DOI: 10.7860/JCDR/2021/47688.14757

Original Article

Internal Medicine Section

A Study of the Clinico-epidemiological Profile of COVID-19 Patients Admitted in a Tertiary Care Hospital in India

CHARVI PATEL[1], SONALI PALKAR[2], PURWA DOKE[3], RUPESHKUMAR DESHMUKH[4]

ABSTRACT

Introduction: India is the second country with the highest Coronavirus Disease-2019 (COVID-19) case burden in the world. In India, Maharashtra state has the highest number of cases.

Aim: To study the clinico-epidemiological profile of COVID-19 patients admitted in a COVID-19 designated tertiary care centre in Pune, Maharashtra, India.

Materials and Methods: The authors retrospectively investigated epidemiological, demographic, clinical, laboratory, radiological and treatment data of 413 Real Time-Polymerase Chain Reaction (RT-PCR) confirmed COVID-19 patients from 14th April 2020 to 30th June 2020. The data was analysed using the Mann-Whitney U test for continuous variables with non-normal distribution. Also, the multivariate logistic regression was used for analysis.

Results: Among the 413 laboratory confirmed COVID-19 patients, 249 (60.29%) were males, majority {87 (21.07%)} of the patients belonged to the age group of 51-60 years. The most common co-morbid condition found was diabetes mellitus {102 (24.69%)}. The most common symptoms were fever {185 (44.79%)} and cough {146 (35.35%)} followed by breathlessness {134 (32.45%)}. History of close contact with a confirmed COVID-19 case was present in 205 (49.64%) patients. The mean time from the onset of symptoms to hospital admission was 3.75 (SD±2.64) days. There was a strong association between increasing age and the need for intensive care. Total 63 (80.77%) out of 78 patients above 60 years of age had abnormal Chest X-Ray (CXR) findings during hospitalisation. Furthermore, the maximum number of deaths i.e., 31 patients (58.49%, n=53) occurred in the age group of more than 60 years of age.

Conclusion: The findings suggest that increased value of serum Lactate Dehydrogenase (LDH) and Urea can be used as predictors for mortality rate. Patients aged more than 60 years are more prone for severe disease with Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2) pneumonia and this subset of patients requires urgent medical attention.

Keywords: Coronavirus disease-2019, Diabetes, Mortality, Urea

INTRODUCTION

The COVID-19 pandemic has been in circulation for more than 11 months now causing a huge economic crisis the world over. Despite this, India still has the second-highest number of confirmed cases in the world after the United States as on 29th December 2020 [1]. Additionally, Maharashtra state accounts for one-third of the total cases in India. Maharashtra still has the maximum number of new active cases and the maximum number of daily deaths as on 29th December 2020 [2].

Many laboratory confirmed COVID-19 patients remain asymptomatic. Most of the patients develop mild or uncomplicated illness. The most common symptoms of COVID-19 observed in studies from India are fever and cough followed by breathlessness, sore throat and headache [3,4]. Around 14% require hospitalisation and supplemental oxygen, while 5% require intensive care unit admission [5]. Literature review shows that studies from India have a Case Fatality Rate (CFR) ranging from 2.36% to 29.4% [6,7,8].

Literature search shows that the clinical profile and outcomes of this novel disease are varied in different countries [9-12]. There is an urgent need to document this clinico-epidemiological profile in the local population. There is little robust data available from India. Very few single centre, small studies are available from North India. These findings cannot be generalised. There are hardly any studies from the state of Maharashtra (the present study region) which still carries the second highest caseload as on 29th December 2020 [13]. Compiled data on 12,271 patients from Maharashtra is available although data concerning their clinical presentation, laboratory, radiology and treatment is not available [14,15].

Furthermore, the World Health Organisation (WHO) has also stressed on the need for research on the epidemiology of this disease [16]. This data on the local population will help in great lengths for prioritising patients needing medical attention and investigations in resource limited areas. There is an urgent need to systematically collect and disseminate data for evidence-based decisions in future in case there is a rise in patients with relaxation of norms.

