Drug Prescribing Pattern Observed during Pharmacotherapy of Antibiotics in Medical Wards at Saidu Group of Teaching Hospital, Khyber Pakhtunkhwa, Pakistan

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Abstract

ABSTRACT Objectives: The leading purpose of this investigation is to measure the excellence of drug treatment by likeable in the assessment of data on drug prescribing, dispensing, administering and use of drugs by patient. Material & Methods: The study was planned to be a retrospective, assessing the prescribing design concerned about the utilization of anti-biotic in the management of various infections, throughout a period of two months January 2017 to February 2017 (approximately 60 days). The study was conducted at tertiary care hospital in which the prescriptions of 200 patients from the medical wards, were evaluated, in which 57 (28.5%) were females and 143 (71.5%) were males. Results: Mostly prescribed antibiotic were ceftriaxone 105 (34.09%), amoxicillin/clavulanic acid 18 (5.84%), moxifloxacin 35 (11.36%), metronidazole 55 (17.85%), azithromycin 7 (2.27%), sulbactam/cefoperazone 22 (7.14%), doxycycline 13 (4.22%), ciprofloxacin 40 (12.98%), cefotaxime 5 (1.62%), and clarithromycin 3 (0.97%). Total number of drugs prescribed were 1643 in which the average number of drugs encountered per prescription were 8.21, the percentage of encounters with antibiotics were 308 (18.74%), the percentage of encounter with injections were 897 (54.59%), the percentage of drugs prescribed by generic name were 205 (12.47%), and the percentage of drugs prescribed from EDL were 1367 (83.20%). Conclusion: On the bases of our study, the pattern used at Saidu Group of Teaching Hospital for the, prescription of antibiotics, injections, generic concept and drugs from EDL shows deviation from the standards guidelines of WHO.

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What is already known about this subject: According to the WHO report in 2008, more than 50% of all medicines are dispensed, sold or prescribed inaccurately and that more than 50% of all patients failed to take medicines properly.[19] For the treatment and management of infection antibiotics are the key drugs in routine practice.[20] However irrational uses of antibiotics are reported in many studies.[21] Irrational use of antibiotics is very common in clinical practice which may lead to infections that are worse than the initially identified infections.[22]

What this study adds: This study will evaluate WHO core prescribing indicators and generic concept in the prescribing patterns of consultants in a tertiary care hospital in Khyber Pakhtunkhwa, Pakistan. Also it will evaluate and compare the prescribe medications with essential drug list of WHO. Irrational prescribing of Medicines is a widespread general medical condition, prompting to antibiotic resistance. Understanding the prescribing pattern of antibiotics is significant to handling unreasonable remedy.

ABSTRACT

Objectives: The leading purpose of this investigation is to measure the excellence of drug treatment by likeable in the assessment of data on drug prescribing, dispensing, administering and use of drugs by patient.

Material & Methods: The study was planned to be a retrospective, assessing the prescribing design concerned about the utilization of anti-biotic in the management of various infections, throughout a period of two months January 2017 to February 2017 (approximately 60 days). The study was done at tertiary care hospital in which the prescriptions of 200 patients from the medical wards, were evaluated, in which 57 (28.5%) were females and 143 (71.5%) were males. Data analysis was carried out using Microsoft Excel.

Results: Mostly prescribed antibiotic were ceftriaxone 105 (34.09%), amoxicillin/clavulanic acid 18 (5.84%), moxifloxacin 35 (11.36%), metronidazole 55 (17.85%), azithromycin 7 (2.27%), sulbactam/cefoperazone 22 (7.14%), doxycycline 13 (4.22%), ciprofloxacin 40 (12.98%), cefotaxime 5 (1.62%), and clarithromycin 3 (0.97%). Total number of drugs prescribed were 1643 in which the average number of drugs encountered per prescription were 8.21, the percentage of encounters with antibiotics were 308 (18.74%), the percentage of encounter with injections were 897 (54.59%), the percentage of drugs prescribed by generic name were 205 (12.47%), and the percentage of drugs prescribed from EDL were 1367 (83.20%).

