ORIGINAL RESEARCH PAPER

General Medicine

PRESCRIBING PATTERN OF DRUGS USED IN VARIOUS HEPATIC DISORDERS

KEY WORDS: Liver Disorders, Hepatic Impairment, Prescribing Pattern.

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ABSTRACT

Liver disorders constitute about 10 % of all diseases. Since the diagnosis of liver disorders is so difficult, identification of its demographics is of great importance in present health scenario to understand more about diseases. The objective of this study is to assess the prescribing pattern of drugs used in various liver disorders. This was a prospective observational study carried out for a period of 6 months in general medicine outpatient, inpatient and ICU departments of RIMS tertiary care teaching hospital, Kadapa. Out of 150 patients with hepatic disorders, 120 were diagnosed at admission and 30 were diagnosed to have hepatic impairment during a hospital stay. Among them 120 were males and 30 were females. Antibiotics were the most commonly prescribed drugs. Majority of patients were not affected by drug interactions, errors including prescribing errors were minimally noted. It is the responsibility of a clinical pharmacist to communicate physician regarding the patients' health conditions, drug utilization, and their problems, which improves the community health status.

INTRODUCTION:

Prescribing pattern of drugs involves the rational use of medicines by giving the right drug to right patient in the right dose, frequency, and route of administration in right time. The liver is the body's second largest organ as it performs many essential functions related to digestion, metabolism, immunity, and the storage of nutrients within the body[1, 2]. There are various liver disorders due to many triggering factors, some of the hepatic disorders are Alcoholic liver cirrhosis, Alcoholic ascitis, Hepatitis, Cirrhosis, Cirrhosis with portal hypertension, Hepatosple nomegaly, Jaundice, Hepatitis with cirrhosis, Liver abscess, Polycystic liver disease, Alcoholic fatty liver disease, Malaria with hemolytic jaundice, Hepatic encephalopathy, Cholelithiasis, Wilson's disease, Drug-induced liver diseases, Liver cancer. Commonly prescribed drugs in hepatic disorders are antibiotics, hepatoprotectants, diuretics, Antacids, proton pump inhibitors, laxatives.

Assessing the prescribing pattern of all drugs used in hepatic disorders is significant, as most of the drugs get metabolized through the liver and liver disease rates are increasing over the years. According to National statistics in the UK, liver diseases had the fifth rank for which they are the cause of death[3].

The main objective of this study is to evaluate the prescribing pattern of drugs in hepatic patients for better therapeutic outcomes.

METHODOLOGY:

A prospective observational study was carried out in General medicine OP, IP and ICU departments of Rajiv Gandhi Institute of Medical Sciences (RIMS), Kadapa (750 bedded multi-disciplinary tertiary care teaching hospital) for about 6 Months.150 Hepatic impairment patients were taken. Adults and Geriatrics Hepatic impairment patients with or without other diseases were included. Pediatrics and pregnant women were excluded from the study. The patients who were admitted in General medicine OP; IP and ICU departments with hepatic impairments at admission and during their hospital stay were followed. Ethical approval was taken from the respective RIMS ethical committee. Screening of patients was done on daily basis to include into the study as per eligibility criteria. A self-designed data collection form was used to collect the required data such as demographic data, admitting/provisional diagnosis data, past medical/medication data, social history and other verbal communication data with patients.

The data was collected from the patient and caretakers or family members. Finally, complete information was collected, analyzed and documented. Then patient interview and chart review method which is well suited to identify the prescribing pattern of drugs used in hepatic impairment.

RESULTS

A total of 150 hepatic impairment patients were screened from 5200 subjects. So the prevalence rate of hepatic impairments in patients was 3%.

The Average number of drugs per prescription

In our study, the physicians have prescribed 1020 drugs in 150 patients. And the average number of drugs prescribed per prescription is 6.8.

Percentage distribution of patients based on admission

Out of 150 patients, 120 (80%) were hospitalized related to hepatic impairments and 30 (20%) were hospitalized with other nonhepatic disorders who developed hepatic impairment during their hospital stay.

Percentage distribution of patients based on Gender wise

Out of 150 patients, the gender distribution of the study population showed that males were 130 (86.66%) and females were 20 (13.33%) as illustrated in table 1.

Percentage distribution of patients based on Age

Total distribution of patients with respect to age group shows 36% were from 30-39 years followed by 50-59 years (24.6%) and finally 10% were from 20-29 years was represented in table 1.

Percentage distribution of patients based on risk factors

Out of 150 patients, 100 (66.66%) were found to have various social habits and 5 (3.33%) had a family history. Out of 100 patients, 45 were found to have alcohol consumption as a social habit, both smoking and alcoholism were found in 30 patients, 20 were having a habit of smoking alone and finally, 5 (3.33%) were showing a habit of tobacco chewing alone was represented in table 1.

Percentage distribution of patients based on the type of liver diseases

Out of 150 patients of hepatic impairments, alcoholic liver cirrhosis was found in 45 (30%) patients followed by ascitis in 12 (8%), hepatitis in 12 (8%), cirrhosis with portal hypertension in 9 (6%),

then finally Wilson's disease was diagnosed in 3 (2%) and various liver disorders are illustrated in table 1.

