Maternal and Perinatal Outcome of Post Covid 19 Infection at Qena Governorate

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Abstract

Background: The global pandemic induced by the severe acute respiratory syndrome coronavirus 2 (SARSCoV2) was expanding at an accelerating rate. The clinical manifestations of COVID-19 in pregnant women were identical to those of general COVID-19 patients, suggesting a bad outcome for both mother and fetus. Imaging features indicative of COVID-19 pneumonia were present in the majority of chest CT images of the work.

Objectives: to detect the maternal and perinatal outcomes of post-COVID-19 infection in Qena Governorate.

Patients and methods: This study was a prospective observational cohort research that was conducted in the obstetrics and gynecology department, faculty of medicine, Qena University, at Qena University Hospitals and General Hospital from January 2022 to December 2022.

Results: Among our included patients, the majority (93.3%) got pregnant spontaneously, while 6.7% had induced ovulation. 7.2% were primigravida, while the remaining 92.8% were multigravida. Among our studied population, 1.7% developed maternal complications (1 developed maternal hemorrhage, 1 developed chorioamnionitis, and both had preterm labor).

Conclusion: In pregnant women with post-COVID-19 infections, severe maternal and newborn problems were common.

Keywords: COVID 19; Infection; Pregnancy.

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Introduction

The global dissemination of the SARS-CoV-2 pandemic is occurring at an accelerated pace. It is imperative to identify and safeguard individuals who are most vulnerable in society as mortality rates increase. Previous epidemics of human coronaviruses, including SARS-CoV-2 and MERS-CoV, have provided valuable insights into the heightened susceptibility of pregnant women and their fetuses to the detrimental consequences of infection **(Zhu et al., 2020 ; Wong et al., 2004)**.

The clinical manifestations of COVID-19 in pregnant individuals were shown to be similar to those observed in non-pregnant individuals with the virus. These symptoms included fever, congestion, myalgia, shortness of breath, and diarrhea. Consequently, the outcome of COVID-19 infection during pregnancy was adverse for both the maternal and fetal health. The health of the mother was adversely affected by a COVID-19 infection during pregnancy **(Guan et al., 2020)**. Lymphopenia, leukocytosis, reduced platelet counts, and elevated levels of transaminase, C-reactive protein, and D-dimer were commonly seen in the laboratory results of patients. The majority of chest CT pictures had imaging characteristics that are suggestive with COVID-19 pneumonia (**Guan et al., 2020)**.

A systematic review was conducted, including a total of 230 women from 20 eligible studies. Among these women, there were 154 deliveries, 66 continuing pregnancies, and 10 abortions. Additionally, 156 neonates from the same 20 valid studies were included in the review. A total of 34.62% of the cases involving pregnant persons were found to have obstetric problems, and among these instances, 59.05% of the individuals reported fever. A prevalence rate of 40.71 percent was observed for lymphopenia in the studied population. Mechanical ventilation was supplied to a proportion of 5.1% of the female population. A total of seven ladies were in a critical state. One female parent and two juvenile individuals died. Approximately 24.74 percent of newborns were born prematurely. All five infants who tested positive for SARS-CoV-2 through throat swab testing were delivered through cesarean section. Among the babies who underwent throat swab testing, a total of three out of eight individuals had higher levels of IgM and IgG antibodies targeting the SARS-CoV-2 virus **(Chi et al., 2020)**.

The objective of the research was to identify the maternal and perinatal effects of post-COVID-19 infection in Qena Governorate.

Patients and methods

Type of the study: cohort study from January 2022 to December 2022.

Study Setting: Qena Governorate including Qena university hospital and general hospital:

Study subjects:

1- **Inclusion criteria**: Pregnant women with past history of COVID-19 before pregnancy which was validated by PCR or History of admission to isolated hospitals for COVID-19 infection.

2- **Exclusion criteria:** 1- Pregnant women with any medical disorders such as [DM , Asthma , hypertensive , Chronic kidney disease , Heart disease) 2-pregnant women with obstetric disorder such as premature rupture of membrane ;Placenta previa ;hyperemesis ; Hypertension (HTN) disorders with pregnancy.

Study tools: Potential trial participants were provided with both verbal and written information, and written informed consent was obtained from every patient who qualified for the research.

All patients were subjected to the following

A) Content of initial visit (Booking visit):

i. Full complete medical history:

1. maternal name, age and parity.