Conclusion: On the bases of our study, the pattern used at this Hospital for the, prescription of antibiotics, injections, generic concept and drugs from EDL shows deviation from the standards guidelines of WHO.

Key Words : Antibiotics, Assessment, Prescription, Poly-pharmacy

Introduction:

Prescription is a written paper which contain medication prescribed to a patient by a prescriber and it is an authorized concern of not individually of the physician but of all those which are involves in the implementation of the prescription. Prescriptions writing needs significant and basic skills of a physician, so specific supervision and working out in prescription writing must be done during undergraduate and postgraduate teaching to minimize the error in prescription writing.[1]

Antibiotics are drugs utilized for treating diseases brought about by bacteria, and they have saved endless lives.[23] Antibiotics are as of now the most regularly prescribed drugs in medical clinics globally.[24,25] However, the unseemly utilization of antibiotics adds to the improvement of bacterial resistance, which quickens the rise and spread of resistant microorganisms and significantly affects the therapy result. Antibiotic resistance (ABR) creates when conceivably unsafe microscopic organisms change in a manner that lessens or wipes out the viability of the antibiotic. In spite of the fact that ABR is a typical issue, the wrong use and malprescribing of antibiotics are expanding the frequency of ABR.[26] ABR has been identified globally; it is probably the best test to worldwide general wellbeing today and the issue is growing.[25] The inexorably fast development and spread of ABR has become an overall issue during the previous few decades.[23,27,28]

Presently, the CDC cautions wellbeing experts to work in improving antibiotic prescribing practice and use in human medical care, and suggests the foundation of an ASP.[29] Changing recommending practices could

be troublesome, however there are demonstrated, proof based techniques to advance antibiotic treatment for people while limiting damage to the patient and lessening ABR in the community. Thus, the rational use of antibiotics is a significant wellbeing need [24]. There is no uncertainty that antibiotics have crucial roles in medical care frameworks globally and they are fundamental in all medical services settings. Despite the fact that antibiotics are a foundation instrument in medical care conveyance in emergency clinics and save incalculable lives, up to half (20–50%) of prescribed antibiotics are improperly burned-through, globally.[30] This substantially affects the nature of the medical services framework and remedial expenses, and builds the pace of unfavorable medication events.[24]

Wrong utilization of antibiotics agents is predominant, resulting in ABR, which is a key challenge in community. Wrong utilization of these medications could be unsafe and lead to ABR.[28,31]Patients with antibiotic-resistant infections are bound to encounter ineffectual treatment, repetitive contamination, death or delayed recovery.[31,32] About 6.5% of morbidity and mortality of hospital admissions is linked to unsuitable prescribing of antibiotics, even though maximum of these actions are avoidable.[16]

The most common method used for the treatment of a disease is medication therapy in general medical practice. However, the patterns of drug prescription are often irrational and actions for these patterns are essential to recover prescribing standards.[2]

Drug utilization studies (DUSs) is defined as an organized process that is used to evaluate the quality of drug therapy by compelling in the assessment of data on medication prescribing, dispensing, administering and use of drugs by patient in a given health care setup, against specific standards guidelines. Drug utilization educations pursue to supervise, assess and suggest alterations in the prescribed medication with the purpose of making the pharmaceutical care rational and economic.[3]

It also cooperates and develops working association with other health team to accomplish a rational utilization of drugs. Prescription patterns define the scope and profile of drug utilization, patterns, quality of drugs, and consistence with territorial, public and international guidelines like WHO standards, utilization of drugs from essential list of drugs and use of generic drugs.

