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Research Article

AN EPIDEMIOLOGICAL STUDY OF COVID-19 CASES ADMITTED IN A DEDICATED COVID HOSPITAL DURING SECOND WAVE OF CORONA PANDEMIC IN CENTRAL INDIA

SHARMA VK[1], ALOK KULSHRESTHA[2], VISHNU PAL[3]

[1]Department of Community Medicine, Mahaveer Institute of Medical Sciences and Research Centre, Bhopal, Madhya Pradesh, India.
[2]Department of Community Medicine, Peoples College of Medical Sciences and Research Centre, Bhopal, Madhya Pradesh, India.
[3]Department of Anatomy, Peoples College of Medical Sciences and Research Centre, Bhopal, Madhya Pradesh, India. Email: pal.vishnu78@gmail.com

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ABSTRACT

Objective: The objective of the study was to find out any peculiarities in the epidemiological and clinical profiles of COVID-19 cases, admitted in the hospital; which may be useful in management of health services in future.

Methods: Retrospective analysis of hospital records of COVID-19 cases admitted from March to May 2021 in our COVID hospital. A total of 1332 hospital case records were analyzed.

Results: Out of 1332 admitted COVID-19 cases, 50% were in age group 40–60 years. About 60% cases were male. Symptoms were fever (88.29%), sore throat (70.64%), breathlessness (58.84%), loss of smell (58.82%), pain in abdomen (53%), loss of taste (35.29%), and diarrhea (29.43%). Most cases had multiple symptoms. About 60% cases came in serious condition. About 65% cases needed intensive care unit admission. About 50% cases expired.

Conclusions: Only peculiarity noticed in clinical profile was loss of taste and sense of smell in few cases. Preponderance of males in the age group of 40–60 years and high mortality among the admitted cases was only peculiar epidemiological feature.

Keywords: COVID-19, Hospital admission, Epidemiology, Clinical profile, Outcome.

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INTRODUCTION

COVID-19 or severe acute respiratory syndrome corona virus 2 (SARS Cov-2) has become a global health problem in a short span of time. In December 2019, hospitals in Wuhan, Hubei, China reported a cluster of idiopathic pneumonia cases [1]. With the use of real-time reverse transcription polymerase chain reaction (RT-PCR), researchers identified the cause being a novel corona virus labeled as SARS-CoV-2, which was later termed as corona virus disease 2019 (COVID-19) [2,3]. Soon similar cases started occurring in other countries, initially with travel history to China. The pandemic spread very fast and engulfed all the continents of world. Till May 2021, 3.21 Crore cases and 4.3 Lakh deaths occurred in India [4]. Health services were grossly overburdened due to rapidly increasing case load and hospital admissions. Rapid spread of COVID-19, with uncertain course of pandemic forced most governments of the world to take strict containment measures such as prolonged lock downs and severe restrictions on movement of people. The COVID-19 pandemic is unique in human history, as it led to wide spread loss of life, economic suffering, and anxiety among the people world over. Large number of cases and deaths due to COVID-19 occurred in India during first and second waves of COVID-19. Our hospitals and health services were overwhelmed with COVID-19 cases. Therefore, understanding the epidemiological and clinical profile as well as course and outcome of the COVID-19 cases admitted in hospitals is important to deal with COVID-19 pandemic with efficiency.

Objective

The objective of the study was to find out peculiarities in the Epidemiological and Clinical profiles of COVID-19 cases admitted in the dedicated COVID Hospital (DCH).

Study setting

A tertiary care DCH of 600 beds in central India.

Study design

This was a retrospective observational study.

METHODS

Retrospective analysis of hospital records of all confirmed cases of COVID-19 admitted in our DCH from March to May 2021 was done to extract data relevant to our study. Data were collected on a predesigned data extraction form and stored on Microsoft Excel sheet. No sampling technique was used. All records which met inclusion criteria were included in the study.

Inclusion criteria

Hospital record of RT-PCR confirmed case of COVID-19 admitted in DCH between March 1 and May 30, 2021.

Exclusion criteria

The following criteria were excluded from the study:

- Case not confirmed by RT-PCR for COVID-19 or Incomplete Hospital records.
- Data analysis was done by Microsoft Excel software. A total of 1332 hospital records were analyzed from 1400 cases of COVID-19 admitted during the study period.

RESULTS

Age distribution of cases

Out of total 1332 COVID-19 cases, maximum were in the age group of 50–59 (28.45%, n: 379), followed by age group 40–49 (21.84% n: 291). Thus, 40–59 years age group accounted for half (50.29%) of total cases (Table 1).

Gender distribution: Males were 65.62% (n=874) whereas females were 38.34% (n=458) of total 1332 cases. Proportion of males and females did not show any major difference across various age groups (Table 1).

