Covid Infection and Variables Affecting its Severity Among Pregnant Women in Dubai

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ABSTRACT

The acute respiratory syndrome has produced an unprecedented global disaster since December 2019 known as coronavirus 2 (SARS-CoV-2). Pregnant women are a particular group that needs special care during crises and infectious illnesses. Compared to uninfected women, this cross-sectional study was based on pregnant women infected with COVID-19. The data was collected from DHA Latifa Hospital, Medical records. The research committee approved the study in DHA. The study was based on 326 patients aged 20-42 years, of which COVID-infected pregnant women were 199 and 118 were uninfected. Most patients were from the UAE, with a mean age of 31.63+ 6.36 and an average BMI of 28.96±1.16 kg/m2 of COVID-infected pregnant women. While the mean age of 31.33+ 6.23 and an average BMI of 27.06±11.05 kg/m2 of uninfected pregnant women. Hemoglobin (HB), White Blood cells (WBCs), and C-Reactive Protein(CRP) showed significantly different when compared to COVID-infected and uninfected pregnant women. Significant results showed in Comorbid diseases compared with COVID-infected and uninfected pregnant women, but a high frequency was observed in uninfected women. The results showed insignificance with Comorbid diseases when compared with COVID- infected pregnant women and uninfected pregnant women. A decrease in WBC and CRP was observed in COVID- infected pregnant women

INTRODUCTION

The severe acute respiratory syndrome has produced an unprecedented global disaster since December 2019 known as coronavirus 2 (SARS-CoV-2) (Kamel Boulos & Geraghty, 2020; Sohrabi *et al.*, 2020). Pregnant women are a particular group that needs special care during crises and infectious illnesses. According to the literature, pregnant women infected with COVID-19 suffer a more severe form of the disease, which increases their chance of dying by up to 35.0 percent and causes nearly a quarter of them to develop pneumonia. Furthermore, pregnant women affected by COVID-19 infection had a higher likelihood of being hospitalized than non-pregnant people of the same age (31.5 percent versus 5.8 percent), as reported by the CDC (Centers for Disease Control and Prevention).

UKOSS research showed that many pregnant/expected women were admitted to the hospital in the third trimester or postpartum, and severe illness happened in later pregnancy (Vousden *et al.*, 2021). According to the literature, immunologic and physiological changes during pregnancy can be blamed for the complexity of the maternal disease and obstetric effects. These changes include reduced lung volume, cardiovascular and hemodynamic deviations, high oxygen demand, hypoxia causing respiration problems such as low maternal tolerance, structural changes with an enlarged transthoracic diameter, and restricted diaphragm expansion as previous health issues like preeclampsia or diastole (Chen *et al.*, 2020; Yan *et al.*, 2020).

The epidemiology of severe COVID-19-mediated pregnancy-related changes in the inflammatory response to viruses has been linked to an overt Th1

and Th2 response to SARS-CoV-2. Natural killer (NK), Plasmacytoid dendritic cells decline while increased progesterone levels in circulating cells during pregnancy (Wastnedge *et al.*, 2021). These changes in the mother's immune system affect the clinical course of COVID-19 and the therapy and prevention of COVID-19 in pregnancy. Pregnant women may be more prone to serious respiratory infections because of decreased lung capacity and difficulty removing secretions (Thompson *et al.*, 2020).

Regarding the potential effects of COVID in early pregnancy, there is less research (up to 12 weeks gestation). Seasonal influenza has been linked to a greater incidence of miscarriage (Dorélien, 2019). Extrapolating from the impact of other viruses in late pregnancy (more than 24 weeks gestation) (Dorélien, 2019) (Mosby *et al.*, 2011), COVID-19 infection might result in higher rates of unfavourable pregnancy results in fetal growth limitation, premature delivery, and perinatal death. Once available, population-level data on these results must be evaluated to spot tendencies relevant to the COVID-19 pandemic. This research examines the relationship between maternal severity due to COVID-19 and the effect of Comorbid disease. Examining how demographic variables affected by COVID on pregnant women. We also studied the correlation between the severity of illness and the number of dosages, comorbid diseases, and the duration of the vaccine (the time since it was given wither within 6 months or in more than 6 months).

