STUDY ON ANTIBIOTIC PRESCRIPTION PATTERN AND COMPLIANCE TOWARDS W.H.O DRUG USE INDICATORS AT TERTIARY CARE HOSPITAL IN JAMMU AND KASHMIR

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ABSTRACT

Purpose: To investigate antibiotic prescribing patterns in tertiary care patients. Our further aims were to examine the specifics of anti-microbials such as (class of drug, frequency of medication, route of administration, dose of medicine, duration of therapy), correct the prescription mistakes, and assess the prescription in accordance with World Health Organization's (WHO) criteria. **Methods:** The research was a prospective observational study with a total of 126 patients and a six-month study period. The patients' IPD prescription orders were examined, and data was entered into the data collection form. The collected data was examined in accordance with the study's goal. **Results:** The most often prescribed antibiotic class was Cephalosporins in 46 (36.51 percent) of the 126 patients. In 104 (82.5%) of the prescriptions, generic names were written. Intravenous was the most often recommended mode of drug delivery 86(68.25%). Despite the fact that the dosage and frequency of the medicine were written on 100(79.36%) of the prescriptions, medication mistakes were found in 39(30.95%) of them. Sensitivity testing was performed on 56 patients (43.7%). In 56 (44.44 percent) of the prescriptions, the WHO criteria was followed. **Conclusion:** In a hospital that provides tertiary care, a clinical pharmacist plays an essential part in minimizing the risk of medical mistakes and fostering a reasonable approach to the dosing and administration of medications.

KEYWORDS: Antibiotic, Prescription, Prescribing pattern, Errors, Criteria.

INTRODUCTION

Antimicrobials have, without a shadow of a doubt, proven to be an indispensable asset to the healthcare delivery systems found in every region of the globe.[1] This is common knowledge among all of us. Since their first discovery in the 1930s, antibiotics have been responsible for the prevention of an unimaginably large number of deaths.[2] Recent research suggests that the mortality rate in India owing to infectious causes is something in the neighborhood of 416.75 fatalities per 1 Lakh inhabitants.[3] There is mounting evidence to imply that there is a significant increase in the incidence of microorganisms that are resistant to many drugs in environments associated with health care.[4] There are a number of variables that contribute to the rise of antibiotic resistance in India, some of which include easy availability to medications, a high incidence of infectious illnesses, and living circumstances that are substandard.[5] India is among the top countries that account for the highest rates of usage of antibiotics worldwide.[6] One of the best ways to deal with the problem of antibiotic resistance is to reduce the inappropriate prescription of antibiotics, which may be done by adhering to the antibiotic stewardship programs that have been developed by the WHO.[7] Such initiatives are being implemented in industrialized nations, and they have shown to be successful in means of improving medical outcomes, promoting the responsible use of anti-microbials, and reducing the number of resistant pathogens.[8]

Currently, the audit and feedback methods are used by those who offer medical treatment to effect behavioral shifts in clinical settings. This phenomenon contributes to the provision of summaries of clinical performance and supports favorable alterations in the practices of health care. The information is often gathered by direct patient observations, direct examination of medical records, or through use of electronic databases. When antibiotics are used appropriately, there is less chance of pathogens developing resistance to them, and overall death rates drop as a consequence. In this study, our goals are to evaluate the prescribing pattern in patients who are treated at a hospital of tertiary care; details about antibiotics (class of drug, frequency of medication, route of administration, dose of medicine, duration of therapy); rectification of errors that were made in the prescription; and evaluation of the prescription in accordance with World Health Organization's criteria.[9]

MATERIAL AND METHODS

Over the course of three months, the research was carried out at the Shri Mata Vaishno Devi Narayana Super - specialty Hospital in Katra (JAMMU & KASHMIR). It was a Prospective Observational Study that included a total of 126 people who volunteered to participate. Participants in our research were required to get a full course of antibiotic therapy and ranged in age from 18 to 90 years old. Each participant provided a validly signed informed permission form that included information about the study, and the Institutional Ethical Committee of the ISF College of Pharmacy gave their blessing to the research before it was carried out. The patients' individual prescription orders from the IPD were analyzed, and the results were entered into the data collection form.

