

Disease Pattern and Drug prescribing trends in Intensive Care Unit

Dikshita Sharma¹, Hem Raj¹, Amit Sharma¹

1. Department of Pharmacy Practice, ISF College of Pharmacy, Moga, Punjab

Corresponding author Dr. Hem Raj

ISF College of Pharmacy

Department of Pharmacy Practice

ISF College of Pharmacy, Moga

GT Road, Ghal Kalan Punjab - 142001, India.

Abstract

Background & Objectives: Intensive care units (ICUs) have significantly improved the quality of care and outcomes of critically ill and injured patients, predominantly in high-resource settings. Patients admitted to the intensive care unit are seriously ill and often suffer from chronic illnesses. Antibiotics are the most frequently prescribed drugs among hospitalized patients especially in ICU settings. Widespread use of antibiotics, crowding of patients, presence of invasive medical devices favor the emergence, and spread of resistant organisms, which substantially raises already rising health care costs and increases patient morbidity and mortality. The aim of this study was to perform a key role to evaluate if, there is any difference in the disease pattern and drug prescribing trends in new normal and the objectives of this study was to evaluate the drug prescribing trends in the intensive care unit and correlate them with the disease patterns and to access the multiple factors with morbidity and duration of stay.

Materials & Methods: It was a cross sectional observational study which was conducted in Moga (Punjab) at Aastha hospital for a period of 6 months. All the patients above 18 years admitted in intensive care unit were enrolled in the study and the patients were not interested or having incomplete information that were excluded from the study. To evaluate the diagnosis and prescription pattern of the ICU patients a data collection sheet was prepared in which whole data was recorded the data collection sheet contain details such as demographics, diagnosis, duration of stay in the ICU and the prescription pattern. Total 124 case records were studied during this study period. The data was collected from the treatment plan of the patients admitted to the intensive care unit. The collected data was entered into the computer for subsequent analysis using SPSS version 26.

RESULTS: Most of the patients admitted to intensive care unit belonged to age group 41-50 and female patients were predominant than the male ones. Average duration of stay in ICU was 4.46 days. Admissions with seizures were more common in intensive care unit and this study revealed that 7.3% of reported cases belong to seizure disorder. Antibiotics are the main drugs prescribed to the patients admitted in intensive care unit.

Conclusion: This drug utilization study has highlighted the strengths and shortcomings of the prescription pattern of patients who were admitted in the critical care setup. The information derived from this research work will be transmitted to the stakeholders for implementing the modifications wherever applicable for the betterment of the patient and the community.

Keywords: Intensive care unit, seizures, prescription pattern.

Date of Submission: 26-06-2022

Date of Acceptance: 09-07-2022

I. Introduction

The modern concept of intensive care is said to have been pioneered by an anesthetist in Denmark over half a century ago during the polio pandemic. Since then, intensive care units (ICUs) have significantly improved the quality of care and outcomes of critically ill and injured patients, predominantly in high-resource settings. Patients admitted to the intensive care unit are seriously ill and often suffer from chronic illnesses. Intensive care is appropriate for patients requiring or likely to require advanced respiratory support, patients requiring support of two or more organ systems, and patients with chronic impairment of one or more organ systems who also require support for an acute reversible failure of another organ.¹ Drug utilization is nothing but the process of appraising and reconsidering the usage of drugs to determine the effectiveness of drug treatment. Multiple drugs are prescribed since patients admitted to the ICU. The most of the drugs are empirically prescribed and mainly based on physician previous experience, resulting in the lack of quantitative

precision of drugs usage. Therefore, utilization trends and costs of drugs prescribed in the ICU need to be urgently addressed².

Antibiotics are the most frequently prescribed drugs among hospitalized patients especially in ICU settings. Widespread use of antibiotics, crowding of patients, presence of invasive medical devices favor the emergence, and spread of resistant organisms, which substantially raises already rising health care costs and increases patient morbidity and mortality. Keeping all these factors in mind, the study of prescribing pattern of drugs in an ICU should be undertaken to monitor, evaluate, and suggest modifications in practitioner's prescribing habits so as to make medical care rational and cost-effective³

A study by Hartmann et al. reported that antibiotic therapy correlates with hospital mortality in patients staying for more than 24 hrs in a surgical ICU. Even with the presence of drug use guidelines and policies in the ICU, it might be difficult to apply them due to the patient-specific disease state and physician medication preferences. To improve therapeutic practices in such a case, it was found that the application of simple techniques of drug utilization was useful and in expensive. Therefore, utilization trends and costs of drugs prescribed in the ICU need to be urgently addressed⁴.