MATERIALS AND METHODS

This cross-sectional study was based on 326 patients

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aged 20-42 years, of which COVID-infected pregnant women were 199 while 118 were uninfected. The data was collected from DHA Latifa Hospital, Medical records. This research was conducted after the ethical approval from the research committee in DHA. Informed consent was also obtained. The questionnaire contains data on Demographic characteristics, symptoms, blood profile, and vaccination details. Statistical Package of Social Sciences (SPSS, V20.0) was used for data analysis. The Data was represented as Mean ± SD, while variable differences were analyzed as frequency (percentage). Fisher and student T-tests were used to comparing COVID-infected and uninfected pregnant women. A relative regression test was performed to determine the relations of participants' characteristics such as Age, BMI, and Severity of COVID-19 symptoms and blood profile. The statistically significant value P= <0.05 was considered.

RESULTS AND DISCUSSION
Results
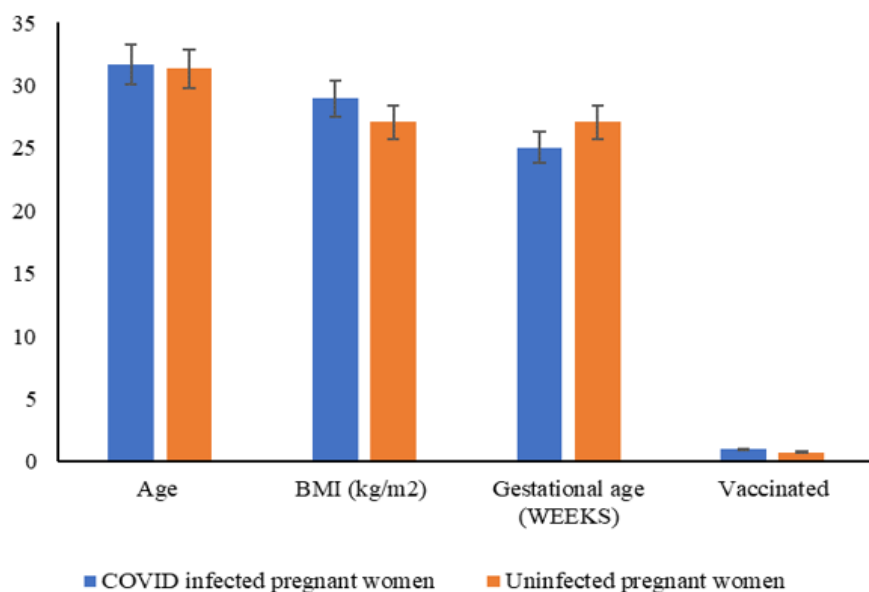
Table 1: Demographic characteristics of the study

| Variables	All patients (n=326)	p-value
Age	31.63+ 6.36	<0.001*
Ethnicity, n (%)		
UAE	182(0)	0.005*
Yemen	13(3.9)	0.05*
Pakistan	12(3.68)	0.05*
Oman	8(2.4)	0.55
Comery	1(0.3)	0.55
Kyrgyzstan	1(0.3)	0.55
Comoros	4(1..22)	0.55
Kuwait	1(0.3)	0.55
France	1(0.3)	0.55
Pakistan	3(0.9)	0.55
Sri Lanka	2(0.6)	0.55
Jordan	7(2.1)	0.55
Tunisia	1(0.3)	0.55
Vietnam	1(0.3)	0.55
Tajikistan	1(0.3)	0.55
Azerbaijan	1(0.3)	0.55
Filipi0	14(4.29)	0.05*
Sudan	1(0.3)	0.55
Bangladesh	1(0.3)	0.55
Saudi Arabia	2(0.6)	0.55
India	15(4.6)	0.05*
Leba0n	1(0.3)	0.55
Syrian	8(2.4)	0.35
Iran	12(3.6)	0.05*
Iraq	1(0.3)	0.55
Egypt	11(3.3)	0.05*
Turkey	1(0.3)	0.55
China	3(0.9)	0.55
Bahrain	2(0.6)	0.55
Morocco	6(1.8)	0.55
United Kingdom	1(0.3)	0.55
Turkey	1(0.3)	0.55
Leba0n	1(0.3)	0.55
South Africa	1(0.3)	0.55
Kazakhstan	2(0.6)	0.55
Kenya	2(0.6)	0.55
Somalia	1(0.3)	0.65

Significance at p-value<0.05.

