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"AN INSIGHT ON THE MATERNAL & FETAL OUTCOME OF CRITICALLY ILL PREGNANT WOMEN DURING THE SECOND WAVE OF COVID-19"

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**Short Title**: **Outcomes in COVID Pregnant women**

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**ABSTRACT:**

**Background:** As our understanding of the COVID-19 pandemic is evolving and its unpredictable outcome in mothers and babies. There is a need to understand the course of disease with complications in pregnancy that can lead to maternal and neonatal mortality and morbidities in a multicultural society like the UAE.

**Objective:** To assess and compare the Maternal and fetal outcomes of critically ill pregnant women infected with COVID – 19 cases of pneumonia who required admission to the intensive care unit.

**Design:** A retrospective observational study

**Settings:** Tertiary care hospital settings affiliated with an academic center in UAE.

**Patients and Methods:** A total of 123 patients in their third trimester were included from 1 December 2020 to 31 March 2021 in the study with 30 cases of severe or critical COVID and 93 mild to moderate pregnant COVID patients. The maternal demographic, radiological, and biochemical profile of mothers was noted. Maternal and fetal outcomes were compared.

**Main outcomes Measured:** Maternal and fetal outcomes were compared in severe and mild COVID cases.

**Result:** A total of 30 (24.3%) patients were admitted in ICU and eight required invasive ventilation meaning, Severe COVID was significantly associated with higher mortality (20% vs 0% p-value <0.001), postpartum complications (50% vs 9.67% p-value<0.001) and increased overall hospital stay (p-value<0.001). In addition, the primary indication for intervention in severe cases was worsening of COVID and they had significant chances of undergoing Caesarian sections (80% vs 40.8% p-value=0.01). Neonates born to severe COVID patients had significant higher chances of being born preterm (76.6% vs 35.7% p-value<0.001) and have low birth weight (46.6% vs 13.9% p-value=0.002). There were four cases of stillbirth, two cases of vertical transmission, and no neonatal deaths.

**Conclusion:** Pregnant females with severe COVID have high mortality, peripartum complications, increased hospital stay, and are more likely to undergo caesarian section because of COVID progression. The newborns born to such mothers may be premature, have low birth weights but have comparable mortality.

**Keywords:** COVID-19, maternal-fetal outcome, mortality

**INTRODUCTION:**

Coronavirus disease 2019 (COVID-19) is speculated to be a zoonotic disease that was first reported in Wuhan province of China in December 2019 and caused by Severe Acute Respiratory Syndrome coronavirus 2 (SARS-Cov-2).[[1]](#endnote-1) The disease is very contagious and it spread all over the world forcing World Health Organization (WHO) to declare it a pandemic in March 2020.[[2]](#endnote-2) It presents typically with respiratory symptoms as cough, malaise, fever, and shortness of breath but gastrointestinal and neurological presentations have also been reported.[[3]](#endnote-3)

COVID-19 and other respiratory infections have been attributed to causing severe disease and pneumonia in pregnant women because of physiological stress and alterations in the immune system during pregnancy.[[4]](#endnote-4) In past coronavirus outbreaks that is Severe Acute Respiratory Syndrome coronavirus (SARS-CoV) and Middle Eastern Respiratory Syndrome coronavirus (MERS-CoV) it was evident that pregnant women are prone to develop serious outcomes for both mother and child as admission in Intensive care unit, invasive ventilation, miscarriage, preterm delivery, stillbirths, low birth weight, and organ failure and reported mortality was as high as 10 % in some case series.[[5]](#endnote-5),[[6]](#endnote-6)