The aim of the study was to evaluate the clinico-epidemiological characteristics of COVID-19 disease during the early phase of pandemic in India.

MATERIALS AND METHODS

This was a single centre retrospective study done at a government approved (Pune Municipal Corporation) COVID-19 designated hospital that began on the 14th April 2020. The study was initiated after the Institutional Ethics Committee approval (Ref no. BVDUMC/IEC/12).

Inclusion criteria: Data of all adult laboratory confirmed COVID-19 patients admitted during the period from 14th April 2020 to 30th June 2020 were included.

Exclusion criteria: The data of COVID-19 patient under the age of 18 years were excluded from the study.

Data collection: The patient's data was collected from the medical records section of the hospital. The disease was classified as per the revised guidelines on the clinical management of COVID-19 by the Ministry of Health and Family Welfare, Government of India [17]. The definitions are as follows:

- **Uncomplicated illness:** Patients with uncomplicated upper respiratory tract viral infection who may have non-specific

symptoms such as fever, cough, sore throat, nasal congestion, malaise, and headache. The elderly and immunosuppressed may present with atypical symptoms.

- **Mild pneumonia:** Patient with pneumonia and no signs of severe pneumonia.
- **Severe pneumonia**: Fever or suspected respiratory infection, plus one of the following: respiratory rate 30 breaths/min, severe respiratory distress, SpO2 90% in room air.
- **Acute respiratory distress syndrome:** New or worsening respiratory symptoms within one week of known clinical insult.

STATISTICAL ANALYSIS

The statistical analysis was done using the SPSS software version 25.0. The continuous variable results were shown by descriptive statistics and the categorical variables by frequency and percentages. Group comparisons were done using the chi-square/fisher test for categorical variables. Mann-Whitney U test was used for continuous variables with non-normal distribution. Multivariate logistic regression analysis was done for analysis of different independent laboratory parameters with respect to dependent outcome variable. The p-value <0.05 was considered as significant.

RESULTS

A total of 413 laboratory confirmed adult COVID-19 patients' data admitted were included. The maximum number of patients belonged to the age group of 51-60 years. The mean age was 46.13 (±15.71) years with age groups ranging from 18 to 84 years. Men were 249 (60.29%); M:F ratio being 1.5:1.

There were 324 (78.45%) symptomatic and 89 (21.55%) asymptomatic patients. Mortality was higher in symptomatic patients and this was clinically significant (p<0.001) [Table/Fig-1].

On presentation, the most common symptom was fever, followed by cough and breathlessness. The other symptoms were sore throat, generalised weakness, diarrhea, vomiting and the least common was headache. Among the symptomatic patients, the mean duration of onset of symptoms to admission was 3.75±2.64 days. History of close contact with a laboratory confirmed COVID-19 case was present in 205 (49.64%) patients. A total 159 (38.50%) patients had co-morbid conditions. Amongst them the most common was diabetes mellitus, followed by hypertension. On admission, the maximum number of patients were admitted in the COVID-19 ward followed by Intensive Care Unit (ICU) and High Dependency Unit (HDU), respectively. The mean duration of hospitalisation for more than 10 days was 13.76±4.82 days and for less than 10 days were 5.62±3.36 days. However, no significant association was found between duration of hospitalisation and the severity of disease. Out of the 413 admitted patients, 360 (87.17%) were discharged and 53 (12.83%) died. Thus, the Case Fatality Rate (CFR) was 12.83%. Majority of the patients were treated symptomatically with a combination of per oral azithromycin (500 mg every 24 hourly for 5 days), oseltamivir (75 mg every 12 hourly for 5 days) followed by hydroxychloroquine (400 mg every 12 hourly on day 1 followed by 200 mg every 12 hourly for next 4 days) [Table/Fig-2].

