A Retrospective Observational Drug Utilization Study on COVID-19 At Tertiary Care Teaching Hospital

Varunsingh Saggu[1], Ajay Mishra[2], Brinal Solanki[2], Anand Soni[2], Pratyush Parikh[2]

[1]*Department of Pharmacy, Sumandeep Vidyapeeth Deemed to be University, Vadodara, Gujarat, India,*
[2]*Department of Pharmacy Practice, Parul Institute of Pharmacy, Parul University, Vadodara, Gujarat, India*

Abstract

Introduction: The Coronavirus Disease 2019 (COVID-19) pandemic has presented an unparalleled challenge to health-care systems worldwide since its emergence in late 2019. As health-care providers grapple with the complexities of managing COVID-19 patients, the need for comprehensive understanding of treatment strategies and drug utilization patterns becomes increasingly critical. In response to the evolving nature of the pandemic, health-care facilities have implemented various therapeutic interventions, often adapting treatments based on emerging evidence and clinical experience. This manuscript presents a retrospective observational drug utilization study conducted at a tertiary care teaching hospital, aimed at examining the patterns of drug utilization among COVID-19 patients. With the rapid development and dissemination of treatment guidelines and protocols, understanding real-world drug utilization patterns is essential for optimizing therapeutic approaches and informing evidence-based clinical decision-making. Ultimately, this research aims to contribute to the collective efforts to mitigate the impact of the COVID-19 pandemic and improve outcomes for patients receiving care at tertiary care teaching hospitals. **Objective:** The objective of the study is to analyze prescribing patterns in COVID-19 patients and to find the prevalence of co-morbidities associated with COVID-19. **Methods:** A total of 500 patients diagnosed with COVID-19 were finally recruited after strictly obeying the selection criteria in this retrospective, observational study conducted over 6 months in a tertiary care teaching hospital, Parul Sevashram Hospital. Relevant data were extracted from prescriptions, case records, and investigational reports. **Results:** Of the total 500 patients, 300 (60%) were males and 200 (40%) females. The highest numbers of patients were in the age group of 46–55 years (147 patients, 29.34%). Out of 500, 289 patients had comorbidity in which hypertension was the most common comorbidity (115 patients, 39.8%) observed, followed by diabetes (102 patients, 35.3%) and diabetes mellitus plus hypertension (52 patients, 18%). Commonly employed in treatment were class of medications such as anticoagulant (9.3%), antipyretic (8.7%), folic acid supplements (8.4%), Vitamin C supplements (8.4%), proton pump inhibitors (8.3%), Vitamin D supplements (8.1%), steroids (7.7%), and antibiotics (7.6%), while other classes of drugs such as anthelmintics, antitussive, antiviral, and antihypertensive were administered according to the patient's specific disease state and the severity of their condition. **Conclusion:** Further investigation is warranted on the evolving subject of COVID-19 due to the virus's variability and characteristics, alongside the insufficient evidence backing current treatment drugs for the development of updated guidelines, ultimately lessening the strain on global health-care providers. Future research endeavors will focus on refining drug utilization and prescription practices for COVID-19 treatment. Regular evaluation of drug utilization patterns is imperative for enhancing management strategies and the overall quality of life for patients.

Key words: Coronavirus, COVID-19, pandemic, public health crisis, SARS-CoV-2

INTRODUCTION

Coronavirus Disease 2019 (COVID-19), arising from a novel coronavirus termed severe acute respiratory syndrome coronavirus 2, emerged during a respiratory illness outbreak in Wuhan City, Hubei Province, China. The World Health Organization was notified of this disease on December 31, 2019, and subsequently declared

it a global health crisis on January 30, 2020. Manifesting primarily in the lungs, COVID-19 exhibits varying symptoms among individuals, with most experiencing mild-to-moderate illness and recovering without hospitalization. In addition, treatments for COVID-19 have demonstrated rapid recovery outcomes.[1]

Following is the list of symptoms [Table 1].