Percentage distribution based on the type of drugs prescribed:
Out of 1020 drugs prescribed, antibiotics were of 551(54%), followed by Diuretics 214(21%), Hepatoprotectants 122(12%), Laxatives 51(5%), Antihypertensives 31(3%), bronchodilators 21(2%), Proton pump inhibitors 10(1%), Antacids (1%), Antidiabetics 10(1%) was represented in table 1.

Type of formulations prescribed:
Out of 1020 drugs were prescribed, 46.66% were prescribed in tablet formulations and 44.44% were in injection form, which is explained in table 1.

Categorization based on medication errors
Out of 150 prescriptions, 15 medication errors had been found; in which 13(86.66%) were prescribing errors and administration errors were found to be 2(13.33%) was represented in table 1.

TABLE 1: Distribution of patients based on demographic data

PARAMETER	TOTALNUMBER	PERCENTAGE
Based on gender		
Males	130	86.66%
Females	20	13.33%
Based on age		
20-29	15	10%
30-39	54	36%
40-49	20	13.4%
50-59	37	24.6%
60-69	24	16%
>70	0	0%
Based on risk factors		
Family history	5	3.33%
Social habits	100	66.66%
Unknown cause	45	30%
Based on social habits[n=100]		
Alcoholics	45	45%
Smokers	20	20%
Both	30	30%
Tobacco chewers	5	5%
Based on the type of liver disease		
Alcoholic liver cirrhosis	45	30%
Alcoholic ascitis	12	8%
Hepatitis	12	8%
Cirrhosis	9	6%
Cirrhosis with portal HTN	9	6%
Hepatosplenomegaly	9	6%
Jaundice	9	6%
Hepatitis with cirrhosis	6	4%
Liver abscess	6	4%
Polycystic liver disease	6	4%
Liver failure	6	4%
Alcoholic fatty liver disease	3	2%
Malaria with hemolytic jaundice	3	2%
Hepatic encephalopathy	3	2%
Cholelithiasis	3	2%
Wilsons disease	3	2%
Drug-induced liver diseases	3	2%
Liver cancer	3	2%
Type of drugs prescribed		
Antibiotics	551	54%
Diuretics	214	21%
Hepatoprotectants	122	12%
Laxatives	51	5%
Proton pump inhibitors	10	1%
Antacids	10	1%
Antihypertensives	31	3%
Antidiabetics	10	1%
Bronchodilators	21	2%
Type of formulation		
Tablets	469	46.66%
Injections	452	44.44%
Syrups	61	6.66%
Capsules	20	2.22%
Based on medication errors[n=15]		
Prescribing errors	13	86.66%
Administration errors	2	13.33%

Co-morbid conditions observed
Among the co-morbid diseases of hepatic impairments, COPD was found in 9 (34.61%) patients and HIV in 1(3.84%) patient and Table 2 illustrate the complete information on co-morbid conditions found in the study population.

TABLE 2: Distribution of patients based on co-morbid conditions

Diseases	No. of male patients (%)	No. of female patients (%)	Total no. of patients 30(100%)
COPD	9 (100%)	0 (0%)	9 (30.00%)
Convulsions	4 (80%)	1 (20%)	5 (16.66%)
Hypertension	5 (71.42%)	2 (28.57%)	7 (23.33%)
HIV	1 (100%)	0 (0%)	1 (3.3%)
Type 2 diabetes	3 (75%)	1 (25%)	4 (13.33%)
Renal impairments	1 (50%)	1 (50%)	2(6.6%)
Hyperthyroidism	1 (50%)	1 (50%)	2 (6.6%)

Percentage distribution of patients based on a number of drugs prescribed per prescription:

Out of 150 patients, 56(37.33%) were treated with the single drug, 68 (45.33%) were prescribed with 2- drug regimen, 17(11.33%) were with 3- drug regimen and finally 9 (6.00%) with 4- drug regimen. Table 3 explains the type of therapy along with the gender distribution.

TABLE 3: Distribution of patients based on the number of drugs prescribed per prescription

Treatment	No. of male patients (%)	No. of female patients (%)	Total no. of patients (%)
Mono therapy	45 (80.35%)	11 (19.64%)	56 (37.33%)
2- drug therapy	54 (79.41%)	14 (20.58%)	68 (45.33%)
3- drug therapy	14 (82.35%)	3 (17.64%)	17 (11.33%)
4- drug therapy	7 (17.77%)	2 (22.22%)	9 (6.00%)

Based on the type of Drug interactions:
Out of 150 prescriptions evaluated, 11 were found with major possible drug interactions, 38 were with moderate and 29 were with a minor. In drugs involved, Furosemide was found to be involved in 64 (42.66 %) interactions followed by spironolactone 28 (18.66 %), which is illustrated in table.4

TABLE 4: Distribution based on the type of Drug interactions

Type of drug interactions	Outcome of interaction	Number of interactions	Range
Spironolactone+ furosemide	spironolactone increases furosemide decreases serum potassium	28	Moderate
Ceftriaxone+ furosemide	Increased risk of nephrotoxicity	26	Minor