Table 2: Variation in the COVID- infected and uninfected pregnant women related to symptoms, vaccination and blood variables.

Variables	COVID- infected pregnant women	uninfected pregnant women
n	199	118
Age	**31.63+ 6.36**	**31.33+ 6.23**
BMI (kg/m2)	28.96±1.16	27.06±11.05

Gestational Age (Weeks)	25.06±3.5	27.06±11.05
Vaccinated	1±0.4	0.737+0.4
HB	11±0.141	11.20± 1.34
WBC	7 ± 3.25	8.37 + 2.862
CRP	18 ± 10.1	17.79+3.722
Procalcitonin	0±0.049	0.489+3.27
Fever	1±0.7	0±0.3
Sore Throat	0±0.0	0±0.15
Shortness of Breath	0±0.7	0±0.0
Cough	1±0	0±0.2
Dehydration (Acetone in Urine)	1±0.7	1±0.41
Lethargy	0±0.	0±0.

Figure 1: Differences between Demographic characteristics of COVID-infected and uninfected pregnant women
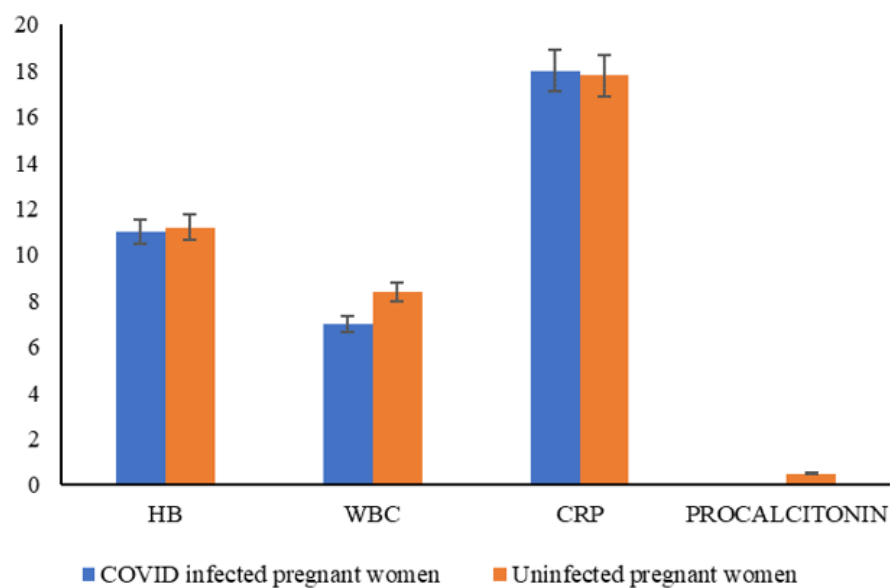
Figure 2: Differences between blood variables of COVID-infected and uninfected pregnant women.
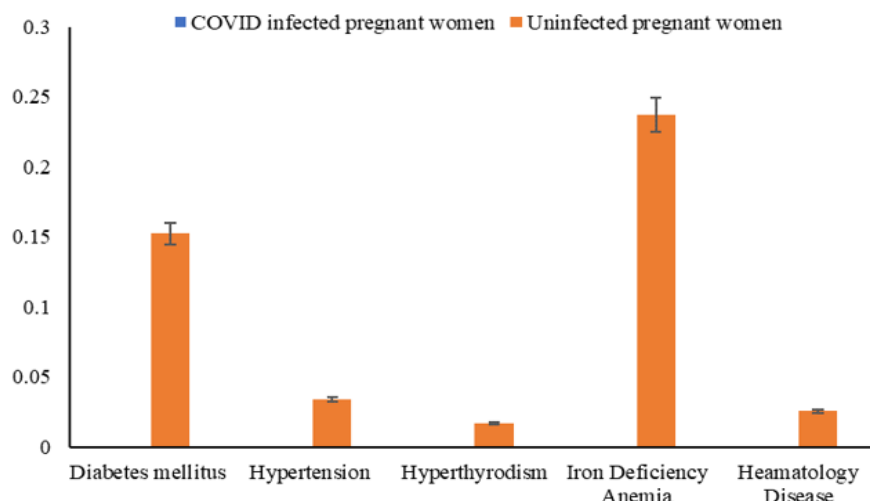
Figure 3: Difference between Comorbid disease in COVID-infected and uninfected pregnant women

