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Prevalence and Drug Utilization Pattern in Hepatic Impairment Patients at a Tertiary Care Hospital

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Abstract: ***Aim and Objective: Drug utilization research help in identification of the clinical use of drugs in population and its impact on health care system. To select the rational use of drugs as a predominant technique for the prevalence in the utilization of selective drugs in liver impairment. Methodology: A Prospective observational study was conducted in General Medicine department in tertiary care hospital for a period of 6 months. inpatient ward with or without co-morbidities was included in the study; antibiotics prescribed for liver impairment. Results: Total 150 impairment patients were admitted. In this study, almost all prescriptions were with polypharmacy. In this hepatic impairment, 41-50 age group patients have shown more prevalent. A total of -150 patients‖ who were prescribed antibiotic were included in the study Out of 150 cases, female patients were 98(65.%) and male patients were 52 (35%). in this study maximum number of disease was found to be pancreatitis 39(26%), Out of 1135 medications, the highly prescribed formulation was solid dosage forms 606 (53.39%). Conclusion: Alcohol consumption in liver impairment patient is prevalent. Before prescribing to the patients, evaluation of medications with the suitable criteria is required. In other words, rational use drug must be strictly followed.***

Keywords: Drug utilization, liver impairment, prescription pattern

1. Introduction

Tertiary care is highly specialized health care usually for a long period of time that involves advanced therapy and complex investigation procedures and treatments done by health care professionals in health care system compare with primary and secondary care hospital. Liver impairment caused by the various infections, drugs, autoimmune conditions, toxins. Liver impairment can be acute or chronic involves destruction and regeneration of the hepatic cells leading to different liver diseases[1]. Alcohol is a psychoactive substance with dependence-producing properties that has been widely used in many cultures for centuries[2].The use of alcoholic beverages has been an integral part of many cultures for thousands of years[3]. The harmful use of alcohol causes a large disease, the social and economic burden in societies[3]. The harmful use of alcohol ranks among the top five risk factors for disease, disability, and death throughout the world[3]. A Prospective observational study was conducted in General Medicine department, for a period of 6 months. Patients of either gender in-patient ward with or without comorbidities were included in the study; we excluded seriously ill and patients unable to communicate and Patients unwilling to participate in the study[4]. Drug utilization evaluation could be needed, otherwise, liver impairment should face serious consequences regarding the medications4-7. Long-term medical care ultimately leads to the inappropriate prescribing, that means failure to provide the quality medical care to the patients and it is achieved by the good clinical practice[8]. To evaluate the prescription pattern of antibiotics in liver impairment in medicine department in a tertiary care hospital. To identify the pattern of drug utilization of Antibiotics in prescriptions of patients at general medicine department, of Manipal Multispeciality Hospital, Vijayawada, India. To analyze rationality among the prescriptions.

2. Methodology

A hospital based Prospective observational study was conducted in the Department of General Medicine Department of Manipal Multispeciality Hospital, Vijayawada, India. This study was conducted for a period of six months (October 2016 – March 2017). We have collected 150 prescriptions in these six months study, after obtaining the consent from the patient. A specially designed proforma was used for collecting data which includes patient demographics, personal history, co-morbidities, diagnosis and present medications prescribed for each patient. The data were obtained by direct patient interview and from patient case profiles[8]. 150 cases were collected from general medicine wards, according to study criteria.

- **Study Design:** A hospital based prospective and observational study.
- **Study Site:** The study was conducted in the Department of General Medicine Department of Manipal Multispeciality Hospital, Vijayawada, India.
- **Study Period:** October 2016 – March 2017
- **Study Population:** 150 cases were collected from general medicine wards, according to study criteria.
- **Inclusion Criteria:** Any age. Patients of either sex. Patients with Co-morbid conditions. Patients operated in an emergency.
- **Exclusion Criteria:** Pregnant women. we excluded seriously ill and patients unable to communicate and Patients unwilling to participate in the study.Outpatients.
- **A collection of data:** Data of patients matching inclusion criteria were recorded. Total 150 cases were collected. The study was carried out for 6 months duration from October 2016 – March 2017. Data like name, age, sex, prescription drugs including antibiotics used were recorded in the prepared case record form[9].