There is a paucity of data regarding clinical characteristics and maternal-fetal outcomes in COVID-19. The first study to evaluate the pregnant women with COVID-19 was done in China and it described comparable outcomes in both pregnant and non-pregnant adults with no vertical transmission.[[7]](#endnote-7) However, subsequent studies were consistent with substantially increased risk in terms of maternal and neonatal morbidity and mortality in COVID-positive pregnant women.[[8]](#endnote-8) There are again conflicting results about the vertical transmission of SARS-CoV-2 to neonates with some studies reporting as much as 13% positivity in newborns and others reporting no transmission at all.7, 8 There is a lack of comparison between COVID-19 cases of varying severity and perinatal outcomes in international literature especially during the second wave. A study in Britain showed that pregnant women are more prone to develop a severe infection during the second wave.[[9]](#endnote-9) Moreover, various laboratory and radiological parameters are scarcely studied in pregnant females in the third trimester who develop severe COVID-19. The primary aim of the study was to assess the maternal and fetal outcome of critically ill pregnant women infected with COVID – 19 cases of pneumonia who required admission to intensive care unit and comparing it with maternal & fetal outcome of pregnant women COVID-19 positive women who had mild to moderate disease. The secondary outcomes included characteristics of critically ill pregnant women, associated risk factors, comorbidities mode of delivery, laboratory infection markers, and chest X-ray findings.

**MATERIAL AND METHODS:**

This was a retrospective observational study conducted at Latifa Hospital, Dubai Health Authority (Dubai, United Arab Emirates). All procedures were in accordance with the ethical standards of the Institutional and there was no interference in any treatment protocol. The total duration of the study was four months and data was retrieved retrospectively from the hospital database and then prospectively extra-plotting it in Performa. All booked or un-booked COVID-19 positive female patients confirmed by RT-PCR between ages 22 to 44 years between 22 to 42 weeks of gestation from 01 December 2020 to 31 March 2021 were enrolled in the study. The patients who were younger than 22 years or older than 44 years and those having first or second trimesters were excluded.

Patients were closely followed during their admission period up till discharge from the hospital. Various demographic parameters as Age, Body Mass Index (BMI), Nationality, prior history of travel or contact with COVID-19 patient, co-morbidities, Gravida, Parity, and Gestational age at the time of delivery were noted. Patients who had RT-PCR positive and any of the signs and symptoms of COVID-19 were labeled as mild cases. Those with respiratory symptoms but saturation ≥ 94% at room air were grouped as moderate cases. Whereas those who had saturation <94% at room air and required supplementary oxygen were grouped as serious COVID-19 cases. Those who required ICU admission because of ventilator support of multi-organ failure were labeled critical.

The clinical signs and symptoms were noted along with chest x-ray findings reported by the same consultant radiologist in terms of severity scoring system. This was a semi-quantitative scoring system where each lung was divided into three zones and graded from 0 to 3 based on opacities in that zone.[[10]](#endnote-10) Values of Total leucocyte count, C-reactive protein, ferritin, pro-calcitonin, and other acute-phase reactants, creatinine, Alanine, and Aspartate transaminase were recorded. The lowest values of Haemoglobin and platelets were also noted during admission. Perinatal maternal and fetal outcomes were also recorded. To better understand the results mild and moderate were grouped whereas, severe and critically ill COVID patients were grouped to compare peripartum and postpartum outcomes. The fetal RT-PCR samples were obtained from the nasopharynx on day 1 post-delivery and neonates were followed closely for signs and symptoms of respiratory distress for one week.

The data was analyzed using Statistical Package for Social Sciences version 26. Means and Standard deviation were noted for quantitative variables as age, BMI whereas percentages were calculated for qualitative variables as co-morbidities. The variables were compared between two groups using an independent t-test for parametric means, Whitney U test for non-parametric means and Chi-square for percentages keeping p-value less than 0.05 as significant.

