

Role of vital parameters and biomarkers in predicting the outcome of patients in Covid ICU: A comparative study

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ABSTRACT

Aim: The aim of the present study to compare the vital parameters and biomarkers in predicting the outcome of patients in Covid ICU.

Methods: 200 patient were divided in to two groups, Group A of those who expired and Group B of the survivors. The mean for each parameter was calculated and compared among the two groups and based on which p value was calculated for each parameter undertaken in clinical evaluation. Blood reports of investigations assessing the levels of biomarkers like Procalcitonin (PCT), C- Reactive Protein (CRP), D-dimer, Ferritin, Lactate dehydrogenase (LDH) and Interleukin-6 (IL-6) sent on first day and last day of hospitalisation in covid ICU were collected for Group A (Expired) and Group B (Survived) and master chart was prepared.

Results: The study population comprised of 200 confirmed Covid-19 cases, among which those expired (Group A) were 103, and those who survived (Group B) were 97. The mean age difference was statistically significant (p value = 0.003). The mean Heart Rate on day of admission was statistically significant (p value = 0.005). The mean Heart Rate on last day of hospitalisation difference was statistically significant (p value = 0.001). The Median PCT levels along with its interquartile range in Group A (Expired) versus Group B (Survivors) on day of admission the difference was statistically significant (p value < 0.001). The Median Ferritin levels along with its interquartile range in Group A (Expired) versus Group B (Survivors) on day of admission the difference was statistically significant (p value < 0.0003). The Median Ferritin levels along with its interquartile range in Group A (Expired) versus Group B (Survivors) on last day of hospitalisation the difference was statistically significant (p value < 0.001).

Conclusion We concluded that the comparison of the two arms of study, clinical parameters such as Heart Rate, Systolic Blood Pressure, Respiratory Rate and Oxygen Saturation on the day of admission had significant difference among those who expired (Group A) versus the Survivors (Group B), further the raised levels in Expired group corresponded with the severity, poor outcome and higher mortality in critically ill patients in ICU. In addition to clinical parameters, the raised levels of biomarkers such as PCT, CRP, D-dimer Ferritin, LDH and IL-6 in the expired patients in comparison to the survivors on the day of admission and subsequently compared with those of the last day of

hospitalisation are reliable indicator of progression towards severity, poor prognosis and outcome.

Keywords: COVID, pandemic, intensive care unit.

INTRODUCTION

COVID-19 was declared as a global pandemic by WHO on 11 March 2020.¹ It has now spread to over 200 countries and territories worldwide. With the cumulative cases in the world approaching 22million and cumulative deaths touching 796281 (as of 20 August 2020), it has become a catastrophic public health crisis.² The USA has surpassed all countries in the number of COVID-19 positive cases and now stands at over 5.5million cases with more than 172416 deaths as of 20 August 2020.³ Other countries with high case rates and disease burden are Brazil (3 407 354), India (2 836 925), Russia (942 106), South Africa (596 060) and Peru (549 321).⁴ This outbreak has been a challenge for clinicians and researchers alike. COVID-19 infection has a variable clinical presentation from asymptomatic to milder symptoms, including fever, dry cough, dyspnoea, myalgia, sore throat and headache, to more severe and emergent manifestation including confusion, chest pain, hypoxemia, pneumonia and other complications requiring intensive care unit (ICU) admission and mechanical ventilation.⁵⁻⁷ Diarrhoea, anosmia and ageusia have also been reported in a few studies, as well as neurologic manifestations.⁸ Researchers all over the globe have been searching for predictors of COVID-19 disease severity to identify and stratify them accordingly, in an effort to guide medical management. Insights into disease pathogenesis and methods to rapidly discern and assess COVID-19 infection are evolving. Laboratory biomarkers are less expensive, faster and easier to obtain. As such, they have been the preferred modality to monitor and predict outcomes and prognosis of disease.⁹ Understanding the variation and profile of specific biomarkers as a function of different COVID-19 outcomes would aid in the development of a risk stratified approach to the care of patients with this illness. With the surge in COVID-19 cases across the globe due to its highly contagious nature, there have been numerous studies that have reported on the predictors of disease severity in COVID-19 patients. Studies have shown that severe or fatal cases of COVID-19 disease are associated with an elevated white cell count, blood urea nitrogen, creatinine, markers of liver and kidney function, C reactive protein (CRP), interleukin-6 (IL-6), lower lymphocyte (<1000/ μ L) and platelet counts (<100x10⁹ /L) as well as albumin levels compared with milder cases in which survival is the outcome.¹⁰ These studies offered an initial understanding of the impact of SARS-CoV-2 infection, but the findings cannot be generalised due to limitations of geographical locations, single centre experience and small cohorts.

