reduces the doctor's choice of treatment by limiting specific antibiotics suitable for that infection. It also increases mortality as well as human pain; infections become refractory leading to longer stay in the hospital. Already in the USA the occurrence of resistance in hospitals is considered an indicator of poor quality care and services and many patients' resort to lawsuits for damages (Batopoulos, 2007).

Multi antibiotic resistant disease causing microbes are so prevalent globally that they have assumed a major public health concern in both developing and developed parts of the world. The prime cause of the rapid increase in the number of reported cases of resistant bacteria in both developing and developed countries is the abuse and inappropriate use of antibiotics. They therefore have to be used in the right dose and for the right length of time. The problem of irrational use of antibacterial drugs is both complex and multi-faceted. Irrational prescribing could lead to adverse effects that may even be lethal especially when antibiotics are being misused or used inappropriately for self-medication (Rhashid et al, 1986). It may also compromise the efficacy of antibiotics especially when sub-therapeutic dosages are

taken for serious infections such as tuberculosis or leprosy. Improving the rational use of drugs (RUD) is a difficult task worldwide.

Drug utilization studies play an important role in the rational use of drugs in populations. For the individual patient, the rational use of a drug implies the prescription of a well-documented drug for the right indication, at an optimal dose, together with the correct information, at an affordable price.

Knowledge of drug prescribing pattern is important for effective treatment, and counseling the patients about the potential harm of drug use is a matter of high priority, which should be carried out by every prescriber (WHO, 2003). Drug utilization research also provides insight into the efficiency of drug use, i.e. whether a certain drug therapy provides value for money and the results of such research can be used to help to set priorities for the rational allocation of health care budgets. Drug utilization enables the researcher estimate the numbers of patients exposed to specified drugs within a given time period and describes the extent of use at a certain moment or in a certain area (eg in a country, region, community or hospital).

Bithi et al(2014) in a study in University of Asia Pacific Dhaka Bangladesh India reported that in prescriptions for orthopaedic patients, among the monoantibiotic therapy, cefixime was the most commonly prescribed (170 prescriptions) and cefuroxime was the least (7 prescriptions). Most commonly prescribed class of antibiotics was found to be beta-lactam(81.69%) followed by fluoroquinolone (7.56%) & macrolide (7%). Among beta-lactams,cephalosporin was the pioneer with a percentage of 67.26% & amongst cephalosporins; cefixime (90%) was the most common antibiotic. In poly-antibiotic therapy (two), cefixime & flucloxacillin (72.96%) was the pioneer combination in single prescription and in triple therapy, Cefixime, flucloxacillin & ceftriaxone (77.78%) was the highly prescribed combination.

Ghosh et al. (2013) reported the drug utilization study on antibiotics use in an orthopedics department of a tertiary care hospital in west Bengal. During the study period of six months from July 2012 to December 2012, a total of 410 patients were included in the study and their prescriptions containing at least one antibiotic were analyzed only once - no follow up visit was done.

Demographic characteristics showed that percentage of males suffering from infection was more than females (male: female- 1.15:1). Further it was noted that a majority of the patients were within the age group of 18-30 years (38.29%) and the lowest percentages were in 31-40 years (13.41%). Road Traffic Accident (RTA) was the most common clinical situation where antibiotics were prescribed in high percentage (52.43%), while acute osteomylitis was the least (02.92%). Most commonly prescribed category of antibiotics was found to be beta-lactam (42.3%) followed by metronidazole (14.56%). Ceftriaxone was the most common antibiotic among beta-lactam group. When prescriptions were screened thoroughly, the number of prescriptions of mono-antibiotic prescription (single antibiotic/prescription) were 136 (33.17%), while prescriptions containing poly-antibiotic therapy were 274 (66.83%).

This presentation indicates that poly-antibiotic prescription were more preferred to mono-antibiotic therapy. Among the mono-antibiotic therapy, cefuroxime was prescribed most commonly (42 prescription) and cefoperazone was the least (11 prescription). In poly-antibiotic therapy, [Infusion Metronidazole 400mg T.D.S. + inj. Ceftriaxone 1gm i.v BD] combination was prescribed mostly (78%). Some antibiotics were prescribed generically (like ciprofloxacin, ceftriaxone, metronidazole, ampicillin and amikacin) more frequently. The reason for this trend may be due to its free availability in hospital pharmacy. The antibiotics which were not supplied in the hospital pharmacy were not prescribed generically.

