ejpmr, 2024, 11(8), 725-736

SJIF Impact Factor 7.065

EUROPEAN JOURNAL OF PHARMACEUTICAL AND MEDICAL RESEARCH

www.ejpmr.com

Research Article

ISSN 2394-3211

EJPMR

PRESCRIPTION PATTERN IN TERTIARY CARE HOSPITAL

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Article Received on 21/06/2024 **Article Revised on 11/07/2024** **Article Accepted on 01/08/2024**

ABSTRACT

Objective: To study the prescription pattern in tertiary care hospital and analysing the prescription as per WHO prescribing indicators. **Methods:** An appraisal of 185 prescriptions was done to analyse patient's age, gender, diagnosis, categories and number of medicines prescribed, dosage, frequency and route of administration. Along with baseline demographic data, the total number and categories of drugs prescribed, percentage of individual drugs in each category, their dosage forms, percentage of drugs prescribed by generic name and drugs prescribed from essential drug list were analysed. **Results:** The average number of drugs prescribed per prescription was found tobe10.58 which was extremely higher than the standard value (1.6 – 1.8). 40.0% of the prescriptions has less than 10 drugs per prescription, 39.46% prescriptions contained more than 11 drugs per prescription and 20.54% prescriptions had between 10 and 11 drugs per prescription. It was observed that majority of the drugs prescribed were by brand names 97.18% (n=1902) while only 2.82% (n = 55) drugs were prescribed by generic name. **Conclusions:** The prescribing pattern shows deviation from WHO prescribing indicators. The prescribing practices were not appropriate as they consist of polypharmacy, lesser prescription by generic name and lack of knowledge of the EDL. Implementing of standard treatment guidelines, hospital formulary, and regular knowledge update programs and utilizing the services of a clinical pharmacist may be of benefit.

KEYWORDS: Prescription pattern, Tertiary care hospital, Antibiotics, Rout of Drugs Administration, Therapeutic index.

INTRODUCTION

The concept of drug utilization research was developed in the mid-1960 due to initiatives taken in Northern Europe and the United Kingdom.[1] The pioneering work of Arthur Engel in Sweden and Pieter Sedaris in Holland,[2] alerted many investigators to the importance of comparing drug use between different countries and regions. Their illustration of the remarkable differences in the sales of antibiotics in six European countries between 1966 and 1967 inspired World Health Organization (WHO) to arrange its first meeting on drug consumption in Oslo in 1969.[3]

The rational use of drugs requires that patients receive medications fitting to their clinical needs, in doses that meet their individual requirements for a sufficient period of time, and at the economic cost to them and their community. In 1977 WHO published its first report on selection of essential drugs. One of the objectives of makingof essential drugs list is to establish and follow a system of rational use of drugs. Drug review programs are accepted as a means to foster proper use and may assist in controlling expenses.[4]

Pharmacoepidemiology can be a useful for estimating the appropriateness of drug prescriptions and for evaluating therapeutic needs. Especially, pharmacoepidemiology can be valuable in the pediatric setting, which is specify by the availability of only limited information on the safety and effectiveness of drug use. Drug utilization studiesperformed in the Italian pediatric population have found a prescription profile that appears to be specific to Italy, especially concerning antibiotics, in which both quantitative and qualitative differences with other European countries were found. The prescription prevalence was three- to four fold higher than in the Netherlands or the UK, with a wide use of second choice antibiotics such as cephalosporin. Moreover, wide, irrational use of anti-asthmatics, in particular inhaled steroids, has been observed.[5]

Prescription pattern monitoring studies are drug

utilization studies with main focus on the rational use of drugs in populations. The definition of rational use of medicines – "Patients receive medications appropriate to their clinical needs, in doses that meet their own individual requirements, for an adequate period, and at the lowest cost to them and their community."[6] The World Health Organization (WHO) core indicators help to improve the prescribing patterns and thus promote the rational use of drugs in a healthcare facility.[7] It is needed to assess the rational prescribing skill of the clinicians, and this can be done by conducting periodic prescription audit. An audit in healthcare is a system used by health professionals to determine, appraise and improve the care of patients in an efficient way and it measures existing practice against a defined standard.[8] Audit facilitates in the assessment of the contemporary trends of drug handling, drug disbursement, appropriateness of prescriptions and adherence to evidence-based recommendations.[9]

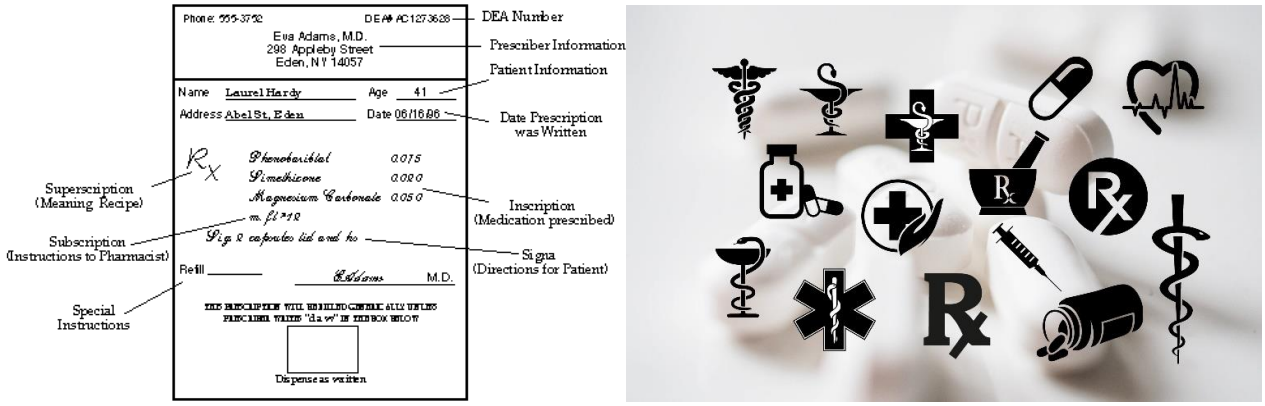

Figure 1: Prescription Pattern and All Pharmacy Symbols.