**RESULTS:**

During the study period, a total of 1184 pregnant women reported during their third trimester in our hospital and nasopharyngeal plus oropharyngeal swabs were taken for RT-PCR and 123 (10.38%) came positive. Among the 123 positive patients, there were 93 (75.6%) cases of mild to moderate symptoms and 30 (24.4%) patients had severe symptoms requiring ICU admission. The mean age and BMI of patients were 32.68 ± 5.755 years and 31.28 ± 5.886 respectively. 56 patients (45.5%) were local UAE nationals, 21 (17.1%) were from other Middle Eastern countries, 26 (21.1%) patients belonged to the Indo-Pak subcontinent and 20 (16.3%) had other diverse nationalities. Only 23 (18.7%) cases had a prior positive history of contact with COVID-19 patients or travel to an endemic area. The most common symptom was cough present in 54 (43.9%) patients, followed by fever in 49 (39.8%), shortness of breath in 35 (28.5%) and chest pain in 15 (12.2%) cases. In co-morbidities Gestational Diabetes was present in 24 (19.5%) cases, followed by Obesity in 10 (8.1%), Anemia in 10 (8.1%), hypertension in 7 (5.7%) and 3 had asthma. All patients were non-smokers. The demographic comparison between mild to moderate disease and severe cases is shown in table 1. Among serious COVID pregnant women, the mean ICU duration was 8.66 ± 6.394, 1 (3.3%) patients required oxygen through nasal prongs, whereas, 13 (43.3%) were given oxygen through a face mask. 3 (10%) required non-invasive ventilation and 15 (50%) patients had to be intubated because of worsening pneumonia. The mean duration of ICU stay was 8.66 ± 6.394 days and the mean number of days during which oxygen was provided to serious patients was 9.15 ± 7.492 days.

Various acute laboratory parameters and Chest X-rays were monitored in COVID-19 including complete blood count, acute phase proteins, liver and kidney profiles. The distribution of these parameters is shown in table 2. Severe COVID patients had significantly high Chest X-ray severity score, Total Leucocyte count, CRP, pro-calcitonin, LDH, Ferritin, serum potassium and ALT levels, whereas, Haemoglobin was lower as compared to mild cases. Moreover, 3 blood cultures were positive among severe COVID patients out of which two were Staph. Aureus and one was Pseudomonas.

There were a total of 6 (4.9%) deaths in our study all 6 (20% 6/30) had severe disease and died because of COVID-related complications. So mortality was significantly higher among severe COVID-19 pregnant women (p-value <0.001). Morbidity was also very high in serious patients as 15 (50%) patients suffered from various respiratory-related complications as pneumothorax in three, prolong intubation in seven, PPH in four and seizures in one. The maternal outcomes are shown in table 3.

A total of 132 babies were born to COVID-19 infected mothers out of which there were two twin pregnancies. The mean birth weight of all neonates 2607.5 ± 700.5 grams. There were two cases (1.6%) of vertical transmission in our study as COVID-19 RT-PCR came positive in neonates born to mothers with mild infection. There were only four (3%) cases of Intrauterine fetal deaths and 11(8.33%) cases required NICU admission, however, 57(43.12%) neonates were born premature and 27(20.7%) had low birth weight. The neonatal outcomes are further elaborated in Table 4. Further risk assessment for mortality in severe COVID cases is given in Table 5.

**DISCUSSION:**

**Strength:** There is a rapid evolution in our understanding of COVID-19 as new strains are emerging around the world and numerous countries are facing the second and third waves of upsurge. Still, we know very little about the effects of this virus on pregnant women. Our study, to the best of our knowledge, is the largest being conducted in the UAE to compare the maternal and fetal outcomes. A previous study done in our hospital identified a total of seven critical pregnant patients admitted during the first wave.[[11]](#endnote-11) During our study period, a total of 30 (24.3%) patients were admitted to ICU and 12 required invasive ventilation meaning thereby that the second wave caused a more deleterious effect on pregnant women. A systemic review evaluated an ICU admission rate of 9.6% among pregnant women and most of those women were in their third trimester.1 The higher rate in our study can be due to study design as only women in their third trimester were evaluated. In addition, our hospital was specifically earmarked for the management of all COVID cases in the region being a tertiary care and receiving complicated patients. It can be due to the emergence of new strain but this is not yet proven.