Antibiotics are the significant medications for treatment infections and are the supreme commonly recommended drugs in medical as well as in surgery departments.[4] Resistance to antibiotics can be initiated by various factors such as health facilities, medication non-compliance, various prescribers and dispensers, use of first generation medications, unsuitable medication usage, consumption of wrong dosage, inappropriate usage of drugs, use of counterfeit drugs, over and under usage of medications.[5]

Irrational medication use can also lead to augmented effects and patient death can occur due to irrational use of drugs.[6]Peoples living in the developing world often develop resistance to antibiotics which is one of the reasons for poor treatment outcomes and higher healthcare use.[7] Irrational prescribing make drug use further difficult.

Many studies in both develop and developing countries, defines it as a pattern containing poly-pharmacy, use of medicines that are not accompanying to the treatment or unnecessary costly use of drugs, irrational use of antibiotics, and self -medication, and taking drugs in not enough quantities.[8] In clinical practice, the irrational prescribing design has been extensively reported from both developing as well as developed nations. The danger brought about via indiscreet utilization of antibiotics can be streamlined by accomplishing proper utilization of antibiotics.[9]

A study was carried out in primary health care hospitals on prescription, which was written by several doctors and was mainly stressing on primary health care centers and dispensaries. Data were collected in one year duration from March 2006 to February 2007. Data was collected on the basis of WHO standards. Standardized WHO tools were used for evaluation of appropriate medicine usage. The results of the study were such that the average number of drugs per encounter was 6.11, while the percentage of drugs prescribed by generic names were 69.81%, the percentage of antibiotics prescribed was 50.10%, while the percentage of injections prescribed was 72.70% and about ninety four percent (94%) of drugs were prescribed from EDL.

The use of antibiotics and injections was very high from the standards of WHO.[10]

Another study was carried out in geriatric patients whose age was more than 60 years and was prescribed in the tertiary care hospital. The demographic data and data on prescribing pattern were evaluated in case sheets. Three hundred-six (306) prescriptions were collected from different outpatient departments in which 102 (33.3%) were females and 204 (66.6%) were males. A total of 1749 medicines was prescribed, in which the 5.7 drugs per prescription was average drugs. The drugs prescribed by their generic names were 315 (18.01%), the percentage of antibiotics prescribed as single or in combination were 128 (41.8%), and the percentage of injections prescribed were 138 (45.1%) of the prescriptions, and about 35% of the drugs were prescribed from the NEDL.[11]

Improper utilization of antibiotics is a great community health concern in light of its expanded odds of improvement of antibiotic resistance to numerous antibiotics in a community. Prescriptions monitoring can recognize the problems associated to prescriptions and provide feedback to the prescriber so as to produce awareness for the rational use of drugs.[12]

An examination was done for one month duration in April- May 2011. The details of the patients were being documented in a detailed format and results were evaluated by descriptive statistic and expressed as mean ± SD. The results of the study was such that, the total number of patients were 200, among these 132 patients were received antibiotics, in which 77 (58.33%) was male and 55 (41.66%) was female. An antibiotic per prescription was 1.41 ± 0.67. The duration of antibiotic therapy was 6.05 ± 3.45 days and length of hospitalization was 8.91 ± 5.35. In our study, 71% of child patients were on single antibiotic and most of the child patients were receiving injectable preparation. The most generally used antibiotic in the study were Cephalosporin (41.5%), and most commonly found antibiotics combination in the study were & Cefotaxime, Clavulanic acid, Sulbactam and Amoxicillin.[4]

Another study was carried out at Hawassa university teaching and referral hospital. The total number of drugs prescribed was 491 with average number of 1.9 in the range of 1-4 drugs were prescribed per encounter. The percentage of antibiotics was 58.1% per prescription, the percentage of injection was 38.1%. The Percentage of medicines prescribed by generic name was 98.7% and percentage of medicines prescribed from EDL was 96.6%. Among the antibiotics most generally used antibiotics were ampicillin (15%), amoxicillin (16.4%), cloxacillin (13.4%), gentamicin (14.9%), ceftriaxone (9.8%) and chloramphenicol (11.6%).[13]