Data analyses

The collected data were analyzed using descriptive analysis in accordance with the goals of the research with the assistance of SPSS statistical software version 26.

RESULTS

Age Distribution

The total 58 out of 126 patients, or 46.03 percent, are considered to be within the age range of 41 to 60 years old. This represents the majority of the patient population (Figure 1). 71 (or 56.34%) of the patients were male, and 55 (or 43.65%) of the patients were female (Figure No. 2).
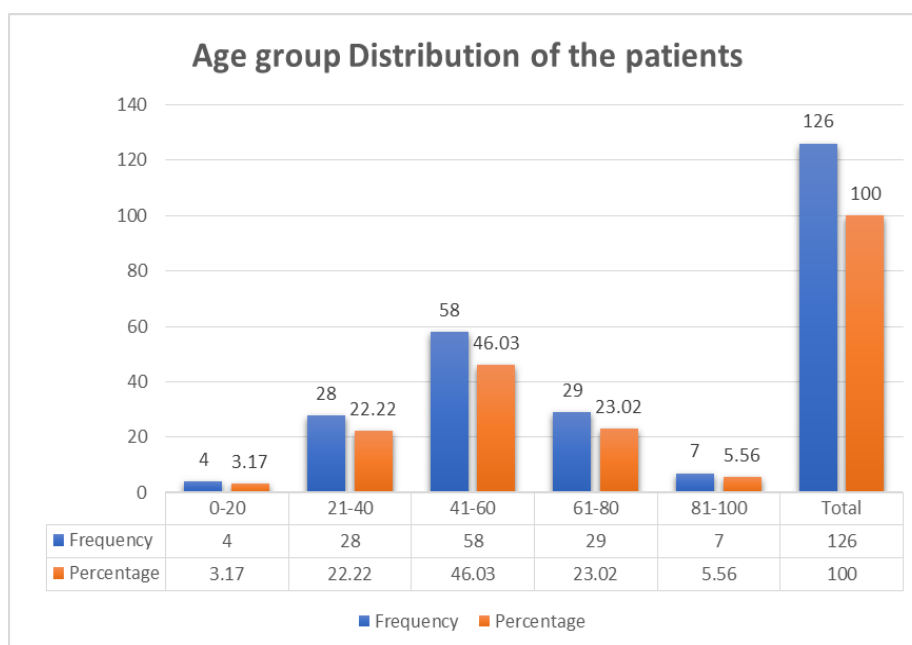

Figure No. 1: Age group distribution of the subjects.

Gender Distribution

Out of 126 patients, 71 patients were Males and 55 patients were Females. The details are given in Figure No. 2 below.
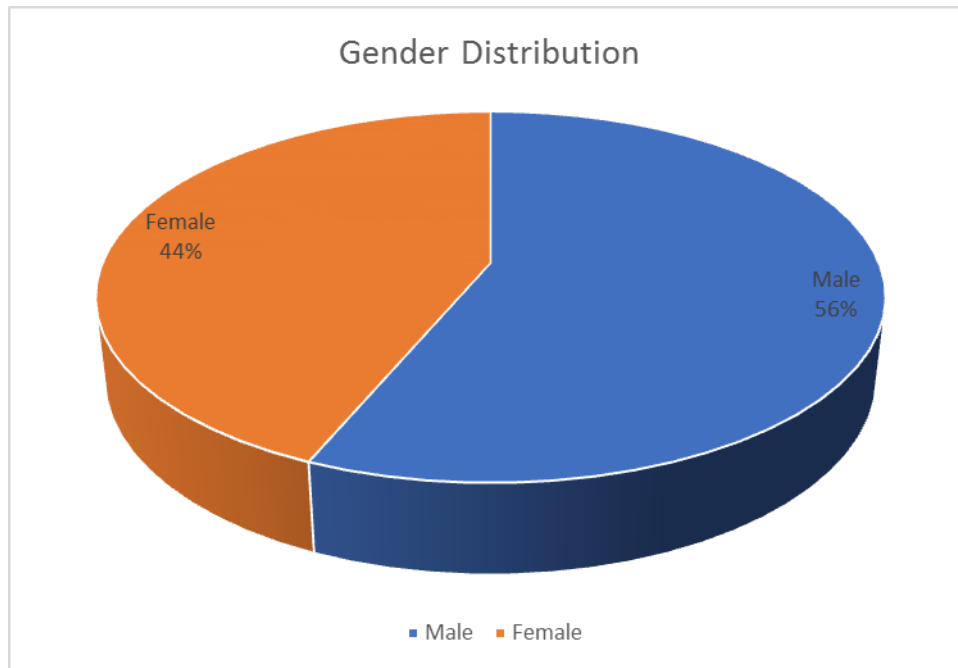