MATERIAL AND METHODS

The study was conducted after taking the approval of the protocol review committee and institutional ethics committee. Among 200 confirmed COVID-19 patients admitted in Covid-ICU in our hospital. In our study, patient population were divided in to two groups, Group A of those who expired and Group B of the survivors. Based on review of case files data, basic demographic data like Age, Sex, and the vital parameters such as Heart Rate (HR), Systolic BP (SBP), Diastolic BP (DBP), Respiratory Rate (RR), Oxygen Saturation (SpO₂) on the day of admission and last day of hospitalisation were collected for patients in Group A (Expired) and Group B (Survived). The mean for each parameter was calculated and compared among the two groups and based on which p value was calculated for each parameter undertaken in clinical evaluation. Blood reports of investigations assessing the levels of biomarkers like Procalcitonin (PCT), C- Reactive Protein (CRP), D-dimer, Ferritin, Lactate dehydrogenase (LDH) and Interleukin-6 (IL-6) sent on first day and last day of hospitalisation in covid ICU were collected for Group A (Expired) and Group B (Survived) and master chart was

prepared. Further mean value for each inflammatory marker was calculated and compared among both groups. Finally p value was calculated using statistical analysis among both arms for each inflammatory marker and their significance analysed.

RESULTS

The study population comprised of 200 confirmed Covid-19 cases, among which those expired (Group A) were 103, and those who survived (Group B) were 97. The mean Age of expired patients was 63.16 ± 11.79 yrs, and that of survivors was 56.99 ± 12.15 yrs and the difference was statistically significant (p value = 0.003).

Among those expired in Group A, Males were 80 (77.67) and females were 23 (22.33), with male: female ratio of 3.48:1, whereas among those survived in Group B, Males were 80 (82.47) and females were 17(17.53), with male: female ratio of 4.7:1.

Further the mean duration of hospitalisation among those expired was 9.25 ± 4.74 days whereas among those survived was 13.11 ± 5.32 days, and the difference was statistically significant (p value < 0.001).

The mean Heart Rate on day of admission was 98.98 ± 19.68 bpm among those expired and 90.88 ± 14.69 bpm in those survived, and the difference was statistically significant (p value = 0.005). The mean Heart Rate on last day of hospitalisation was 107.11 ± 29.29 bpm among those expired and 86.12 ± 14.18 bpm in those survived, and the difference was statistically significant (p value = 0.001).

The mean Systolic BP on day of admission was 132.78 ± 19.88 mm Hg among those expired and 131.03 ± 19.36 mm Hg in those survived, and the difference was not statistically significant (p value = 0.71). The mean Systolic BP on last day of hospitalisation was 101.03 ± 22.23 mm Hg among those expired and 130.03 ± 11.76 mm Hg in those survived, and the difference was statistically significant (p value < 0.001).

The mean Diastolic BP on day of admission was 79.42 ± 12.65 mm Hg among those expired and 80.30 ± 10.16 mm Hg in those survived, and the difference was not statistically significant (p value < 0.72). The mean Diastolic BP on last day of hospitalisation was 60.33 ± 12.98 mm Hg among those expired and 77.66 ± 10.69 mm Hg in those survived, and the difference was statistically significant (p value < 0.001).

The mean Respiratory Rate on day of admission was 31.02 ± 6.88 breaths per min among those expired and 27.16 ± 8.77 breaths per min in those survived, and the difference was statistically significant (p value < 0.0007). The mean Respiratory Rate on last day of hospitalisation was 23.93 ± 4.75 breaths per min among those expired and 20.97 ± 2.93 breaths per min in those survived, and the difference was statistically significant (p value < 0.001).

The Median SpO₂ levels along with its interquartile range in Group A (Expired) versus Group B (Survivors) on day of admission was 83% (IQR: 75 - 85) and 89% (IQR: 85 - 94), and the difference was statistically significant (p value < 0.001). The Median SpO₂ levels along with its interquartile range in Group A (Expired) versus Group B (Survivors) on last day of hospitalisation was 87 % (IQR: 79 - 94) and 98 % (IQR: 96 - 99), and the difference was statistically significant (p value < 0.0001).