Nusrat et al (2015) carried out a study on the drug utilization review of antimicrobials in Orthopaedic Indoor Patients of a Tertiary Care Teaching Hospital in Jammu. The study showed that cephalosporin group was the commonly prescribed antimicrobial class in 81% patients followed by aminoglycosides in 56% patients, oxazolidindione in 10%, antiprotozoal in 8% patients, quinolones in 8% of patients, macrolides in 7% patients and penicillins in 4% of the patients. Most commonly prescribed individual drug from different antimicrobials group was amikacin in 51% patients from the aminoglycosides and cefoperazone (22%) from cephalosporin. The other commonly used antimicrobials were ceftriaxone, ceftazidime, linezolid, metronidazole, ciprofloxacin and ampicillin-cloxacilline. None of the drug was prescribed by generic names. All of the drugs were prescribed with trade names. The drugs which were from the essential drug list were ampicillin, cloxacillin, ceftriaxones, ceftazidime, ciprofloxacin, metronidazole, and the drugs which were not from WHO essential drug list were cefoperazone, and linezolid; amikacine is a complimentary drug in WHO essential drug list. The drugs in fixed dose combination were cefoperazone with sulbactam in 22% of the

patients, ceftriaxone with sulbactam in 21% patients, ceftazidime with sulbactam in 21% patients, ampicillin and acloxacillin combination in 3% of the patients and cefuroxime and linezolid in 22% of the patients. The other common categories of drugs prescribed to the patients other than the antimicrobials were non-steroidal anti-inflammatory drugs in 156 patients (95%), antacids in 68%, benzodiazepines in 5% patients, steroids in 4% and vitamins in 2% patients.

Azza et al (2009) reported the antibiotic use in Single Orthopedic Department Egypt. Out of 671 patients who were admitted to the Orthopedic Department during the study period, 32 patients were excluded because their records were irretrievable. Of the 639 surveyed hospitalized patients, 627 were received antimicrobial therapy, with a percentage of 98.1% A total of 1119 antibiotics were given to 627 patients, of whom 258 (41.1%) were female and 369 (58.9%) male. Of the patients receiving antibiotics, 53.1% were ≥61 years old, 24.4% were 21–60 years and 22.5% were ≤20 years. Of notice, the infection rate was 13.1% where nosocomial infections represent the majority of the cases with a percentage of 10.3%, mainly in the form of SSI (4.7%).Twenty-one antimicrobial agents were prescribed as single agent (486 prescriptions) and as drug combinations (633 prescriptions in 273 combinations; double: 186 or triple: 87). The main duration of treatment was 12.4±10.9 with a range of 3-37 days. Eighty-one percent of prescribed antimicrobial agents belong to cephalosporins and penicillins classes and 54.2% of all antimicrobial use consisted of cefotaxime (42.1%) and amoxicillin-flucloxacillin (12.1%). Of the total of 1119 antimicrobial drug courses, 213 (19%) were entirely provided orally, 243 (21.7%) intramuscularly (I.M) and 663 (59.3%) intravenously. Antibiotics were given for prophylaxis continued post-operatively (483; 77%), for infections (84; 13.4%: community 18; 2.9% and hospital 66; 10.5%) and randomly (138; 22%). The antimicrobial prescription rate for these groups was 66.8%, 18.5% and 14.7% respectively. Of notice, there was an overlap in antibiotic courses as 12 out of 18 patients who were admitted with infections have received empirical/therapeutic then prophylactic antibiotic courses. Similar overlap occurred in the 66 nosocomially infected patients. Antimicrobial prescription rate in community acquired and nosocomial infections was 4.3% and 14.2%, respectively. The overall appropriateness of treatment was 11.3%, with a range of 4.8–71.9% per course. Of notice, 165 prescriptions were given randomly without any indication. The appropriateness of ABP, empiric and therapeutic antibiotics used were 4.8%, 18.9% and 71.9%, respectively. All ABP were given by intravenous route. The appropriateness of ABP (36; 4.8%) was based on its type (45; 6%), duration (69; 9.2%) and