Figure No. 2: Gender Distribution Chart.

Disease Distribution

As stated in Table No. 1, From 126 Patients, the highest percentage of patients with diseases was Diabetes mellitus type 2 with Hypertension that was 10 (7.94%), followed by 5 (3.97%) patients with Urinary tract infection with renal stones.

Table No. 1: Disease distribution of the Patients.

Diagnosis	Frequency	Percentage
Jaundice	1	0.79
Fever	1	0.79
Spinal cord extra modular lipoma	1	0.79
Prostate cancer	1	0.79
Psychotic illness	1	0.79
Ovarian Cancer	1	0.79
Quadriplegia	1	0.79
Rheumatic heart disease	1	0.79
Coronary artery disease	1	0.79
Dilated cardiomyopathy	2	1.59
Cellulitis	1	0.79
Accident (Broken Limb)	1	0.79
Cerebrovascular Haemorrhage	1	0.79
Hyperthyroidism	2	1.59

Upper uretic mass	1	0.79
Chronic myeloid leukaemia	2	1.59
Thyroid Cancer	2	1.59
Ulcerative colitis	1	0.79
Glioblastoma (malignant)	1	0.79
Prostate abscess	1	0.79
Testicular cancer	1	0.79
Acute cholecystitis	1	0.79
Pregnigrvida at 10 Months	3	2.38
Post menopause	2	1.59
Soft tissue injury	2	1.59
Dystrophy injury	1	0.79
Bladder Cancer	1	0.79
Breast tumour	1	0.79
Nephobibhasis	1	0.79
Breast Cancer	1	0.79
Emphysema	1	0.79
Cholistiasis	2	1.59
Post operative double valve replacement	1	0.79
Chronic Obstructive Pulmonary Disease	1	0.79
Viral encephalitis	1	0.79
Retrobular neuritis	1	0.79
Right leg Swelling	1	0.79
Renal tubular acidosis	1	0.79
Left ventricular failure	1	0.79
Hairpin in abdomen	1	0.79
Acute gastroenteritis	1	0.79
Post opperative hesrectomy	1	0.79
Fracture	1	0.79
Hernia	1	0.79
Acute Lvf	1	0.79
Abdominal pain	1	0.79
Acute coronary syndrome	3	2.38
Smv Thrombopoisis	1	0.79
Chronic liver disease	1	0.79
Systemic lucus erythromatis	1	0.79
Dengue	2	1.59
Hepatic encephlopathy with chronic liver disease	1	0.79
Urinary tract infectiion + renal stones	5	3.97
Coronary obstructive pulmonary disease +coronary artery disease	1	0.79
Benign prostatic hyperplasia+phimosis	1	0.79
Chronic liver disease+hepatic encephalopathy	1	0.79
Acute pencrititis+sepsis	1	0.79
Hypertension+prostogramy	1	0.79
Ovarian Cancer+hypertension	1	0.79
Gastritis+acute cholitis	1	0.79
Type 2 Diabetes mellitus+chronic kidney disease	3	2.38