For the appropriate use of antibiotics and to reduce the bacterial resistance an improvement in antibiotic prescribing pattern is needed and control hospital costs is a rising importance, in any case, the best approach to achieve this is inadequately characterized. Suitable medication use has an immense commitment to world-wide decreases in mortality and morbidity with its resultant clinical, social and monetary administrations.[14] The effective medication classes of antibiotics must be listed in EDL and among these classes the most suitable antibiotic must be selected from the theme of its effectiveness, safety, suitability and cost effectiveness of the drugs.[15]

Nowadays antibiotics are the broadly utilized class of drugs around the globe. As per the WHO report, the unseemly utilization of antibiotics was 50% while the overuse and misuse was up to 100% in URTIs a study was carried out on the use of antibiotics in 13 low, middle and high income countries during 1993-1996, the study presents that approximately 30% cases of UTIs were inaccurately prescribed for antibiotics.[16] Because of high level of community antimicrobial drug resistance the use of costly drugs becomes compulsory which may not be economical for majority of population in developing countries like India.[17]

Thus, understanding the prescribing pattern of antibiotics is a main initial step for the foundation of ASPs in such asset restricted locations. Consequently, this examination expected to explore endorsing examples of antibiotics and distinguish the most often prescribed antibiotics for hospitalized patients. Furthermore, this work will add proof for policymakers to plan procedures and apply mediations to upgrade the reasonable endorsing of antibiotics among hospitalized patients in Pakistan and all the more all around the world. When the prescribing pattern of antibiotics has been resolved, suitable systems can coordinate the ASP toward mediations that must be made to improve the proper prescribing practice of antibiotics agents for

hospitalized patients. It could likewise be useful as a record for different scientists who are interested on this territory.

Methodology:

2.1. Study design:

Our study was carried out in the Medical wards (medical A and B) of Saidu Group of Teaching Hospital Saidu Sharif Swat. The examination was designed to be a retrospective, assessing the prescribing pattern concerned with the utilization of antibiotics in the management of various infections, during a period of two month January 2017 to February 2017 (approximately 60 days).

2.1.1 Inclusion/Exclusion criteria:

All admitted patients to medical wards (Medical A and Medical B) having infectious diseases are included in our study. While the patients who refuse to take medication, and patients who were not ready to participate in the study are excluded from our study.

2.1.2 Source of data:

The source of data for our study was the case sheets of inpatients of medical wards (counting patient prescription and organization subtleties). Prescription diagrams and laboratory reports were likewise evaluated to gather applicable information.

2.2. Data collection:

The prescriptions were picked dependent on the inclusion criteria and details of the patient were followed till discharge. During the examination, the inpatient case records were surveyed which included patient demographics, specific issue related to antibiotics use such as names of antibiotics, date of discontinuation, route of administration, their dosage schedule, generic name and bacteriological examination. The data gathered was reported in the patient profile form. The assumed diagnosis and the suggested antibiotics along with dosage, schedule and duration, were analyzed using WHO core indicators.

2.3. Patient demographic history/bio data

Patient's bio-data were collected. Bio data includes name, gender, address, date of admission and discharge, age and also the name of the prescribers etc.

2.4. Chief Complaints, lab findings, and diagnosis

Appropriate biochemical tests lead to appropriate diagnosis, on the basis of that physician may diagnose appropriate indication which may help in prescribing appropriate medication.

2.5. Prescribed medications:

The prescribed medications were recorded. It includes Dose schedule, generic name, brand name, strength, dosage form, price and the manufacturer.

2.6. WHO core indicator:

The prescribed medications were then evaluated by WHO core indicators.