**Main Findings and Interpretations:** Severe COVID was significantly associated with higher mortality (20% vs 0% p-value <0.001), postpartum complications (50% vs 9.67% p-value<0.001) and increased overall hospital stay (p-value<0.001). In addition, the primary indication for intervention in severe cases was worsening of COVID and they had significant chances of undergoing Caesarian sections (80% vs 40.8% p-value<0.001). Similar studies pointed out higher rates of maternal mortality, morbidity, and early caesarian section primarily due to deteriorating mother health or fetal distress.[[12]](#endnote-12), [[13]](#endnote-13), [[14]](#endnote-14) It was also evident in our study that neonates born to severe COVID patients had significantly higher chances of being born preterm (76.6% vs 35.7% p-value<0.001) and had low birth weight (46.6% vs 13.9% p-value=0.002). However, there were four cases of stillbirth in mild cases of the corona, two cases of vertical transmission in mild cases, and no neonatal deaths indicating that overall newborn outcomes are relatively better as compared to mothers. The above values are much higher than the average rate of stillbirth (4/1000 birth) and preterm births (6.1%) in UAE.[[15]](#endnote-15) The higher mortality rate can be explained by increased referrals from peripheriy centers as three of the four still births were diagnosed in community health units and transferred to this hospital for definitive management.A study by Schwartz DA showed better neonatal outcomes and no intrauterine spread of novel coronavirus.[[16]](#endnote-16) On the contrary, numerous case reports and some publications did confirm vertical transmission in newborns but the rate was very low.[[17]](#endnote-17)

Only chest X-rays were performed in all pregnant females and CT was not done owing to potential radiation exposure. The severe and critical COVID women had more mean severity score than mild to moderate cases (11.43 vs 4.69 p-values <0.001). The laboratory indices showed statistically significant higher mean Total Leukocyte count and lower hemoglobin levels for severe cases. The levels of CRP, pro-calcitonin, LDH, and Ferritin were also significantly raised. However, D-Dimer values were not significantly higher. Similarly, levels of ALT were elevated in severe cases. The level of potassium was also raised in severe cases but it was within the normal limits. The literature review describes conflicting results but most of them did point out raised CRP and total leukocyte count to be reliable indicator of severity in COVID pregnant females.[[18]](#endnote-18),[[19]](#endnote-19),[[20]](#endnote-20) The third-trimester pregnancy is considered a risk factor for severe COVID.1,8 We found increasing age, symptoms of fever, cough, and dyspnea to be significantly associated with severe disease. The BMI in severe COVID was also raised but it was not significant (p-value=0.928). The treatment protocols remained unaltered in all cases and ICU patients were administered steroids, anti-viral drugs as remedesivir and other supportive care as per international guidelines.

A sub-analysis of mortality cases comparison with severe COVID cases showed lower gestational age, increased duration of hospital and ICU admission, invasive ventilation, higher TLC, and lower Haemoglobin were significantly associated with mortality. Whereas, increased values of acute-phase reactants were not related to death. The maternal cause of mortality was worsening of sepsis, development of disseminated intravascular coagulation and respiratory failure. The lower gestational age can be due to a low threshold towards delivery as in 5 cases decision to go for Caesarian was made based on worsening COVID pneumonia.

**Limitations:** We understand that this was a retrospective study so further workup was not possible and treatment protocols were not studied in addition to amniotic sampling for evidence of vertical transmission.

**CONCLUSION:**

Pregnant females with severe COVID have high mortality, peripartum complications, increased hospital stay, and are more likely to undergo caesarian section because of COVID progression. The newborns born to such mothers may be premature and have low birth weights. Increase age and presence of symptoms inpregnant women during their third trimester may be associated with the development of severe COVID.

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**Statement of Ethics and Disclosure:** All procedures followed were in accordance with the ethical standards of the responsible committee and with the Helsinki Declaration of 1975, as revised in 2000. Informed consent was obtained from all patients for being included in the study. Subjects (or their parents or guardians) have given their written informed consent and that the study protocol was approved by Dubai Scientific Research Ethics Committee (DSREC), Dubai Health Authority DSREC-02/2021\_21 dated 3/4/2021.