Prescription pattern: Prescription monitoring studies (PPMS) are a tool for assessing the prescribing, dispensing and distribution of medicines. The main aim of PPMS is to facilitate rationaluse of medicines (RUM).

Introduction to Prescription: Prescription order is an important transaction between the physician and the patient. It is an order for a scientific medication for a person at a particular time.[10] It brings into focus the diagnostic acumen and therapeutic proficiency of the physician with instructions for palliation or restoration of the patient's health.[11] Prescription is a written document that engages the medical and legal responsibility not only of the physician but of all those subsequently involved in its execution.[12]

Prescription writing used to be an art as well as a science. Unfortunately, times have changed. More often than not, we find incomplete and illegal prescriptions being handed over to patients, and, more unfortunately, honored at pharmacies. This has resulted in a disturbing trend of putting the patients' safety at risk; and there is an urgent need to put things right.[13] Nowadays the prescribing pattern is changing and it has become just an indication of medicine with some instructions of doses without considering its rationality.[10]

Parts of the Prescription: The elementary requirements of a prescription are that it should state what is to be given to whom and by whom prescribed, and give instructions on how much should be taken how often, by what route and for how long or total quantity to be supplied.[14,15]

1) Date
2) Address of doctor
3) Superscription {Symbol (Rx)}
4) Inscription or the name and dose of medication prescribed
5) Subscription or Dispensing direction to Pharmacist
6) Signature or Instructions for Patient
7) Signature of doctor

Date: Prescriptions are dated at the time they are written and also when they are received and filled in the pharmacy. The date is important in creating the medication record of the patient. The Date is also important to pharmacist in filling prescription of controlled substances. No Prescription order of controlled drugs may be dispensed or renewed more than 6 months after the date prescribed.

Address of doctor: It is important to write physician's name, address, telephone number and Drug Enforcement Agency (DEA) number or Medical council registration number in India on prescription pads.

Superscription {Symbol (Rx)}: This is the symbol R generally is understood to be a contraction of the Latin verb recipe, meaning take thou or you take. The stroke after "R" is considered as an invocation to Jupiter. Jupiter is a god of healing. Sign of Jupiter employed as request for healing. Today, the symbol is representative of both the prescription and the pharmacy itself.

Inscription or the name and dose of medication prescribed: This is the body or principal part of the prescription order. It contains the name and quantities of the prescribed ingredients. Today, majority of the prescriptions are written for medication already prepared

or prefabricated into dosage forms by industrial manufacturers. The medications may be prescribed under their trademarked or manufactures proprietary name or by their nonproprietary or generic names. Pharmacists are required to dispense the trademarked products when prescribed, unless substitution of an equivalent product is permitted bythe prescribing physician or by the state law. Prescription orders requiring the pharmacist to mix ingredients are termed compounding prescriptions. Prescriptions requiring compounding contain the names and quantities of each ingredients required.The names of the ingredients generally are written using the nonproprietary names of the materials, although occasionally proprietary names may be employed. Quantities of ingredients to be used may be indicated in the metric or apothecary system of weights and measures; however, the use of the apothecary system is diminishing. In the metric system the decimal point is often replaced by vertical line that may be imprinted on theprescription blank or drawn by the prescriber.[16]

Subscription or Dispensing directions to Pharmacist: This part of the prescription consists of directions to the pharmacists for preparing the prescription. In majority of prescriptions, the subscription serves merely to designate the dosage form (as tablets, capsules, etc) and the number of dosage units to be supplied. Examples of prescription directions to the pharmacist are "make a solution,""mix and place into 30 capsules," or "dispense 30 tablets.[16]

Signature or Instructions for Patient: The prescriber indicates the directions for the patient's use of the medication in the portion of the prescription called signature. The word, usually abbreviated signa or sig means mark thou. The directions in the signa commonly are written using abbreviated forms of English or Latin terms or a combination of each.[16]