Table 1: Age and sex distribution of Covid-19 cases

Age groups	Female (n)	Female (%)	Male (n)	Male (%)	Total (n)	Total (%)
>30	36	8%	51	5.83	87	6.53
30–39	52	11.33	149	17.05	201	15.09
40–49	104	22.7	187	21.39	291	21.84
50–59	134	29.26	245	28.03	379	28.45
60–69	89	19.43	142	16.25	231	17.34
70–79	31	6.78	66	7.55	97	7.28
80 and above	12	2.62	34	3.89	46	3.45
Total	458	100	874	100	1332	100

For overall male female difference Chi-square statistics is 10.2831. The p=0.0395. the result is significant at p<0.05

Urban/Rural distribution: Most cases lived in urban areas (97.83% n=1082). Only 2.17% (n=24) cases were from rural areas. Information on residential area was available for 1106 cases only.

Income groups: Majority of these (65.42% n=335) had monthly income of Rs. 30,000-/- or less. About 17.58% (n=90) had income of more than Rs. 50,000-/-month. Remaining were income bracket of 30–50 thousands/month. Information on monthly family income was available for 512 cases only.

Family type

Out of 1332 cases, most of cases belonged to nuclear family (57.65%, n=768) followed by joint family (40.24%, n=536). Very few belonged to three generation family (2.10%, n=28).

Education level

Information on education level was available for 824 cases only. Out of these, 50.85% (n=419) were Graduates/Post Graduates. Those with primary to secondary level of education were, 42.72% (n=352). Only 6.43% (n=53) were without any formal education/illiterate.

Occupation

Data on occupation were available for 1124 cases only. Out of these, 33.89% (n=381) were in private service, 20.73% (n=233) in Government service, 10.23% (n=115) in business, 08.81% (n=99) in agriculture, 19.30% (n=217) were home maker, and 6.67% (n=75) were retired. Very few (0.35% n=04) were students. Most of cases (55%) came from service class.

Clinical symptoms

Main symptoms observed, in decreasing order of occurrence, were: Fever, sore throat, breathlessness, loss of smell, pain in abdomen, loss of taste, and diarrhea. Most of the cases had multiple symptoms (Fig. 1).

Clinical condition at the time of admission: Out of 1332 cases; 22.89% (n=305) were severely ill; 35.13% (n=468) were moderately ill; and 41.96% (n=559) were mildly ill.

Admission in intensive care unit (ICU)

883 cases (66.29%) of total hospital admissions were admitted in ICU for various lengths of time. Duration of admission in ICU varied from 01 to 15 days. Out of these 883 cases; 43.26% (n=382) were admitted for 01–03 days, 36.57% (n=323) were admitted for 04–07 days, 12.23% (n=108) were admitted for 08–10 days, and 2.26% (n=20) were admitted for more than 10 days.

Need for ventilator

Out of total 1332 cases, only 11.79% (n=157) were put on ventilator.

Final outcome

Out of total 1332 cases admitted in COVID hospital during the period of study; 50.08% (n=667) expired and 49.08% (n=665) survived and recovered.

Vaccination status of admitted cases: Out of total 1332 admissions; 334 (25.07%) were partially vaccinated with Single dose of Covishield and 22 (1.65%) were fully vaccinated with two doses of Covishield. Majority of admitted cases (n=976, 73.27%) had not received any dose of Corona vaccine.

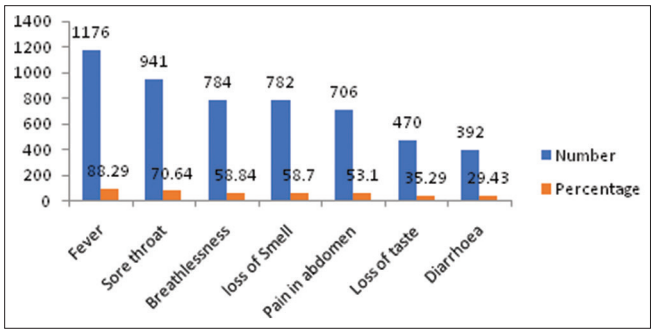

Fig. 1: Presenting symptoms among COVID-19 cases

The previous history of confirmed COVID infection with in the past 1 year of admission: Out of 1332 admitted COVID-19 cases, none had confirmed COVID infection in the past 1 year.