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**Contributions of Authors: NA** conceived and designed the research. **SF and AMA** did data analysis and manuscript writing. **IAM** Supervised the whole study & editing of manuscript. **LP and SFD** did data collection and compiling international research.

**REFERENCES:**

1. Turan O, Hakim A, Dashraath P, Jeslyn WJ, Wright A, Abdul‐Kadir R. Clinical characteristics, prognostic factors, and maternal and neonatal outcomes of SARS‐CoV‐2 infection among hospitalized pregnant women: A systematic review. International Journal of Gynecology & Obstetrics. 2020 Oct;151(1):7-16. [↑](#endnote-ref-1)
2. Zhang L, Jiang Y, Wei M, et al. Analysis of the pregnancy outcomes in pregnant women with COVID‐19 in Hubei Province. *Zhonghua Fu Chan Ke Za Zhi*. 2020;55:166–171. [↑](#endnote-ref-2)
3. Antoun L, El Taweel N, Ahmed I, Patni S, Honest H. Maternal COVID-19 infection, clinical characteristics, pregnancy, and neonatal outcome: A prospective cohort study. European Journal of Obstetrics & Gynecology and Reproductive Biology. 2020 Sep 1;252:559-62. [↑](#endnote-ref-3)
4. Naccasha N, Gervasi MT, Chaiworapongsa T, Berman S, Yoon BH, Maymon E, et al. Phenotypic and metabolic characteristics of monocytes and granulocytes in normal pregnancy and maternal infection. *Am J Obstet Gynecol*. 2001;**185**(5):1118-1123. doi: 10.1067/mob.2001.117682. [↑](#endnote-ref-4)
5. Wong SF, Chow KM, Leung TN, Ng WF, Ng TK, Shek CC, Ng PC, Lam PW, Ho LC, To WW, Lai ST, Yan WW, Tan PY. Pregnancy and perinatal outcomes of women with severe acute respiratory syndrome. *Am J Obstet Gynecol.* 2004;**191**(1):292-297. doi: 10.1016/j.ajog.2003.11.019. [↑](#endnote-ref-5)
6. Metz TD. Clinical Management Guidelines for Obstetrician– Gynecologists Critical Care in Pregnancy. 2019. [↑](#endnote-ref-6)
7. Chen H, Guo J, Wang C, Luo F, Yu X, Zhang W, Li J, Zhao D, Xu D, Gong Q, Liao J, Yang H, Hou W, Zhang Y. Clinical characteristics and intrauterine vertical transmission potential of COVID-19 infection in nine pregnant women: a retrospective review of medical records. *Lancet*. 2020;395(10226):809-815. doi: 10.1016/S0140-6736(20)30360-3. [↑](#endnote-ref-7)
8. Villar J, Ariff S, Gunier RB, Thiruvengadam R, Rauch S, Kholin A, Roggero P, Prefumo F, Do Vale MS, Cardona-Perez JA, Maiz N. Maternal and neonatal morbidity and mortality among pregnant women with and without COVID-19 infection: the INTERCOVID multinational cohort study. JAMA pediatrics. 2021 Apr 22. [↑](#endnote-ref-8)
9. Kadiwar S, Smith JJ, Ledot S, Johnson M, Bianchi P, Singh N, Montanaro C, Gatzoulis M, Shah N, Ukor EF. Were pregnant women more affected by COVID-19 in the second wave of the pandemic?. The Lancet. 2021 Apr 24;397(10284):1539-40. [↑](#endnote-ref-9)
10. Monaco CG, Zaottini F, Schiaffino S, Villa A, Della Pepa G, Carbonaro LA, Menicagli L, Cozzi A, Carriero S, Arpaia F, Di Leo G. Chest x-ray severity score in COVID-19 patients on emergency department admission: a two-centre study. European Radiology Experimental. 2020 Dec;4(1):1-7. [↑](#endnote-ref-10)
11. Hazari KS, Paulose L, Kurien N, Mohammad H, Elgergawi TFA, et al. Clinical characteristics, management, maternal and neonatal outcome among seven severe and critically ill pregnant women with COVID-19 pneumonia. Clin J Obstet Gynecol. 2020; 3: 158-166. [↑](#endnote-ref-11)
12. Bachani S, Arora R, Dabral A, Marwah S, Anand P, Reddy KS, Gupta N, Singh B. Clinical Profile, Viral load (E, RdRP, ORF1 gene), Fetomaternal outcomes of pregnant women with COVID-19 in a Tertiary care Hospital of India: First 4 weeks experience: retrospective, single-centre descriptive study. Journal of Obstetrics and Gynaecology Canada. 2020 Oct 28. [↑](#endnote-ref-12)
13. Juan J, Gil MM, Rong Z, Zhang Y, Yang H, Poon LC. Effect of coronavirus disease 2019 (COVID‐19) on maternal, perinatal and neonatal outcome: systematic review. Ultrasound in Obstetrics & Gynecology. 2020 Jul;56(1):15-27. [↑](#endnote-ref-13)
14. Elshafeey F, Magdi R, Hindi N et al.A systematic scoping review of COVID-19 during pregnancy and childbirth.Int J Gynecol Obstet. 2020; 150: 47–52. <https://doi.org/10.1002/ijgo.13182>. [↑](#endnote-ref-14)
15. World Health Organization, Eastern Mediterranean Regional office. Child Adolescent health United Arab Emirates. <http://www.emro.who.int/child-adolescent-health/data-statistics/emirates.html> accessed on 22 June 2021. [↑](#endnote-ref-15)
16. Schwartz DA. An analysis of 38 pregnant women with COVID-19, their newborn infants, and maternal-fetal transmission of SARS-CoV-2: maternal coronavirus infections and pregnancy outcomes. Archives of pathology & laboratory medicine. 2020 Jul;144(7):799-805. [↑](#endnote-ref-16)
17. Alzamora MC, Paredes T, Caceres D, Webb CM, Valdez LM, La Rosa M. Severe COVID-19 during pregnancy and possible vertical transmission. American journal of perinatology. 2020 Jun;37(8):861. [↑](#endnote-ref-17)
18. Vakili S, Savardashtaki A, Jamalnia S, Tabrizi R, Nematollahi MH, Jafarinia M, Akbari H. Laboratory findings of COVID-19 infection are conflicting in different age groups and pregnant women: a literature review. Archives of medical research. 2020 Jun 11. [↑](#endnote-ref-18)
19. Wang Z, Wang Z, Xiong G. Clinical characteristics and laboratory results of pregnant women with COVID‐19 in Wuhan, China. International Journal of Gynecology & Obstetrics. 2020 Sep;150(3):312-7. [↑](#endnote-ref-19)
20. Ayed A, Embaireeg A, Benawadh A, Al-Fouzan W, Hammoud M, Al-Hathal M, Alzaydai A, Ahmad A, Ayed M. Maternal and perinatal characteristics and outcomes of pregnancies complicated with COVID-19 in Kuwait. BMC pregnancy and childbirth. 2020 Dec;20(1):1-9.