- **Data Analysis:** Data was analyzed on MS Excel and descriptive statistics was used for analyzing the result of the study.

3. Results & Discussion

Table 1: Prevalent Diseases Among Liver Impairment Patients

S. no	Case	No of Patiens	Male	Female	Percentage (%)
1	Pancreatitis	39	32	7	26.0*H
2	Jaundice	29	23	6	19.33
3	CLD	25	19	6	16.66
4	Cholelithiasis	22	5	17	14.66
5	ALD	18	15	3	12.0
6	Metabolic encephalopathy	8	3	5	5.33
7	Amoebic liver	5	4	1	3.33
8	Bile duct injury	4	1	3	2.66
	Total	150	102	48	100

The prevalence of pancreatitis in this current study was 26% (n=100).Of these people with pancreatitis 7 were among female and 32 prevalence among male liver impairment patients.

In this study maximum number of disease was found to be pancreatitis 39(26%), Followed by jaundice, CLD, cholelithiasis, ALD, Metabolic encephalopathy & amoebic liver. the lowest rate of disease was found to be bile duct injury 4(2.66%). Percentages are 19.33%, 16.66%, 14.66%, 12.0%, 5.33, 3.33 & 4.54% respectively.

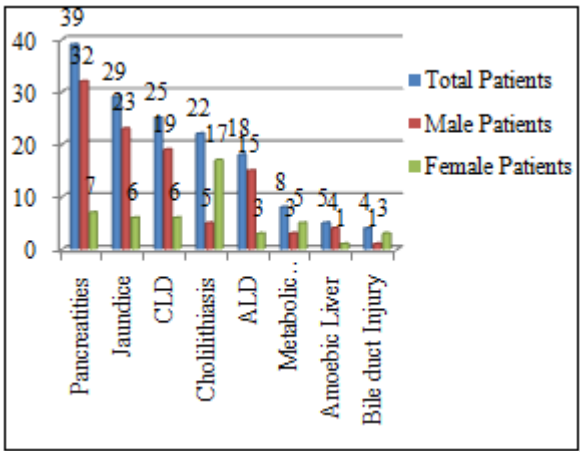

Figure 1: Prevalent Diseases among liver impairment Patients

Table 2: Shows distribution of the patients according to age groups

S.No	Age group	No of patients	Male	Female	Percentage (%)
1	10-20	8	4	4	5.33
2	21-30	25	14	11	16.66
3	31-40	30	23	7	20
4	41-50	38	23	15	25.3*H
5	51-60	33	26	7	22
6	61-70	10	4	6	6.66
7	71-80	6	4	2	4
	Total	150	98	52	

In this hepatic impairment, 41-50 age group patients have shown more prevalent when compared to that of other age groups.

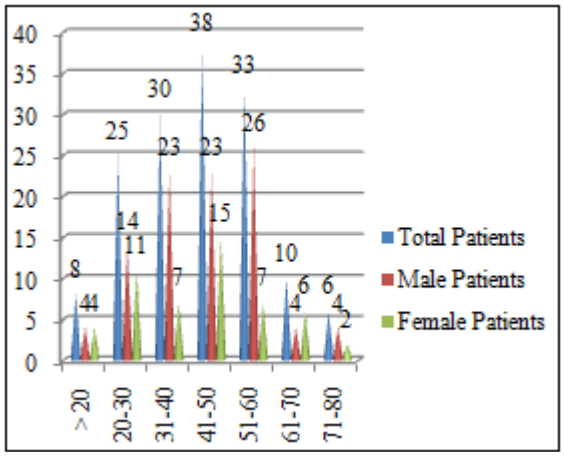

Figure 2: Shows distribution of the patients according to age groups

Table 3: Disease Pattern Reported with comorbidities

Disease with Comorbidity	No. of Patients	% of Population
Pnacreatities + HTN	2	5.12
Pnacreatities + DM	1	2.56
Pnacreatities + Hep	4	10.25
CLD + HTN	3	12
CLD + DM	2	8
CLD + DM + HTN	4	16
ALD + HTN	4	22.22
ALD + DM	4	22.22
Cholilithiasis + HTN	2	9.09
Cholilithiasis + DM	4	18.18
Cholilithiasis + HTN + DM	4	18.18
Cholilithiasis + Hypothyroidism	6	27.27
Jaundice + Hep A	4	13.79
Jaundice + Hep B	5	17.24
Jaundice + Hep C	4	13.79