2.Occupation.
3. Conception (Spontaneous, ovulation induction, intracytoplasmic sperm injection, or in vitro fertilization).
4. Previous history of any respiratory infection
5. History of medications: anti-coagulants or antihypertensive.
6. Family history of asthma.
7. Gestational age, weeks.
8. Pregnancy interval

ii. General examination:

1. General condition of the patient.
2. Vital signs
3. Body mass index (BMI)

iii. Abdominal and obstetric examination:

1. By ultrasonography (U/S): Determination of gestational age, fetal lie, position, amniotic fluid index, placenta site, grading and fetal weight.
2- Exclude any fetal malformation.

iv. Investigations:

1. the eligible patients had Positive PCR.
2. Full routine laboratory tests: CBC for Lymphopenia, coagulation profile, liver function (ALT and AST), kidney function tests, random blood sugar

B) Content of Subsequent visit:

1- **Any new complaint**
2- **Laboratory investigation** CBC for Lymphopenia, coagulation profile, liver function (ALT and AST), kidney function tests, random blood sugar
3- **III. Abdominal and obstetric examination:**
1. By U/S: Determination of gestational age, fetal lie, position, amniotic fluid index, placenta site, grading and fetal weight.

C) Antenatal visits

In first 28 weeks → Visit every 2 weeks
Till 36 weeks → Visit every one week
Till 41 weeks → twice weekly

D) Follow up (All pregnant women were subjected for regular visits of follow up to detect any problems were occur for mother or pregnancy all through pregnancy period and during labor and after labor up to the end of puerperium

Research outcome measures: To evaluate the incidence of maternal and fetal complications and the need of neonatal intensive care admission (NICU).

Ethical code: SVU-MED-OBG024-1-22-2-325.

Statistical analysis

Utilizing version 26 of the Statistical Package for the Social Sciences (SPSS) software, data was managed and analyzed. Continuous variables were illustrated as Mean ± SD or median and range. The median and range were utilized for assessing ordinal variables. When the P value was ≤0.05, the values were deemed significant.

Results

The current study included 236 patients; their ages ranged from 20-39 years, with a mean age of 27.75 ± 5.709 years. Their BMI ranged between 26 and 31, with a mean value of 28.075 ± 1.419. Their Gestational age (GA) ranged between 34 – 40 weeks, with a mean value of 37.567 ± 1.382. Their gestational interval ranged between 34-41 weeks, with a mean value of 37.576 ± 1.703. Among our included patients, the majority (93.2%) got pregnant spontaneously, while 6.8% had induced ovulation. 7.2% were primigravida, while the remaining 92.8% were multigravida. Among our studied patients, AFI ranged between 8 – 19 with a mean value of 12.983 ± 3.514, EFW ranged between 2210 – 3455 g with a mean value of 2731.119 ± 502.596 g, and BPD ranged between 90.8 and 93.5 with a mean value of 91.659 ± 0.788, (**Table.1**).

Table 1. Socio-demographic and clinical data distribution of the studied population

Variables			N=236	
Age (yrs)	**Range**		20 – 39	
	Median [IQR]		26 [8.5]	
	Mean ± SD		27.750 ± 5.709	
BMI	**Range**		26 – 31	
	Median [IQR]		28 [2]	
	Mean ± SD		28.075 ± 1.419	
Gestational age (weeks)	**Range**		34 – 41	
	Median [IQR]		38 [3]	
	Mean ± SD		37.576 ± 1.703	
			N	**%**
Mode of pregnancy	**Spontaneous**		220	93.2%
	Induced ovulation		16	6.8%
Gravidity	**Primigravida**		17	7.2%
	Multipara		219	92.8%
Parity	**PG**		17	7.2%
	1		65	27.5%
	2		97	41.1%
	3		57	24.2%
Mode of Delivery	**NVD**		158	67.8%
	CS		75	32.2%
Obstetrical characters:	**Min**	**Max**	**Mean**	**SD**
AFI	8	20	12.983	3.514
EFW	2210	3455	2731.119	502.596
BPD	90.8	93.5	91.659	0.788

PG: primigravida, NVD: normal vaginal delivery, CS: cesarean section, AFI: Amniotic Fluid Index, EFW: Estimated Fetal Weight. BPD: Biparietal Diameter Biparietal.

Among our studied patients, HB ranged within 9.200-14.200 with mean value of 10.431±1.174 and WBCs ranged within 6200-8.800 mm3 with a mean value of 8.010±0.527 and lymphocytes% ranged between 28 – 33 with a mean value of 8.026 ± 0.527. Bleeding profile and biochemical investigations were within the normal range, (**Table .2**).

Table 2.Laboratory findings among studied population

Variables	N=236			
	Min	**Max**	**Mean**	**SD**
HB	9.100	14.200	10.431	1.174
HCT	27.300	42.600	31.294	3.523
WBCs	6.200	8.800	8.026	0.527
Plat	240.000	343.000	296.627	26.099
CRP	1.000	2.400	1.319	0.339
Lymphocytes%	28	33	30.782	2.241
PT	20	27	22.788	2.024
PTT	28.5	35.5	31.288	2.025
INR	1.9	3	2.392	0.259
urea	26.9	27.9	27.225	0.214
Creatinine	0.5	1.3	0.918	0.222
AST	12	26	18.729	4.027

ALT	9	23	15.559	3.999

HB: Hemoglobin, HCT: Hematocrit, WBCs: White Blood Cells, Plat: Platelets, CRP: C-Reactive Protein, PT: Prothrombin Time, PTT: Partial Thromboplastin Time, INR: International Normalized Ratio, AST: Aspartate Aminotransferase and ALT: Alanine Aminotransferase.