The Median PCT levels along with along with its interquartile range in Group A (Expired) versus Group B (Survivors) on day of admission was 0.77 ng/ml (IQR: 0.25 - 2.0) and 0.21 ng/ml (IQR : 0.11 - 0.30), the difference was statistically significant (p value < 0.001). The Median PCT levels along with along with its interquartile range in Group A (Expired) versus Group B (Survivors) on last day of hospitalisation was 1.8 ng/ml (IQR: 0.51 - 7.2) and 0.11 ng/ml (IQR : 0.11 - 0.3), the difference was statistically significant (p value < 0.001).

The Median D-dimer levels along with its interquartile range in Group A (Expired) versus Group B (Survivors) on day of admission was 2458 mcg/L (IQR : 1220 - 8174) and 1177

mcg/L (IQR : 730 - 652), and the difference was statistically significant (p value < 0.001). The Median D- dimer levels along with its interquartile range in Group A (Expired) versus Group B (Survivors) on last day of admission was 4255 mcg/L (IQR : 1965 - 9512) and 832 mcg/L (IQR : 522 - 1554), and the difference was statistically significant (p value < 0.001).

The Median Ferritin levels along with its interquartile range in Group A (Expired) versus Group B (Survivors) on day of admission was 715 ng/ml (IQR: 384.8 - 1253) and 435 ng/ml (IQR: 182 - 803.9), and the difference was statistically significant (p value < 0.0003). The Median Ferritin levels along with its interquartile range in Group A (Expired) versus Group B (Survivors) on last day of hospitalisation was 894 ng/ml (IQR: 435 - 1315.9) and 394 ng/ml (IQR: 182 - 581), and the difference was statistically significant (p value < 0.001).

The Mean LDH levels on day of admission was 645.2 ± 321.81 IU/L among those who expired and 451.21 ± 188.73 IU/L among those survived, and the difference was statistically significant (p value < 0.001). The median LDH levels along with its interquartile range in Group A (Expired) versus Group B (Survivors) on last day of hospitalisation was 619 IU/L (IQR : 419 - 810) and 341 IU/L (IQR : 257 - 516), and the difference was statistically significant (p value < 0.001).

Table 1: Demographics Profile of the patients

Parameter	Group A Expired (n = 103)	Group B Survived (n = 97)	P value
Mean age	63.16 ± 11.79	56.99 ± 12.15	0.003
Male	80 (77.67)	80 (82.47)	0.79
Female	23 (22.33)	17(17.53)	0.68
Mean duration of stay	9.25 ± 4.74	13.11 ± 5.32	<0.001

Table 2: Parameters of the patients

Parameter	Group A Expired (n = 103)	Group B Survived (n = 97)	P value
Mean Heart Rate on first day	98.98 ± 19.68	90.88 ± 14.69	0.005
Mean Heart Rate on Last day	107.11 ± 29.29	86.12 ± 14.18	<0.001
Mean Systolic BP on first day	132.78 ± 19.88	131.03 ± 19.36	0.71
Mean Systolic BP on Last day	101.03 ± 22.23	130.03 ± 11.76	<0.001
Mean Diastolic BP on first day	79.42 ± 12.65	80.30 ± 10.16	0.72
Mean Diastolic BP on Last day	60.33 ± 12.98	77.66 ± 10.69	<0.001
Mean RR on first day	31.02 ± 6.88	27.16 ± 8.77	0.0007
Mean RR on Last day	23.93 ± 4.75	20.97 ± 2.93	<0.001
Median Spo2 on first day	83 (75,87)	89 (85, 94)	<0.001
Median Spo2 on last day	87 (79,94)	98 (96, 99)	<0.0001

Table 3: Biomarkers

Parameter	Group A Expired (n = 97)	Group B Survived (n = 89)	P value
Mean PCT on first day	0.77 (0.25,2)	0.21 (0.13,0.39)	<0.001
Mean PCT on last day	1.8 (0.51,7.2)	0.11 (0.11,0.3)	<0.001
Mean CRP on first day	17.87 ± 12.12	1278 ± 10.67	0.01

Mean CRP on last day	18.98 ± 13.12	6.87 ± 9.36	<0.001
Median D-Dimer on first day	2458 (1220,8174)	1177 (730,652)	<0.001
Median D-Dimer on last day	4255(1965,9512)	832 (522,1554)	<0.001
Median Ferritin on first day	715 (384.8,1253)	435 (182,803.9)	0.0003
Median Ferritin on last day	894 (435,1315.9)	394 (182,581)	<0.001
Mean LDH on first day	6452 ± 321.81	451.21 ± 188.73	<0.001
Median LDH on last day	619(419,810)	341 (257,516)	<0.001
Median IL-6 on first day	64.86 (30.13,170)	31 (15.87,62)	<0.001
Median IL-6 on last day	110.9 (40.2, 455.11)	18.87 (8, 52)	<0.001