Using Mann-Whitney U test, significant association between laboratory parameters and poor outcome was obtained [Table/Fig-3]. It was observed that as the age increased, the requirement of ICU also increased. It was seen that abnormal chest radiography findings increased with the increasing age of the patients [Table/Fig-4]. Adjusted odds ratio by multivariate logistic regression showed that increased levels of serum Lactate Dehydrogenase (LDH) and urea were risk factors for mortality [Table/Fig-5].

DISCUSSION

This study is focused on analysing and identifying the demographic, clinical and laboratory parameters of 413 COVID-19 patients admitted in a tertiary care centre.

Characteristics		Outcome				Total (n)	Chi-square value (χ^2)	p-value
		Discharged (n)	(%)	Died (n)	(%)			
Gender	Male	215	86.35	34	13.65	249	0.378	0.538
	Female	145	88.41	19	11.59	164		
Age group (years)	≤30	82	98.80	1	1.20	83	71.16	<0.001**
	31-40	81	97.59	2	2.41	83		
	41-50	76	92.68	6	7.32	82		
	51-60	74	85.06	13	14.94	87		
	>60	47	60.26	31	39.74	78		
Co-morbidities	Present	120	75.47	39	24.53	159	31.61	<0.001**
	Absent	240	94.49	14	5.51	254		
Symptoms	Present	272	83.95	52	16.05	324	13.9	<0.001**
	Absent	88	98.88	1	1.12	89		
History of close contact	Present	185	90.24	20	9.76	205	3.44	0.063
	Absent	175	84.13	33	15.87	208		
Clinical Classification on admission	Uncomplicated Pneumonia	173	100	0	0	173	294.85#	<0.001**
	Mild Pneumonia	76	100	0	0	76		
	Severe Pneumonia	96	97.96	2	2.04	98		
	ARDS	13	27.08	35	72.92	48		
	Septic Shock	2	11.11	16	88.89	18		
Place of admission during hospitalisation	Ward	308	100	0	0	308	278.54#	<0.001**
	ICU	21	28.38	53	71.62	74		
	HDU	31	100	0	0	31		

[Table/Fig-1]: Demographic, co-morbidities, symptoms, clinical classification, place of admission during hospitalisation among patients discharged and died of SARS-CoV-2 pneumonia.
**p-value <0.001 statistically highly significant #Fisher-exact test used *N=413; ARDS: Acute respiratory distress syndrome; ICU: Intensive care unit; HDU: High dependency unit

Characteristics		N	(%)
Types of co-morbidities	Diabetes mellitus	102	24.7
	Hypertension	73	17.68
	Renal disease	32	7.75
	Others	67	16.22
Symptoms	Fever	185	44.79
	Cough	146	35.35
	Breathlessness	134	32.45
	Weakness	45	10.9
	Sore Throat	43	10.41
	Diarrhoea	17	4.12
	Vomiting	13	3.15
	Headache	11	2.66
Treatment	Azithromycin	209	50.61
	Fluvir	207	50.12
	Hydroxychloroquine	57	13.8
Days of hospitalisation	≥10 Days	281	68
	<10 Days	132	31.96
Symptomatic days before hospitalisation	1-17 Days	324	78.45

[Table/Fig-2]: Distribution of various clinical characteristics, treatment received and days of hospitalisation of the COVID-19 patients (N=413).

are parallel to studies where increasing age correlated with the severity of disease. [18-20]. Another study done in United States suggest that 80% of deaths occurred in age group >65 years with 53% requiring ICU admission [21]. These findings are analogous to data from China, where more than 80% deaths occurred in the age group of >60 years [22]. In this study, there was a male predominance which is similar to other national and international studies [3,4,8,9,18-20,23-25]. This could be because of higher exposure in male members of the family in pursuit out of doors. Increased level of angiotensin converting enzyme in males as compared to females can also be another reason [26]. In the present study, symptomatic patients were more than the asymptomatic ones. This finding is unlike the other studies [18,6,20]. As the study hospital is a tertiary care centre, there are more symptomatic and severe diseased patients seeking medical attention than the asymptomatic high-risk contacts. The most common symptoms were fever, cough and breathlessness. The authors found that their study had similar findings to those of others conducted globally [3,4,9,18,20,23-25]. A study by Bhandari S et al. observed higher mortality in symptomatic patients [20]. The mean time between onset of symptoms and hospitalisation was 3.37 days. Similarly, in another study by Fen D et al., the average interval was 3.8 days [27]. In this study, a history of close contact with a positive case was given by 49.64% patients which was similar to the study from Wuhan [24]. Diabetes followed by hypertension were the most