DISCUSSION

More than 50% of admitted cases were in 40–59 years age group. A review of literature reported that most of the cases of COVID-19 were in age group 30–79 years [5]. Average age of COVID-19 cases was 38 years and age is not a significant factor for getting infected by corona in population [6]. Outpatient department (OPD) screening of ILI cases for COVID-19 at PGI Chandigarh found 63.20% cases in age group of 20–40 years and 23.9% in age group 41–60 years [7]. Age distribution of COVID-19 cases in our study was similar to that found in other studies. Since Influenza, like illness and COVID-19 have similar clinical presentations, but COVID-19 has higher mortality, it is essential to have a fast and reliable screening protocol for identification of COVID-19 cases to prevent overburdening of hospitals and better management of cases.

About 65.7% of cases were male, whereas only 38.3% were female. The difference is statistically significant [p=0.0359]. Preponderance of males was also found in the hospital admission of COVID-19 cases in Ethiopia [8]. In a study of 1099 patients with COVID-19 from 552 hospitals in China; male to female ratio was 1.39:1. Italian epidemiologic data showed male to female ratio up to 3:1 for SARS-CoV-2 infection [9]. PGI study had also found higher proportion of males (65.6%) compared to females (34.4%) during the OPD screening of ILI cases for Corona [7]. A study on Impact of COVID-19 Infection in a gender specific manner concluded that males and females respond differently to several viral infections across different mammalian species ranging from rodents to humans. Viral infections are found to be more prevalent in males compared to female. The underlying mechanism behind this difference is quite complex and involves several factors including behavioral, genetic, hormonal, and immunological factors [10]. Several clinical case series, both from India and other countries, reported a preponderance of male patients in hospitalized samples. This phenomenon may be

partly explained by sex differences in the immune and inflammatory response to SARS-CoV-2 infection. However, in the Indian context, this relationship could also be influenced by traditionally defined gender roles. These are associated with comparatively more movement of men, which places them at a higher risk of exposure to infection [11].

About 97% of cases admitted in our COVID hospital were from urban areas. This may be due to easy accessibility of our hospital for urban population compared to rural population. Therefore, we do not attribute much significance to this observation. Predominantly urban distribution of hospital admissions creates a doubt of significant difference in the incidence of COVID-19 in urban and rural populations. A population based study on prevalence of Corona-19 cases in rural and urban populations with representative sampling can only remove this doubt.

Most of COVID-19 cases admitted in COVID hospital belonged to low-/middle-income groups. However, no meaningful inference can be made on this observation, because information on family income was not available in more than half of the hospital records.

COVID-19 being an airborne infection, it was expected to have higher proportion of admitted cases from larger families (Joint and Three generation families) but our results were against this expectation as proportion of cases from nuclear family was more compared to larger families. It may be due to less family support system in a nuclear family necessitating admission of a COVID case in Hospital.

About 90% COVID-19 cases had education from primary to postgraduate levels. A positive correlation between COVID-19 incidence and literacy rate of the region was observed [11]. High proportion of educated persons among the admitted cases was contrary to expectations because, lot of information was disseminated on preventive measures through television/radio and social media during the past 1 year. It may be that these messages did not create adequate risk perception and required behavior modification even among educated people. Assessment of impact of health propaganda on behavior of people is needed with suitable correction in strategy and messages for effective control of pandemic.

More than 50% of COVID cases in our study were from service sector. It may be due to that most of admitted cases in our hospital were from urban areas where majority of persons are employed in a Govt/private service sector.

Main presenting symptoms in our study were: Fever (88.29%, n=1176), sore throat (70.64%, n=941), breathlessness (58.84%, n=784), loss of smell (58.82%, n=782), pain in abdomen (53.0%, n=706), loss of taste (35.29%, n=470), and diarrhea (29.43%, n=392). In a review study, common symptoms reported among COVID cases were: Fever (82.2%), cough (61.7%), fatigue (44.0%), dyspnea (41.0%), anorexia (40.0%), productive sputum (27.7%), myalgia (22.7%), sore throat (15.1%), nausea (9.4%), dizziness (09.4%), diarrhea (08.4%), headache (06.7%), vomiting (03.6%), abdominal pain (02.2%) [5]. A Saudi Arabian study among confirmed COVID-19 cases found that most common symptoms were: Cough (53.6%), fever (36.2%), fatigue (26.4%), dyspnea (21.9%), sore throat (21.9%), headache (16.2%), muscle pain (14.5%), joint pain (09.2%), sputum production (07.7%), and diarrhea (07.7%) [12]. A Chennai study concluded that a person is almost two times more likely to report loss of smell or taste if she/he tested positive for COVID-19 as compared to someone who tested negative. The sensitivity of self-reported or clinically identified loss of smell was 17.2% and that of loss of taste was 06.9% [13]. Olfactory and gustatory dysfunctions are important clinical presentation of mild to moderate forms of the COVID-19 [14]. Most common symptoms reported were, fever (70.5%), cough (52%), influenza-like illness (09.8%), and breathlessness (13%), loss of taste or smell (03%) patients [15]. Non respiratory symptoms among COVID-19 cases range from 2-40%. Gastro-intestinal, neurological, and cardiac symptoms should also be considered while screening for COVID-19, for better case detection [16]. PGI study on, OPD screening of ILI cases for Corona, found main symptoms among ILI cases to be: Cough (57.01%), fever (49.3%), and sore throat (43.5%). Loss of taste and smell were not reported by any subject in this study [7].