Current Scenario of Prescribing: Indian markets are flooded with over 70,000 formulations, compared to roughly 350 preparations listed on the WHO Essential Drugs List.[17] There are thousands of drug companies, and several companies manufacture generic preparations using different brand names. In addition, thousands of formulations of vitamins, tonics, and multi-drug combinations that are unique to the Indian market are manufactured and marketed regularly. A visit to the physician has come to necessarily mean a prescription comprising of a broad-spectrum combination of antibiotics — one or more, an anti-pyretic or frequentlyan unnecessary combination of the two drugs, a multivitamin tonic, and a cough syrup. Intravenous, rehydration, and parenteral medication are also used frequently.[18] Worldwide, more than half of all medicines are prescribed, dispensed, or sold unacceptably, and 50% of patients take them wrongly. Moreover, about one third of theworld's population lacks access to essential medicines.[19] A survey conducted in 8 hospitals in southern Ethiopia that investigated their prescription patterns concluded that irrational prescribing, as evidenced by high average number of drugs prescribed per encounter, high percentage of injections, and high percentage of antibiotic use, was prevalent in the studied region.[20] It is obvious that irrational prescribing is a global problem. Bad prescribing habits lead to ineffective and unsafe treatment, exacerbationor prolongation of illness, distress and harm to the patient, and higher costs. Irrational prescribing patterns are perpetuated through patient pressure, bad example of colleagues, and high-powered salesmanship by drug company representatives. In teaching hospitals, new graduates will copy from seniors, completing the vicious circle. Changing existing practice of prescribing habits becomes very difficult.[21] Assessment of drug use patterns with the WHO drug use indicators is becoming increasingly necessary to promote rational drug use in developing countries.[22,23] Physician prescribing is the most frequent medical intervention with a highest impact on healthcare costs and outcomes. Therefore improving and promoting rational prescribing is of great interest. In a study a four arm randomized trial with economic evaluation was conducted in Tehran. Three interventions (routine feedback, revised feedback, and printed educational material) and a no intervention control arm were compared. Physicians working in outpatient practices were randomly allocated to one of the four arms using stratified randomized sampling. The interventions were developed based on a review of literature, physician interviews, and current experiences in Iran and with theoretical insights from the Theory of Planned Behavior. Effects of the interventions on improving antibiotic and corticosteroid prescribing were assessed using regression analyses. Cost data was assessed from a health care provider's perspective and an incremental cost effectiveness ratio was calculated.[23] The another study by Soleymani et al determined the effectiveness and cost-effectiveness ofthree interventions and determined the most effective interventions in improvingprescribing pattern. Study concluded that if the interventions are cost effective, they would likely to be applied nationwide.[24]

Before activities to promote rational drug use are started, an effort should be made to describe and quantify the situation. Several well-established survey methods are available for this purpose. One assessment method is a prescribing and patient care survey using the WHO health facility drug use indicators. These quantitative indicators are now widely accepted as a global standard for problem identification and have beenused in over 30 developing countries.[25] Prescribing patterns need to be evaluated periodically to increase the therapeutic efficacy, decrease adverse effects and provide feedback to prescribers.[26]

Why Do We Need Prescribing Quality Evaluation? In spite of all measures developed at various stages like local, state, national & international level, the situation still needs improvement and as reviewed previously

inappropriate or irrational prescribing is widespread all over the world. To improve thesituation further stringent continuous efforts will be required. The first step in this direction would be to assess the quality of prescribing at local, state, national & International level. Several tools have been developed and introduced from time to timefor this purpose. They ranged from simple tools (WHO core prescribing indicators) to complex tools (Beer's criteria, explicit criteria, Medication Appropriateness Index).

Brief Introduction to Various Indicators and tools: Prescribing indicators are commonly used in the public sector to gain an impression of a quality of services. If they are developed and used appropriately they can help to identify potential problems and encourage quality improvement and/or improved safety. In the UK, there is a long history of indicators being used to show how prescribing performance of NHS general practices might compare with other practices,local and national averages or with themselves over time. The National Prescribing Centre and the Prescribing Indicators National Group recommend that prescribing indicators should:

- be based on scientific evidence and supplemented in a systematic way by expert opinion
- cover a range of process and outcome measures
- represent areas where change is largely within the control of the clinician
- represent areas of practice that are regarded as important by clinicians and consistent with national health policy initiatives
- represent areas of practice where the most important case mix and risk adjustment factors are known and data about them can be collected
- be based on clinical data that:
- should be recorded by clinicians as part of the process of clinical care
- should be electronically recorded in clinical records using current clinicalterminologies and codes
- can be extracted in a timely manner - are sensitive to changes in quality of care
- can be easily checked for validity and reliability.[27]

Indicators based on the use of GP prescribing data continue to be employed regularly inthe UK, and continue to form part of local prescribing incentive schemes. Nevertheless, while potentially extremely useful for analyzing prescribing patterns, these data are rarely linked to diagnoses and patient characteristics and so they have limitations whenassessing quality and safety. Other indicators have required very detailed analysis and assessment of clinical records e.g. the medication appropriateness index.[28] These are potentially very useful for research purposes, but are not feasible for the large-scale assessment GP prescribing.

A major advance in recent years in terms of developing and using more sophisticated indicators of quality and safety of prescribing has involved the interrogation of electronic medical records. This has come about because of considerable improvements in the quality and completeness of electronic records in general practices, and also due to developments in the ability to run electronic searches and analyze the results across large numbers of practices.

Indicators that focus general prescribing quality: National Patient Safety Agency (NPSA) documents – the NPSA has produced a number of documents that are relevant to the safety of prescribing in primary care.[29] For example, the fourth report from the Patient Safety Observatory[30] highlighted medication incidents in the community and at the interface between community and hospital care and also suggested ways in which risks of harm could be reduced. In addition, the NPSA has highlighted a number of specific safety issues relevant to primary care including anticoagulant prescribing, dosing errors with opioid medicines and the prescribing of methotrexate (NPSA 2009). A number of these issues could be incorporated into indicators.[29]

WHO prescribing indicators: The World Health Organization (WHO) in 1993 has formulated a set of "Core drug use indicators" namely prescribing indicators, patient care indicators and facility indicators. Among them, for this study only "prescribing indicators" were taken which measure the performance of prescribers. The core prescribing indicators are average number of drugs per prescription, percentage of drugs prescribed by generic name, percentage of encounters with an antibiotic prescribed, percentage of encounters with an injection prescribed and percentage of drugs prescribed from essential drug list or formulary. Some additional indices are percentage of encounters with a NSAID prescribed,percentage of encounters with an antiulcerant prescribed, percentage of encounters with a calcium preparation prescribed and the data was expressed as percentage, meanand total numbers.[31]

Selected WHO/INRUD drug use indicators for primary health care facilities (WHO, 1993)[31]