Mann-Whitney U test									
Lab parameters	Outcome	N	Median	p-value	Lab parameters	Outcome	N	Median	p-value
TLC	Discharged	245	5800	<0.001**	HbA1c	Discharged	49	7.5	0.12
	Death	47	12400			Death	17	7.8	
Lymphocyte count	Discharged	192	28	<0.001**	Ferritin	Discharged	102	400.5	<0.001**
	Death	34	7			Death	43	754	
Platelet	Discharged	220	216500	<0.001**	Procalcitonin	Discharged	87	0.13	<0.001**
	Death	45	192000			Death	37	1.08	
CRP	Discharged	226	41	<0.001**	LDH	Discharged	124	712	<0.001**
	Death	45	136			Death	36	1026	
D-dimer	Discharged	126	276.5	<0.001**	ALT	Discharged	91	33	0.69
	Death	39	1156			Death	28	30.5	
Urea	Discharged	106	24.5	<0.001**	AST	Discharged	92	41	0.15
	Death	39	65			Death	27	49	
Creatinine	Discharged	115	0.9	<0.001**	Total Bilirubin	Discharged	82	0.48	0.27
	Death	39	1.18			Death	20	0.68	
BSL	Discharged	39	137	0.09	K	Discharged	101	4	0.21
	Death	19	163			Death	31	4.1	

[Table/Fig-3]: Comparison between laboratory parameters and outcome among COVID-19 patients (N=413).
*TLC: Total leucocyte count; L%: Lymphocyte count; CRP: C-reactive protein; LDH: Lactate dehydrogenase; K: Potassium; **BSL: Blood sugar level; AST: Aspartate transaminase; ALT: Alanine transaminase
**p-value <0.001 statistically highly significant

Age group (in years)		≤30	31-40	41-50	51-60	>60	Chi-square value	p-value
Place of admission during hospitalisation	Ward	79	70	66	56	37	72.86	<0.001**
	ICU	3	5	10	21	35		
	HDU	1	8	6	10	6		
Chest X-ray	Normal	61	45	34	20	15	68.21	<0.001**
	Abnormal	22	38	48	67	63		

[Table/Fig-4]: Place of admission during hospitalisation, Chest X-Ray (CXR) findings during hospitalisation among different age groups.
**p-value <0.001 statistically highly significant

Higher age (>60 years) had a strong positive correlation with mortality in the present study. Also, the requirement of ICU increased with increasing age. Patients with severe disease most of the time required ICU care at our centre. These findings

Variable	Adjusted OR (95%CI)	p-value
CRP	0.99 (0.99-1.00)	0.163
D dimer	1.00 (1.00-1.00)	0.192
Ferritin	1.00 (1.00-1.00)	0.283
Procalcitonin	0.96 (0.88-1.04)	0.287
Serum LDH	1.01 (1.00-1.01)	0.028*
Urea	1.10 (1.02-1.17)	0.011*
Creatinine	1.29 (0.19-8.60)	0.790
TLC	1.00 (1.00-1.00)	0.154
Co-morbidities	0.21 (0.01-3.96)	0.300

[Table/Fig-5]: Risk factors for mortality in COVID-19 patients using multivariate logistic regression.
*p-value <0.05 statistically significant; (Outcome variable is binary - death, survival Adjusted Odds Ratio (OR) derived for death, with reference to the survival); CRP: C-reactive protein; TLC: Total leucocyte count

common co-morbid conditions at our centre. The observations were supported by other studies [9,6,23,26]. Maximum patients in the present study with a poor outcome had the presence of one or more co-morbidities. The findings by Rivera-Izquierdo M et al., from Spain also had the maximum number of patients with co-morbidities and a higher mortality. Their study consisted of most of the patients above the age of 65 years. This study also had the maximum number of patients in the age group of 51-60 years [18]. Present findings are also similar to another Indian study from Jaipur [20]. However, other studies from North India do not share the same findings. This could be due to their smaller sample size [3,26].