The aim of this study was to perform a key role to evaluate if, there is any difference in the disease pattern and drug prescribing trends in new normal and the objectives of this study was to To evaluate the drug prescribing trends in the intensive care unit and correlate them with the disease patterns and to access the multiple factors with morbidity and duration of stay.

II. Methodology

2.1 METHODS

It was a prospective observational study. The study was conducted at Aastha hospital, Moga (Punjab). Total 124 cases were recorded in this study over a period of six months.

a. INCLUSION CRITERIA

All patients with age more than 18 years and Patients admitted in intensive care unit were enrolled in the study.

b. EXCLUSION CRITERIA

All patients with age below than 18 years, patients with incomplete information and Patient not willing to participate in study were excluded from the study.

The ethical committee of the college granted this study institutional approval vide approval no. ECR/296/Indt/PB/2021/ISFCP/106.

This study was carried out by collecting data from the treatment chart review and patient case sheets of patients admitted to intensive care unit.

III. Results

Total 124 cases were enrolled in this study and out of 124 patient 73 patients were female and 51 patients were male. According to table 1 the age was divided into 10 categories in which most of the patients were belong to 51-60 age group that was about to 21 (16.9%) patient and in age group 21-30 and 41-50 least number of patients were observed.

Table 1: Age of the patients

According to table 2 patients admitted due to seizures were found to be 9 (7.3%) patient, 7 (5.6%) patient due to Gastroenteritis with dehydration, patient diagnosed with Intestinal obstruction and Septicemic shock was 5 (4.0%). Fibroid uterus and patients admitted due to Pregnancy and myocardial infarction are found to be 4 (3.2%).

Age of the patients	Frequency	Percent
21-30	21	16.9
31-40	10	8.1
41-50	21	16.9
51-60	21	16.9
61-70	34	27.4
71-80	15	12.1
81-90	2	1.6
Total	124	100.0

Table 2 Diagnosis of patients

Diagnosis of the patient	Frequency	Percent
Acute dysentery with HIV	2	1.6
Acute hepatitis	2	1.6
Appendicitis	2	1.6
Brain stroke	1	.8

Disease Pattern and Drug prescribing trends in Intensive Care Unit

Bronchial asthma	3	2.4
CCF with pulmonary edema	3	2.4
CCF with renal failure	1	.8
Cerebrovascular accident	1	.8
Cholelithiasis	3	2.4
Cholelithiasis with E.R.C.P	1	.8
Cholelithiasis with fibroid uterus	1	.8
CLD	1	.8
CLD with ascites	3	2.4
CLD with HCV	1	.8
CLD with Splenomegaly	1	.8
COPD	3	2.4
COPD with RA	1	.8
Covid-19	3	2.4
Cryptogenic cirrhosis	2	1.6
Diabetic ketoacidosis	2	1.6
DM-2 with epistaxis	2	1.6
Fibroid uterus	4	3.2
Gastroenteritis with dehydration	7	5.6
Gastroenteritis with epilepsy	1	.8
Haemorrhage	1	.8
Haemorrhage with intraventricular leak	1	.8
Hemiparalysis	2	1.6
Hepatic encephalopathy with CLD	2	1.6
Hepatic encephalopathy	1	.8
Hepatomegaly with fatty liver	1	.8
HHD	3	2.4
HHD with uraemic encephalopathy	1	.8
HHD with jaundice	1	.8
HHD with hemiparalysis	1	.8
HTN with thrombocytopenia	1	.8
Hypoglycemia	3	2.4
IHD with intestinal obstruction	1	.8
IHD with renal failure with pleural effusion	1	.8
Interstitial lung disease	1	.8
Intestinal obstruction	5	4.0
Pregnancy	4	3.2
MI with CCF with RHD	1	.8
Myocardial infarction	4	3.2
Neuromuscular disorder	1	.8
Pancreatitis	3	2.4
Pancreatitis with cholecystitis	1	.8
Pleural effusion	3	2.4
Pleural effusion with cholelithiasis	1	.8
Pleural effusion with hemiparalysis	1	.8
Pneumonia	2	1.6
Pneumonia with renal failure	1	.8
Renal failure	3	2.4
Renal failure with dengue shock	1	.8
Renal failure with pulmonary edema	2	1.6
Seizures	9	7.3
Septicemia with severe pneumonia	1	.8
Septicemic shock	5	4.0
Severe anemia	2	1.6
Severe dehydration with shock	1	.8
Severe gastritis with septicemia	1	.8
Total	124	100.0

According to table 3 average duration of stay in intensive care unit was 4.46 days. Maximum duration of stay in intensive care was 2 days.