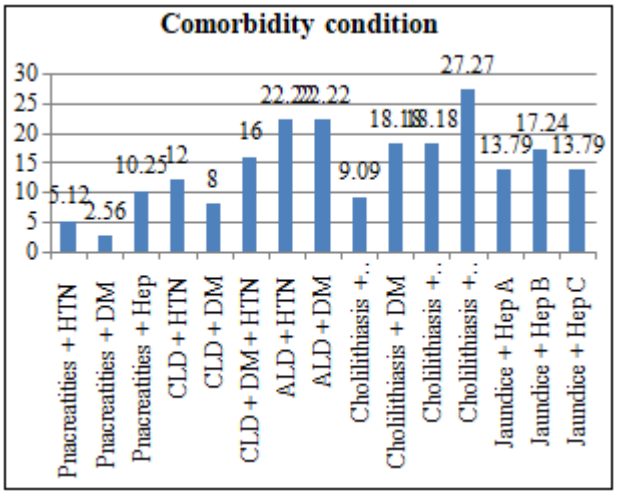

Figure 3: Disease Pattern Reported with comorbidities

Co-morbidity means patient is simultaneously suffering from number of diseases

Table 4: Depicts the distribution of patients according to habitual for liver impairment

Case	No. of Patients	% of Population
Pancreatitis + Alcohol	24	61.53
Pancreatitis + Smoker	7	17.69
Jaundice + Alcohol	10	34.48
Jaundice + Smoker	1	3.44
CLD + Alcohol	15	60
CLD + Smoker	4	16
ALD + Alcohol	14	77.77
ALD + Smoker	3	16.66
Amoebic liver + Alcohol	2	40
Bile Duct Injury + Alcohol	1	25
Bile Duct Injury + Smoker	1	25

CLD: Chronic Liver Disease, ALD: Acute Liver Disease, HTN: Hypertension, DM: Diabetes Mellitus, Hep: Hepatitis

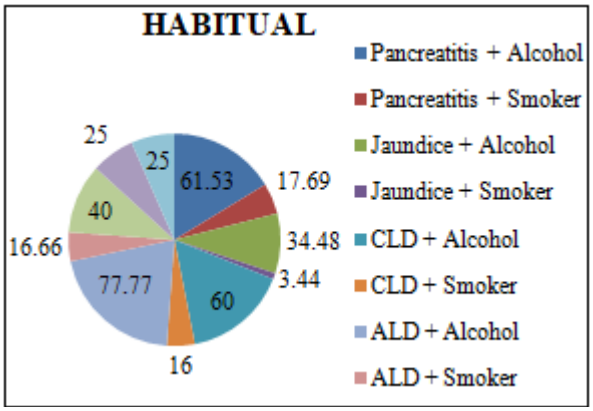

Figure 4: Depicts the distribution of patients according to habitual for liver impairment

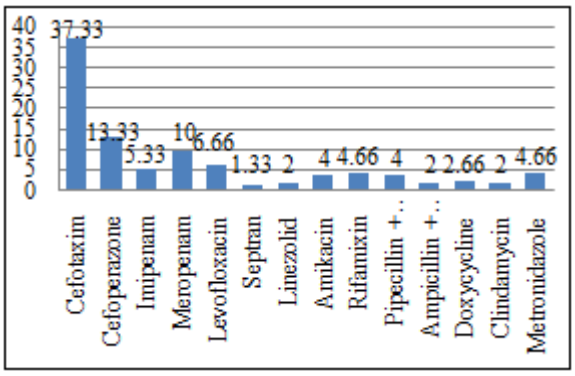

Figure 5: Distributions of Antibiotics in Study Population

Table 5: Distributions of Antibiotics in Study Population

S.no	Antibiotic	Total no. prescribed	Percentage (%)
1	Cefotaxime	56	37.33
2	Cefoperazone	20	13.33
3	Imipenam	8	5.33
4	Meropenam	15	10
5	Levofloxacin	10	6.66
6	Septran	2	1.33
7	Linezolid	3	2
8	Amikacin	6	4
9	Rifamixin	7	4.66
10	Piperacillin + Tazobactam	6	4
11	Ampicillin + Salbactam	3	2
12	Doxycycline	4	2.66
13	Clindamycin	3	2
14	Metronidazole	7	4.66
	Total	150	100

