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RESEARCH ARTICLE

COURSE OF HOSPITALIZATION & OUTCOME OF COVID-19 ADMISSIONS DURING SECOND WAVE OF PANDEMIC IN A TERTIARY CARE INSTITUTE, BIHAR, INDIA

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Abstract

Introduction: With emergence of new strains of SARS-COV-2 and increased transmission of the virus, it is necessary to study the socio-demography, epidemiology, clinical course, outcome of Covid-19 patients to add to the existing pool of literature and understand the lacunae behind its epidemiology.

Methods: A record based observational study done among 100 COVID-19 admissions of second wave using a pre designed Performa containing details regarding covid-19 admissions and results tabulated and necessary statistical tests applied and significance attributed to $P < 0.05$.

Results: Among 100 admissions, Median age was 56.5 (IQR:40-65) years, 12% having history of contact with COVID-19 cases, cough being the common symptom (84%) and 61% having one or more comorbidity with median 10 days of hospital stay, 59% requiring oxygen treatment, 14% required ICU care and 7(7%) reaching primary outcome (expired).

Conclusion: Cough is the most common presenting symptom with more admissions in middle aged-elderly. One requiring ICU, Artificial ventilation, Intubation and Oxygen supplement had more mortality than others.

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Introduction:-

Its been more than an year ever since Corona virus disease 19(COVID-19) was declared pandemic.^[1] Covid-19 is caused by Severe acute respiratory syndrome corona virus 2(SARS-COV-2), a single stranded RNA virus of family coronaviridae.^[2] With the rapid spread of disease, with subsequent waves, the health and wealth of the population of the world was drained. Till date world has seen 17.8 crore confirmed cases and 38.6 lakh deaths due to covid 19 worldwide.^[3] India being the second most worst hit country in terms of covid-19, has reported 3 crore confirmed cases and 3.8Lakh deaths as of last week of June 2021^[4] after reporting of First case in Jan 2020.^[5]

Covid-19 spreads through droplet infection and mainly through respiratory route and attaches to mature ACE 2 receptors of paranasal sinuses and lower respiratory tract causing Acute respiratory distress syndrome.^[6]

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The Median incubation period is 5.1 days(1-14days) with clinical features of fever, cough, sore throat, breathlessness, diarrhoea, myalgia, loss of smell and taste sensation. Disease severity is classified as mild, moderate, severe based on hypoxia, dyspnoea and other supporting features.^[7]

Many literature have showed the epidemiology, clinical course, outcome of covid 19 admissions at various country and state level.^{[8][9][10]}

But there remains the emergence of new strains of covid-19 which spreads faster, with more severity of disease, RT PCR negative tests, affecting the effectiveness of existing vaccine,^[11] has led to rethink about the epidemiology, clinical course, hospital stay and outcome of Covid-19 patients. Also with the new emerging Covid 19 management guidelines, it is important to see the lacunae in Covid-19 appropriate behaviour to reinforce the importance of preventive measures and practices to deal the disease over the long run.^[12]

Keeping this in mind, the study was designed with objectives of assessing the sociodemographic, epidemiological, clinical, covid appropriate behaviour, course of hospital stay, need for oxygen supplementations and outcome of COVID-19 admissions in this tertiary care hospital of national importance.

Methodology:-

Study design

Record based observational study

Study setting

All India Institute of Medical Sciences, Patna

Study duration

3 months (April-June 2021)

Sample size

According to Aggarwal et al^[13], 90.4% of Covid 19 patients had Dyspnoea as most common presenting complaint. So according to this, we would need a minimum sample size of **71** COVID 19 cases for the study at 95% confidence interval and 7% precision using Statulator.^[14]

Inclusion

All laboratory confirmed COVID-19 admissions in AIIMS Patna during the study period

Study tool

A pre structured questionnaire containing information pertaining to Sociodemographic details, symptoms, vitals, oxygen requirement, covid appropriate behaviour, comorbidities details, course of hospital stay and final outcome was used to capture data.