Symptom profile of COVID-19 cases in our study was almost similar to other studies. Fever, cough, and breathlessness were common main symptoms in various studies. Loss of smell and loss of taste found in our study were not reported in other studies except one study done in south India [13]. These symptoms appear to be associated more with Corona infection as compared to other respiratory infections and Influenza like illness. Loss of smell and/or taste and gastro-intestinal, neurological symptoms if present, should be used as strong indications for doing a RT-PCR confirmation of COVID-19.

About 66.30% of COVID-19 cases were required to be admitted in ICU for various durations, ranging from 1 to 15 days. It was 1–3 days for 45.9% cases, 4–7 days for 38.8% cases, and 8 or more days for remaining cases. In a retrospective analysis of confirmed COVID-19 cases admitted in AIIMS New Delhi; almost 49.3% cases were admitted in ICU. Same study further reported that ICU admission varies from 05 to 46.8% of hospitalized patients in different studies and is related to the availability of ICU resources in that region [17]. Most cases of COVID-19 develop mild or uncomplicated illness, approximately 14% develop severe disease that requires hospitalization and oxygen support, and only 5% require admission to an ICU [18]. Decision to admit a case in ICU depends on multiple factors. Main factors being clinical condition of patient, availability of beds, advanced life support systems and ventilators in ICU.

Out of 1332 COVID-19 cases, only 11.79 % (n: 157) needed ventilator support in our series. In a retrospective case series of critically ill patients, 99% of admitted cases required respiratory support; endo-tracheal intubation in 88%, and non-invasive ventilation in 11% cases [20]. Need for ventilators in a hospital may vary from time to time depending upon number of cases with severe respiratory distress. Availability of ventilator support for about 25% of hospital admissions may be sufficient in usual circumstances.

Out of 1332 COVID-19 cases admitted in our hospital, 667 cases (50.08%) expired, whereas 665 cases (49.08%) survived and recovered. A retrospective study conducted at AIIMS New Delhi found Hospital mortality at 18.2% and ICU mortality at 36.1% for COVID cases [17]. ICU mortality of COVID-19 patients varied from 8.0% to 66.7% in different studies [17]. Similar mortality rates have been reported in other studies from US, Spain, Italy, and few studies from China [17]. Therefore, mortality of 50.08% among the Covid-19 cases admitted in our COVID hospital appears is not unusual. However, a systematic review to identify any modifiable factors contributing to mortality may be helpful in better management of COVID cases in future.

Majority of admitted cases (73.27% n=976) were not vaccinated. About (26.73% n=356) were partially vaccinated with single dose and (1.65% n=22) were fully vaccinated with two doses of Covishield vaccine. Very low proportion (1.65%) of fully vaccinated cases in our study may be an indication that vaccination reduces need for hospital admission. No case had history of confirmed COVID-19 disease in the past 1 year.

CONCLUSIONS

Only peculiarity noticed in clinical profile was loss of taste and sense of smell in few cases. Preponderance of males in the age group of 40–60 years and high mortality among the admitted cases were only peculiar epidemiological features in our study.

Recommendation

There is need to develop a protocol to identify serious cases at early stage of illness in view of 50% mortality among admitted cases.

Limitations

Our study was conducted at a single DCH; hence, external validity may not be strong. A multi-centric study is needed to better elucidate the epidemiological and clinical peculiarities of COVID-19 among admitted cases.

DEFINITIONS

COVID-19 case

Individual with RT-PCR positive report for COVID-19 before/during admission in hospital.

Severely ill

If RR was >30/min with breathlessness and/or SpO_2 <90% on room air.

Moderately ill

If RR was >24/min with Breathlessness and/or SpO_2 90–93% on room air.

Mildly ill

If only upper respiratory symptoms and/or Fever without Breathlessness and without Hypoxia. [Cases were categorized at the time of admission as per ICMR guidelines].

AUTHOR'S CONTRIBUTIONS

1. Dr. V K Sharma: Data analysis, referencing and writing of manuscript.
2. Dr. Alok Kulsherstha: Conceptualization of study and data collection.
3. Dr. Vishnu Pal: Review and editing of manuscript.

CONFLICT OF INTEREST

None.

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