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Research Article

PRESCRIPTION AUDIT AND EFFECTS OF COMORBIDITIES ON INDOOR COVID-19 PATIENTS OF A TERTIARY CARE TEACHING HOSPITAL

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ABSTRACT

Objective: Management of COVID-19 has been a challenge to the health-care system. The COVID-19 pandemic led to prescribing a greater number of drugs for curing the disease in the initial phase of the pandemic due to a lack of understanding of the pathophysiology of COVID-19, symptomatic treatment was given as no definite treatment was available. This presented an opportunity to assess prescribing practices during the pandemic.

Methods: The study presents a retrospective cohort to assess 300 random prescriptions from indoor COVID-19 patients of a tertiary care teaching hospital. The parameters analyzed in the process of the prescription audit were patients' demographics data, prescribing standards according to the World Health Organization core indicators, clinical diagnosis with the comorbid condition, legibility of handwriting, doctor's name and signature, and outcome of the disease.

Results: Out of 300 cases analyzed, a total of 298 (99.66%) prescriptions were with antimicrobialsa total of 55 (18.3%) patients received antivirals. 167 (55.67%) admitted patients having comorbidities such as hypertension (28%) and diabetes (24.3%).

Conclusion: It is observed almost every patient has received antimicrobial in the form of antibiotic or antiviral. About 18.3% of patients received antiviral drugs. The effect of co-morbidity has a significant influence on the outcome of patients having COVID-19, as in this study, mortality rate in diabetic patients is higher up to 11.48% than in non-diabetics.

Keywords: Prescription audit, Comorbidity, COVID-19.

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INTRODUCTION

COVID-19 is a highly infectious disease caused by the SARS-Cov-2 virus. It can pass from person to person through droplet transmission and mainly causes pulmonary symptoms. Within a short time, it emerged into a pandemic, globally as of March 2023, there have been around 44,686,371 confirmed cases of COVID-19 including 530,771 deaths in India reported to the World Health Organization (WHO) [1]. COVID-19 is treated symptomatically and for optimal support, oxygen therapy is used along with some drugs such as steroids, remdesivir, and other drugs for individual complications.

This study helps in evaluating the prescription patterns of doctors and the impact of co-morbidities on COVID-19 patients. It can help in identifying areas of improvement in the management of COVID-19 patients and improving the quality of care given to them. The study also highlights the importance of understanding the impact of pre-existing conditions on COVID-19 patients and can assist health-care providers in developing better treatment plans for patients with underlying health problems. This type of research is crucial for a better understanding of COVID-19 and finding ways to improve patient outcomes.

METHODS

This retrospective study was conducted at the COVID-19 center, a tertiary care teaching hospital, after obtaining ethical clearance from the institutional ethics committee. (No: PDUMCR/IEC/33/2021 dated: March 23, 2021). The duration of the study was 6 months from May 2020 to October 2020. A total of 300 prescriptions, 50 prescriptions each month were analyzed from records of admitted patients for COVID-19 treatment.

The parameters analyzed in prescription auditing were the patient's socio-demographic data (name, age, and sex), duration of treatment, and clinical diagnosis. The severity of the disease, according to Indian Council of Medical Research (ICMR) treatment guidelines for COVID-19 [2],

- Mild: Absence of signs of severe or critical disease
- Moderate: Oxygen saturation <90% on room air, signs of pneumonia, and signs of severe respiratory distress
- Severe: Requires life-sustaining treatment, acute respiratory distress syndrome, sepsis, septic shock, with or without comorbid condition [4].

The prescribing standards according to the WHO indicators, outcome of the disease, legibility of handwriting, doctors' name, and signature [3].

Statistical analysis

Data were entered into Microsoft Excel according to their age, gender, therapeutic category, and prescriptions analyzed accordingly. Descriptive statistics such as frequencies and percentages were calculated for categorical variables. The relation between comorbidity and COVID-19 outcome is done using the Chi-square test.

RESULTS AND ANALYSIS

Out of 300 cases analyzed, the majority of patients were in the age group of 41–60 years (44.33%) followed by 61–80 years (27.66%) followed by 21–40 years (20.66%) and age group 01–20 (5.33%), and

above 81 years (2.3%). Among 300 patients, 198 (66%) were male and 102 (34%) were female.

A total of 2972 drugs were prescribed. 2602 (87.55%) drugs were prescribed by generic name, and 1324 (44.00%) drugs were administered by parenteral route as shown in Table 1.

A total of 298 (99.66%) prescriptions were with antimicrobials, among it 77 (25.66%) patients received a single antibiotic, 187 (62.33%) patients received two antibiotics 36 (11.00%) patients received more than three antibiotics. As shown in Table 2, the most commonly prescribed antibiotics were azithromycin followed by ceftriaxone and piperacillin-tazobactam. On average, each patient was prescribed antibiotics for 7 days.

As shown in Table 2, a total of 55 (18.3%) patients received antivirals. 47 (85%) patients received a single antiviral, for example, remdesivir, and 8 (15%) patients received two antivirals, for example, remdesivir and favipiravir. On an average, each patient was prescribed antiviral for 5 days [4].