Demographic characteristics showed in Table 1. Most patients were from the UAE, with a mean age of 31.63+ 6.36 and an average BMI of 28.96±1.16 kg/m2 of COVID-infected pregnant women. While the mean age of 31.33+ 6.23 and an average BMI of 27.06±11.05 kg/m2 of uninfected pregnant women. Variation in the COVID-infected and uninfected pregnant women related to symptoms, vaccination and blood variables (Table 2). This study showed that the age, BMI, and gestational age were insignificant compared to the COVID-infected and uninfected pregnant women (Fig 1). Hemoglobin (HB), White Blood cells (WBCs), and C-Reactive Protein (CRP) showed significantly different when compared to COVID-infected and uninfected pregnant women (Fig 2). Significant results showed in Comorbid diseases compared with COVID-infected and uninfected pregnant women, but a high frequency was observed in uninfected women (Fig 3).

Table 3: The severity of illness and its correlates

		Severity of Illness	Type of Vaccine	Number of Doses Received	Less than 6 month	More than 6 Months
Severity of Illness	Pearson Correlation	1	-0.679	-0.75	-0.108	-0.29
Type of Vaccine	Pearson Correlation	-0.679	1	.828**	.778**	.618**
Number of Doses Received	Pearson Correlation	-0.75	.828**	1	.823**	.833**
Less than 6 month	Pearson Correlation	-0.108	.778**	.823**	1	.511**
More than 6 Months	Pearson Correlation	-0.29	.618**	.833**	.511**	1

**. Correlation is significant at the 0.01 level (2-tailed).

Table 3. shows the correlation between the severity of the vaccine and the number of doses received, dosage received in less than 6 months, and more than 6 months. It can be seen that a negatively moderate correlation was found between the severity of illness and the type of vaccine, and a negatively strong correlation was found between the dosage and severity of illness. In contrast, a negatively weak correlation was seen in the severity of illness and individuals with dosage received in less than 6 months and in individuals with dosage received in more than 6 months.

The fitted model data's chi-squared ratio test yielded a

Table 4: Likelihood Ratio Test.

Effect	Model Fitting Criteria	Likelihood Ratio Tests		
	-2 Log Likelihood of Reduced Model	Chi-Square	df	Sig.
Intercept (SOI)	28.185a	0	0	.
Diabetes Miletus	28.422	0.238	1	0
Hypertension	28.29	0.105	1	0
Hyperthyroidism	34.893	6.708	1	0.01
Iron Deficiency Anemia	30.285	2.1	1	0
Hematology Disease	29.714	1.529	1	0.016
SLE	28.185	0.06	1	0
Others	28.438	0.253	1	0

The chi-square statistic is the difference in -2 log-likelihoods between the final and reduced models. The reduced model is formed by omitting an effect from the final model. The null hypothesis is that all parameters of that effect are 0. a. This reduced model is equivalent to the final model because omitting the effect does not increase the degrees of freedom.

score of 11.557 (p = 0.000), indicating a good model fit. Furthermore, suitable outcomes for the pseudo R-squared (Cox and Snell: 0.907, Nagelkerke: 0.726). Our logistic multinomial model's power was appropriate since it correctly recognized 93.2% of the observed data and can be relied upon to predict future guesses. The likelihood ratio tests for the model's effects and partials are shown in Table 4, and their low p-values show how highly relevant the model's variables are.