timing (93; 12.4%) While the appropriateness of empiric (21; 18.9%) and therapeutic (69; 71.9%) antibiotic therapies were based mainly on the source of infection (34; 30.6% and 73; 76%, respectively), age of the patient (59; 53.2% and 89; 92.7%, respectively) and underlying kidney diseases (74; 66.7% and 81; 84.4%, respectively). Interestingly, the rate of appropriateness varied among different sources and sites of infections. In order to address the relationship between misuse of antibiotics and the development of resistant bacterial strains, all infected cases were subjected to standard microbiological examination of different isolates with analysis of their antibiograms. Ninety-three isolates were recovered from 84 infected patients. The majority of isolates were gram negative (77.4%) which are represented by 5 bacterial types. The rate of oxacillin resistance was nearly similar among both S. aureus and CNS isolates, at 53.3% and 66.7%, respectively. All isolates of staphylococci were susceptible to vancomycin. Resistance rates of ≥50% to ceftazidime and/or cefotaxime were detected especially in Acinetobacter, Klebsiella, Pseudomonas and E. coli strains. Noticeably, susceptibility to imipenem for gram negative bacilli was >80%.

Shailesh et al in a study on antimicrobial drug utilization pattern and appropriateness in the surgical units of civil hospital, Ahmedabad had the following results. Out of 200 patients 192 patients i.e. 96% were prescribed antibacterial drugs. The most commonly prescribing drug was metronidazole 44.8% followed by ciprofloxacin 38.5%, gentamicin 36.9% and cefotaxime 32.2%. Amikacin, ampicillin + cloxacillin and cephalexin were other antibacterial in use. Use of cefazolin and norfloxacin was quite minimum i.e. 7.3% and 5.7% respectively. In 83.3% of the cases more than one antibacterial drugs were given, and on an average 2.5 (+0.06) antibacterial drugs were used per patient in a range of 1 to 4.

The duration of the treatment with antibacterial drugs were 5 days to 15 days, with an average duration of 6.9 (+0.14) days. Oral route was used in 15.6% of patients while in 84.4% of cases they were given parenterally. Out of 192 patients in 42.2% of cases antibacterial drugs were used for prophylaxis while in remaining 57.8%, the intention appeared to be curative for an existing or a recently acquired infection. Culture and sensitivity test was done only in 3.1% of cases and out of these, therapeutic modification was done only in one case which clearly indicates that laboratory support is hardly ever sought or taken in consideration in surgical practice while prescribing antibacterial drugs.

Methicillin resistance was detected in 57.1% of Staphylococcal isolates with MRSA prevalence of 38.1% (8/21 isolates). Multi-resistant strains represented 48.6% (35/72) of the

isolated gram negative strains. ESBLs were identified in 21/72; 29.2% of those isolates with percentages of 62.5% and 33.3% in Klebsiella and E.coli isolates, respectively. Of notice, 57.1% and 66.7% of Pseudomonas and Acinetobacter isolates (19.4% of gram negative isolates) were resistant to amikin, ciprofloxacin and ceftazidime.

Chitra (2016) carried out a study on the drug utilization pattern of antibiotics at a private corporate hospital. The study reports more number of female patients (59%) compared to male patients 41%. The social status of patients shows that more than 25% of patients were smoker and alcoholic. Lower respiratory tract infection was predominantly seen in the study population when compared to other diagnosis.

Out of 100 prescriptions, four classes of antibiotics were mainly prescribed, which includes Cephalosporins, Fluoroquinolones, Aminoglycosides and Penicillins Around 66% of the prescriptions were prescribed with monotherapy, 23% of the prescriptions with dual therapy, 7% with 3 antibiotics and 3% of the prescriptions were prescribed with 4 antibiotics. Around 32% of the prescriptions had drug interactions. Among the interacting drugs, levofloxacin had 22% of interactions followed by other drugs.

Shankar et al (2007) reported a study on the prescribing pattern in the orthopaedics out patient department in a teaching hospital in Pokhara Western Nepal. One hundred and eighty-six patients/prescriptions were randomly selected of the 1238 patients attending the orthopaedics OPD. The age distribution of the patients is shows that eighty-six patients (46.2%) were male, 92 (49.5%) were female while the sex was not mentioned in 8 prescriptions. Low back ache was the most common reason for attending the orthopaedics OPD [31 patients (16.7%)]. The other common diagnoses were spondylosis [14 patients (7.5%)], fractures [8 patients (4.3%)] and sprain [6 patients (3.2%)]. The median duration for prescription was 7 days. A total of 352 drugs were prescribed to the 186 patients attending the OPD. The mean ± SD number of drugs per prescription was 1.9 ± 0.8. Drugs were prescribed by generic name in 19.3% of cases. NSAIDs were the most commonly prescribed category followed by multivitamin and mineral preparations and anti-ulcer drugs. The anti-ulcer drugs in all instances were prescribed to reduce or prevent the gastrointestinal irritation caused by NSAIDs. This was arrived at by analysis of the prescriptions and discussion with the 18 consultants of the department of orthopaedics. Diclofenac sodium and meloxicam were the most commonly prescribed drugs.