Bio-Statistical Analysis

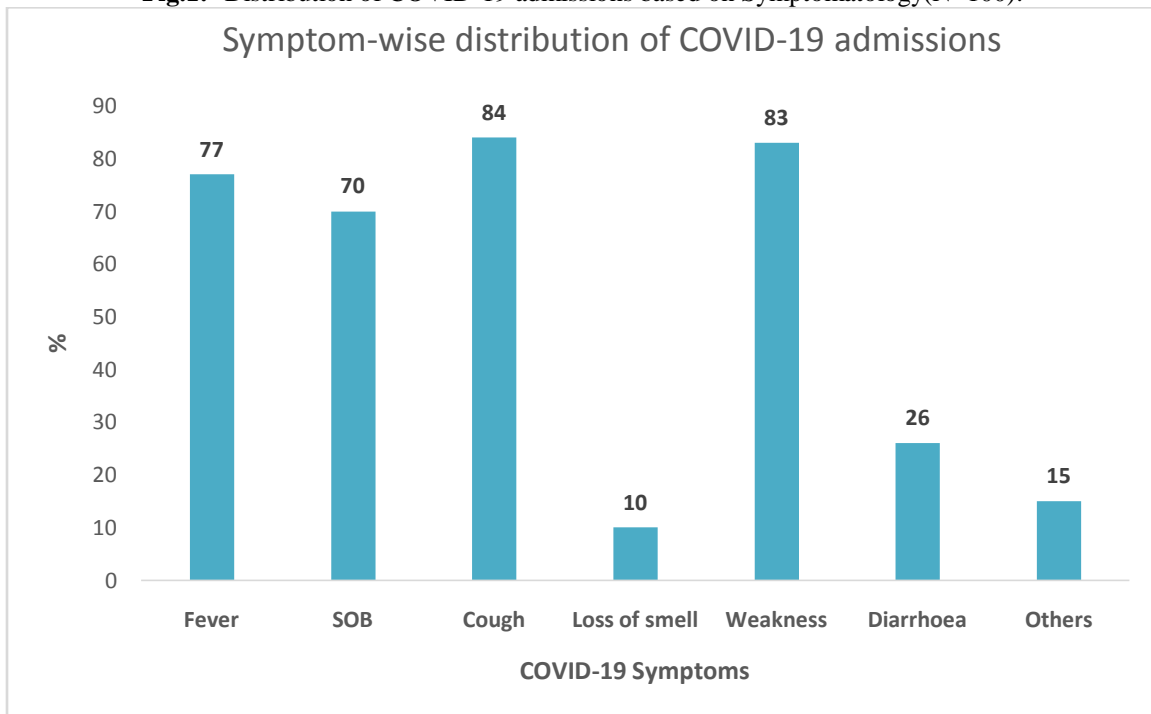
The information collected was entered in MS Excel and analysis was done using IBM SPSS version 22. Descriptive analyses were conducted to describe the demographic characteristics. The quantitative variables were expressed as mean (SD)/median (IQR) depending on normality and the categorical variables were expressed as proportion and percentages. Pearson's Chi-Square test/Fischer's exact was used to test the association between categorical variables like requirement of oxygen supplement, ICU, artificial ventilation, Intubation and Independent T test/Mann Whitney U test was used for assessing difference in SPO2 levels, duration of stay, oxygen supplement among dead and alive groups. Values of $P < 0.05$ were considered statistically significant (two-sided tests)

Results:-

In our study, out of 100 COVID-19 admissions, 40(40%) were elders (>60 years) with median (IQR) age of 56.5(40-60) years. 76(76%) were males, 52(52%) were from urban areas, 38(38%) were unemployed, 40(40%) were vegetarian by diet while 22(22%) were current tobacco users and 55(55%) were practicing regular physical activity. 12(12%) had history of contact with COVID-19 patients unprotected while 88(88%) had history of travel prior to symptom onset. (Table 1)