Out of 55 patients those who received antiviral, 32 patients (58.19%) recovered and 23 (41.81%) patients expired. Among 55 patients who had received antiviral 15 patients had comorbid conditions.

Eighty-three percent of prescribed drugs were included in the National List of Essential Medicines (NLEM - 2019), while antivirals such as remdesivir and favipiravir are not included in NLEM.

Out of 300 cases, 93 (31%) were mild, 103 (34.33%) were moderate, and 104 (34.67%) were of severe category. Disease severity was decided based on ICMR guidance for clinical management of COVID-19 by the WHO [4].

Bar Diagram 1: Patients with/without comorbidities (Including patients with multiple morbidities)

Of 167 (55.67%) admitted patients having comorbidities such as hypertension (28%), diabetes (24.3%), and other conditions such as ischemic heart disease (IHD), hypothyroidism, tuberculosis, and anemia (13.6%) as shown in the above Bar Diagram 1. Eighty-eight patients (29.3%) were given insulin according to the RBS. Steroids were given to 206 (68.66%) patients, and anticoagulants were given to 215 (71.66%) patients.

As shown in Table 3, fatal outcome was observed in 87 (36%) of patients, out of which 42 (17.42%) patients had hypertension, 34 (14%) patients had diabetes, and 11 (4.56%) patients were suffering from other diseases. Out of 300 patients, 59 patients were transferred to other hospitals or discharged against medical advice.

Comorbidities were significant predictors for mortality, such as diabetes (odds ratio: 4.314, 95% CI 2.39–7.77; p<0.001) and hypertension (odds ratio 7.39, 95% CI 3.97–13.74, p<0.001).

The average duration of hospital stay was 8 days.

DISCUSSION

Out of 300 cases analyzed, majority of patients were in age group of 41–60 years (44.33%) followed by 61–80 years (27.66%) followed by 21–40 years (20.66%) and age group 01–20 (5.33%) and above 81 years (2.3%) similar study done by Gawali and Gurung had observed age group of 41–60 years (38.33.2%) followed by age group 21–40 years (20.6%) followed by age group of 61–80 years (23.6.2%) age group 01–20 (5, 6%) and above 81 years (1.3%). The majority of patients, 198 (66%) were male and 103 (34%) were female. In similar study done by Mandal *et al*. reported, 397 (64%) were male and 223 (36%) were female. Moreover, study done by Gawali and Gurung shows 190 male and 110 female out of 300 patients.

Table 1: Who prescribing drug use core indicators [3]

Prescribing indicators	
1. Average number of drugs per prescription	9.90
2. Percentage of drugs prescribed by generic name	88%
3. Percentage of encounters with antimicrobial	99.66%
4. Percentage of encounters with injections	44%
5. Percentage of drugs prescribed from National Essential Drug List	83.34%

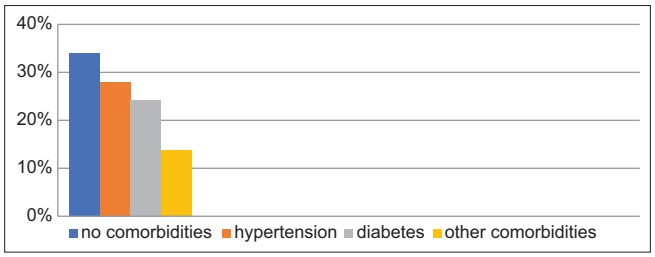
Table 2: Antimicrobials prescribed

S. No.	Name of drug	Total drugs
A)	Antibiotics	526
1.	Azithromycin	223
2.	Ceftriaxone	185
3.	Piperacillin+tazobactam	56
B)	Antivirals	63
1.	Remdesivir	55
2.	Favipiravir	8

Table 3: Disease outcome

S. No.	Disease outcome	No. of patients n=241*(%)
1.	Expired	87 (36)
2.	Recovered	154 (63.9)

*No. of patients n=241. Transfer and DAMA were excluded from the total no (300) patients



Bar Diagram 1: Patients with/without comorbidities (Including patients with multiple morbidities)

Out of 300 cases, the severity of the disease was mild 93 (31%), moderate 103 (34.33%), and 104 (34.67%) were severe. Whereas in Mandal *et al*. reported, mild 26 (4.1%), moderate 126 (20.32%), and 458 (73.87%) severe out of 620 cases and Gawali and Gurung shows mild 165 (55.00%) moderate 128 (42.66%), and severe cases are 7 (2.33%) out of 300 cases.

On average, 9.9 drugs were prescribed in a single indoor patient's prescription order. Although there are no standard criteria to define what exactly should be the number of drugs per prescription to consider polypharmacy, generally five or more drugs encountered can be considered polypharmacy [5,6]. In studies, it has shown that polypharmacy can lead to non-compliance and economic burden on patients. Drugs carry their own risk to the body and irrational prescribing can lead to many adverse effects [5]. COVID-19 is an ongoing pandemic emergency disease; patients were treated according to symptoms and complications. There should not be any criteria for polypharmacy in this pandemic period [13].