DISCUSSION

The study population comprised of 200 confirmed Covid-19 cases, among which those expired (Group A) were 103, and those who survived (Group B) were 97. The mean Age of expired patients was 63.16 ± 11.79 yrs, and that of survivors was 56.99 ± 12.15 yrs and the difference was statistically significant (p value = 0.003). This showed that the elderly population (> 60 yrs age) had higher susceptibility and mortality to covid-19 infection. This finding was similar to that of the study conducted by Kayina CA *et al.*¹¹ in 2020 among 235 adult patients, where mean age of patients was 50.7 ± 15.1 yrs. Also it was similar to that of the study conducted by Chen N *et al.*¹² in 2020 among 99 patients, where the mean age was 55.5 years (SD 13.1).

Among those expired in Group A, Males were 80 (77.67) and females were 23 (22.33), with male: female ratio of 3.48:1, whereas among those survived in Group B, Males were 80 (82.47) and females were 17(17.53), with male: female ratio of 4.7:1. In both groups, Males were predominantly involved. This finding was similar to that of the study conducted by Kayina CA *et al.*¹¹ in 2020 among 235 adult patients, where 160 of 235 patients (68.1 %) per cent were males and 75 of 235 (31.9%) were females. Also it was similar to that of the study conducted by Chen N *et al.*¹² in 2020 among 99 patients, where they found that 67 of 99 patients (67.6%) were males and 32 of 99 patients (32.4%) were females.

Further the mean duration of hospitalisation among those expired was 9.25 ± 4.74 days whereas among those survived was 13.11 ± 5.32 days, and the difference was statistically significant (p value < 0.001). This finding was similar to that of study conducted by Serafim RB *et al.*¹³ in 2020 among 69093 patient admitted in ICU where they found that the median ICU length of stay was 9 days (95%CI 6.5-11.2 days). Also these findings were similar to that of the study conducted by Larsson E *et al.*¹⁴ in 2021 among 198 patients admitted in ICU, where the mean duration of stay was 12 days (IQR, 6-18 days)

The mean Heart Rate on day of admission was 98.98 ± 19.68 bpm among those expired and 90.88 ± 14.69 bpm in those survived, and the difference was statistically significant (p value = 0.005). The mean Heart Rate on last day of hospitalisation was 107.11 ± 29.29 bpm among those expired and 86.12 ± 14.18 bpm in those survived, and the difference was statistically significant (p value = 0.001). The results were similar to that of study conducted by ChenQ *et al.*¹⁵ in 2020 among 39 severe and 15 critically ill patients in ICU, where they found that sinus tachycardia was seen in 23 out of 39 (59.0%) severe patients and 15 out of 15 (100%) critically ill patients. These findings were also similar to that of the study conducted by Ceconi M *et al.*¹⁶ in 2020 among 238 patients, where the mean Heart Rate was 82 ± 14 bpm. The mean Systolic BP on day of admission was 132.78 ± 19.88 mm Hg among those expired and 131.03 ± 19.36 mm Hg in those survived, and the difference was not statistically significant (p value = 0.71). The mean Systolic BP on last day of hospitalisation was 101.03

± 22.23 mm Hg among those expired and 130.03 ± 11.76 mm Hg in those survived, and the difference was statistically significant (p value < 0.001).

The mean Diastolic BP on day of admission was 79.42 ± 12.65 mm Hg among those expired and 80.30 ± 10.16 mm Hg in those survived, and the difference was not statistically significant (p value < 0.72). The mean Diastolic BP on last day of hospitalisation was 60.33 ± 12.98 mm Hg among those expired and 77.66 ± 10.69 mm Hg in those survived, and the difference was statistically significant (p value < 0.001). These findings were similar to that of the study conducted by Ran J *et al.*¹⁷ in 2020 among 803 patients where they found that the mean SBP and DBP on admission were 137.0 mmHg (± 19.7) and 84.2 mmHg (± 12.8), respectively. Also these results were similar to that of the study conducted by Chen T *et al.*¹⁸ in 2020 among 274 patients, where they found that the median systolic blood pressure was significantly higher in 113 deceased patients 137 mm Hg (IQR : 122.0 - 147.0) than 161 recovered patients 125 mm Hg (IQR : 115.5 - 136.0). However this finding was contradictory to that of study conducted by E. Christiaan Boerma *et al.*¹⁹ in 2021 among 28 mechanically ventilated covid-19 patients where they found that the mean arterial pressure increased from 77 ± 10 mmHg on day 1 to 84 ± 9 mmHg on day 21 ($p = 0.04$), in combination with the rapid tapering and cessation of norepinephrine and the gradual use of antihypertensive drugs in the vast majority of patients