Mode of transmission

COVID-19 transmission occurs through the exhalation of virus-containing droplets and particles by infected individuals, which can be inhaled by others or come into contact with their eyes, nose, or mouth. These particles may also contaminate surfaces, posing a risk of transmission upon contact. Close proximity to an infected person, within a distance of less than 6 feet, increases the likelihood of transmission. The virus spreads through three primary routes: Inhalation of airborne particles emitted by infected individuals, direct contact with respiratory droplets, and transmission through contaminated surfaces.[2] Despite early challenges in understanding and treating COVID-19, frontline health-care providers have initiated medication strategies, although concerns regarding medication selection, combination, and safety persist. While some studies have focused on epidemiological findings, clinical presentation, and outcomes, few have systematically examined drug utilization among COVID-19 patients.[3]

Drug utilization research encompasses the study of the marketing, distribution, prescription, and usage of medications within society, focusing on the resultant medical, social, and economic outcomes. Its primary objective is to promote the proper and judicious use of drugs tailored to individual patients. This field serves as a crucial instrument for examining the clinical application of medications across the population and its implications for the healthcare infrastructure.[4] This study aims to evaluate the patterns of drug utilization among individuals diagnosed with COVID-19.

MATERIALS AND METHODS

A retrospective observational study with 500 patients was conducted. After ethical approval, the study was conducted for 6 months in Parul Sevashram Hospital to assess the drug utilization in COVID-19 patients. The data were collected from the Medical Record, Department of Parul Sevashram Hospital, and drafted in the patient data collection form. Information of all patients including their IPD number, date of admission, demographic details, laboratory parameters, and date of discharge was analyzed and reported using graphs as per percentage, history, diagnosis, prescription, other information, etc.

RESULTS

A total of 500 patients for the study were recruited. Only in-patient data were recorded and analyzed.

Demographic profile

In this study, 500 patients were recruited. Of these, 300 (60%) were males, and 200 (40%) were females.

Therefore, male patients dominated the female patients. The figure represents the gender distribution among the COVID-19 [Figure 1].

Co-morbidity assessment

The most prevalent comorbidity was observed to be hypertension trailed by diabetes, etc. The table depicts the comorbidity assessment [Table 2].

Hypertension was found to be the most common comorbidity (115 patients, 39.8%) observed in the study population, followed by diabetes (102 patients, 35.3%), diabetes mellitus plus hypertension (52 patients, 18%), CKD (08 patients, 2.8%), thyroid (7 patients, 2.4%) [Figure 2].

Table 1: List of symptoms		
Mild	**Moderate**	**Severe**
Fever	Ache and pains	Difficulty breathing or shortness of breath
Dry cough	Sore throat	Chest pain or heaviness
Tiredness	Diarrhea	Loss of speech or movement
Nausea	Conjunctivitis	Tachycardia
Headache	Loss of taste or smell	Hypoxia

Table 2: List of comorbidities		
S. No	**No. of patients**	**Comorbidities**
1	115	Hypertension
2	102	Diabetes
3	52	DM+HTN
4	8	CKD
5	7	Thyroid
6	1	Asthma
7	2	CKD+DM+HTN
8	1	ALD
9	1	Anemia
Total	289	

Age group comparison

During the study out of 500 patients, 3.79% of patients were between the ages 18 and 25, 11.97% were between 26 and 35 years, 26.34% were between 36 and 45, 29.34% were between 46 and 50 years, 28.54% were between 56 and 65 years [Table 3].

Medication assessment

Drugs such as acetaminophen, Vitamin C supplement, pantoprazole, folic acid, and Vitamin D supplement were commonly used in the treatment, and rest other medicines such as antibiotics, antiviral, anthelmintics, and steroids were used based on the disease state of the patient along with the severity of the disease [Figure 3].
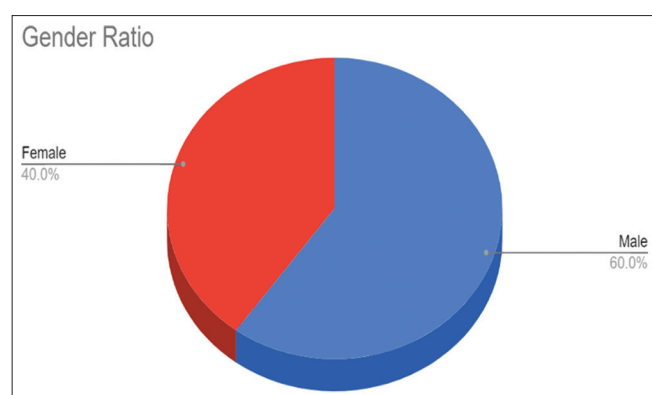
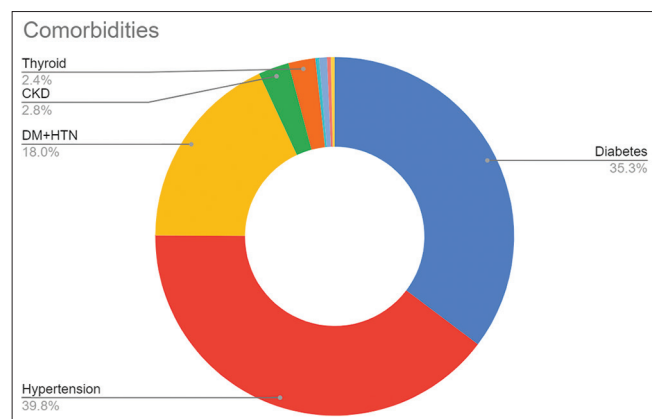