Renal tubular acidosis+injury on right finger	1	0.79
Diabetic foot+chronic kidney disease	1	0.79
Renal tubular acidosis+head injury	1	0.79
PCOD +gastric diabetes mellitus	1	0.79
Granuloma annulare+ Period of gestation	1	0.79
Sepsis+thrombocytopenia	1	0.79
Jaundice+ Alcoholic Liver Disease	2	1.59
Chronic Liver Disease + Ascites	1	0.79
Autocrine disease+urinary tract infection	1	0.79
Diabetes mellitus type 2 + hypertension	10	7.94
Pneumonitis+diebetes mellitus type 2	1	0.79
Neuroendocrine tumor+ascites	1	0.79
Hypertension+connective tissue disease	1	0.79
Renal tubular acidosis+intraventricular hemorrhage	1	0.79
Acute coronary syndrome+htn	3	2.38
Phemoris+htn	1	0.79
Dilated cardiomyopathy with Diabetes mellitus type 2+chronic kidney disease	1	0.79
Stroke+diabetes mellitus type 2+hypertension	1	0.79
Chronic Kidney Disease + Anaemia +coronary artery disease	1	0.79
Hypertension+hypothyroidism+chronic kidney disease	1	0.79
Chronic Liver Disease +Jaundice + Alcoholic Liver Disease	1	0.79
Diabetes mellitus type 2 +HTN+chronic kidney disease	3	2.38
HTN + diabetes mellitus type 2+diabetic nephropathy	2	1.59
Diabetes mellitus type 2+HTN+cerebrovascular accident	1	0.79
Chronic liver disease+diabetes mellitus type 2+HTN	2	1.59
Benign prostatic hyperplasia+HTN+ coranary artery blockage	1	0.79
Cerebrovascular accident+HTN+ coronary artery disease	1	0.79
HTN+COPD+AV block	1	0.79
Diabetes mellitus type 2 +HTN+acute kidney injury+chronic kidney disease	1	0.79
Status epilepticus+Diabetes mellitus type 2 +chronic kidney disease+ urinary tract infection	1	0.79
Encephlopathy+Parkinsons+coronary artery disease+Diabetes Mellitus type 2	1	0.79
Total	**126**	**100%**

Class of Medication

The most of the patients, 46 (36.51 percent), were administered Cephalosporin class medications, followed by Penicillin, which was prescribed to 10 (7.94 percent) patients out of a total of 126 patients. Table No. 2 lists all of the drug classifications in detail.

Table No.2: Class of Antibiotic used During Treatment.