Prescribing Indicators

a) Average number of medicines prescribed per patient encounter
b) % medicines prescribed by generic name.
c) % encounters with an antibiotic prescribed
d) % encounters with an injection prescribed
e) % medicines prescribed from essential medicines list or formulary

Patient Care Indicators

- Average consultation time
- Average dispensing time
- % medicines actually dispensed
- % medicines adequately labeled
- % patients with knowledge of correct doses

Facility Indicators

- Availability of essential medicines list or formulary to practitioners

- Availability of clinical guidelines
- % key medicines available

Complementary Drug Use Indicators:

- Average medicine cost per encounter
- % prescriptions in accordance with clinical guidelines

Review of Literature

1. Study of prescription pattern in medicine intensive care unit of a rural medical college and hospital of Himachal Pradesh: A retrospective observational study.[32]

Arvind Kumar et. al (2017) conducted a retrospective observational study and all the patients admitted to ICU between March 2016 to July 2016 were included in the study except for those who expired. Total 152 cases were included with 100 (65%) males and 52 (35%) females. The mean age was 60.05 ± 16.05 years with a range of 20 years – 90 years with mean age of 58.72 ± 14.85 years in males and 62.52 ± 17.80 years in females. 111 (73%) patients were more than 50 years of age. Average duration of hospital stay was 2.96 ± 2.57 days with a range of 1 to 20 days.

Hypertension and Diabetes were most common co-morbidities (52%). Average numbers of drugs prescribed were 11.06 ± 3.88. CVS system was affected in 80%, respiratory system in 6%, excretory system in 4%, GIT in 3%, CNS in 2% and others in 5% patients. Drugs prescribed were atorvastatin in 124, aspirin ± clopidogrel in 119, anticoagulants in 105, oxygen inhalation in 95, benzodiazepines in 94, ACEIs/ ARBs in93, β- Blockers in 86, laxatives in 81, morphine in 62, antiemetics in 58, gastric acid secretion inhibitors in 58, diuretics in 50, vasopressor agents in 48, nitrates in 45, bronchodilators in 44, fibrinolytics in 32, steroids in 29, antidiabetics in 28, antihistaminics in 21, NSAIDs in 20, atropine in 15, antianginals in 7, CCBs in 6 and potassium channel openers in 2 patients. The authors concluded thatfrequent drug utilization studies are need of the hour to know drug prescription pattern and to promote evidence-based medicine.

2. **Evaluation of antibiotic prescribing pattern in pediatrics in a tertiary care hospital**[33]

Mathew R et al. (2021) did a study to evaluate the prescribing pattern of antibiotics forchildren using WHO core prescribing indicators. A prospective, observational study was carried for 6 months in the pediatric department at a tertiary care hospital, Pune. The WHO prescribing indicators were used to evaluate the prescriptions, and the ideal WHO range was considered as a determining factor for rational prescription. A total of 302 patients were included in the study, with a mean patient age of 4.92 ± 4 years. The average number of drugs per encounter was 6.12 (WHO standard is less than 2). The percentage of antibiotics prescribed was 26.3% with an average of 1.63 antibiotics per prescription. Of the 493 antibiotics, 85.59% were injectable which is higher than the WHO standard of 13.4–24.1%. A near-optimal value of 99.59% antibiotics was prescribed from the hospital formulary which is similar to WHO standards, and the antibiotics prescribed with generic names were 25.76%. The most common class of antibiotics prescribed were cephalosporins and penicillins. Polypharmacy, high injectable use, and nonadherence to generic prescription were common in our tertiary care center. Continuous audits, training, and new treatment protocols were recommended by the authors of this study.

3. **Prescription Pattern In A Medical ICU Of A Tertiary Care Teaching Hospital Of South India**[34]

Rajatjilagam T. et. al. (2018) conducted a study evaluate the prescribing pattern in the medical I.C.U. of a tertiary care teaching hospital in Tamilnadu**.** A prospective cross-sectional study was conducted among patients admitted to the medical ICU for a period of 6 months to establish the prescribing pattern. The collected data was analysed to estimate the WHO core drug prescribing indicators and patient indicators. The prescription data of 130 patients who met the study criteria was analyzed. The mean age group of patients admitted was 54.95 ± 8.1 years and average duration of stay in the ICU was 5.5 ± 2.4 days. Cardiovascular (CVS) diseases were involved in the majority of the patients (41.5%, n = 54). Among parenteral drugs, 15 drugs (8 classes) acted on the CVS and 13 drugs (5 classes) were antibiotics while 25 drugs (7 classes) acted on the CVS and 11 drugs (6 classes) acted on the neurological system among oral drugs. Analysis of prescription records for drug utilization pattern in this study revealed that most of the drug classes were prescribed for appropriate indication & all drugs were prescribed as generics.

4. **Prescription Audit in an Outpatient Pharmacy of a Tertiary Care Teaching Hospital-A Prospective Study**[35]

Sunny D et al. (2019) did a study with an aim to carry out prescription audit in the outpatient pharmacy department of a tertiary care teaching hospital. A prospective observational study was conducted on 500 prescriptions for a span of four months in the outpatient pharmacy department of a tertiary care teaching hospital in South Karnataka, India. All the prescriptions were analyzed based on WHO prescribing indicators and were evaluated for errors in prescription writing. Data were entered and analyzed using into SPSS. Graphic representation has been used for visual interpretation of the analyzed data. Five hundred scripts comprising of 1,661 drugs were analyzed. The average number ofdrugs per prescription was three. The study encompassed 52% males and 48% females.Most patients were from the age group of 41-60 years. Only 3.6% (18) of medications were prescribed by generic names. Patients received 9% (145) medications contained in Essential Drug List and prescriptions containing antibiotics were 19% (97).