DISCUSSION

This study aimed to contribute to the association between COVID-19 severity in pregnancies and their outcomes. Literature showed that of the 184 critically ill patients (24% of whom were female) found that 31% of them experienced thrombotic events, demonstrating that COVID-19 is linked to the high incidence of thromboembolic consequences in the general population (64). The cause of this is the stimulation of coagulation pathways, which may lead to diffuse vascular coagulopathy (DIC), fibrinolysis, and dynamic hypercoagulation associated with thrombocytopenia.

The results showed insignificance concerning COVID and gestation age(week), while the severity of the condition was significantly correlated with gestational age upon presentation. For asymptomatic patients, the median gestational age at symptom start or diagnosis was 37 weeks; for symptomatic patients, it was 33 weeks; and for patients who needed oxygen assistance, it was 36 weeks. This indicated a risk of severe COVID-19 infection in late pregnancy. A modified immune system may control the extreme changing in secondary physiological aspects adapted due to pregnancy. However, the hormonal role in modifying the immune system in pregnancy was significant. According to the evidence, severe COVID-19 during pregnancy is linked to iatrogenic premature births (75%), mostly due to maternal indication and during the third trimester (Pierce-Williams et al., 2020).

The results also showed low WBCs compared with uninfected pregnant women, similar results in the observation of Mohr-Sasson 2020 (Mohr-Sasson et al., 2020). C-Reactive Protein was also insignificant (Fig 2) and similar to the results observed by Rizo-Téllez in 2020 (Rizo-Téllez et al., 2020). The study showed that pregnant women affected by COVID do not have a significant chance to transfer it. It may affect the baby during and after birth. Furthermore, the modified immune system in pregnancy prevents most diseases but not viral ones.

It is challenging to determine with certainty whether pregnant women are at a higher risk of COVID-19's severe repercussions based on the available research. Pregnant women are nearly always excluded from more than 300 clinical trials looking into potential therapy alternatives, despite worries about their heightened sensitivity to COVID-19 (Whitehead & Walker, 2020). Pregnant participants are seldom included in clinical studies, not even those examining treatments with a well-established safety profile during pregnancy. In order to build a fair and knowledgeable evidence base with data from a representative population, researchers should be pushed to consider pregnant women and other groups. In several research, vaccination was seen as a prophylactic method to improve their health (Taryam et al., 2021). Similar beliefs about immunization being wise, necessary, or beneficial undoubtedly influenced or anticipated vaccine acceptance. Other factors mentioned by Tuite et al. (Tuite et al., 2010) were protecting others and residing with people who could be exposed. Immunization. The belief that immunization weakens one's natural defences, is unpleasant, brings on illness, or has no bearing on one's health was adversely connected with vaccination uptake (Taryam et al., 2021).

The provision of acute medical treatment has taken priority over the provision of prenatal care, resulting in a restricted capacity of clinics and a reduced capability to screen for disorders like gestational diabetes. Healthcare services have had to be reorganized in many contexts due to social distancing regulations that limit direct interaction between specialists and patients to suggest identifying and treating mental health issues more effectively (Brooks et al., 2020). In this situation, most women are extra susceptible to intimate partner abuse (Bradbury-Jones & Isham, 2020; Pal & Rao, 2020) and the harmful pregnancy related to it, and they are also less able to seek help. (Wenham et al., 2020) The study results observed an insignificance relation between Comorbid diseases with COVID-infected women, similar to Wang's research in 2020. (Wang et al., 2020) The vaccination and the booster dose were very helpful in reducing the intense onset of the disease that leads to death. Besides all, vaccination is more important not only to stop the onset of disease but also to restrict the severity of the disease. (Menni et al., 2021) Social distancing and precautionary measures such as masks, gloves and hand sanitization restrict the spread. In conclusion, the overall features of individuals with COVID-19 infection who appear from mid-trimester forward are comparable to those of non-pregnant people based on the clinical and scientific evidence that is currently available. There is currently no proof that COVID-19 infection is more likely to affect pregnant women or that COVID-19 infection increases the risk of developing severe pneumonia.

CONCLUSION

The results showed insignificance with Comorbid diseases when compared with COVID- infected pregnant women and uninfected pregnant women, while a decrease in WBC and CRP was observed in COVID- infected pregnant women.

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