Class of Medication	Frequency	Percentage
Cephalosporin	46	36.51
Penicillin	10	7.94
Aminoglycoside	1	0.79
Antiviral	3	2.38
Bactericidal	2	1.59
Nitrofurans	1	0.79
Beta Lactamaze+Cephalosporin	2	1.59
Cephalosporin+Polymixins	1	0.79
Penicillin+Antifungal	1	0.79
Cephalosporin+Aminoglycoside	6	4.76
penicilin+ Cephalosporine	7	5.56
Oxazolidinone+Penicillin	1	0.79
Floroquinolones+Antivirals	1	0.79
Carbapenem+ Macrolides	1	0.79
Cephalosporin+Nitronidazole	2	1.59
Cephalosporin+Quinolone	2	1.59
Macrolide+Cephalosporin	3	2.38
Antifungal+Cephalosporin	2	1.59
Antiplatelet+Betalactmase	1	0.79
Antifungal+Penicillin	1	0.79
Carbapenems+Azoles	1	0.79
Cefroxime+Aminoglycoside	2	1.59
Cephrofloxacin+Beta Lactamase	2	1.59
Cephalosporin+ Tetracycline	3	2.38
Cephalosporin+Lincomycin	1	0.79
Penicillin+Nitronidazole	2	1.59
Semisynthetic+Fluoroquinolones	2	1.59
Cephalosporin+Semisynthetic	2	1.59
Macrolide+ Penicillin	2	1.59
Quinolone + Semisynthetic	1	0.79
Penicillin +Oxazolidinone+Semisynthetic	3	2.38
Betalactmase+ Polymyxins+Cephalosporin	1	0.79
Carbepenem+Penicillin+glycopeptide	2	1.59
Cephalosporin+Glycopeptide+Glycopeptide	1	0.79
Nitroinidazole+ Cephalosporin +Tetracycline	1	0.79
Nitroinidazoles+ Cephalosporin+ Tetracycline	1	0.79
Glycopeptide+Antiviral+Cephalosporin	1	0.79
Cephalosporin+ Quinolone+Semisynthetic+Antimycobacterial	1	0.79
Polymixins,+ Azole + Nitronidazole + Aminoglycoside	1	0.79
Ciprofloxacin+ Aminoglycosde+Azole+Semisynthetic+Antimicobacterial	1	0.79
Antifungal+Polypeptide+Cephalosporin+Penicillin+Glycopeptide	1	0.79
Total	**126**	**100.00%**

Generic Names

Out of 126 patients, Generic name was written in 104(82.5%) prescriptions and there are 22(17.5%) prescriptions (Figure No. 3) in which generic name was not written.
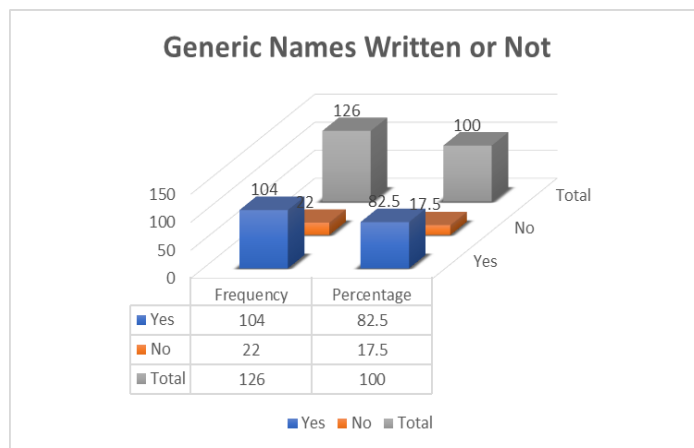

Figure No. 3: Compliance and Non-Compliance of Generic Names.

Route of Administration

Out of 126 patients the maximum used route is Intravenous 86(68.25%) followed by a combination of Intravenous + Oral 29(23.02%). The detailed information is given in Figure No. 4.

From the study the percentage of intravenous drugs were found to be 68.25% and oral is 7.14% which is significantly ($p<0.05$) less than the percentage of intravenous drugs of study conducted by (P. Sneha Pallavi _et-al_) which was found to be 75% and similar case in oral the study found less use of oral antibiotic then (P. Sneha Pallavi _et-al_) which had 24% use.
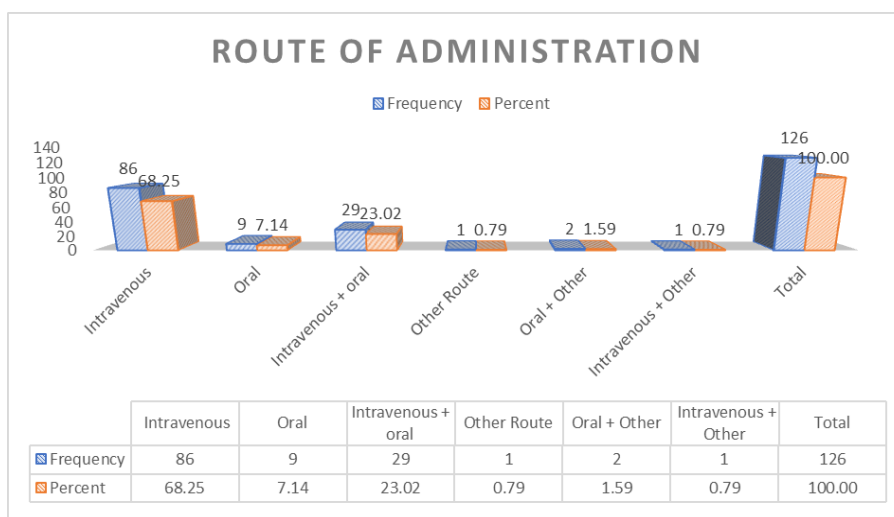