The mean Respiratory Rate on day of admission was 31.02 ± 6.88 breaths per min among those expired and 27.16 ± 8.77 breaths per min in those survived, and the difference was statistically significant (p value < 0.0007). The mean Respiratory Rate on last day of hospitalisation was 23.93 ± 4.75 breaths per min among those expired and 20.97 ± 2.93 breaths per min in those survived, and the difference was statistically significant (p value < 0.001). These results suggested that higher respiratory rate at presentation was associated with higher mortality. This finding was similar to that of the study conducted by Bahl A *et al.*²⁰ among 1461 patient where the median admission respiratory rate was 21.0 (IQR 19.0 - 24.0) for survivors and 24.0 (IQR 21.0 - 28.0) for non-survivors, respectively ($p < 0.001$)

The Median SpO₂ levels along with its interquartile range in Group A (Expired) versus Group B (Survivors) on day of admission was 83% (IQR: 75 - 85) and 89% (IQR: 85 - 94), and the difference was statistically significant (p value < 0.001). The Median SpO₂ levels along with its interquartile range in Group A (Expired) versus Group B (Survivors) on last day of hospitalisation was 87 % (IQR: 79 - 94) and 98 % (IQR: 96 - 99), and the difference was statistically significant (p value < 0.0001). This finding was similar to that of study conducted by Ferrando C *et al.*²¹ in 2020 among 663 patient admitted in ICU where they found that non-survivors were more hypoxemic with, median SpO₂ of 90 % (IQR 83-93) in comparison to survivors with median SpO₂ of 91% (IQR 87-94); ($p < 0.001$)

The Median PCT levels along with its interquartile range in Group A (Expired) versus Group B (Survivors) on day of admission was 0.77 ng/ml (IQR: 0.25 - 2.0) and 0.21 ng/ml (IQR : 0.11 - 0.30), the difference was statistically significant (p value < 0.001). The Median PCT levels along with its interquartile range in Group A (Expired) versus Group B (Survivors) on last day of hospitalisation was 1.8 ng/ml (IQR: 0.51 - 7.2) and 0.11 ng/ml (IQR : 0.11 - 0.3), the difference was statistically significant (p value < 0.001). This finding was similar to that of study conducted by Hu R *et al.*²² in 2020 among 95 Covid patients, where they found that the mean serum procalcitonin (PCT) levels were over four times higher in severe patients than in moderate patients and were over eight times higher in critical patients than in moderate patients. For discharged patients, both high-normal PCT levels and abnormal PCT levels decreased during recovery. However, in death cases, serum levels of PCT increased as the disease worsened. The Mean CRP levels on day of admission was 17.87 ± 12.12 mg/dl among those who expired and 12.78 ± 10.67 mg/dl among those survived, but the difference was not statistically significant (p value < 0.01). The mean CRP

levels on last day of admission was 18.98 ± 13.12 mg/dl among those who expired and 6.87 ± 9.36 mg/dl among those survived, further the difference was statistically significant (p value < 0.001). The results were similar to that of studies conducted by Sharifpour M *et al.*²³ in 2020 where they found that the median CRP was significantly higher amongst the patients who died, compared to those who survived [206 mg/L (IQR: 157–288 mg/L) vs 114 mg/L (IQR : 72–160 mg/L), $p < 0.001$].

The Median D-dimer levels along with its interquartile range in Group A (Expired) versus Group B (Survivors) on day of admission was 2458 mcg/L (IQR : 1220 - 8174) and 1177 mcg/L (IQR : 730 - 652), and the difference was statistically significant (p value < 0.001). The Median D- dimer levels along with its interquartile range in Group A (Expired) versus Group B (Survivors) on last day of admission was 4255 mcg/L (IQR : 1965 - 9512) and 832 mcg/L (IQR : 522 - 1554), and the difference was statistically significant (p value < 0.001). These results were similar to that of the study conducted Zhang L *et al.*²⁴ in 2020 among 334 patients. Out of these 67 patients had D- dimer ≥ 2000 mcg/L, and 267 patients with D-dimer <2000 mcg/L on admission. During hospitalisation 13 deaths occurred. On analysis patients with D-dimer levels ≥ 2000 mcg/L had a higher incidence of mortality when comparing with those who with D-dimer levels <2000 mcg/L (12/67 vs 1/267, $P < 0.001$).