Majority of the prescriptions were from Orthopedics (18.6%) tailed by General Medicine (15.8%). Consecutively Analgesics (12.7%) were the most commonly prescribed drug class, among which Diclofenac and Paracetamol+Tramadol were usually prescribed, this was tailed by gastrointestinal medicines (11.7%). The authors concluded that prescription audit can be helpful to plan appropriate intervention to ensure the rational drug therapy and to evaluate the existing drug use pattern. It also reflects the perspectives of current prescribing pattern in hospitals.

5. Assessment of Drug Prescribing Pattern Using World Health Organization Indicators in a Tertiary Care Teaching Hospital[36]

This cross-sectional study was carried out by **Hussain S et. al. (2018)** to assess drug prescribing pattern at a tertiary care teaching medical institute. One thousand prescriptions were randomly collected and analyzed using the world health organization prescribing indicators. The average number of drugs per prescription was 2.91. The percentage of drugs prescribed by generic name, from the essential drug list(National) and as fixed dose combinations (FDCs) was 10.05%, 22.57%, and 49.22%, respectively. The total percentage of encounters with antibiotics, injectable, and FDCs was 19.70%, 2.20%, and 73.60%, respectively. The most common group of drug prescribed was gastrointestinal tract drugs (26.38%) followed by Vitamins and Minerals (23.12%), cardiovascular system drugs (11.56%) and antimicrobials (9.63%). The prescribing practices were not appropriate as they consist of polypharmacy, lesser prescription by generic name, and over prescription of FDCs. There is a need for improvement in the standards of prescribing patterns in many aspects.

6. Drug prescription pattern in a tertiary care hospital in Pakistan[37]

Ansar A et. al. (2017) conducted a study to determine the drug prescription patterns and frequency of polypharmacy in the outpatient department of a tertiary care hospital in Lahore. This cross sectional study was conducted at the Medical and Surgical outpatient Departments of Shalimar Hospital Lahore from January to March 2017. Materials and Methods: A desired sample of 400 prescriptions was selected using multistage sampling technique, with 200 prescriptions each from medical and surgical outpatient departments. Prescribing trends of drugs were reviewed and compared to the available WHO prescribing indicators. Results: Average number of drugs per encounter in this study was 3.56 with 48% of prescriptions having more than 3 drugs. Antibiotics and analgesics were prescribed in 34.3% and 62.8% of the encounters respectively. Percentage of prescriptions containing only oral medication, injectables and topical drugs was 79.3%, 2.8% and 17.8% respectively. None of the prescriptions had drugs with generic names. Statistically significant difference in the prescribing trend of analgesics was noticed between medical and surgical prescriptions with p value of <0.001. Conclusion: Polypharmacy and prescribing brand names, instead of generic names of the drugs, continue to be the major problems in tertiary care hospitals of Pakistan. These inappropriate prescription trends need to be addressed by observation of WHO guidelines for drug prescription to avoid unwanted consequences.

7. Drug prescription pattern in a Nigerian tertiary hospital[38]

Tamuno I and Fadare J. O (2012) did a study to evaluate the prescribing pattern of clinicians in the general outpatient unit of the Aminu Kano Teaching Hospital, Kano (AKTH). This was a descriptive retrospective study conducted using 500 prescriptions made at the general outpatient unit of AKTH between April and July 2009. A total of 497 prescriptions were successfully analyzed. The average number of drugs per encounter in the facility was 3.04. Generic prescribing was low at 42.7 % while antibiotic prescription was high at 34.4 %. Injections were prescribed in 4 % of encounters while 36.2, 19.1, 25.8 and 1 % of encounters had analgesics, antimalarial, antihypertensive and anxiolytics prescribed, respectively. Vitamins were prescribed in 9.7 % of encounters. It was concluded that polypharmacy, low rate of generic prescriptions and overuse of antibiotics still remain a problem in health care facilities in Nigeria. This calls for sustained interventional strategies and periodic audit at all levels of health care to avoid the negative consequences of in appropriate prescriptions.

8. Antibiotic Prescription Pattern among the In-Patients of A Tertiary CareHospital[30]

Raj Shivani M. R and Selva P conducted a study with the main objective to analyze the prescription pattern of the antibiotics given to the in-patients of their hospital and to access the rationality of these prescriptions given, using the World Health Organizations core drug prescribing indicators. A total of 400 in-patients from Departments of Pediatrics, General Surgery, Obstetrics & Gynecology and Orthopedics were analyzed after screening for inclusion and exclusion criteria. The numbers of Females were 248 (62%) and the males were 152 (38%) in a ratio of 1:1.63.101 patients belonged to 40-60 years age group. The pattern of antibiotic usage in the Department of Pediatrics, Obstetrics and Gynecology, General Surgery, Orthopedics was studied. The most common antibiotics prescribed were Cefotaxime (44%), Amoxicillin (38%) and Cefazolin (38%, 24%) in Departments of Pediatrics, Obstetrics & Gynecology, Surgery and Orthopedics respectively. The total numbers of drugs prescribed were 1441 out of which 612 were antibiotics (43.09%). The number of antibiotics per prescription was 1.53. The average number of drugs prescribed perprescription was 3.6.The percentage of encounters with injections was 26.48%. The percentage of drugs prescribed by generic name is 36.2%. The percentage of drugs from the Essential Drug List was 92%.

The percentage of fixed-dose combinations of antibiotics prescribed was 14.54%. Hence, in the study, though most of the drugs were given from the Essential List of Medicines, drugs given by a generic name was low. Physicians can been courage to prescribe more drugs by generic name. The study concluded that antibiotic stewardship interventions have to be implemented to promote the judicious use of antibiotics to prevent adverse consequences.