Figure No. 4: Compliance Chart of Route of Administration.

Sensitivity Testing

Out of 126 patients, Number of patients on which sensitivity testing was done were 56(43.7%) and on rest 71(56.3%) patients these tests were not conducted. The details are given in Table no. 3

From the study the percentage of prescription in which sensitivity testing was found to be 35.7% which is significantly ($p<0.05$) less than the sensitivity testing percentage of study conducted by (Ravi Pathiyil Shankar *et-al*) which was found to be 69.4%.

Table no. 3: *Sensitivity testing.*

Sensitivity Testing	Frequency	Percent
Yes	56	43.7
No	71	56.3
Total	126	100.0

Dose and Frequency of Medication

Out of 126 prescriptions, 100 (79.37%) had the drug's dosage (Table No. 4) and frequency (Table No. 5) written on them, whereas 26 (20.63%) had no dose or frequency written on them. Our research also discovered that patients received treatment for a minimum of 6 days and a maximum of 31 days. Because of his poor condition, one patient was given this 31-day treatment, and he died on the 31st day.

Table No. 4.

Dose of Medication	Frequency	Percent
Yes	100	79.37
No	26	20.63
Total	126	100.0

Table No. 5:

Frequency of Medication	Frequency	Percent
Yes	100	79.37
No	26	20.63
Total	126	100.0

Medication Error

Out of 126 prescriptions there were 39(30.95%) prescription in which there was a medication error and there were 87(69.07%) prescription in which there was no error found. The details are given in Figure No. 5.
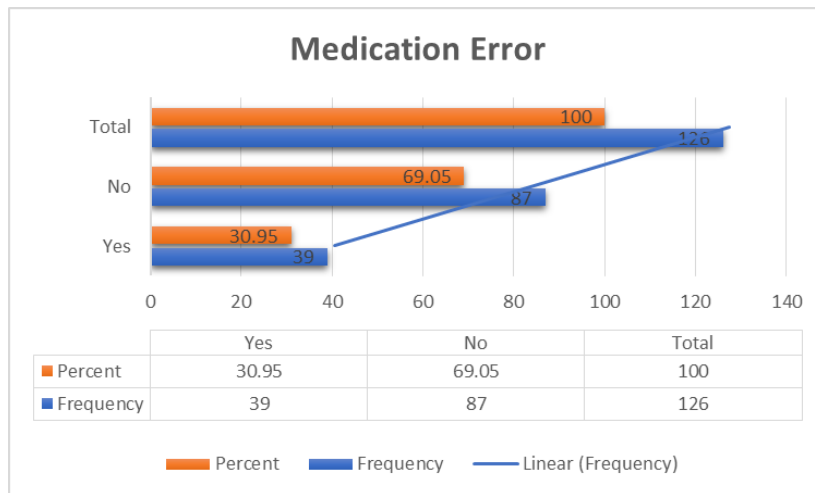
Figure No. 5: Compliance Chart of Medication Errors.