The Median Ferritin levels along with its interquartile range in Group A (Expired) versus Group B (Survivors) on day of admission was 715 ng/ml (IQR: 384.8 - 1253) and 435 ng/ml (IQR: 182 - 803.9), and the difference was statistically significant (p value < 0.0003). The Median Ferritin levels along with its interquartile range in Group A (Expired) versus Group B (Survivors) on last day of hospitalisation was 894 ng/ml (IQR: 435 - 1315.9) and 394 ng/ml (IQR: 182 - 581), and the difference was statistically significant (p value < 0.001). These findings were similar to those of the meta-analysis study conducted by Cheng L *et al.*²⁵ in 2020 among 10614 patients where they found that the ferritin level was significantly increased in severe patients compared with the level in non- severe patients [Mean difference 397.77 (95% CI 306.51- 489.02), $P < .001$]. Non- survivors had a significantly higher ferritin level compared with the one in survivors [Mean 677.17 (95% CI 391.01- 963.33), $P < .001$]. Also in study conducted by Dahan S *et al.*²⁶ in 2021 among 39 patients it was found that severe patients had significantly higher levels of ferritin (2817.6 ng/ml) than non-severe patients (708.6 ng/ml) (p = 0.02).

The Mean LDH levels on day of admission was 645.2 ± 321.81 IU/L among those who expired and 451.21 ± 188.73 IU/L among those survived, and the difference was statistically significant (p value < 0.001). The median LDH levels along with its interquartile range in Group A (Expired) versus Group B (Survivors) on last day of hospitalisation was 619 IU/L (IQR : 419 - 810) and 341 IU/L (IQR : 257 - 516), and the difference was statistically significant (p value < 0.001). These findings were similar to that of the study conducted by Dong X *et al.*²⁷ among 119 patients where they found that the mean LDH among 54 patient who expired was significantly higher (559.5 IU/L) (IQR : 172 - 7575) than 65 patients who survived (228 IU/L) (IQR : 117 - 490). Also in study conducted by J. HariKishan *et al.*²⁸ in 2020 among 108 patients, they found that there was a significant association between outcome and serum LDH levels. Among subjects with normal LDH levels (140 to 280 U/L), 21.1% required O₂ and 5.3% were intubated, further among subjects with increased LDH levels (>280 U/L), 47.7% required O₂, 27.3% required NIV and 4.5% were intubated. The Median IL-6 levels along with its interquartile range in Group A (Expired) versus Group B (Survivors) on day of admission was 65.86 pg/ml (IQR: 31.13 - 180) and 32 pg/ml (IQR: 15.55 – 61.0), and the difference was statistically significant (p value < 0.001). The median IL-6 levels along with its interquartile range in Group A (Expired) versus Group B (Survivors) on last day of hospitalisation was 110.9 pg/ml (IQR: 40.2 - 455.11) and 18.87 pg/ml (IQR: 8.0 – 52.0), and the difference was statistically significant (p value < 0.001).

These findings are similar to the results of comparative study conducted by Guirao JJ *et al.*²⁹ in 2020 among 50 patients of which survivors were 36 and those expired were 14. The mean IL-6 value among survivors was 24.31 ± 9.90 pg/ml and in those expired was 166.46 ± 97.36 pg/ml, and the difference was significant ($p = 0.003$). Similar findings were seen in the study conducted by Jurado A *et al.*³⁰ in 2020 among 178 severe patients, wherein the Median IL-6 levels along with its interquartile range on the day of admission, 87.45 pg/ml (IQR : 30.4 – 239.7) were significantly higher than that on discharge 24.86 pg/ml (IQR : 9.1 – 59.63).

CONCLUSION

We concluded that the comparison of the two arms of study, clinical parameters such as Heart Rate, Systolic Blood Pressure, Respiratory Rate and Oxygen Saturation on the day of admission had significant difference among those who expired (Group A) versus the Survivors (Group B), further the raised levels in Expired group corresponded with the severity, poor outcome and higher mortality in critically ill patients in ICU. In addition to clinical parameters, the raised levels of biomarkers such as PCT, CRP, D-dimer Ferritin, LDH and IL-6 in the expired patients in comparison to the survivors on the day of admission and subsequently compared with those of the last day of hospitalisation are reliable indicator of progression towards severity, poor prognosis and outcome.

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