Table 3 Duration of stay

Duration of stay	Measurement of central tendency
Mean	4.46
Median	4.00
Mode	4
Std. Deviation	1.858
Range	10
Minimum	2
Maximum	12

Correlation of prescribing pattern with disease pattern

According to table 4 Chi- Square test was performed to find out the significance between Diagnosis and dependent variable (as shown in table 4). Various variables were observed with highly significant values such as Cefuroxime Axetil, Acelofenac+Paracetamol+Serratiopeptidase, Domperidone+Omeprazole, Metoprolol succinate+Amlodipine, Prazosin etc.

Table 4 Correlation of prescribing pattern with disease pattern (Significant values)

Independent Variable	Dependent variable	Chi-Square value	Df	P-value
Diagnosis	Pantaprazole+Domeperidone	86.841	59	.011
	Cefuroxime Axetil	124.000	59	.001
	Acelofenac+Paracetamol+Serratiopeptidase	113.884	59	.001
	VitaminA+VitaminB1	93.234	59	.003
	Acelofenac+PCM+Chlorzoxazone	92.231	59	.004
	Domperidone+Omeprazole	216.225	118	.001
	Metoprolol succinate+Amlodipine	372.000	236	.001
	Prazosin	248.000	177	.001
	Picopil	365.105	236	.001
	Deriphyllin	390.768	295	.001
	Ceftriaxone	240.168	177	.001
	Nitroglycerine	593.068	413	.001
	Norepinephrine	347.827	295	.019
	Levofloxacin	258.695	117	.001
	Amikacin	89.001	59	.007
	Methylprednisolone	124.000	59	.001
	Imipenem	164.656	118	.003
	Phenlephrine+Ambroxol+Levocitirizine+Guaifenesin	153.852	118	.015
	Hydrocortisone	254.734	177	.001
	Amoxicillin + Clavunic acid	227.268	177	.006
	Fluconazole	87.804	59	.009
	Dexamethasone	366.886	295	.003
	Metronidazole	286.405	236	.014
	Cefoperazone+Salbactam	156.501	118	.010
	Dopamine	285.433	236	.015
	Piracitam	226.138	177	.007
	Remdesivir	124.000	59	.001
	Metolazone	124.000	59	.001
	Rosuvastatin+ Aspirin	102.821	59	.001
	Cerebroprotein+Hydrolysate	267.972	177	.001
	Mannitol	240.978	177	.001
	Ethimsylate	221.899	118	.001
	Olmesartan Medoxomil+Hydrochlorothiazide	164.656	118	.003
	Ramipril	146.635	118	.038
	Rosuvastatin	294.640	236	.006
	Cholecalciferol Concentrate	77.018	59	.058
	Calcium Carbonate+VitaminD3	95.761	59	.002
	Ciprofloxacin	154.498	118	.014
	Furosemide	392.015	236	.001
	Clarithromycin	81.989	59	.026
	Telmisartan+Hydrochlorothiazide	259.981	177	.001
	Phytonadione	80.375	59	.034
	Torseamide+Spironolactone	106.016	59	.001
	Ternexamic acid	193.710	118	.001
	Levosalbutamol+Ipratropium	500.706	354	.001
Budesonide	413.631	295	.001	
Rifaximin	106.772	59	.001	
Arginine+Glycerine	102.821	59	.001	
Terlipressin	155.000	118	.013	
Cefixime	213.900	177	.030	