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    | --- | --- | --- | --- | --- |
    | **S.no** | **Demographic Variable** | **Mild to Moderate COVID (n=93)** | **Severe COVID (n=30)** | **p-value** |
    | 1. | **Age** | 31.72 ± 5.661 years | 35.67 ± 5.047 years | 0.001 |
    | 2. | **BMI** | 30.968 ± 5.932 | 32.260 ± 5.735 | 0.298 |
    | 3. | **Nationality**  UAE  Arab  Sub-continent  Others | 46  13  20  14 | 10  8  6  6 | 0.284 |
    | 4. | **Gravida** | 3.44 ± 2.329 | 3.07 ± 1.639 | 0.416 |
    | 5. | **Parity** | 2.01 ± 1.809 | 1.97 ± 1.474 | 0.904 |
    | 6. | **Gestational Age at admission** | 36.58 ± 3.405 | 33.33 ± 2.928 | <0.001 |
    | 7. | **Co-morbidities**  GDM  Obesity  Anemia  HTN  Asthma | 16  7  7  6  3 | 8  3  3  1  3 | 0.382 |
    | 8. | **Symptoms**  Cough  Fever  Dyspnea  Chest Pain | 26  24  11  6 | 28  25  24  9 | <0.001  <0.001  <0.001  0.004 |
    | 9. | **Blood Group**  B-positive  O-positive  A-positive  AB-positive  Negative groups | 26  32  23  7  5 | 9  6  12  2  1 | 0.458 |