Metronidazole+ theophylline	Affecting hepatic enzyme CYP 3A4	7	Major
Propranolol+ glimepiride	Increases glycaemia	4	Major
Propranolol+ furosemide	propranolol increases furosemide decreases serum potassium	6	Moderate
Propranolol+ theophylline	Increasing theophylline level and toxicity	5	Major
Pantop+ theophylline	Hypochlorhydria	4	Moderate
Furosemide+ hydrocortisone	Risk of hypokalemia	3	Minor

DISCUSSION

Hepatic diseases were more prevalent in males 86.66% than in females 13.33%, generally, males will expose more to the risk factors like alcohol, smoking and etc… and same was concluded in the study conducted by Meenu Vijayan et al.[5] in 2014.

In our study majority (80%) of the patients were hospitalized with the hepatic diseases and remaining 20 % were found to have the hepatic disease during the treatment for the other conditions, it was supported by the Meenu Vijayan et al.[5], study, where they concluded that 70 % of the study subjects were admitted with the hepatic diseases.

The occurrence of the disease is more (46%) in the age group 20-39 years but Hemang Suthar et al.[6] studies on the Clinical profile of cases of the alcoholic liver disease, revealed that 58 % patients belonged to age group of 40-49 years. It may be due to that, in the study area 20-40 years age group people were addicted to the alcoholism and smoking than another age group. And it is also proved with our study i.e. 67 % of the total study patients was have been found to be exposed with risk factors especially alcoholism (30%) which is supported by Rehm jet al study[7]. And only 3% of patients were found to have a family history.

We have observed a significant occurrence of hepatic diseases in the early age group, which alarms the health care system to monitor and prevent/minimize the prevalence of hepatic disease in this age group people with modifiable/reversible risk factors.

Generally, hepatic disease patients will develop concomitant diseases like T2 DM, HTN, thyroid disorders and etc. if they were untreated. We found that some of the patients (15.38 %) were suffering from Type 2 DM, which is supported by Keith G. Tolman et al. [8], a study in that 57% patient was found to have T2 DM related to hepatic impairment.

We have also found that 30 % of the patients were suffering from other diseases which are not related to the hepatic diseases i.e. COPD (30%) was the most common followed by HTN, Convulsions, and HIV.

According to our study, most of the patients were suffering from alcoholic liver cirrhosis (30 %), this is due to the overuse of alcohol in our region which is supported by Hemang Suthar et al[6]. We have also observed very few cases of Wilson's disease, cholelithiasis, liver cancer and hepatic encephalopathy (2% each).

A total of 36 types of drugs were prescribed in 150 patients during the study period at an average of 6.8 drugs per prescription. Both parenteral and oral preparations were used in almost the same quantity i.e. 44 % and 46 %. Usage of Parenteral preparation is more as patients are coming into the hospital only at the progressive stage with acute conditions.

Most of the patients were treated with combinational drug therapy (63 %), in that two drug therapy was found to be more (46 %). Majorly 24 % of patients were prescribed with the combination of diuretics and hepatoprotectants .we have also observed the usage of laxatives in combination with diuretics (16 %), with hepatoprotectants (13 %) and with antihypertensive agents (9 %), which is supported by *Deepak N. Amarapurkar et al.*[9], *study on Prescribing Medications in Patients with Decompensated Liver Cirrhosis.*

This study indicates that the subjects were not developed any complications and responded well to the 2 drug regimen than other therapies.

Monotherapy also most useful at specific case conditions, supported by Justiniano Santos et al.[10] study, they conclude that spironolactone alone seems to be as safe and effective than spironolactone associated with furosemide. Since spironolactone alone requires less dose adjustment, it would be more suitable for treating ascitis on an outpatient basis.

However, mono and combination therapies are most useful to treat the specific case conditions, for the patient's better health outcomes.

Antibiotics were used more (54 %) when compared to other drugs, usage of hepatic protestants was little i.e. 12 %.

We have also identified the 15 medication errors; in that 13 were related to Prescribing errors and remaining 2 were related to administration errors by a nurse.

We have also identified the 83 potential Drug-Drug Interactions, in that most of the interactions were observed with diuretic combinations, and the severity was assessed for the identified Drug-Drug Interactions, it was found that 46 % DDIs were moderate, 43 % were minor and 13 % were major, it is supported by Justiniano Santos et al[10]. Fortunately, none of the patients has developed any consequences of the Drug-Drug Interactions but, this triggers the regular review and modification of prescription habits.

CONCLUSION:

We conclude that the majority of patients received monotherapy, but patients were responded well to 2 drug regimen, whereas multidrug therapy was used in only a few patients as it is ineffective. Except for hepatoprotectants, other drugs were prescribed in generic names, whereas none of the drugs prescribed out of respective hospital formulary and all the drugs prescribed were mentioned in the essential drug list. In this study, no drug-related problems were identified as the physician followed standard guidelines during therapy. It is the responsibility of a clinical pharmacist to communicate physician regarding the patient's health conditions, drug utilization, and their problems, which improves the community health status.

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