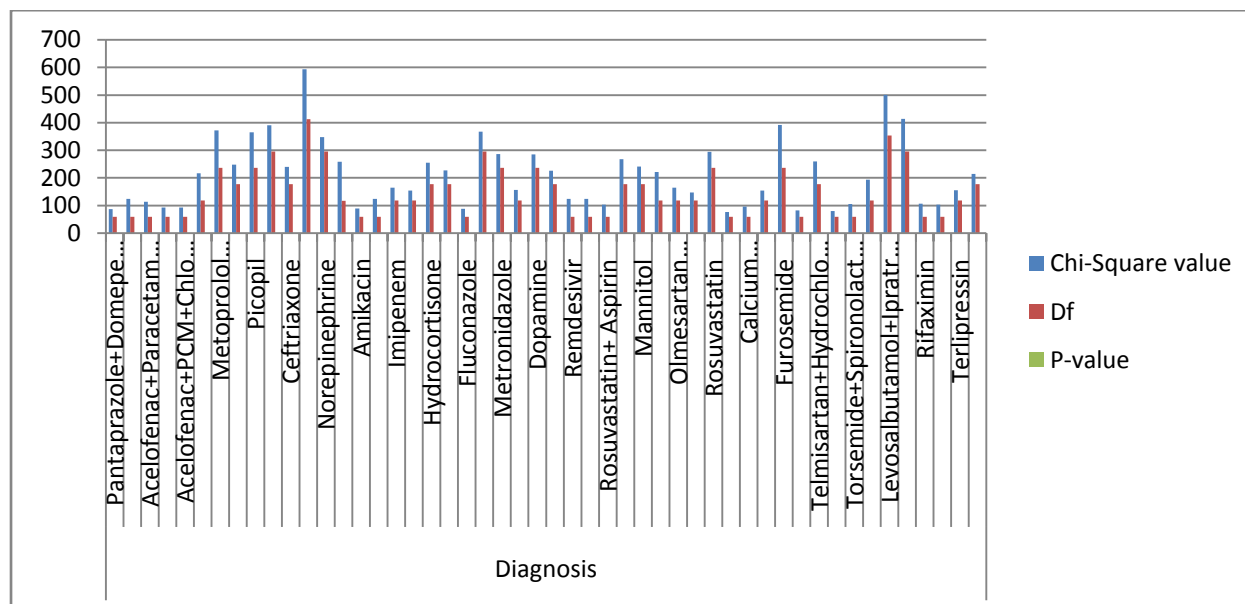


Figure 1. Correlation of prescribing pattern with disease pattern (Significant values)

According to table 5 Chi- Square test was performed to find out the non-significance between Diagnosis and dependent variable (as shown in table 5). Various variables were observed with non-significant values.

Table 5 Correlation of prescribing pattern with disease pattern (non-significant values)

Independent Variable	Dependent variable	Pearson Square value	Chi- df	P-value
Diagnosis	Ofloxacin	130.117	118	.210
	Pantoprazole	55.228	59	.615
	Ondansteron	116.102	118	.532
	Valporate+Valproic acid	25.974	59	1.000
	Multivitamin	40.661	59	.967
	Isobromide Dinitrate	30.244	59	.999
	Cephalexin	60.984	59	.404
	Duloxetine	76.738	59	.060
	Lopramide	16.850	59	1.000
	Amoxycillin+Potassium clavulanate	67.522	59	.209
	Linezolid	67.522	59	.209
	Glimepride+Metformin	102.148	118	.850
	Gentamycin	60.984	59	.404
	Paracetamol	135.103	118	.134
	Ceftriaxone+Salbactam	116.906	118	.511
	Cefepime	64.204	59	.299
	Enoxaparin	196.463	177	.151
	Aspirin	40.661	59	.967
	Phenytoin	218.177	236	.791
	Levetiracetam	53.530	118	1.000
	Promethazine	117.877	118	.486
	Pentazocine	114.027	118	.586
	Butorphanol	108.934	118	.713
	Piperacillin+Tazobactam	174.455	177	.540
	Aspirin+Clopidogrel	277.543	295	.760
	Pheniramine	115.258	118	.554
	Levocitirizine+Montelukast	127.256	118	.264
	Peroxycam	153.108	177	.903
	Hyoscine Butylbromide	179.903	236	.997
	Lorazepam	142.370	295	1.000
	Tramadol	352.323	472	1.000
	Atropine	76.184	118	.999
	L-ornithine+L-aspartate	203.456	177	.084
	Ursodeoxycholic acid	122.463	118	.371
Insulin	332.431	354	.789	