    **Table 1: Demographic comparison between mild to moderate and severe COVID-19 infected pregnant women in third trimester**

    |  |  |  |  |  |
    | --- | --- | --- | --- | --- |
    | **S.no** | **Laboratory and Radiological Parameters** | **Mild to Moderate COVID (n=93)** | **Severe COVID (n=30)** | **p-value** |
    | 1. | **Chest X ray Severity score** | 4.69 ± 2.880 | 11.43 ± 1.869 | <0.001 |
    | 2. | **White Blood Count** | 9.590 ± 3.825 | 12.723 ± 4.301 | <0.001 |
    | 3. | **Platelet count** | 203.9 ± 63.46 | 221.2 ± 150.4 | 0.372 |
    | 4. | **Haemoglobin levels** | 11.066 ± 1.903 | 9.957 ± 1.322 | 0.004 |
    | 5. | **C-reactive Protein** | 24.138 ± 33.083 | 86.327 ± 69.192 | <0.001 |
    | 6. | **Pro-calcitonin Levels** | 0.094 ± 0.232 | 0.668 ± 1.135 | 0.01 |
    | 7. | **D-Dimer levels** | 2.755 ± 3.469 | 2.346 ± 4.044 | 0.591 |
    | 8. | **LDH Levels** | 170.1 ± 107.6 | 324.7 ± 161.7 | <0.001 |
    | 9. | **Ferritin Levels** | 93.66 ± 123.99 | 290.69 ± 328 | <0.001 |
    | 10. | **ALT Levels** | 25.49 ± 31.35 | 47.27 ± 49.24 | 0.029 |
    | 11. | **AST Levels** | 29.88 ± 32.12 | 38.20 ± 27.57 | 0.174 |
    | 12. | **Creatinine** | 0.43 ± 0.127 | 0.43 ± 0.182 | 0.971 |
    | 13. | **Potassium levels** | 3.38 ± 1.02 | 3.790 ± 0.56 | 0.04 |
    | 14. | **Blood Cultures positivity** | - | 3 (14.2%) | 0.001 |

    **Table 2: Radiological and Laboratory variable comparison between mild to moderate and severe COVID-19 infected pregnant women**

    |  |  |  |  |  |
    | --- | --- | --- | --- | --- |
    | **S.no** | **Maternal Outcomes** | **Mild to Moderate COVID (n=93)** | **Severe COVID (n=30)** | **p-value** |
    | 1. | **Mortality** | - | 6 | <0.001 |
    | 2. | **Post-partum complications**  Respiratory complications  PPH  others | 1  5  3 | 10  4  1 | <0.001 |
    | 3. | **Indication of Caesarean**  Fetal Distress  Worsening COVID  Other causes | 24  13  14 | 7  18  2 | <0.001 |
    | 4. | **Duration of Hospital stay** | 5.20 ± 6.457 | 12.33 ± 7.092 | <0.001 |
    | 5. | **Mode of Delivery**  NVD  LSCS | 55  38 | 6  24 | 0.001 |