Table 7: Ten most frequently prescribed medications

S. No	Medication name	No of prescriptions	Percentage (%)
1	Pantoprazole	120	10.57
2	Tramadol	65	5.72
3	Vitamin supplement	60	5.28
4	ondansetron	57	5.02
5	cefotaxime	56	4.93
6	Acetaminophen	35	3.08
7	Metronidazole & rabeprazole	25	2.20
8	Cefoperazone & ultracet	22	1.93
9	Meropenam & razo – D & Ipratopium bromide + salbutamol	20	1.76
10	Optineuron	18	1.58

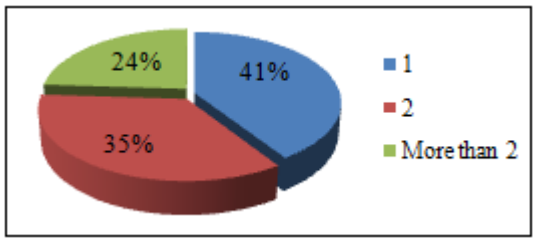

Figure 6: List of Patients Simultaneously Suffering from Comorbid Illness

Table 6: List of Patients Simultaneously Suffering from Comorbid Illness

No of disease patients	No of patients	Percentage (%)
1	61	40.66
2	53	35.33
More than 2	36	24
Total	150	100

Table 7: Ten most frequently prescribed medications

S. no	Medication name	No of prescriptions	Percentage (%)
1	Pantoprazole	120	10.57
2	Tramadol	65	5.72
3	Vitamin supplement	60	5.28
4	Ondansetron	57	5.02
5	Cefotaxime	56	4.93
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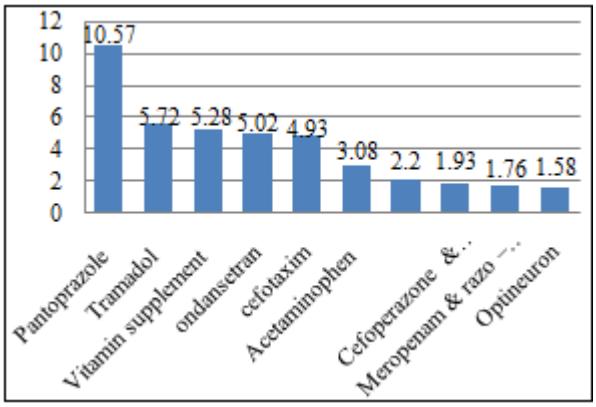

Figure 7: Ten most frequently prescribed medications

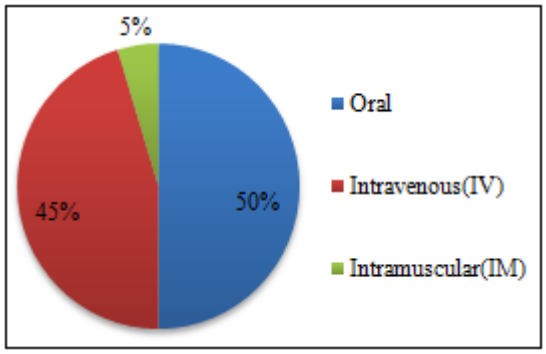

Figure 8: Dosage forms used in the study

Table 8: Dosage forms used in the study

S.No	Route of Administration	Total No. of Cases	Percentage (%)
1.	Oral	75	50
2.	Intravenous(IV)	68	45.33
3.	Intramuscular(IM)	7	4.66
	Total	150	100