Highest percentage of abnormal chest X-ray findings were seen in the age group of more than 60 years (80.77%) followed by 51-60 years (77.01%). Another similar study done on 783 Italian patients suggests that males more than 50 and females more than 80 years showed the highest chest X-ray score [19].

Two independent variables that affected the mortality rate were found using multivariate logistic regression. These were higher levels of serum LDH and urea. LDH is secreted into the extracellular space when the cell membrane is damaged, suggesting viral infection or lung injury, like COVID-19 pneumonia [28]. Ma X et al. indicated LDH and CRP as predictive factors for mortality [29].

The CFR at the study centre is 12.83%. The study from Spain had also reported higher mortality. This could be due to the maximum number of elderly populations in their country [18]. The CFR at our centre is lesser than the study done by Tambe MP et al. in Pune itself [8]. This could be because their hospital had more patients admitted with severe disease. In another study from Pune, the CFR was lesser compared to to the present study. This is probably because they had maximum admitted patients with mild disease and younger age groups [30].

Limitation(s)

The serial monitoring of laboratory investigations could not be captured. The specific chest radiograph findings could not be documented and analysed.

CONCLUSION(S)

The study data on the local population from the state of Maharashtra shows that maximum COVID-19 positive patients, requiring ICU admission on hospitalisation were 60 years and above. Further, the highest mortality was seen in patients more than 60-year-old. Along with the above findings, the presence of co-morbidities on admission contributed to progression of the disease. Hence, the authors suggest that patients more than 60-year-old are predisposed to severe disease and should be carefully monitored. This is the specific group of patients should be prioritised for urgent medical attention in resource limited settings. Increased values of serum LDH and urea are the independent predictors for mortality rate. Hence, these investigations should be focused on during the treatment of patients with severe disease. This data will be helpful in near future in case of a second wave due to the recent relaxation of norms.

Acknowledgement

The authors would like to thank the Institute's Medical Director Dr. Sanjay Lalwani and Deputy Medical Director Dr. Jitendra S Oswal, for allowing us to access the medical records.