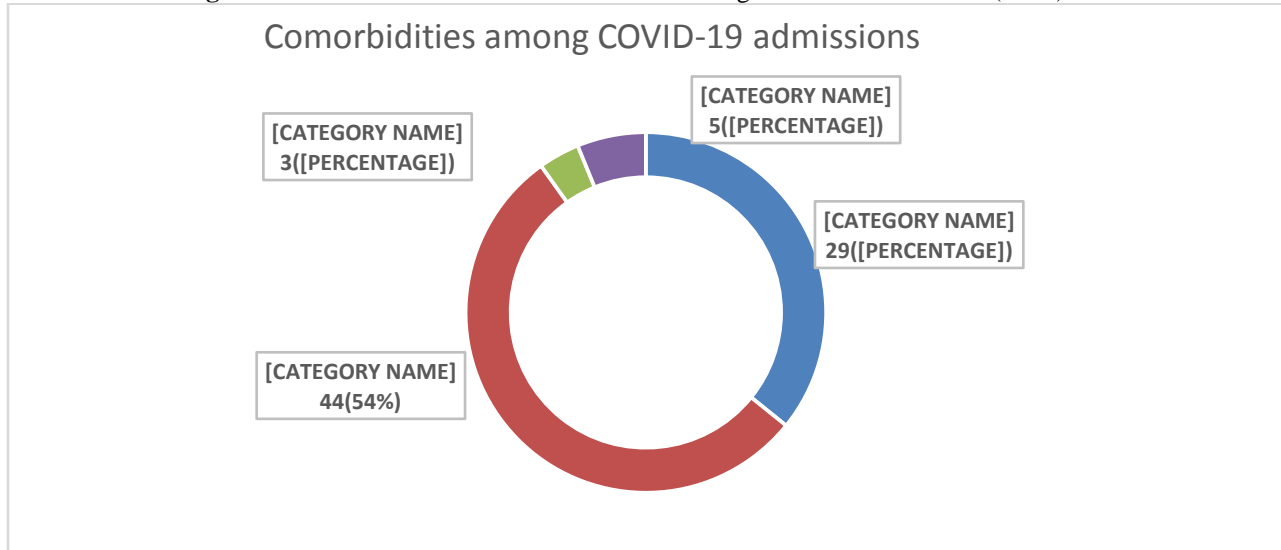
Table 1:- Sociodemographic details of COVID-19 admissions(N=100).

Variables	category	N(%)
Age(Years)	18-45	26(26)
	45-60	34(34)
	>60	40(40)
Median(IQR)age	56.5(40.25-65) years	
Gender	Female	24(24)
	Male	76(76)
Residence	Rural	48(48)
	Urban	52(52)
Occupation	Unemployed	38(38)
	Employed	62(62)
Diet	Vegetarian	40(40)
	Mixed	60(60)
Tobacco use	No	78(78)
	Yes	22(22)
Physical activity	No	45(45)
	Yes	55(55)
History of Contact with COVID-19 case (Unprotected)	Yes	12(12)
	No	88(88)
History of travel	No	12(12)
	Yes	88(88)

Fig.1:- Distribution of COVID-19 admissions based on Symptomatology(N=100).

Out of 100 COVID-19 admissions, all 100 had one or symptoms. Cough was most common symptom(84%) followed by weakness(83%) and fever(77%).(Figure 1)

Fig.2:- Distribution of COVID-19 Patients according to their Comorbidities(n=61).



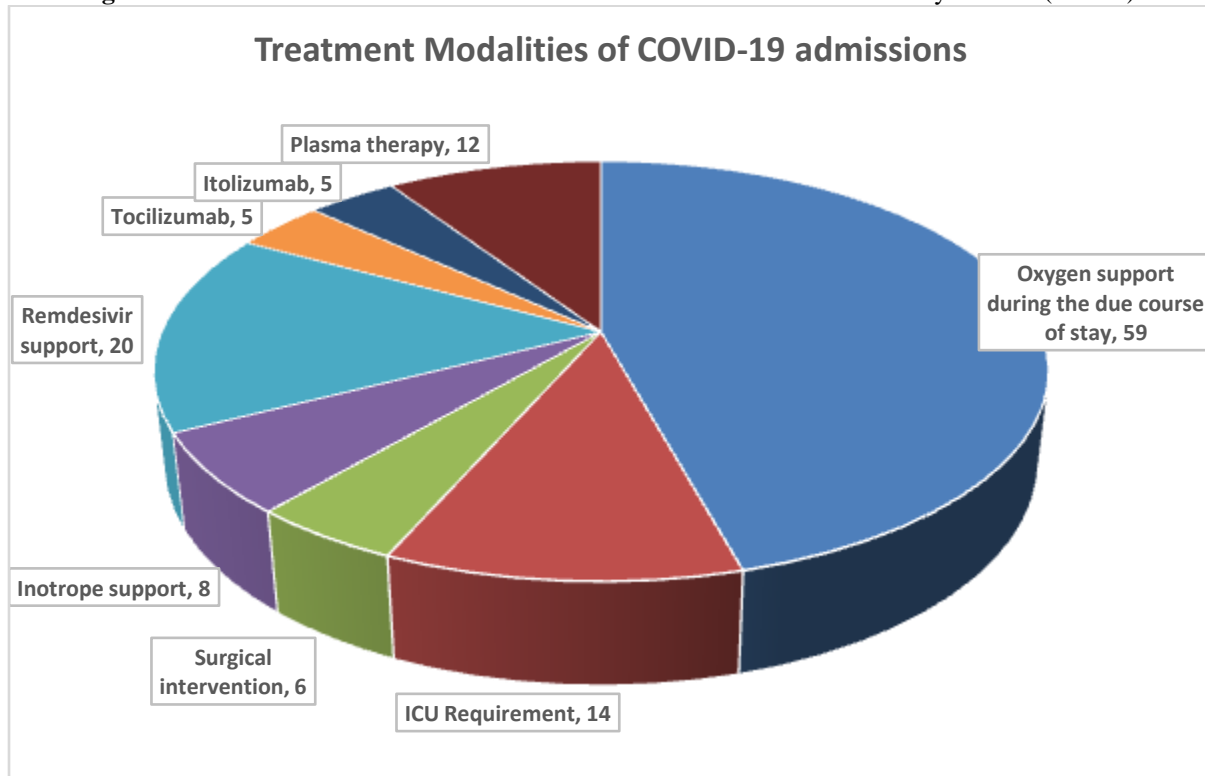
Out of 100, 61(61%) had one or more comorbidity(s). Hypertension(54%) was the most common comorbidity followed by Diabetes(36%).(Figure 2)