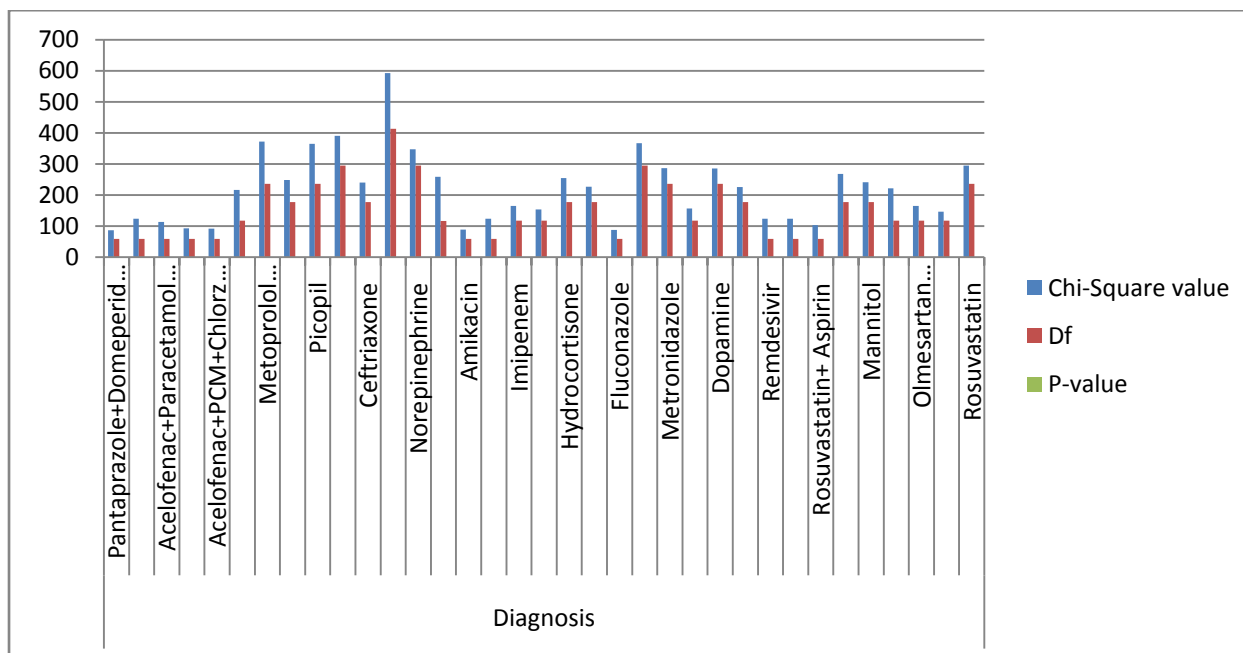


Figure 2. Correlation of prescribing pattern with disease pattern (non-significant values)

IV. Discussion

Patients admitted in the ICU invariably suffer from chronic and critical illness. It is difficult to treat patients in the ICU with multiple co-morbidities with less number of drugs as they require drugs for treatment of specific condition as well as for prophylaxis, but it is also essential to keep a balance between the number of drugs and effective pharmacotherapy. In our study the age was not normally distributed, median of age was found to be 57.00 years. Dissimilar results were obtained in the study conducted by Sharmin A. et al. (2019) in their study the age was normally distributed they stated that mean age of the ICU patients was 48.86 years¹. In this study, the average duration of intensive care unit stay was found to be 4.46 days is similar to Tripathi CB et al. 2013². In the present study the most of the patients admitted in intensive care unit were due to seizure disorder followed by Gastroenteritis with dehydration. In our study, almost all the parameters matched with the previous studies in various ICUs, except for the excessive use of the AMAs, which are prescribed in about 96% of the patients. ICUs are frequently associated with the emergence and spread of bacterial resistance due to excessive use of broad-spectrum antibiotics and other multiple factors. Bacterial resistance to antibiotics has emerged as an important factor influencing patient mortality and morbidity. So, measures should be taken to avoid the inappropriate use of antibiotics. Physicians must have a clear understanding of the therapeutic use of antibiotics; they must be aware of the prevalence of various pathogens and resistance patterns in their hospital and exercise good judgment in the selection of empirical antibiotic regimens. Management teams consisting infectious disease specialists, intensive care specialists, pharmacologists, pharmacists, and microbiologists may be helpful³.

V. Conclusion

Based on the results, we conclude that seizure disorder related admissions were common in the intensive care unit. This drug utilization study has highlighted the strengths and shortcomings of the prescription pattern of patients who were admitted in the critical care setup. The information derived from this research work will be transmitted to the stakeholders for implementing the modifications wherever applicable for the betterment of the patient and the community.