The mean ± SD cost of drugs per patient was 166.2 ± 32.5 Nepalese rupees. NSAIDs contributed to 78.1% of the total drug cost. Glucosamine sulfate contributed to 12.8% of the total drug cost. Two or more NSAID preparations were prescribed concurrently in 42 instances. Injections were prescribed in 16 encounters (8.6%) while an antibiotic was prescribed in 7 encounters.

45.2% of drugs were prescribed from the Essential drug list of Nepal while 13.1% of the drugs prescribed were fixed dose combinations. The most commonly observed problem was the absence of diagnosis [21 prescriptions (11.3%)] on the prescriptions. Other problems noted were the absence of the duration of the drugs prescribed [10 prescriptions (5.4%)], absence of age [7 prescriptions (3.8%)] and sex of the patient [8 prescriptions (4.3%)] and the date [6 prescriptions (3.2%)] on the prescription.

Method

The research design used in this study was observational, cross-sectional retrospective review of hospitals records of orthopedic patients, who were admitted at orthopedic unit of the University of Port Harcourt Teaching Hospital (UPTH), Rivers State. Nigeria.

The sample size of this study was determined using Taro Yamane method. Below is the mathematical illustration for the Taro Yamane method. $n= N/(1+N(e)2)$

Where;

n= Signifies the sample size

N= Population of the study

e= Margin error taken as 0.05 with 95% confidence interval

From Jan 2013 to Jan 2018 Total population under study N= 956

From Taro Yamane formula, the sample size n was calculated as 283.

The WHO well designed prescribing indicator was used to collect data, and information's include demographic details of patients (age and gender distribution) and the WHO/INRUD core prescribing indicators which include number of antibiotics per prescription, percentage encounter of these antibiotics as generics, percentage occurrence of injections, percentage of essential drugs and diagnosis. The folders of patients that visited the Orthopaedic clinic from January 2013 to Jan 2018 were evaluated using the WHO/INRUD core prescribing indicators. Only pregnant women were excluded from the study owing to the restrictions on

prescribing for pregnant women. The data obtained was entered into a spreadsheet and crosschecked for accuracy. The data was analyzed using descriptive statistics to obtain averages and percentages using the statistical package for social sciences (SPSS) version.

The following data was subjected to analysis

- Socio-demographic data
- Prescription pattern as mono/poly antibiotic therapy
- Antibiotics prescribed.

The findings were compared with standard values by the Standard treatment guidelines, WHO/International Network for Rational Use of Drugs (INRUD) parameters.

RESULTS AND DISCUSSION

A total of 282 case notes were reviewed and analyzed; the socio-demographic characteristics used in the analysis were the gender and age wise distribution; the results obtained are presented in Tables 4.1 and 4.2 respectively.

Table 4.1: Gender Wise Distribution Of Anibiotics Among Study Population.

GENDER	FREQUENCY	PERCENTAGE %
MALES	163	57.80
FEMALES	119	42.20
TOTAL	282	100

Table 4.2: Socio-Demographic Characteristics.

AGE	FREQUENCY	PERCENTAGE %
0-18	46	16.31
19-28	78	27.66
29-39	59	20.92
40-50	17	6.03
51-61	24	8.51
62-72	35	12.41
73-83	9	3.19
ABOVE 83	14	4.96
TOTAL	282	100

Table 4.4: Group Wise Distribution of Antibiotics.

Groups	Name of antibiotics	Number	Total no	Percentage %
Beta lactam	Cefixime	18	165	36.17
	Cefuroxime	61		
	Ceftriaxone	88		
	Amoxicillin	12		
Fluoroquinolones	Ciprofloxacin	34	58	12.77
	Ofloxacin	24		
Lincosamides	Clindamycin	18	18	3.90
Macrolide	Erythromycin	16	16	3.55
Aminoglycosides	Gentamicin	13	24	5.32
	Streptomycin	11		
Others	Metronidazole	153	161	35.46
	Vancomycin (glycopeptide)	8		

Table 4.5: Details of Antibiotics Prescribed Singly.

