Retrospective Study on the Clinico - Epidemiological Profile of Covid-19 Patients in a Tertiary Care Hospital in India

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ABSTRACT

The purpose of the study was to assess the clinico-epidemiological profile of Covid-19 patients admitted in a tertiary care hospital during the surge of cases reportedly due to Omicron variant.3080 samples were tested for SARS - CoV 2 by conventional RT-PCR method. The study highlighted on different epidemiological aspects such as age groups, sexes, underlying co-morbidities and most common presenting symptoms with emphasis on severe cases requiring hospitalization. During the study period, the incidence rate of SARS-CoV 2 infection was 26.1 % & was significantly more prevalent (59.7 %) in male patients . RT-PCR positivity was highest (70.9%) in 18-60 yrs of age group. 26% of total positive cases required hospitalization and they were mostly aged more than 60years (69.5%). Most common (92%) complaint in severe cases was respiratory distress (SpO2 <90%). Type II Diabetes mellitus was the most important (67%) underlying disease in hospitalized patients .29% of the hospitalized adult cases did not receive any vaccination. Mean CT value in RT-PCR was less in hospitalized patients (23.8). The median CRP value in admitted patients was 9.4mg/L whereas 13.8% patients had CRP ≥ 40mg/L on admission.

Keywords

COVID -19, SARS - CoV2, Omicron, SARI

INTRODUCTION

As we entered a new phase of Covid-19 pandemic at

the end quarter of 2021 with the emergence of new variant, Omicron, the healthcare infrastructure and community preparedness were once again subjected to new challenges worldwide. With the data available hitherto showing high transmissibility of the Omicron variant, quite remarkably higher than the Delta variant dominating till then in most of the countries worldwide[1], we experienced another wave of the Covid-19 pandemic that was different than the previous wave caused by Delta variant[2]. Rapid detection of the cases during the first few days of infection even in asymptomatic individuals holds the key to control the spread of the disease in a highly populated developing country like India[3].

Conventional RT-PCR with its high sensitivity and specificity along with a quick turnaround time is the need of the hour to contain any future spread of the pandemic by the newly emerging variants [4,5].Therefore a retrospective study was undertaken in a tertiary care hospital in Eastern India to assess the clinico-demographic profiles of the Covid-19 patients confirmed on the basis of detection of the SARS-CoV2 by the Multiplex real-time RT-PCR test.

MATERIALS AND METHODS

After obtaining IEC approval, a retrospective cohort study was undertaken in a tertiary care hospital in Eastern India to assess the clinic-demographic profiles of the Covid-19 patients using the conventional RT-PCR assay to detect SARS-CoV2. A total of 3080 patients were included in this study after obtaining informed consent from January 2022 to July 2022.Inclusion criteria involved any patient presenting with symptoms suggestive of Covid-19 or a significant exposure history to a confirmed case of Covid-19 within last 15 days. Patients who had been diagnosed with Covid-19 within last 3 months and coming for a repeat test were excluded.

After obtaining the relevant history, nasopharyngeal and oropharyngeal swabs were collected from the suspected patients attending fever clinic and also from patients admitted with SARI in the hospital maintaining proper precautions. The swabs were immediately transferred to VTM and sent to the Molecular Biology laboratory in the Department of Microbiology designated for detection of SARS-CoV2 with three layered packaging after proper labeling and vigorously maintaining the cold chain during transport. The samples were stored in a -20◦C freezer in the laboratory till further processing and were subjected to RNA extraction later on[6].

Multiplex real-time RT-PCR test were performed using CoviPath Covid-19 RT-PCR kit for qualitative detection of nucleic acid from SARS-CoV2 in NPS and OPS.RNA extraction was carried out using MagMax viral nucleic acid isolation kit. Two primer sets were used for detection of ORF1 ab and N gene in the test specimen. One primer set targeting the RNase P gene was assessed that served as the internal positive control to monitor the sample source. One positive control and one negative control were also set to monitor the reaction set up. The data generated from the PCR cycle was analyzed and interpreted using the analytical software associated with the real time PCR instrument. Clinical Guidance for Management of Adult Covid-19 Patients from the Ministry of Health and Family Welfare, Government of India served as the basis for the clinical classification of the study participants as mild, moderate and severe cases [8].

RESULT

A total of 3080 specimens were subjected to Multiplex real-time RT-PCR analysis for detection of SARS-CoV2 in NPS and OPS swabs. E gene was detected in 900 specimens but the presence of confirmatory RdRp gene could be identified in 804 samples only.

Table 1: Incidence of Covid-19 cases in a tertiary care hospital.