References

- [1]. Chanda Shaha K, Sharmin A, Rezaul Karim M, Karmokar Jyoti B. Disease Patterns and Drugs Load of the ICU Patients in a Tertiary Level Teaching Hospital. *Int J Biomed Eng Clin Sci.* 2019;5(4):78. doi:10.11648/j.ijbecs.20190504.14
- [2]. Gawali UP, Khobragade RS. Drug utilization and prescription pattern study in medicine intensive care unit at tertiary care teaching hospital. 2019;9(7):674-677. doi:10.5455/njppp.2019.9.0516822052019
- [3]. Patanaik S, Pattanayak C, Prasad A, Chauhan A. Drug utilization pattern in an intensive care unit setting in Eastern India. *Int J Basic Clin Pharmacol.* 2015;4(6):1136-1141. doi:10.18203/2319-2003.ijbcp20151347
- [4]. Al-Zakwani I, Al-Thuhli M, Al-Hashim A, Al Balushi KA. Drug utilization pattern in an intensive care unit at a tertiary care teaching hospital in Oman. *Asian J Pharm Clin Res.* 2017;10(2):194-197. doi:10.22159/ajpcr.2017.v10i2.15148
- [5]. Hospital C, Thomas A, Adake U. Drug Utilization Pattern in Adult Medical Intensive Care Unit of a Tertiary. Published online 2019:2019-2022. doi:10.4103/cjhr.cjhr

- [6]. Jeevangi SR, Patil RB, Awanti SM, Manjunath S, Patil B, Devi K. Drug utilization study in a burn care unit of a tertiary care hospital. *Asian Pacific J Trop Dis*. 2011;1(1):41-46. doi:10.1016/S2222-1808(11)60010-8
- [7]. Patel MK, Barvaliya MJ, Patel TK, Tripathi C. Drug utilization pattern in critical care unit in a tertiary care teaching hospital in India. *Int J Crit Illn Inj Sci*. 2013;3(4):250-255.
- [8]. Maharani B, Jafrin AL, Prakash M, Priyadarshini P. Prescription pattern of patients admitted in the intensive care unit of a tertiary care hospital in Puducherry, India. Maharani B, Jafrin AL, Prakash M, Priyadarshini P. Prescription pattern of patients admitted in the intensive care unit of a tertiary c. *Int J Basic Clin Pharmacol*. 2017;6(12):2822. doi:10.18203/2319-2003.ijbcp20175149
- [9]. Adhikari K, Phukan S. Drug Utilization Pattern in Cardiology Intensive Care Unit in a Tertiary Health Care Institution. *Int J Pharm Sci Res*. 2018;9(9):3833-3838. doi:10.13040/IJPSR.0975-8232.9(9).3833-38
- [10]. Nakul G, Mohammed MS, Jameel MYS, Maryam N, Meetu A, Abdul HS. A study on the prescription pattern of drugs in Jazan general hospital, KSA. *African J Pharm Pharmacol*. 2016;10(1):7-13. doi:10.5897/ajpp2015.4285
- [11]. Nibrad V V, Nayak BB, Raul AR, Vijayprasad S, Vakade KP, Jadhav AR VA. Drug Utilization Pattern in Medical Intensive Care Unit (Micu) in a Tertiary Care Teaching Hospital in Rural Area of Maharashtra. *Int J Appl Biol Pharm Technol*. 2015;6(1):148-154.
- [12]. Rajathilagam T, Malathy AR, Seethalakshmi S, Kothai G. Prescription pattern in a medical icu of a tertiary care teaching hospital of south india. *Biomed Pharmacol J*. 2018;11(1):405-410. doi:10.13005/bpj/1387
- [13]. Bajracharya S, Pandey S, Shakya YL. Drug prescribing pattern and disease pattern in KMC Duwakot Health Center. *Kathmandu Univ Med J*. 2004;2 no. 1(5):35-42.
- [14]. Sawe HR, Mfinanga JA, Lidenge SJ, et al. Disease patterns and clinical outcomes of patients admitted in intensive care units of tertiary referral hospitals of Tanzania. Published online 2014:1-8.

Conflict of Interest Statement: The authors have declared that no competing interests exist.

Statement of Ethics: Not applicable

Funding Sources: There are no funding sources for this report.

Authors Contributions: DS: Collected data in ongoing study and writing the manuscript, data analysis, HR: Major contributor in writing, drafting the manuscript, AS: Major contributor in writing and drafting the manuscript, all authors read and approved the final manuscript.

Acknowledgments: We thank ISF College of Pharmacy, Moga, Punjab, for continuous support provided.

Dikshita Sharma, et. al. "Disease Pattern and Drug prescribing trends in Intensive Care Unit." *IOSR Journal of Pharmacy and Biological Sciences (IOSR-JPBS)*, 17(3), (2022): pp. 15-21.