REFERENCES

[1] WHO. WHO Coronavirus Disease (COVID-19) Dashboard. Situation by country, territory or area. Available at https://covid19.who.int/. Accessed on 29th December 2020.
[2] "Covid-19: Cases Soar to 33,053 in Maharashtra, Nearly One-Third of National Total." Hindustan Times, 18 May 2020, www.hindustantimes.com/india-news/covid-19-state-tally-cases-soar-to-33-053-in-maharashtra-nearly-one-third-of-national-total/story-kPYzhFYmabDYxmwSxSwoDK.html.
[3] Gupta N, Agrawal S, Ish P, Mishra S, Gaind R, Usha G, et al. Safdarjung Hospital COVID 2019 working group. Clinical and epidemiologic profile of the initial COVID-19 patients at a tertiary care centre in India. Monaldi Archives for Chest Disease. 2020;90(1). PMID: 32290644.
[4] Kumar S, Rathore P, Choudhary N, Singh N, Thankachan A, Kumar B, et al. Assessment of the prevalence of symptoms in patients under institutional isolation in COVID-19 pandemic in India. Indian Journal of Palliative Care. 2020;26(Suppl 1):S86.
[5] World Health Organization. Clinical management of severe acute respiratory infection (SARI) when COVID-19 disease is suspected: Interim guidance, 13 March 2020. World Health Organization; 2020. https://doi.org/10.15557/pimr.2020.0003. Accessed on 29th December 2020.
[6] Laxminarayan R, Wahl B, Dudala SR, Gopal K, Neelima S, Reddy KJ, et al. Epidemiology and transmission dynamics of COVID-19 in two Indian states. Science. 2020;370(6517):691-97.
[7] Pal R, Yadav U. COVID-19 pandemic in India: Present scenario and a steep climb ahead. Journal of Primary Care & Community Health. 2020;11:2150132720939402
[8] Tambe MP, Parande MA, Tapare VS, Borle PS, Lakde RN, Shelke SC. An epidemiological study of laboratory confirmed COVID-19 cases admitted in a tertiary care hospital of Pune, Maharashtra. Indian Journal of Public Health. 2020;64(6):183.
[9] Huang C, Wang Y, Li X, Ren L, Zhao J, Hu Y, et al. Clinical features of patients infected with 2019 novel coronavirus in Wuhan, China. Lancet. 2020;395(10223):497-506.
[10] COVID-19 National Emergency Response Center E, Case Management Team KCfDC, Prevention. Coronavirus disease-19: The first 7,755 cases in the Republic of Korea. Osong Public Health Res Perspect. 2020;11(2):85-90.
[11] Grasselli G, Pesenti A, Cecconi M. Critical care utilization for the COVID-19 outbreak in Lombardy, Italy: Early experience and forecast during an emergency response. JAMA. 2020;323(16):1545-46.
[12] Young BE, Ong SWX, Kalimuddin S, Low JG, Tan SY, Loh J, et al. Epidemiologic features and clinical course of patients infected with SARS-CoV-2 in Singapore. JAMA. 2020;323(15):1488-94.
[13] Ministry of Health & Family Welfare, Government of India. State Data. Available on https://www.mohfw.gov.in/. Accessed on 29th December 2020.
[14] Government of Maharashtra, Public Health Department. Report of COVID-19 cases. Date: 4 May 2020. Available at https://www.mgims.ac.in/files/covid/meddrep/MEDD REPORT 04-05-2020 (1).pdf. Accessed on 29th December, 2020.
[15] Gandhi A, Kathirvel S. Epidemiological studies on COVID-19 pandemic in India: Too little and too late? Med J Armed Forces India. 2020;76(3):364-65.
[16] Global research and innovation forum: Towards a research roadmap. https://www.who.int/blueprint/priority-diseases/key-action/Overview_of_SoA_and_outline_key_knowledge_gaps.pdf?ua=1. Accessed on 29th December 2020.
[17] Guidelines on Clinical Management of COVID-19. Available from: https://www.mohfw.gov.in/pdf/GuidelinesonClinicalManagementofCOVID1912020.pdf. Accessed on 29th December 2020.
[18] Rivera-Izquierdo M, del Carmen Valero-Ubierna M, R-delAmo JL, Fernández-García MÁ, Martínez-Diz S, Tahery-Mahmoud A, et al. Sociodemographic, clinical and laboratory factors on admission associated with COVID-19 mortality in hospitalized patients: A retrospective observational study. PloS one. 2020;15(6):e0235107.
[19] Borghesi A, Zigliani A, Masciullo R, Golemi S, Maculotti P, Farina D, et al. Radiographic severity index in COVID-19 pneumonia: Relationship to age and sex in 783 Italian patients. La Radiologia Medica. 2020:110.21203/rs.3.rs-19498/v2.
[20] Bhandari S, Singh A, Sharma R, Rankawat G, Banerjee S, Gupta V, et al. Characteristics, treatment outcomes and role of hydroxychloroquine among 522 COVID-19 hospitalized patients in Jaipur city: An epidemio-clinical study. J Assoc Physicians India. 2020;68(6):13-19.
[21] Covid CD, Team R. Severe outcomes among patients with coronavirus disease 2019 (COVID-19)-United States, February 12-March 16, 2020. MMWR Morb Mortal Wkly Rep. 2020;69(12):343-46.
[22] Surveillances V. The epidemiological characteristics of an outbreak of 2019 novel coronavirus diseases (COVID-19)-China, 2020. China CDC Weekly. 2020;2(8):113-22.
[23] Hasan MJ, Chowdhury SM, Khan MA, Rahaman M, Fardous J, Adit T, et al. Clinico-epidemiological characteristics of asymptomatic and symptomatic COVID-19-positive patients in Bangladesh. medRxiv. 2020 Jan 1.
[24] Chen N, Zhou M, Dong X, Qu J, Gong F, Han Y, et al. Epidemiological and clinical characteristics of 99 cases of 2019 novel coronavirus pneumonia in Wuhan, China: a descriptive study. The Lancet. 2020;395(10223):507-13.
[25] Guan WJ, Ni ZY, Hu Y, Liang WH, Ou CQ, He JX, et al. Clinical characteristics of coronavirus disease 2019 in China. New England Journal of Medicine. 2020;382(18):1708-20.
[26] Aggarwal A, Shrivastava A, Kumar A, Ali A. Clinical and epidemiological features of SARS-CoV-2 patients in SARI ward of a tertiary care centre in New Delhi. Journal of The Association of Physicians of India. 2020;68(7):19-26.
[27] Feng D, Jia N, Fang LQ, Richardus JH, Han XN, Cao WC, et al. Duration of symptom onset to hospital admission and admission to discharge or death in SARS in mainland China: A descriptive study. Tropical Medicine & International Health. 2009;14(Suppl 1):28-35.