Table 9: Drug Utilization Pattern in liver impairment

Anti Ulcer Agents	Pantoprazole(120),Rabeprazole(25),Ranitidine(10), Razo-D(20),
Analgesics	Acetaminophen(35),Tramadol(65),Ultracet(22), Diclofenac(17),
Antibiotic	Cefotaxime(53),Cefoperazone(20),Metronidazole(7), Imipenam(8), Meropenam(15), Levofloxacin(10), Septran(2),Linezolid(3),Amikacin(6),Rifamixin(7),Pi pecillin + Tazobactam(6),Ampicillin + Salbactam(3), Doxycycline(4),Clindamycin(3), Mefloquine(7),
Antiemetics	Ondansetron(57),Metaclopramide(2),
Gall Stone Dissolution Agent	Ursodeoxycholic Acid(15),
Antidiarrheal Agent	Octerotide(4),
Gastro intestinal Agents	Rehepatine(15),Glutathione(15),Lactulose(16), Gutclear(5), Mucaine(5)
Anti Hypertensives	Furosemide(15),Torsemide(14),Spiranolactone(7), Clinidipine(7), Telmisartan(5)
Cardio Vascular Agents	Atorvastatin(6),Aspirin(1),Clopidogrel(1),Mon onitrate Sodium(2),Digoxin(1), Ivabradine(5),Bosantan(2),Enoxaparin Sodium(4)
Anti Diabetic Agents	Metformin(2), Insulin(5).
Hyperthyroid Agent	Levothyroxine Sodium(5)
Anti convulsant	Levetriacetam(1)
Vitamin Supplement	Thiamine(14),Vitamin K(22),Vitamin Supplement(38),B-Complex(4), Iron supplement(8),Folic Acid Supplement(8), Vitamin B12(8), Calcium Supplement(8),KCl Supplement(14),Albumin(7).
Nebulizers	Neb. Ipratropium Br + Salbutamol(20),Neb. Budesonide(10),Neb. Salbutamol(4), Neb.Acetyl cystine(8),
Miscellance Drugs	Lorazepam(5),Hydrocortisone(3), Optineuron(18).

Table 10: Prescription Analysis

S.no	Prescription catalog	Results
1.	Total number of prescription analyzed	150
2.	Total number of medications prescribed	1135
3.	Average number of medications per prescription	7.5(1-10)
4.	Percentage of medications prescribed by generic name	683/1135 (60.17%)
5.	Percentage of medications prescribed by brand name	451/1135 (39.73%)
6.	Percentage of medications prescribed by solid dosage form	606/1135 (53.39%)
7.	Percentage of medications prescribed by parenterals	420/1135 (37.00%)
8.	Percentage of medications prescribed by nebulizations	42/1135 (3.70%)
9.	Percentage of medications prescribed by syrups	49/1135 (4.31%)
10	Percentage of medications prescribed by other formulations	18/1135 (1.58%)

Drug utilization studies are important for obtaining data about the patterns and quality of use, the determinants of drug use and the outcomes of use. The WHO drug use indicators are highly standardized and are recommended for inclusion in drug utilization studies[14] The main aim is to facilitate the rational use of medicines in populations[10]. The present study is a prospective, observational and analytical study done on 150 consecutive patients to assess the antibiotics prescribed in liver impairment in medicine department in a tertiary care hospital.

Table-1 shows Prevalent Diseases among liver impairment Patients a total number of cases along with gender distribution. Out of 150 cases, female patients were 98(65.%) and male patients were 52 (35%). in this study maximum number of disease was found to be pancreatitis 39(26%), Followed by jaundice, CLD, cholelithiasis, ALD, Metabolic encephalopathy & amoebic liver. the lowest rate of disease was found to be bile duct injury 4(2.66%). Percentages are 19.33%, 16.66%, 14.66%, 12.0%, 5.33, 3.33 & 4.54% respectively. **Figure-1**

Table-2 shows a total number of cases distribution of patients according to age group along with gender distribution. Out of 150 cases, female patients were 98(65.%) and male patients were 52 (35%). The majority of the patients out of 150 were in the age group 41-50 38(25%) followed by 51-60 (n=33, 22%) than 31-40 (n=30, 20%) followed by 21-30 (n=25, 17%),61-70(n=10,7%),10-