Figure 1: Gender demographic profile

Figure 2: Comorbidities of patients

Table 3: Age group		
Parameter	**Number of patients**	**Percentage**
18–25	19	3.79
26–35	60	11.97
36–45	132	26.34
46–55	147	29.34
56–65	142	28.54
Total	500	100%

Class of medications

Commonly employed in treatment were class of medications such as anticoagulant (9.3%), antipyretic (8.7%), folic acid supplements (8.4%), Vitamin C supplements (8.4%), proton pump inhibitors (8.3%), Vitamin D supplements (8.1%), steroids (7.7%), and antibiotics (7.6%), while other classes of drugs such as anthelmintics, antitussive, antiviral, and antihypertensive were administered according to the patient's specific disease state and the severity of their condition [Figure 4].

DISCUSSION

Prescription pattern studies evaluate the quality of care given to the patients in the health-care system. Proper determination of the medication treatment guarantees the most undue advantage to the patients.

The global health-care systems have encountered substantial challenges due to the COVID-19 pandemic. Despite this, there has been limited research conducted on the clinical dimensions of COVID-19, including potential therapies and risk factors. With few exceptions, the epidemiology of COVID-19 patients and their medication utilization patterns remain largely unexplored.[5] As far as we are aware, this study represents the initial investigation into this disease, as clinicians have had to formulate treatment strategies based on limited data due to the novel nature of the virus.

Our results are organized into five sections.

In the first section, we examined the gender distribution among COVID-19 patients. Our findings revealed that the number of male patients outnumbered female patients, with a ratio of 3:2, which is consistent with findings from other studies.

Moving on to the second section, we analyzed the age distribution of patients. Our study showed variations in age groups compared to studies conducted in the USA. Specifically, 3.79% of patients fell within the 18–25 age bracket, 11.97% were aged 26–35, 26.34% were aged 36–45, 29.34% were aged 46–50, and 28.54% were aged 56–65.

In the third section, we explored the comorbidities present in patients. A significant number of patients had hypertension and diabetes, with some individuals experiencing both conditions concurrently. Our findings were compared to those of a retrospective study conducted in China,[6] where renal and hepatic impairments were more prevalent among patients.