Drugs	N	Percentage
Metronidazole	19	39.58
Erythromycin	5	10.41
Ceftriaxone	13	27.08
Ciprofloxacin	7	14.58
Amoxicillin	4	8.33
Total	48	100

Table 4.6: Prescription Patterns Of Antibiotics As Combination Therapy Based On Class Of Drugs.

DRUGS	N	%
Cefuroxime + Clindamycin	57	13.67
Cefuroxime + Metronidazole	123	29.36
Ciprofloxacin + Metronidazole	168	40.10
Metronidazole + Ceftriaxone	69	16.87

Table 4.3: Drug Prescribing Indicators Used In Orthopaedic Unit Of The University Of Port Harcourt Teaching Hospital.

Prescribing indicator	Value obtained	Reference value	Deviation from standard
Percentage of antibiotics prescribed by generic name	52.84%	100%	47.16%
Percentage of encounter with injection	38%	13.4-24.1%	13.9%
Percentage prescribed from EDL	95.2%	100%	4.8%

RESULTS AND DISCUSSION

Antibiotics are the commonly prescribed medication in the Orthopedics Department both prophylactically (before orthopedics surgery etc.) or to treat ongoing infection (like septic

arthritis, osteomyelitis etc.) But if antibiotics are not used rationally then there will be increased chances of resistance of bacteria and also an increase in the total cost of treatment. Drug utilization studies play an important role in the rational use of drugs in the populations.

The study shows that the majority of patients attending the clinic were males 163(57.80%) than females 119(42.20%) and this corresponds with findings by Bithi et al (2014), who reported that the prevalence of Orthopedic infection is more in males (63.25%) than in females (36.75%). However, the result is in contrast with findings by Ghosh et al(2013) who reported that the prevalence is more in females than in males with a ratio (male: female-1.15:1). Further it was noted that a majority of the patients were age group of 18-28 years (27.66%) and this is similar to the study by Ghosh et al (2013) whose demographic characteristics showed that a majority of the patients were age group of 18-30 years (38.29%) The result is also in consonant with finding made by Nusrat et al (2015) during a study at Postgraduate Department of Orthopedics, Government Medical College, Jammu. Male patients in study were 72.14% while Females were 27.87%. It was also reported that a higher incidence was observed in patients aged 21-30yrs (26.66%).

Road Traffic Accident (RTA) was the most common clinical situation where antibiotics were prescribed in high percentage (40.07%), followed by post-operative (31.56%), septic arthritis (14.54%), chronic osteomyelitis (9.9%) and acute osteomyelitis was the least (6.38%). Road traffic accidents resulting from reckless driving, poor quality of road construction and inadequate maintenance have been on the increase in Nigeria which makes it the major cause of orthopedic infections. The result of this research finding on the most common clinical situation also corresponds with similar findings by Ghosh et al (2013), with RTA(52.43%) being the most common cause of infection and acute osteomyelitis(2.92%) being the least. Similar report was made by Bithi et al (2014), which showed that 32.07% of the patients suffered from accidental trauma.

From the study, five classes of antibiotics were prescribed which includes Beta lactam, Fluoroquinolones, Lincosamides, Macrolides and Aminoglycosides. The most frequently prescribed category of antibiotics was found to be beta-lactam (36.17%) followed by metronidazole (35.46%). While the least prescribed antibiotic was erythromycin in the class of Macrolide(3.55%). Among the beta lactams, cephalosporins was the pioneer with a percentage of 34.4% and amongst the cephalosporins; ceftriaxone(19.15%) was the most common antibiotic. Among the mono antibiotic therapy metronidazole was most commonly