Prescription Indicators

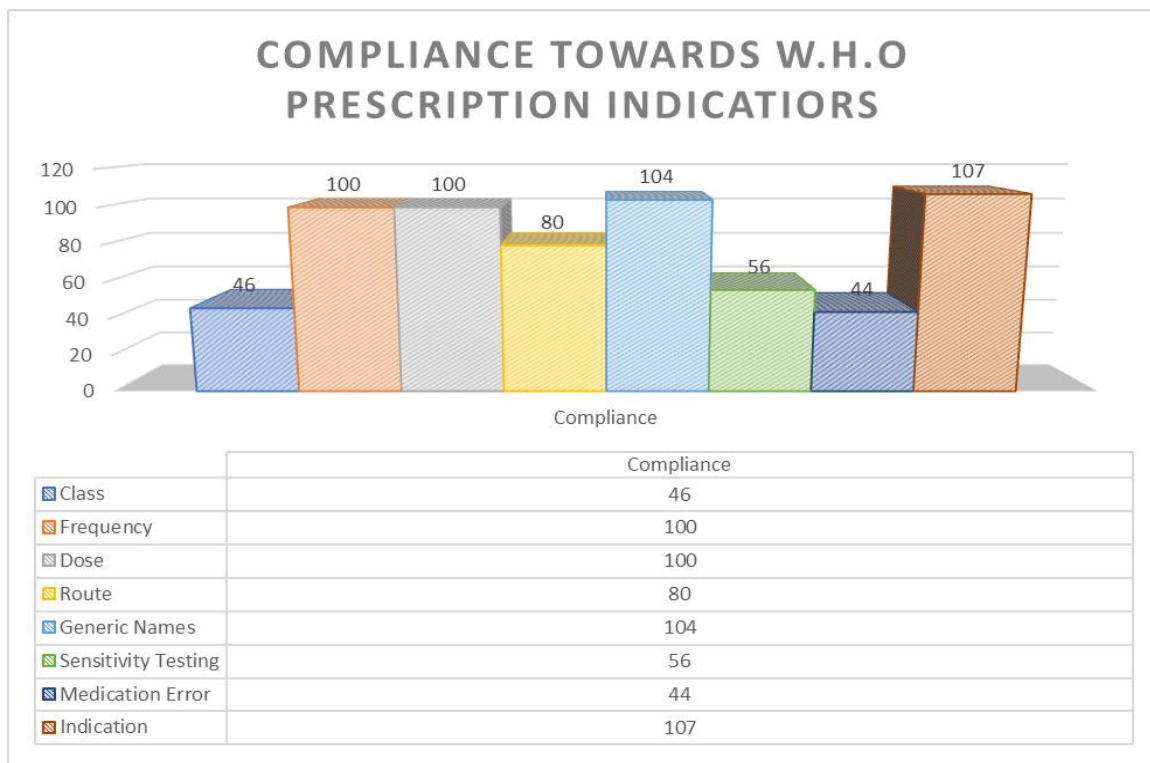The Compliance towards the WHO rational Drug use Indicators is shown in Figure No. 6

Figure No. 6: Compliance Towards Who Prescription Indicatiors.