In our findings, it was observed that a significant portion of COVID-19-positive patients presented with comorbidities, with diabetes and hypertension being the most prevalent. Conversely,
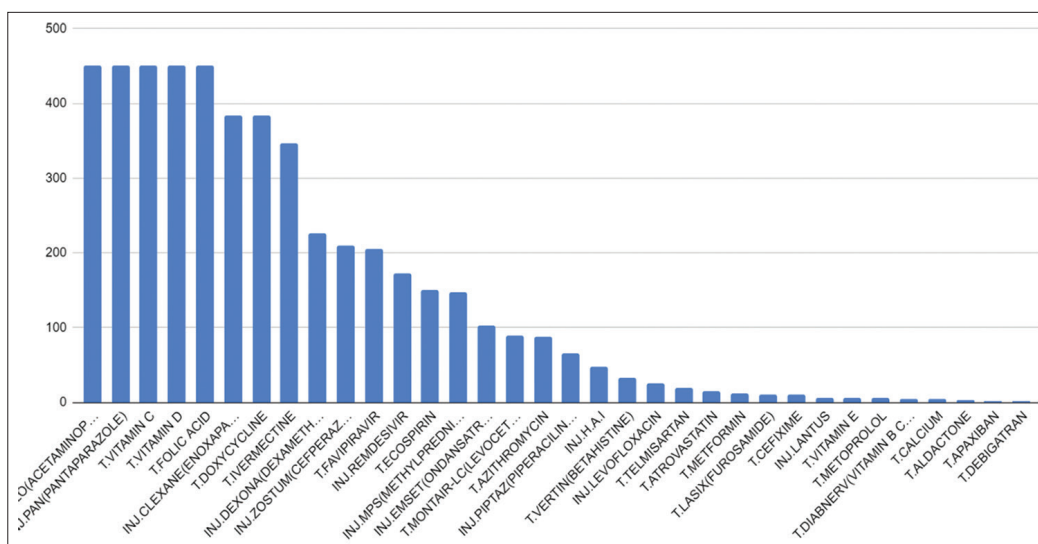
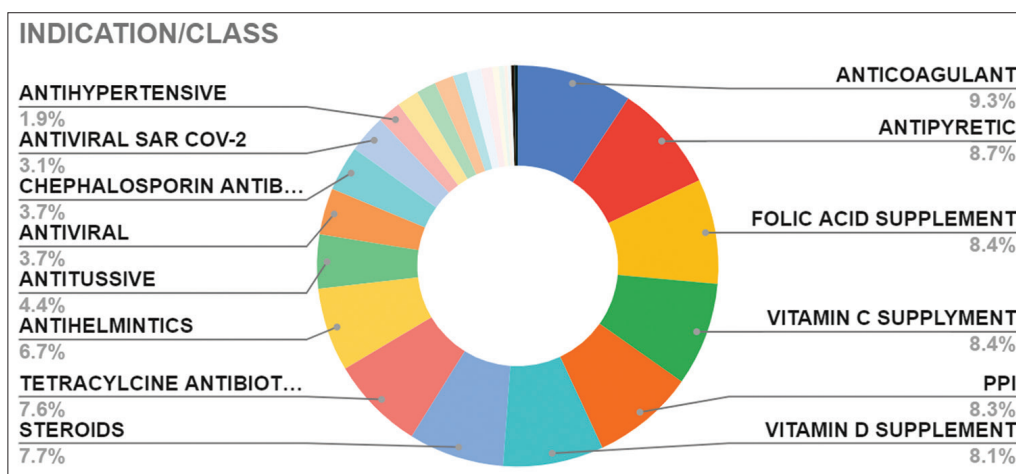**Figure 3:** List of medications assessment

Figure 4: Classes of medications used in treatment

conditions such as asthma, alcoholic liver disease, and anemia were comparatively rare among COVID-19 patients.

Subsequently, we examined the diagnostic tests administered to COVID-19-positive patients to evaluate their disease status. Physicians recommended various tests including CBC, CRP, D-DIMER, SLDH, serum ferritin, and HRCT. Among these, HRCT emerged as the most valuable diagnostic tool for assessing disease prognosis.

Lastly, our discussion delved into the crucial aspect of drug utilization in COVID-19 treatment, as per the ICMR guidelines.[7] We analyzed the spectrum of medications administered to COVID-19 patients during their course of treatment and upon discharge. The medications encompassed antimicrobials (antiviral, antibiotics, and anti-helminthics), steroids, and supplements such as folic acid and Vitamins. In addition, prophylactic treatments included antipyretics, anti-emetics, and proton pump inhibitors. Commonly prescribed drug combinations included antiviral + antibiotic

+ steroids. Notably, drugs such as folic acid, vitamin C and D3, acetaminophen, along with antitussive syrup or proton pump inhibitors were frequently prescribed both during the treatment phase and upon discharge.

CONCLUSION

In summary, further investigation is essential on the prevalent subject of COVID-19 owing to the virus's diverse characteristics and behavior. The existing medications utilized for COVID-19 treatment lack substantial evidence, underscoring the necessity for robust research to inform the development of new treatment guidelines. This initiative is crucial for alleviating the burden on health-care professionals globally. Moving forward, additional studies are warranted to enhance drug utilization practices and prescription patterns in the management of COVID-19. Moreover, it is imperative to regularly assess drug utilization patterns to refine management strategies and enhance the quality of life for patients.

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