prescribed. In poly antibiotic therapy ciprofloxacin & metronidazole was the pioneer combination. The result of this study corresponds with findings made by Ghosh et al (2014), the most commonly prescribed antibiotic was beta-lactam (42.3%) with Linezolid (9.43%) being the list. A similar study was carried out also by Kanishk et al (2017) in Dh Uttarakashi with ceftriaxone being the most commonly prescribed antibiotic. This result was also supported by the findings gotten from Nusrat et al (2013) at the postgraduate Department of Pharmacology Government Medical College Jammu, the most commonly prescribed antibiotic class was Cephalosporin in 81% patients Also in contrary to previous work carried out by Bithi et al (2014), who reported that Cefixime (49.42%) was the most frequently prescribed antibiotic followed by Flucloxacillin (24.42%). However, this study is in contrast with the research carried out by Shailesh et al (2014) the result showed that the most commonly prescribing drug was metronidazole 44.8% followed by ciprofloxacin 38.5%, gentamicin 36.9% and cefotaxime 32.2%. In general practice, the therapeutic approach for orthopaedic infection is primarily empirical and the main aim of the physicians is to treat as specifically as possible. The present study indicates the general trends of use of antibiotics in orthopaedics department. When prescriptions were screened thoroughly, the number of prescriptions of mono-antibiotic therapy (single antibiotic/prescription) were 48 (17.02%), with metronidazole (39.58%) being the most commonly prescribed and amoxicillin being the least. This was not in line with the research carried out by Bithi, et al. whose results showed that cefixime was prescribed most commonly and cefuroxime being the least. The prescriptions containing poly-antibiotic therapy were 234 (82.98%). This result is quite similar with Ghosh et al (2014) where mono antibiotic prescriptions was the most common pattern than poly antibiotic therapy.

The prescription pattern showed that out of 282 prescriptions assessed, a total of 456 antibiotics were prescribed. The average number of antibiotics per prescription was 1.62. Antibiotics prescribed has injections were 95.2%. Percentage of antibiotics prescribed from essential drug list was 95.2%. National Drug Policy using the Essential Drugs List encourages generic prescribing, which allows flexibility of stocking thereby increasing accessibility, availability and affordability of various brands of a particular drug. Percentage of antibiotics prescribed by brand name was 47.12%. Percentage of antibiotics prescribed by generic name was 52.84% as against the reference standard of 100 Antibiotics prescribed generically include metronidazole, erythromycin, ceftriaxone, ciprofloxacin and Amoxicillin

The cause may be due to its free availability in hospital pharmacy. The antibiotics which were not supplied in the hospital pharmacy were not prescribed generically.

Antimicrobial combinations are used widely although most infections in patients with normal defenses can be treated with single antimicrobial agents. Few reasons to justify the use of antimicrobial combinations is the broad spectrum coverage of initial therapy of severally infected persons, prevention of selection of resistant microorganisms when a high mutation rate of the casual organism exists to the antibiotic indicated and antimicrobial synergistic activity.

The results gotten from the antibiotics prescribed as combination therapy based on class of drugs showed that ciprofloxacin + metronidazole combination was the highest followed by cefuroxime + metronidazole, metronidazole + ceftriaxone and the least cefuroxime + clindamycin. Cefuroxime belongs to a second generation cephalosporins while ceftriaxone belongs to the third generation cephalosporin. There is no significant drug interaction between any of the combinations which makes it effective in the reduction of antibiotic resistance and the general well being of the patients. Also the different mechanism of action of the combination drugs makes them more effective when used to treat infection than when used singly. Ciprofloxacin, metronidazole and clindamycin all have activity against anaerobic infections making them not so potent in treating aerobic/anaerobic infections.

Culture and sensitivity test was done only in 3.1% of cases and out of these, therapeutic modification was done only in one case which clearly indicates that laboratory support is hardly ever sought or taken into consideration in surgical practice while prescribing antibacterial drugs.

CONCLUSION

The study showed that orthopedic infections affects more males than females and that a majority of the patients belonged to the age group (18-30) years. It can also be concluded that road traffic accidents was responsible for a majority of the clinical situation.

Pharmacotherapy in this institution showed that ceftriaxone was the most prescribed medication followed by metronidazole. The use of antibiotics is high in the study.

High average number of drug per prescription along with high use of injection was noted.

Non-compliance in the use of generic name, use of injections has showed significant deviation from the WHO core prescribing indicators. Improvement in the standard would help to reduce cost, to recognize and prevent potentially dangerous drug-drug interaction and antibiotic resistance. Generic prescribing is less this shows that all these parameters should be checked and improved to provide quality and rational treatment to the patient.

RECOMENDATIONS

There should be enlightenment and training among healthcare providers so as to ensure rational prescribing pattern and drug use.

There is need for a periodic prescription audit and review at the health facility level so as to promote drug utilization pattern.

Despite the useful findings from the study, which is only focused on core prescribing indicators, there is need for future studies to consider other WHO indicators such as patient care indicator and facility indicator, which are also very important tools in evaluating drug use of a health care facility, so as to ensure a more conclusive finding.

Non-pharmacological parameters such as lifestyle changes, dietary changes, physical exercise should be included in subsequent studies to have a precise evaluation of effectiveness of anti-biotic medications.

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