[28] Mo P, Xing Y, Xiao Y, Deng L, Zhao Q, Wang H, et al. Clinical characteristics of refractory COVID-19 pneumonia in Wuhan, China. Clinical Infectious Diseases. 2020 Mar 16: ciaa270. PMID: 32173725.
[29] Ma X, Ng M, Xu S, Xu Z, Qiu H, Liu Y, et al. Development and validation of prognosis model of mortality risk in patients with COVID-19. Epidemiol Infect. 2020;148:e168. PMID: 32746957.
[30] Shukla UB, Shukla SR, Palve SB, Yeravdekar R, Natarajan V, Tiwari P, et al. Characteristics of COVID-19 patients admitted to a tertiary care hospital in Pune, India, and cost-effective predictors of intensive care treatment requirement. medRxiv. 2020 Jan 1.

PARTICULARS OF CONTRIBUTORS:
1. Intern, Department of Medicine, Bharati Vidyapeeth (Deemed to be) University and Medical College, Dhankawdi, Pune, Maharashtra, India.
2. Associate Professor, Department of Community Medicine, Bharati Vidyapeeth (Deemed to be) University and Medical College, Dhankawdi, Pune Maharashtra, India.
3. Assistant Professor, Department of Medicine, Bharati Vidyapeeth (Deemed to be) University and Medical College, Dhankawdi, Pune, Maharashtra, India.
4. Statistician, Department of Community Medicine, Bharati Vidyapeeth (Deemed to be) University and Medical College, Dhankawdi, Pune, Maharashtra, India.

NAME, ADDRESS, E-MAIL ID OF THE CORRESPONDING AUTHOR:
Purwa Doke,
Assistant Professor, Department of Medicine, Bharati Vidyapeeth (Deemed to be) University and Medical College, Dhankawdi, Pune-411043, Maharashtra, India.
E-mail: purwadoke@gmail.com

PLAGIARISM CHECKING METHODS: [Jain H et al.]
- Plagiarism X-checker: Nov 09, 2020
- Manual Googling: Feb 24, 2021
- iThenticate Software: Mar 30, 2021 (16%)

ETYMOLOGY: Author Origin

AUTHOR DECLARATION:
- Financial or Other Competing Interests: None
- Was Ethics Committee Approval obtained for this study? Yes
- Was informed consent obtained from the subjects involved in the study? NA
- For any images presented appropriate consent has been obtained from the subjects. NA

Date of Submission: **Nov 08, 2020**
Date of Peer Review: **Dec 08, 2020**
Date of Acceptance: **Mar 12, 2021**
Date of Publishing: **Apr 01, 2021**