W.H.O Criteria

Out of 126 patients, the criteria was followed in 56(44.44%) patients and in 71(56.35%) patients this criteria was not followed (Figure No. 7) and therefore, actions were taken against the errors found as shown in Table No. 6.
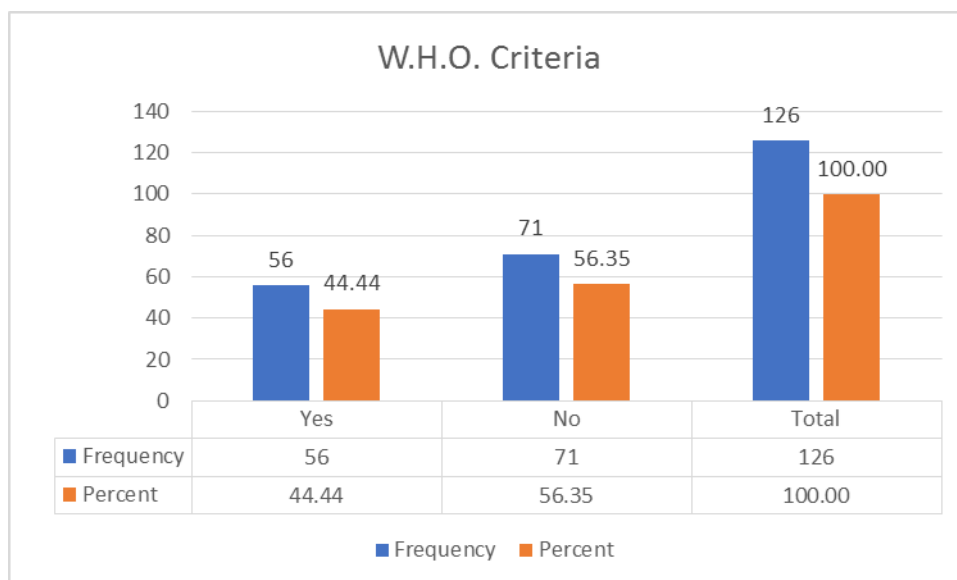
Figure No. 7: W.H.O Criteria Followed or Not.

Table No. 6: Distribution of actions taken against errors.

Action taken for against errors	Frequency	Percentage
No action Taken against errors	31	24.60
Rectification of errors by pharmacist	60	47.62
Suggestion communicated to physicians for rectification of errors	35	27.78
Total	**126**	**100**

DISCUSSION

The results of our inquiry indicate that an observational prospective study on the pattern of antibiotic prescribing at a tertiary care hospital in Jammu and Kashmir is likely to provide favourable results. The majority of patients, or 71(56%) out of the total, were males when they were admitted to the hospital, and the majority of those patients were in the age range of 41 to 60 years old. The highest numbers of patients, 10(7.94%), were diagnosed with diabetes mellitus type 2 associated with hypertension. In the course of our research, we found that the class of cephalosporin antibiotics was the one that was used the majority of the time, with a prescribing rate of 46 (36.51%), which was a considerable increase in comparison to the results of (Sharma et al).[10] The findings of our investigation also showed that the sensitivity testing was performed on 56 (43.7%) of the patients who were admitted. This number was much lower than that of the study that was carried out by (Shanker R P, et al. 2003).[11] The majority of patients, namely 104 (or 82.5%), were given prescriptions that included the generic name of the medication, and 86 (68.25%) of patients were given their medications intravenously. One hundred and twenty-six patients, or 79.37%, had the dosage and

administration schedule for their medications written down on their prescriptions. As a result of our inquiry, we also discovered that the patient's serious condition required a minimum of six days of planned therapy and a maximum of thirty-one days of treatment. In addition to this, we found that 39 (30.95%) of the prescriptions included inaccuracies in the drug that was being prescribed. In the end, we examined the patients' adherence to the prescriptions using the criteria established by the WHO is 56(44.44%).

CONCLUSION

According to the findings of our investigation, the vast majority of prescriptions included more than one antibiotic per prescription. When it comes to antibiotics, polypharmacy is a key contributor to the development of antibiotic resistance, and it also drives up the price of a prescription by many orders of magnitude. When choosing anti-microbials for the management of disease or illness and overall optimization of the therapy, the sensitivity testing protocols are the key stages that need to be followed. In the course of our research, we came to the conclusion that sensitivity testing was lacking. Because the dosage, the method of administration, the frequency, and other important details were missing from many of the prescriptions, this led to a huge number of mistakes in the prescriptions, some of which were potentially fatal. After finding a lot of mistakes, several correction procedures were used to make them all correct. Additionally, we found that some patients' evaluations of their prescriptions did not adhere to the World Health Organization's (WHO) criteria. When it comes to managing the appropriate use of anti-microbials and enhancing the overall quality of life for patients, clinical pharmacists play an important role. In addition, it is necessary to validate these results in a substantial sample of the population.

ACKNOWLEDGEMENT

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