Total no. of specimen received	No. of positive samples	Percentage of positive samples
3080	804	26.1

Figure1: incidence of Covid 19 cases in a tertiary care hospital
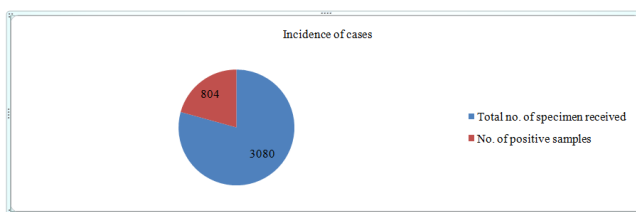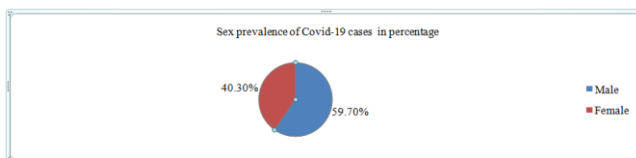

Out of 804 positive specimens, 480 were male patients and 324 were female. Highest proportion of specimens submitted for test belonged to the 18-60 years age group.

Table 2: Sex prevalence of Covid- 19 cases in percentage

	Male	Female
Total 804 Positive cases (%)	59.7%	40.29%

**Figure 2:** Sex prevalence of Covid-19 cases in percentage

570 specimen tested positive among 2464 specimen tested in 18-60 years age group thus accounting for 70.9% of the total positive samples.174 of the 366 specimen tested positive belonged to the patients aged more than 60 years.32 and 28 specimen testing positive were from infants below one year and children of 1-18 years age group respectively.

Table 3: Percentage prevalence of Covid -19 cases among patients of different age groups

Age groups	<1year	1-18 years	18-60 years	>60 years
Total no. of positive cases(n=804)	32	28	570	174
Percentage(%) of positive cases	3.98	3.48	70.9	21.64

Figure 3: Percentage prevalence of Covid-19 cases in different age groups
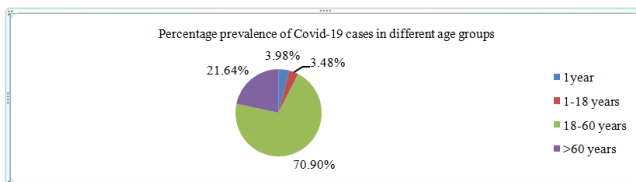
84% of the persons testing positive were symptomatic on presentation.47% and 27% of the cases seeking medical care were classified as mild and moderate disease respectively.26% of the positive cases were classified as severe Covid-19 disease and required admission for further management.210 out of 804 positive cases required immediate hospitalization. 69.5% and 10.48% of them were aged above 60 years and below 18 years respectively. Mean of the time of admission from onset of symptom was Day 7.Most common (92%) presenting symptom for admission was respiratory distress with SpO2 <90% at room air. Productive cough was present in 82% cases. Fever >101F was persisting after 5 days from onset of symptom in 44% cases requiring hospitalization.

Table 4: Percentage prevalence of Covid -19 cases categorized on basis of severity

Severity grading	Mild	Moderate	Severe
Percentage of positive cases (n=804)	47%	27%	26%

Figure 4: Percentage prevalence of Covid -19 cases categorized on basis of severity
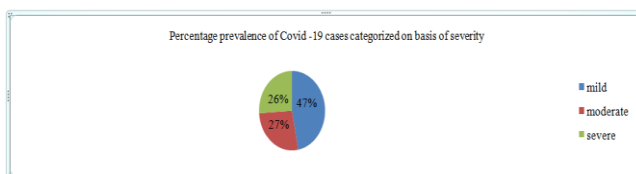
Table 5: Percentage prevalence of severe Covid -19 cases requiring hospitalization among patients of different age groups

Age groups	<18 years	18-60 years	>60 years
Total no. of positive cases(n=210)	22	43	145
positive cases (%)	10.48%	20.48%	69.5%

Figure 5: Percentage prevalence of severe Covid-19 cases requiring hospitalization among different age groups
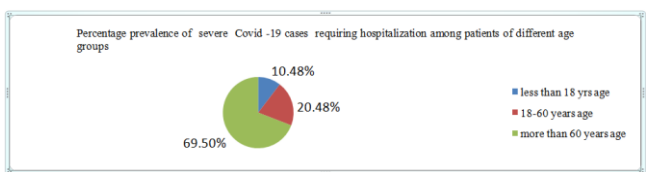

Table.6: Categorization of patients depending upon the presenting symptoms in Covid -19 cases requiring hospitalization

presenting symptoms	Total no. of cases (n=210)	Percentage of cases
Respiratory distress and SpO2<90%	193	92
Productive Cough	172	82
Fever >101F on D5	92	44

Most significant underlying co-morbidity   associated with severe Covid-19 infection were Type 2 Diabetes mellitus (67%),hypertension(38%),COPD(18%) and heart ailments (12%).