Analysis of findings of "prescription audit" performed for indoor cases intertiary care hospital[40]
Gajjar B. et. al. (2020) conducted a study with the objective to analyze the findings of prescription audit performed for indoor cases in tertiary care hospital and to provide appropriate feedback to the prescribers. This was a record based retrospective study conducted at Shree Krishna Hospital, Karamsad, Gujarat. A total of 1809 indoor case files were collected randomly from the Departments of Medicine, Surgery, Obstetrics and Gynaecology, Pulmonary Medicine, Orthopaedics, Ophthalmology, Skin, ENT, and Psychiatry. Prescriptions with insufficient patient history were excluded from the analysis. A total of 1553 case files out of 1809 were found to be suitable for audit. A total of 12,543 formulations were prescribed, of which 9 (0.07%) were unnecessary and 684 (5.45%) were irrational fixed dose combinations (FDCs). Department-wise percentage of irrational FDCs prescribed was found to be highest by ENT (8.58%) followed by pulmonary medicine (8.16%). Cough and cold formulations 325 (47.51%)were the most common irrational FDCs among 684 irrational drugs. The study concluded that development and implementation of 'Hospital Formulary' based on 'WHO Model List of Essential Medicines' has had a satisfactory impact on rational use of medicines, though the compliance by some clinicians needs to improve.

MATERIALS AND METHODS: This was a retrospective study where the prescriptions of patients admitted to various in-patient wards and ICU between the periods of one month (March 2021 to April 2021) were collected from the patient files and analyzed. Prior to the conduct of the study, permission was obtained from the hospital authorities to conduct this study. Prescriptions with final diagnosis were analyzed. Prescriptions of patients of all ages were included in the study. All the out-patients were excluded from the study. Incomplete and illegible data were excluded. Also, illegible prescriptions and those with the use of nonstandard abbreviations were excluded. Data collection form was designed and used by the investigators to record data and information on the prescribed drugs in the health facility. The collected data was pooledin a Microsoft Excel sheet. The patient's age, gender, diagnosis, categories and number of medicines prescribed, dosage, frequency, route of administration and duration of treatment were collected.

Analysis of data was done according to WHO prescribing indicators namely
i) average number of drugs per prescription, ii) percentage of drugs prescribed by generic name and iii) encounters with an antibiotic prescribed, iv) encounters with an injection prescribed and v) percentage of drugs prescribed from essential drug list or formulary. Results were presented using descriptive statistics (frequency and percentages).

RESULTS AND DISCUSSION

Results: An appraisal of 185 prescriptions was done to analyse patient's age, gender, diagnosis, categories and number of medicines prescribed, dosage, frequency and route of administration.

Patient Demographics: The overall study of demographics reveal that the proportion of males was 61.63% (n=114), and that of females was 38.37% (n=71).

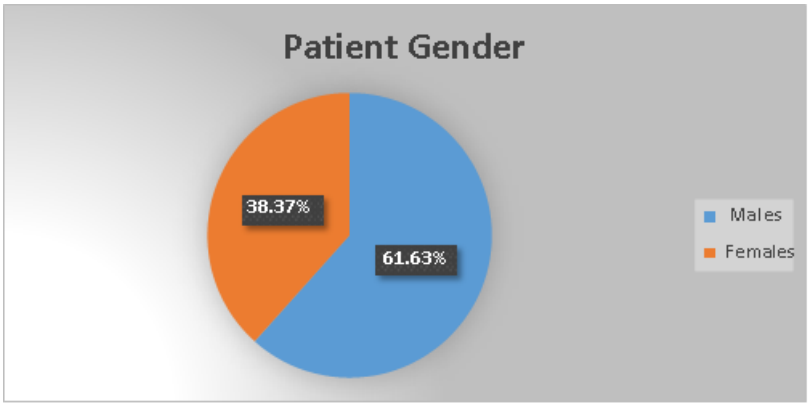

Figure 2: Distribution of patients as per their gender.

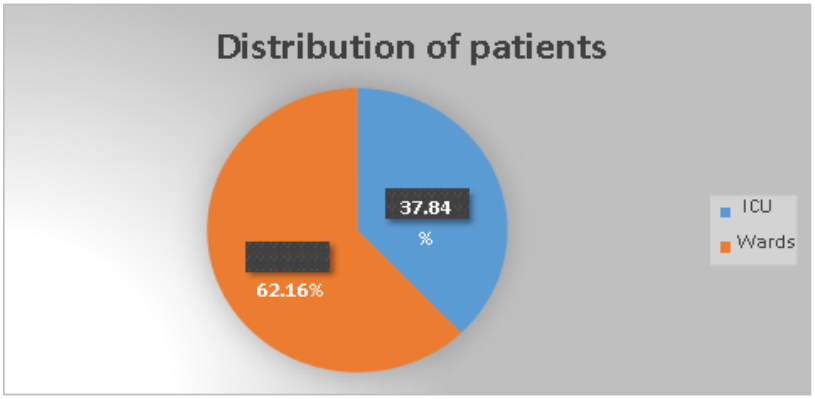

Figure 3: Distribution of in-patients in the hospital.

Out of the 185 patients, 62.16% (n=115) were admitted in the ward while 37.84% (n=70) were admitted in the ICU.

From among the 185 patients, 48.11% (n=89) were more than 60 years of age, while 32.44% (n=60) were between the age group of 41 to 60 years. The complete distribution of patients according to their age is shown in Table 1.

Table 1: Distribution of patients according to their age.