Coming to Covid-19 appropriate behaviour, out of 100, 92(92%) had used face masks regularly,80(80%) had practiced hand hygiene regularly & only 45(45%) had followed social distancing norms.

Table 2:-Hospital Course of COVID-19 admissions(N=100).

Parameters	Values	n(%)
SPO2(on admission)	Mean(SD)	91.1(8.8)
Clinical Severity of Covid-19 based on SPO2 levels	Normal(>94%)	39(39)
	Mild-Moderate(90-94%)	28(28)
	Severe(<90%)	33(33)
SPO2(after oxygenation)	Mean(SD)	94.5(6)
Oxygen requirement(L/min)	Median(IQR)	6(3-10.5)
Duration of stay(days)	Median(IQR)	10(8-14)
Artificial ventilation	Required	11(11)
Intubation	Required	5(5)
Final outcome	Alive	93(93)
	Dead	7(7)

On admission, the mean(SD) SPO2 levels of patients were 91.8(8.8) % on room air. Median(IQR) oxygen required was 6(3-10.5) litre/min and final mean(SD) SPO2 after oxygenation was 94.5(6)%.out of 100,33(33%) were categorised as severe COVID-19 based on SPO2 levels on admission and median(IQR) duration of stay was 10(8-14) days in the hospital.11(11%) required artificial ventilation and 5(5%) required Intubation for mechanical invasive ventilation. 7(7%) out of 100 died.(Table 2)

Fig.3:- Distribution of COVID-19 admissions based on treatment modalities they received(N=100).

When treatment modalities were sorted, out of 100, 59(59%) required oxygen support,14(14%) required ICU treatment,20(20%) required Remdesivir and 12(12%) required plasma therapy.(Figure 3)

Table 3:-Distribution of Clinical parameters of covid-19 admissions based on final outcome(N=100).

Parameters	Alive(N=93)(%)	Dead(N=7)(%)	P Value
1.SPO2 at room air(Mean/SD)	92.62(5.9)	71.4(15.3)	0.01* [@]
2.Final SPO2(Mean/SD)	95.6(3.4)	82.2(12.5)	0.03* [@]
3.Covid-19 clinical severity based on SPO2 levels	Non-Severe(n=67)	1(1.5)	0.004* ^{\$}
	Severe(n=33)	6(18.1)	
4.Mean(SD)Duration of stay(days)	11.5(6.6)	12.7(2.2)	0.6 [@]
5.Median(IQR)Oxygen requirement(L/min)	5(3-10)	15(15)	0.007* [#]
6.Oxygen support	No(%)	0	0.03* ^{\$}
	Yes (%)	7(11.9)	
7.Artificial Ventillation	No(%)	1(1.1)	<0.001* ^{\$}
	Yes(%)	6(54.5)	
8.Intubation	No(%)	2(2.1)	<0.001* ^{\$*}
	Yes(%)	5(100)	
9.ICU Requirement	No(%)	0	<0.001* ^{\$*}
	Yes(%)	7(50)	