Table.7: Categorization of Covid -19 cases according to the risk factors associated

Associated risk factor	No. of severe cases	Percentage of severe cases
Type II Diabetes Mellitus	141	67
Hypertension	80	38
COPD	38	18
Heart ailments	25	12

29% of the adult patients hospitalized were not vaccinated.39% and 32% cases received one dose and two doses of vaccine respectively.

Table 8: Categorization of Covid -19 cases among adults according to their vaccination status

Vaccination against SARS-CoV 2	No. of severe cases (n=188)	Percentage of severe cases
Not vaccinated	55	29
Partially vaccinated(single dose)	73	39
Fully vaccinated (double dose)	60	32

Figure6: Categorization of Covid -19 cases among adults according to their vaccination status
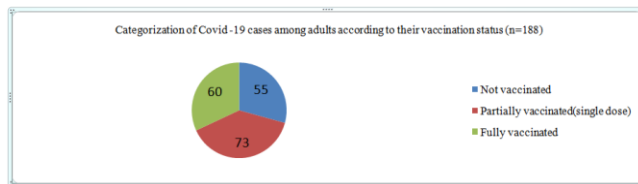
The viral load in severe cases were higher comparatively with the mean CT value of the molecular assays done in admitted patients being 23.8 whereas the mean CT value of all the positive cases was 29.9[9].

The median value of CRP on admission in serum of the hospitalized patients was 9.4mg/L and 13.8% of the hospitalized patients had serum CRP value ≥40mg/L on admission.CRP was abnormal in 20.7% cases in a study in Japan[10] .Bouzhid et al study concluded that the rise in CRP level was lesser in extent even in severe cases due to Omicron variant than the previous Delta variant[11].

DISCUSSION

We observed the largest proportion of admitted patients to be aged more than 60 years with a male predominance in concordance with the Suzuki et al study from Japan in 2022[10] though the proportion of cases requiring admission was much less in our study. The higher sero-prevalence in Indian population may be the major contributing factor for that.

Tiwari et al reported 55.1% mild, 32.5% moderate and 12.2% Covid-19 cases in severe triage category in an Indian study in 2022 [12]. Being a tertiary care hospital, we accounted for a relatively large proportion(26%) of severe cases.

Most common clinical presentations in the hospitalized patients was breathlessness(92%) ,productive cough(82%) and fever (44%) in our study. Similarly breathlessness ,fever and cough/coryza and were most common presenting symptoms in other studies as well(Suresh et al, Tiwari et al, Parvin et al)[12].

Type 2 Diabetes mellitus (67%), hypertension

(38%),COPD(18%) and heart ailments (12%) were the most common co-morbidities associated with disease severity in our study in concordance with other studies from India as well as other countries of South East Asia. [13,14,15]A study from India in 2022 also reported Hypertension (45.2%), diabetes mellitus (41.8%) and chronic kidney disease (CKD; 6.1%) as common comorbidities [12].

According to our study, 71% of the hospitalized cases had received at least one dosage of the vaccines previously in corroboration with other Indian studies[12]. A study from Japan also showed a high proportion(76%) of Covid pneumonia cases to be previously vaccinated(Suzuki et al)[10].

CONCLUSION

Though the emerging variants and sub variants of SARS-CoV 2 are showing less virulence as per available data analysis, but it still remains a cause of concern because of its high transmissibility. Any large volume of cases in a particular area could overwhelm medical centers making it difficult to treat severe cases especially in a vast populated developing country like India. Our study shows that the highest incidence rate of infection is observed in the 18-60years age group along with male predominance because of differences in lifestyle, movement and gender related behavior. The severity of infection is more in people aged more than 60 years because of the waning immunity and underlying co-morbidities associated. People with Type 2 Diabetes are at highest risk. Higher CT values in Real time multiplex RT-PCR assays are associated with increased risk of disease progression. Significant rise in Serum CRP values were seen only in a small proportion of cases only unlike the previous waves due to other variants of SARS-CoV 2. Therefore, the Real time multiplex RT-PCR assays with a high rate of sensitivity and specificity are going to play a significant role in early detection of emerging clusters of Covid-19 cases in vastly populated communities with limited healthcare infrastructure as the fight against Covid-19 goes on worldwide.

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