20(n=8,5%) and last is in >80 years age group (n=6, 4%). **Figure-2**

Table-3 & 6 shows Disease Pattern Reported with comorbidities types of liver impairment. Co-morbidity means the patient is simultaneously suffering from a number of diseases, 89 (59.33%) cases as co-morbid, rest of all cases observed as a morbid or single disease (40.66%). Liver impairment possess multiple diseases naturally and for that, they need number of drugs, and we were observed 61(40.7%) cases as single morbidity, with single co-morbidity 53 (35.33%) cases and with more than single co-morbidity 36(24%) **Figure-3&6**

Table-4 shows precipitating factor associated with liver impairment. 16 patients (29%) were smokers and 66 patients (44%)were alcoholic followed by 11 patients (7%) who suffered from diabetes mellitus, again 11 patients (7%) each were having HTN and followed by 8 cases (6%) were both HTN & DM, 17 cases of hepatitis (12%) and 6 cases of hypothyroidism(4%).**Figure-4**

Table-5 deals with most common antibiotics prescribed for liver impairment. cefotaxime in 56 cases (37%) followed by cefoperazone in 20 cases (13%) than meropenem in 15 cases (10%), levofloxacin in 10 cases (6.66%) followed by imipenem in 8 cases (6%) and rest were prescribed as 7 cases of metronidazole & rifamixin, 6 cases of amikacin and piperacillin+tazobactum and 4 cases of doxycycline, 3 cases each of ampicillin+salbactum, linezolid & clindamycin and 2 cases of Sept run.**Figure-5**

Table-7 shows adjuvant drugs prescribed along with the antibiotics for hepatic liver impairment. Majority of them were prescribed pantoprazole (10.57%) followed by Tramadol (5.72%) than vitamin supplement(5.28%),ondansetron (5.02%) cases, cefotaxime (4.93%) , acetaminophen (3.08%), metronidazole & rabeprazole (2.20%), cefoperazone & Ultracet (1.93%) meropenem , razor-D & ipratropium bromide + salbutamol (1.76%), optineurin (1.58%) . Rest were on antihypertensives and antidiabetic agents and cardiovascular agents like atorvastatin and aspirin. **Figure-7.**

Table-8 shows the route of administration of antibiotics for liver impairment. Out of 150 cases, 75 of them (50%) took the drug by oral route followed by 68 cases (45%) who took the drug by intravenous route (IV) and remaining 7 cases (5%) took the drug by intramuscular route (IM). **Figure-8**

Table-9 shows drugs were divided as category wise. most widely used category drugs are anti-ulcer agents(175). Followed by antibiotics (154) than analgesics(139) followed by vitamin supplement(131) & antiemetics(59).

Table-10 Out of 1135 medications, highly prescribed formulation was solid dosage forms 606 (53.39%); that means tablets and capsules, followed by injections 420(37.00%), syrups 49 (4.31%), nebulizations 42(3.70%), and others 18 (1.58%) were well-prescribed formulations, given in Table 1. Prescribing in generic names was a good thing and easily understandable, 683(60.17%) generic names were practiced by physicians vastly when compared with brand names 451 (39.73%). The highest observed case was pancreatitis. In other studies mostly observed cases were cardiovascular diseases and respiratory disorders, but in this study, pancreatitis was observed as a prevalent disease among admitted patients.

4. Conclusion

The epidemiological studies of liver impairment patients have shown the maximum prevalence of pancreatitis. The prevalence of pancreatitis in this current study was 26% (n=100). The age between 41-50 yrs has a higher prevalence rate of liver impairments patients. Alcohol consumption in liver impairment patient is prevalent. Before prescribing to the patients, evaluation of medications with the suitable criteria is required. Prescribing medicines by generic names would help in less expensive treatment in hepatic impaired patients. In other words, rational use drug must be strictly followed.

Our study suggests that there is a considerable scope for improving prescribing pattern among the health care system and minimizing the use of antibiotics in order to reduce the risk of antibiotic resistance of microbes. The development of the formulary will have a major impact on prescribers and healthcare professionals & for clinical practice.

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