Sr. No.	Age	No. of Prescription	Percentage
1	0 - 20	8	4.32%
2	21 - 40	28	15.13%
3	41 - 60	60	32.44%
4	> 60	89	48.11%

Analysis according to WHO prescribing indicators
Table 2: Enlists the results of the as per the WHO prescribing indicators.
Table 2: Analysis according to WHO prescribing indicators.

Prescription Indicators Assessed	Number	Average/ Percentage	Ideal Value
Drugs per Encounter	1957	10.57	1.6 - 1.8
Drugs prescribed by generic name	55	2.82%	100%
Encounter with Antibiotic	230	11.75%	20.0% - 26.8%
Encounter with Injection	736	37.61%	13.4% - 24.1%
Drugs from EDL (National)	72	3.68%	100%

The average number of drugs prescribed per prescription was found to be10.58 which was extremely higher than the standard value (1.6 – 1.8). One of the reasons for this high value could be that all the patients were admitted either in the ward or in the ICUand were in need of more medicines. Secondly it could be the lack of standard treatment guidelines in the hospital.40.0% of the prescriptions has less than 10 drugs per prescription, 39.46% prescriptions contained more than 11 drugs per prescription and 20.54% prescriptions had between 10 and 11 drugs per prescription. It was observed that majority of the drugs prescribed were by brand names 97.18% (n=1902) while only 2.82% (n = 55) drugs were prescribed by generic name.

This could be attributed to the non-availability of a hospital formulary as well as standard prescribing guidelines in the hospital. It is commonly noticed in developing economies that people are more encountered with infectious diseases, WHO anticipates that 20.0%–26.8% of prescriptions would contain an antibiotic. However, in the present study, the number of encounters with an antibiotic was 11.75%, which is lower than standard value (20.0%–26.8%).

The total encounters with an injection were 37.61% which is very high as compared tostandard value (13.4% – 24.1%). One of the possible reasons for this high figure could be the patients admitted in the ICU, who require more drugs to be administered parentally. The percentage of drugs prescribed from the Essential Drug List (EDL) of India was 3.67%, it very low than the standard value. This could be the lack of knowledge and awareness of the essential drug list.

Analysis of antibiotics used: The total number of encounters with antibiotics was 230 (11.75%). As shown in Figure 3, majority of the antibiotics were prescribed as monotherapy (74.35%), while 25.22% were prescribed and combination of two drug therapy and only 0.43% of the antibiotics were prescribed as three drug therapy.

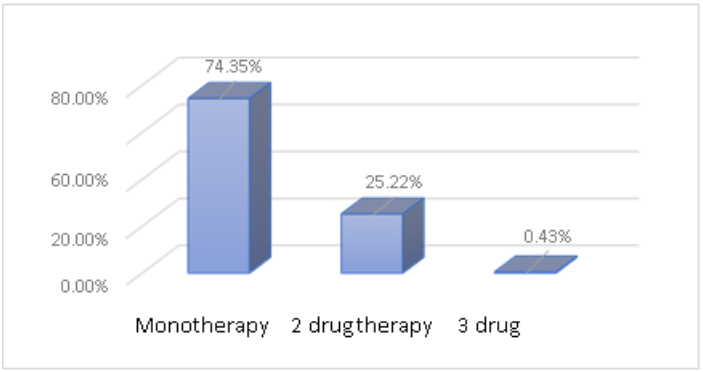

Figure 4: Prescription of antibiotics by number

Table 3 enlists the names, frequency and percentage of the antibiotics that were prescribed as monotherapy.

Table 3: Antibiotics prescribed as monotherapy.

Class of Antibiotic	Frequency/Percentage
Cephalosporin	40 (23.39%)
Others	28 (16.40%)
Fluroquinolones	25 (14.62%)
Beta Lactum	20 (11.69%)
Nitroimidazole	20 (11.69%)
Aminoglycoside	19 (11.11 %)
Polymyxin	11 (6.43%)
Oxazolidones	8 (4.67%)
Total	171 (100%)

Route of drug administration: Routes of drug administration were mostly oral (57.54%) followed by injectables (37.61%) and inhalation were least (2.25%). Other routes of administration included topical, ophthalmic, suppository etc.

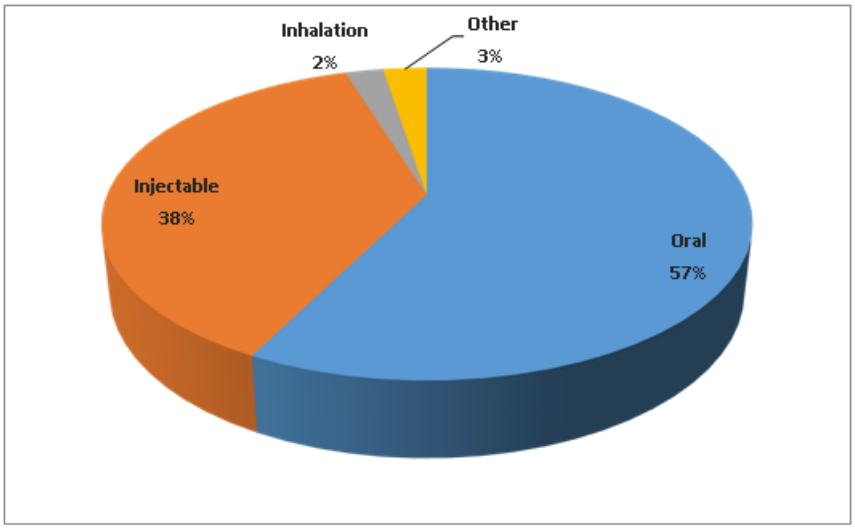

Figure 5: Routes of drug administration.