    **Table 3: Maternal outcome between mild to moderate and severe COVID-19 infected pregnant women**

    |  |  |  |  |  |
    | --- | --- | --- | --- | --- |
    | **S.no** | **Maternal Outcomes** | **Mild to Moderate COVID (n=95)** | **Severe COVID (n=30)** | **p-value** |
    | 1. | **Birth Weight** | 2725.61 ± 714.14 | 2241.3 ± 512.7 | 0.001 |
    | 2. | **Low Birth Weight** | 13 | 14 | 0.001 |
    | 3. | **APGAR at birth** | 8.94 ± 9.599 | 6.70 ± 1.179 | 0.03 |
    | 4. | **APGAR after 5 minutes** | 8.97 ± 1.81 | 8.50 ± 0.861 | 0.176 |
    | 5. | **Umbilical cord pH** | 7.220 ±0.522 | 7.230 ± 0.079 | 0.917 |
    | 6. | **Steroids administered prior to delivery** | 23 | 20 | <0.001 |
    | 7 | **Preterm delivery** | 34 | 23 | <0.001 |
    | 8. | **Stained Liquor** | 10 | 4 | 0.744 |
    | 9. | **Fetal Outcome**  Healthy  NICU admission  Death/ Still birth | 84  7  4 | 26  4  - | 0.341 |

    **Table 4: Fetal outcomes between mild to moderate and severe COVID-19 infected pregnant women**

    |  |  |  |  |  |
    | --- | --- | --- | --- | --- |
    | **S.no** | **Demographic Variable** | **Severe COVID patients who recovered (n=24)** | **Severe COVID patients who died (n=6)** | **p-value** |
    | 1. | **Age ≥ 30 years** | 21 | 6 | 0.361 |
    | 2. | **BMI ≥ 30** | 15 | 4 | 0.298 |
    | 3. | **Nationality**  UAE  Arab  Sub-continent  Others | 9  5  5  5 | 1  4  1  1 | 0.524 |
    | 4. | **Gravida** | 3.04 ± 1.706 | 3.17 ± 1.472 | 0.871 |
    | 5. | **Parity** | 1.92 ± 1.501 | 2.17 ± 1.472 | 0.717 |
    | 6. | **Gestational Age at admission** | 33.92 ± 2.781 | 31 ± 2.449 | 0.026 |
    | 7. | **Co-morbidities**  GDM  Obesity  Anemia  HTN  Asthma | 7  1  3  3  1 | 1  2  -  -  - | 0.278 |
    | 8. | **Symptoms**  Cough  Fever  Dyspnea  Chest Pain | 22  20  19  7 | 6  5  5  2 | 0.464  1  0.819  0.842 |
    | 9. | **Duration of Hospital stay** | 10.29 ± 3.782 | 20.51 ± 11.22 | 0.012 |
    | 10. | **Duration of ICU stay** | 7.04 ± 3.282 | 14.83 ± 11.125 | 0.035 |
    | 11. | **Ventilation Assistance Required** | 9 | 6 | 0.008 |
    | 12. | **Duration of Intubation** | 4.60 ± 2.221 | 10.17 ± 11.652 | 0.377 |
    | 13. | **Chest X ray Severity score** | 11.17 ± 1.659 | 12.5 ± 2.429 | 0.120 |
    | 14. | **White Blood Count** | 11.775 ± 3.678 | 16.51 ± 4.844 | 0.013 |
    | 15. | **Platelet count** | 235 ± 162.7 | 167 ± 70.7 | 0.332 |
    | 16. | **Haemoglobin levels** | 10.32 ± 1.16 | 8.550 ± 0.965 | 0.002 |
    | 17. | **C-reactive Protein** | 76.22 ± 31.32 | 126.75 ± 144.23 | 0.678 |
    | 18. | **Pro-calcitonin Levels** | 0.642 ± 1.091 | 0.770 ± 1.409 | 0.810 |
    | 19. | **D-Dimer levels** | 1.365 ± 1.127 | 6.27 ± 8.119 | 0.097 |
    | 20. | **LDH Levels** | 294 ± 127.1 | 447.5 ± 234.1 | 0.035 |
    | 21. | **Ferritin Levels** | 268.5 ± 306.4 | 379.5 ± 424.7 | 0.468 |
    | 22. | **ALT Levels** | 39.7 ± 28.12 | 77.5 ± 95.4 | 0.407 |

    **Table 5: Risk Factor assessment of mortality among severe COVID patients** [↑](#endnote-ref-20)