Results:

3.1 Patients Demographic Characteristics:

In this study about 200 patients from the medical wards, selected in accordance with WHO core indicators, were involved. As per collected data, the arrangement of the patients with respect to their ages showed that 22 (11.00%) were at the age [?] 18 years old, 115 (57.5%) were between the 19-60 years old, the rest 63 (31.5%) were >60 years old. Out of those 200 selected patients, 57 (28.5%) were females and 143 (71.5%)

were males. In these total 200 patients 115 (57.5%) were hospitalized for 1-3 days, 53 (26.5%) for 4-5 days and 32 (16%) for >5 days, as tabulated in Table 1.

Table 1: Demographic Characteristics of Patients

Variables	Features	Number	Percentage
Age	[?] 18years 19- 60 years > 60 years	22 115 63	11 57.5 31.5
Sex	Male Female	143 57	71.5 28.5
Length of stay at hospital	1-3 days 4-5 days >5days	115 53 32	57.5 26.5 16.00

3.2 General Prescribing indicators used.

In this study a total of 200 prescriptions were evaluated in which total 1643 drugs were prescribed. The average number of drugs per encounter was 8.21. The total antibiotics prescribed were 308 out of which 138 were prescribed as single, while 62 were used more than once in a prescription. Drugs prescribed by their generic name were 205, while the remaining 1438 drugs were prescribed by their brand name, the number of drugs prescribed with an injection was 987, while 531 drugs were prescribed with oral dosage form, and 215 drugs were prescribed with miscellaneous dosage form, as tabulated in Table 2.

Table 2: General Prescribing indicators used

Prescribing indicators	Number of drugs
Total prescription evaluated in the study.	200
Average number of drug encountered per prescription.	8.21
Total drugs prescribed.	1643
Number of antibiotics given as Mono therapy.	138
More than one antibiotic prescribed.	62
Total number of antibiotics encountered in the study.	308
Antibiotics Drugs prescribed by Essential drug list.	251
No. of drugs prescribed with their generic names.	205
No. of drugs prescribed with an injection.	897
No. of drugs prescribed with oral dosage form.	531
No. of drugs prescribed with miscellaneous dosage form.	215

3.3 Prescribed Antibiotics.

A total number of 308 antibiotics were prescribed in the study, out of those antibiotics the most commonly prescribed antibiotic were amoxicillin/clavulanic acid 18 (5.84%), ceftriaxone 105 (34.09%), moxifloxacin 35 (11.36%), metronidazole 55 (17.85%), azithromycin 7 (2.27%), sulbactam/cefoperazone 22 (7.14%), doxycycline 13 (4.22%), ciprofloxacin 40 (12.98%), cefotaxime 5 (1.62%), and clarithromycin 3 (0.97%)(Table 3).

Table 03: Antibiotics prescribed.

S. No	Antibiotic/combination	Number	Percentage
1	Ceftriaxone	105	34.09%
2	Amoxicillin/clavulanic acid	18	5.84%
3	Moxifloxacin	35	11.36%
4	Metronidazole	55	17.85%

S. No	Antibiotic/combination	Number	Percentage
5	Azithromycin	7	2.27%
6	Levofloxacin	5	1.62%
7	Sulbactam/cefoperazone	22	7.14%
8	Doxycycline	13	4.22%
9	Ciprofloxacin	40	12.98%
10	Cefotaxime	5	1.62%
11	Clarithromycin	3	0.97%
	Total	308	308

3.4 WHO prescribing indicators:

Total prescribed drugs were 1643 in which the average number of drugs encountered per prescription were 8.21, the percentage of encounters with antibiotics were 308 (18.74%), the percentage of encounter with injections were 897 (54.59%), the percentage of drugs prescribed by generic name were 205 (12.47%), and the percentage of drugs prescribed from EDL were 1367 (83.20%) which are comparable to other studies.[11] (Table 4).

Table 4: WHO prescribing indicators.