Foot notes: *P<0.05 is statistically significant @P value by independent t test

P value by Mann Whitney U test \$ P value by Fischer's exact test

ICU-Intensive care unit

When the clinical parameters among alive (93) and dead(7) groups were compared, we found that the mean difference of SPO2 of 22.2% on admission at room air between two groups and the median difference of oxygen requirement of 10L/min among two groups were statistically significant [P=0.01 and 0.007 respectively].Also, only 1(1.5%) died in Non severe covid-19 category compared to 6(18.1%) in Severe Covid-19 category with statistically

significant difference among proportion ($P=0.004$, by Fisher exact test). Also, Significant proportion of mortality was seen in patients requiring ICU treatment ($P<0.001$), oxygen supplement ($P=0.03$), Artificial ventilation and intubation ($P<0.001$) (Table 3).

Discussion:-

Second wave of COVID-19 pandemic hit the country severely with more death rates, depletion of resources, havoc and panic in the air.^[15] Our study tried to explore the sociodemographic, clinic-epidemiological, outcomes of COVID-19 admissions during second wave of COVID-19 pandemic among the first 100 admissions of second wave in a tertiary care hospital in Patna, Bihar.

The median age in our study was 56.5 with an Inter quartile range of 40-65 years. A similar finding was found in a study in Delhi^[13] with median age of 54.5 years. Another study in Delhi^[16] showed mean age of 40.3 years much lesser than what we got. Our study had increasing trend of admissions in >60 age group (40%) followed by 45-60 years. This finding of higher rate of admission in middle and elderly age groups is in line with other studies.^[17] While Gupta et al^[16] had increasing admissions in 41-60 years age group. This may be due to presence of one or more comorbidities in these age group, increasing the risk of complications.

Three fourth of the admissions were males in our study while a study in Wuhan^[9] showed almost two fifth were males and Prakash et al^[17] showed almost 88% were males in their study. Males by virtue of working outdoors are at higher risk of exposure.

Our study showed that more than one fifth had history of contact with covid-19 positive case without any protection and also had history of travel to hotspots which is in line with a study done in Lucknow.^[17]

In our study, all 100 were symptomatic with one or more symptoms while a study in Jaipur, Rajasthan revealed that almost one third were asymptomatic.^[18]

Cough was the most common presenting symptom which was in line with other studies^[9,16,18] while Gupta et al^[19] showed fever has main presenting symptom.

In our study almost two third of patients had one or more comorbidity which was more compared to a study done in Delhi among 200 patients where nearly half had comorbidities.^[19]

The mean SPO2 on admission was 91.1% on room air. A study in Delhi^[19] showed mean SPO2 of 95%, which falls under no respiratory distress. Our institute being a tertiary referral center, received mostly severe distress and complicated cases.

The median duration of stay in our study was 10 days (IQR: 8-14 days) which is less compared to a study by Guan et al who had median 12 days of stay.^[9]

Coming to treatment and outcome, more than half (59%) required oxygen support and 14% required ICU support in our study while a study in Wuhan^[9] showed that 41.3% required oxygen therapy and 16.2% required ICU management. Nearly one tenth (7%) reached the primary outcome and expired in our study which was in line with another hospital study in Delhi^[20] and more compared to a study in Wuhan.^[9]

In our study, compared to those alive, dead had a longer duration of stay which is in line with a study by Guan et al.^[9]

Though COVID-19 affected most human race, the clinic-epidemiological features are different in different waves.

Conclusion:-

Our study had more admissions in middle-age and elderly, with male predominance and significant proportion of history of exposure to COVID-19 cases and history of travel. More mortality was seen in those who required ICU, Oxygen supplement, Artificial ventilation and Intubation. This observational study puts more insight towards the socio-demography of COVID-19 patients in east India and their clinical presentation and outcomes. The varying

presentation and manifestations adds to the existing pool of literature of SARS-COV-2 and puts researcher towards more robust mode of treatment with new emerging strains and new waves.

Limitations

This is a record based, Single institute study with limited sample size. Hence, the results cannot be generalized. Many laboratory parameters couldn't be used for analysis as they were out of the scope of the study.

Conflict of Interest

None to declare

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