From among the drugs that were administered orally, tablets were most commonly prescribed (83.83%) followed by syrups (10.48%) and capsules (2.66%). The other oral formulation used were sachets (3.03%) as shown in Figure 5.

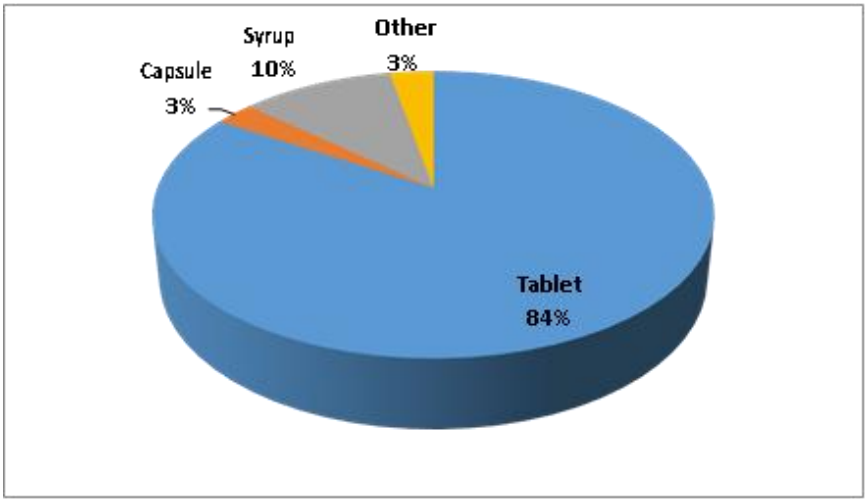

Figure 6: Oral formulations prescribed.

DISCUSSION

A prescription provides an insight into a prescriber's attitude to the disease being treated and the nature of health care delivery system in the community. Using the WHO prescribing indicators, this study has provided a better understanding of the prescribing practices in the facility being studied and has shown areas that need intervention and also this study was undertaken to improve the quality of medication and to promote the prescription of drugs.

This study appraised of 185 prescriptions were done to analyzed Patient's age, gender, diagnosis, categories and number of medicine prescribed, dosage, frequency and route of administration. We encountered a higher number of male cases 61.63% (n=114) than the female cases 38.37% (n=71). Out of 185 Patients, 62.16% (n=115) were admitted in the ward while 37.84% (n=70) were admitted in the ICU. Most of the Patients were from the age distribution of above the 60 years of age 48.11% (n=89), followed by 41 to 60 years of age 32.44% (n=60), while patients from age group between 21 to 40 years 15.13% (n=28) and age group between 0 to 20 years were 4.32% (n=8). The average number of drugs per person is an important index of prescription audit. Mean number of drugs per prescription should be kept as low as possible. Higher figures (polypharmacy) always lead to increased risk of drug interaction, adverse effects, development of bacterial resistance, increased hospital cost. We encountered the average number of drugs prescribed per prescription was found to be10.57 which was extremely higher than the standard value (1.6 – 1.8). One of the reasons for this high value could be that all the patients were admitted either in the ward or in the ICU and were in need of more medicines. Secondly it could be the lack of standard treatment guidelines in the hospital. 40.0% of the prescriptions has less than 10 drugs per prescription, 39.46% prescriptions contained more than 11 drugs per prescription and 20.54% prescriptions had between 10 and 11 drugs per prescription. We observed that majority of the drugs prescribed were by brand names 97.18% (n=1902) while only 2.82% (n=55) drugs were prescribed by generic name which is far diminished value while ideal value of WHO is (100%). This could be attributed to the non-availability of a hospital formulary as well as standard prescribing guidelines in the hospital. We commonly noticed that in developing economies that people are more encountered with infectious diseases, WHO anticipates that 20.0%–26.8% of prescriptions would contain an antibiotic. However, in the study, the number of encounters with an antibiotic was 11.75%, which is lower than standard value (20.0%–26.8%). The total encounters with an injection were 37.61% which is very high as compared to standard value (13.4% – 24.1%). One of the possible reasons for this high figure could be the patients admitted in the ICU, who require more drugs to be administered parentally. The percentage of drugs prescribed from the Essential Drug List (EDL) of India was 3.67%, it very low than the standard value. This could be the lack of knowledge and awareness of the essential drug list. In this study, the total number of encountered with antibiotics was 230 (11.75%). While, majority of the antibiotics were prescribed as monotherapy (74.35%), while 25.22% were prescribed and combination of two drug therapy and only 0.43% of the antibiotics were prescribed as three drug therapy. As we encountered class of antibiotics, Cephalosporin 40 (23.39%) most prescribe antibiotics class of drug in the prescriptions, followed by others 28 (16.40%), Fluroquinolones 25 (14.62%), Beta Lactam 20 (11.69%), Nitroimidazole 20 (11.69%), Aminoglycoside 19 (11.11 %), Polymyxin 11 (6.43%), Oxazolidones 8 (4.67%). Therefore, total 171 (100%) different class of antibiotics were prescribed. In this study routes of drug administration were mostly oral (57.54%) followed by injectable (37.61%) and inhalation were least (2.25%). Other routes of administration were (3%) included topical, ophthalmic, suppository etc. While among the drugs that were administered orally in that tablets were most commonly prescribed (83.83%) followed by syrups (10.48%) and capsules (2.665). The other oral formulation used was sachets (3.03%).

CONCLUSION

The prescribing pattern shows deviation from WHO prescribing indicators. The prescribing practices were not appropriate as they consist of polypharmacy, lesser prescription by generic name and lack of knowledge of the EDL. Implementing of standard treatment guidelines, hospital formulary, and regular knowledge update programs and utilizing the services of a clinical pharmacist may be of benefit.

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