Prescribing indicator	Total drugs/ Encounters	Average/ percent	Standard/derived
Average number of drugs encountered per prescription.	1643	8.21	1.6-1.8
Percent of encounters with antibiotics	308	18.74%	20.0-26.8%
Percent of encounters with injections	897	54.59%	13.4-24.1%
Percent of drugs prescribed by generic name	205	12.47%	100%
Percent of drugs from essential drugs list	1367	83.20%	100%

Discussion:

The present study was carried out to assess the prescribing pattern of antibiotics in a tertiary care hospital using WHO core indicators. Generic prescribing of drugs was relatively minor and mainly not prescribed from EDL. Our investigation recommends that procedures to control silly utilization of antibiotics should be executed and the rules utilized for treatment of patients should be redesigned intermittently.

Irrational prescribing of antibiotics is a general medical issue, prompting to antibiotic resistance. Understanding the prescribing pattern of antibiotics is pivotal to handling irrational prescription. Formulation of an arrangement for hospital antibiotic use and an instructive program particularly for junior specialists is necessary. Rules for antibiotic practice in the public and confining the level of health care practitioners who can prescribe antibiotics are compulsory.

Data about antibiotic use designs is fundamental for a valuable way to deal with issues that emerge from the various antibiotics available.

The results of our study were slightly similar to [18] in which the average number of drugs per encounter was 6.11, while the percentage of drugs prescribed by generic names were 69.81%, the percentage of antibiotics prescribed was 50.10%, while the percentage of injections prescribed was 72.70% and about ninety four percent (94%) of drugs were prescribed from EDL.

The results of our study were comparable to [11] in which the percentage of male was 204 (66.6%) and percentage of females was 102 (33.3%). The total drug prescribed was 1749 while the average drugs per patients were 5.7. The percentage of the drugs prescribed in their generic names was 18%. The percentages of prescriptions which had one or more antibiotics prescribed were 128 (41.8%) and the percentage of prescription which had at least one injection was 138 (45.1%) and percentage of prescription in which the drugs were prescribed from the NEDL were (35%).

The result of our study was similar to [4] in which the most commonly antibiotic combination utilized was Amoxicillin and Clavulanic acid & Cefotaxime and Sulbactam.

The results of our study was slightly comparable with the results of [13] in which the usually prescribed antibiotic were cloxacillin (13.4%), amoxicillin (16.4%), chloramphenicol (11.6%), ceftriaxone (9.8%), ampicillin (15%), gentamicin (14.9%) and penicillin (12.4%).

On the base of our study the prescribing pattern used at this Hospital for use of antibiotics, use of injections, generic concept and prescribing drugs from EDL shows deviation from the standards guidelines of WHO. On the other hand, poly-pharmacy was found to be a problem in our study. So the responsibility of the doctors is to develop prescribing patterns which will support to reduce the intensity of the drugs related problem. Teaching hospitals have responsibility to promote rational prescribing by their staff and the future generations of doctors.

This issue might be decreased by building up an ASP, presenting the practice of antibiotics with the help of culture and sensitivity tests, and creating institutional rules. Consequently, this investigation gives proof to the need and a path forward for the foundation of an ASP in the hospital.

Conflict of Interests: The authors announce that they have no contending interests.

Ethical Approval: All examinations were preceded as a piece of routine clinical consideration with no requirement for independent educated assent.

Abbreviations: (EDL) Essential Drugs List, (WHO) World Health Organization, (URTIs) Upper Respiratory Tract Infections, (ABR) Antibiotic resistance, (CDC) Centers for Disease Control and Prevention.

Authors' Contribution: Asaf Khan supervised, abstracted, drafting and analyzed data, Salman khan developed the original idea and the protocol, Muhammad Waseem critical revision of the manuscript for important intellectual content, Wasim Muhammad, development of the protocol, wrote the manuscript, abstracted data and is guarantor.

Data Availability Statement: The data that support the findings of this study are available on request from the corresponding author. Also the data will be openly available at Library of Shaheed Benazir Bhutto University, Department of Pharmacy, Sheringal, Dir Upper, Khyber Pakhtunkhwa, Pakistan.

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