A total of 2972 drugs were prescribed and 1324 (44.00%) were administered by parenteral route. 2602 (87.55%) drugs are prescribed by generic name. Total anti-microbial prescribed in 242 prescriptions (80.66%), in 62 (20.66%) patients single antimicrobials used, 164 (54.66%) patients used two antibiotic covers when 16 (5.33%) patients were prescribed more than three antimicrobials, on average

each patient was prescribed antibiotics for 7 days. Out of which 17.7% were antimicrobials and 2.086% were antivirals. A drug utilization study done by Sun *et al*. shows the percentage of antibiotics is 98.8%, whereas the duration was 7–12 days according to the severity of patients. In the present study, Most frequently prescribed antibiotics were Azithromycin, Ceftriaxone and Piperacillin-Tazobactam, they were compared with Moxifloxacin, ceftriaxone - tazobactam, Levofloxacin and Meropenem as reported by sun et al and Gawali UP *et al*.

A single antiviral drug remdesivir was received by 47 (85%) patients and 8 (15%) patients received two antiviral remdesivir and favipiravir, Antiviral were used as per ICMR guideline. On average, each patient was prescribed antivirals for 5 days, similar data was reported by Gawali and Gurung showing 54.2% of Sun *et al*. as antiviral drugs were used in 18.3%, as similar to the present study when study done by Mandal *et al*. shows antiviral used in 21.9% and which is very low as compared to the present study.

The percentage of drugs prescribed from the essential drug list is 83.34%. The generic name was used to prescribe 89% of drugs and good legible handwriting was present only in 36.6% of prescriptions. The signature of a doctor was seen only in 3% of prescriptions. Poor legibility of handwriting and prescription without signature may be due to the overburden of patients at the time of pandemic emergency.

One hundred and sixty-seven (55.67%) patients out of 300 were admitted with comorbid conditions. Diabetes and hypertension were the main comorbid conditions, which were present in 24.3% and 28% of patients, respectively. Association between COVID-19 and diabetes and hypertension is a significant predictor for mortality which included comorbidities such as diabetes (odds ratio: 4.314, 95% CI 2.39–7.77; p<0.001) and hypertension (odds ratio 7.39, 95% CI 3.97–13.74, p<0.001). The outcome of transferred and DAMA patients is not considered. A study done by Sun *et al*. observed comorbidity in 50% of patients, 24.8% have hypertension, and 7.3% of patients with diabetes [11]. Whereas a study done by Mandal *et al*. shows most common comorbidities were hypertension (151, 24%) and diabetes (95, 15%) [12], which is low as compared to the present study.

In disease outcome, deaths were reported in 55.74% of diabetics having COVID-19 compared to 44.26% of non-diabetics having COVID-19. Hence, the mortality rate increases up to 11.48% in diabetics [13].

A study done by Callender *et al*., shows many COVID-19-associated morbidities affect the function of the immune system, which in turn directly impacts the response to COVID-19. Furthermore, the myriad of drugs prescribed for these morbidities will also influence the progression of COVID-19 and limit additional treatment options available for COVID-19 [7]. Diabetes and hypertension patients have increased morbidity and mortality rates and have been more likely to hospitalization and intensive care unit admissions [8].

In a study done by Zhu *et al*., a cohort study of 7337 patients with COVID-19 with type 2 diabetes, it was observed that those with type 2 diabetes required increased interventions for their hospital stay versus those who were non-diabetic. It was also observed that patients with poor blood glucose control had an all-around increased mortality and morbidity rate than those with better glucose control. It was noted that poor blood glucose control resulted in a substantially increased risk of complications and death [9].

Deaths were reported in 68.85% of hypertensives having COVID-19 compared to 31.14% in non-hypertensives having COVID-19. Hence, the mortality rate increases up to 37.71% in hypertensive. A retrospective study done by Zhu *et al*. confirmed apparent high mortality in patients presenting with hypertension: 48% versus 23% of survivors [10]. Other morbidities include IHD and others were 11.3% and 15.56%, respectively.

Limitations of this study are that it is a pandemic prescription audit, limited sample size, single-center, and uncontrolled blood sugar level.

CONCLUSION

It is observed almost every patient has received antimicrobial in the form of antibiotic or antiviral. 18.3% of patients received antiviral drugs. The effect of comorbidity has a significant influence on the outcome of patients having COVID-19, as in this study mortality rate in diabetic patients is higher up to 11.48% than in non-diabetics. Similarly in hypertension, the mortality rate is higher up to 37.71% in hypertensive patients than in non-hypertensive patients. There was the practice of polypharmacy for antimicrobial and other symptomatic treatment of COVID-19.

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AUTHORS' CONTRIBUTIONS

Dr.Shahenaz Malek: Idea, Drafting and analysis; Dr. Amita Kubavat: Drafting and analysis and editing; Dr. Anil Singh: Editing and critical input; Dr. PratikChibhadiya: Data collection; Dr. Dwija Rajguru: Data collection; Dr. Hetav Purohit: Data collection; Dr. Karan Hajare: Data collection; Dr. Taksh Hadvani: Data collection.

CONFLICTS OF INTEREST

None.

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