Among our studied patients, vital data at assessment were within the normal range, (**Table .3**). Among our studied population 1.7% developed maternal complications (1 developed maternal hemorrhage, 1 developed chorioamnionitis, and both went into preterm labor). 98.3% had viable fetus, 0.4% had still birth while 1.3% suffered from abortion. Fetal complications were present in 2.5% with 1.3% suffering from IUGR and 1.3% had RD. 1.7% required NICU admission, (**Table .4**, **Fig.1,** and **Fig.2**).

Table 3. Vital data of the studied population

Variables	**N=236**			
	Min	**Max**	**Mean**	**SD**
HR	70	90	78.517	6.165
RR	17	20	17.237	0.768
Temp	37	37.5	37.051	0.151
SBP	90	120	108.856	8.652
DBP	60	80	70.021	5.063

HR: Heart Rate, RR: Respiratory Rate, Temp: Temperature, SBP: Systolic Blood Pressure, DBP: Diastolic Blood Pressure.

Table 4. Maternofetal Outcomes

Variables		**N=236**	
		N	**%**
Maternal complications	**Yes**	4	1.7%
	NO	232	98.3%
Maternal complications	**Maternal hemorrhage**	1	0.4%
	Infection	1	0.4%
	Preterm labor	2	0.8%
Fetal outcome	**Viable fetus**	232	98.3%
	Still birth	1	0.4%
	Abortion	3	1.3%
Fetal complications (IUGR, RD)	**Yes**	6	2.5%
	NO	230	97.5%
Fetal complications	**IUGR**	3	1.3%
	RD	3	1.3%
Need NICU admission	**Yes**	4	1.7%
	No	228	96.6%

IUGR: intrauterine growth restriction, RD: Respiratory distress, NICU: neonatal intensive care unit.

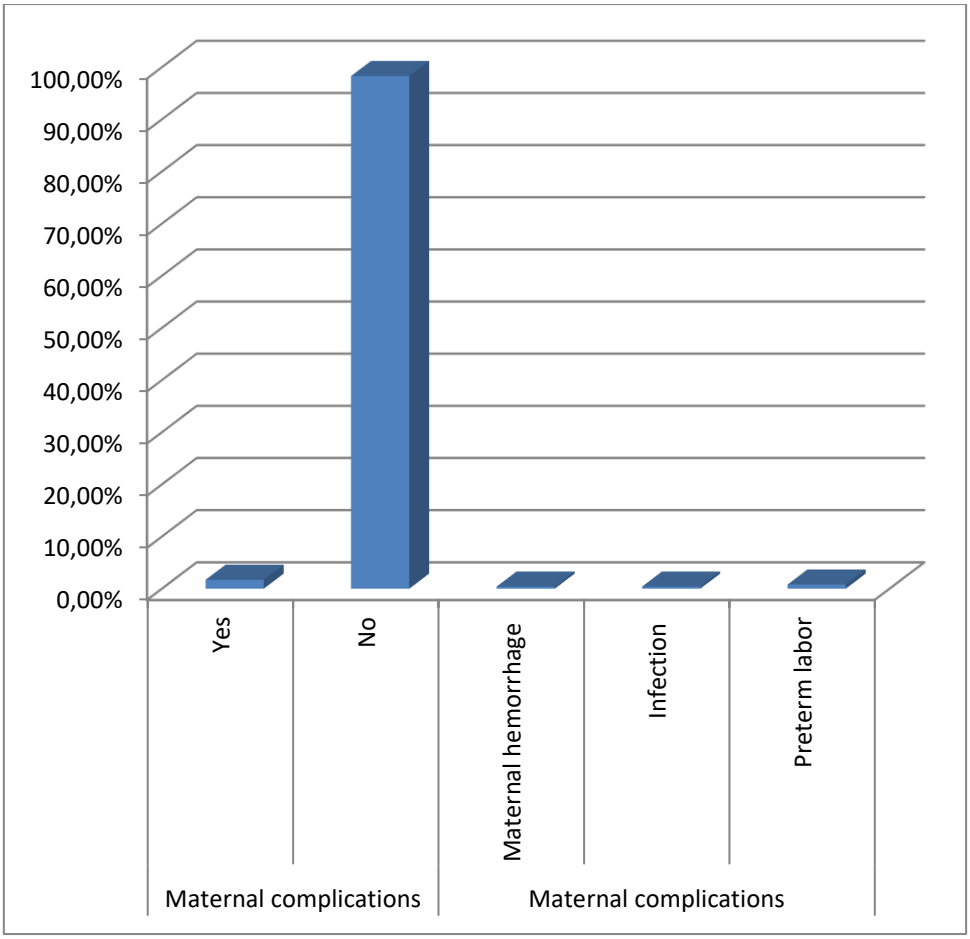

Fig.1. Maternal complications of the studied groups

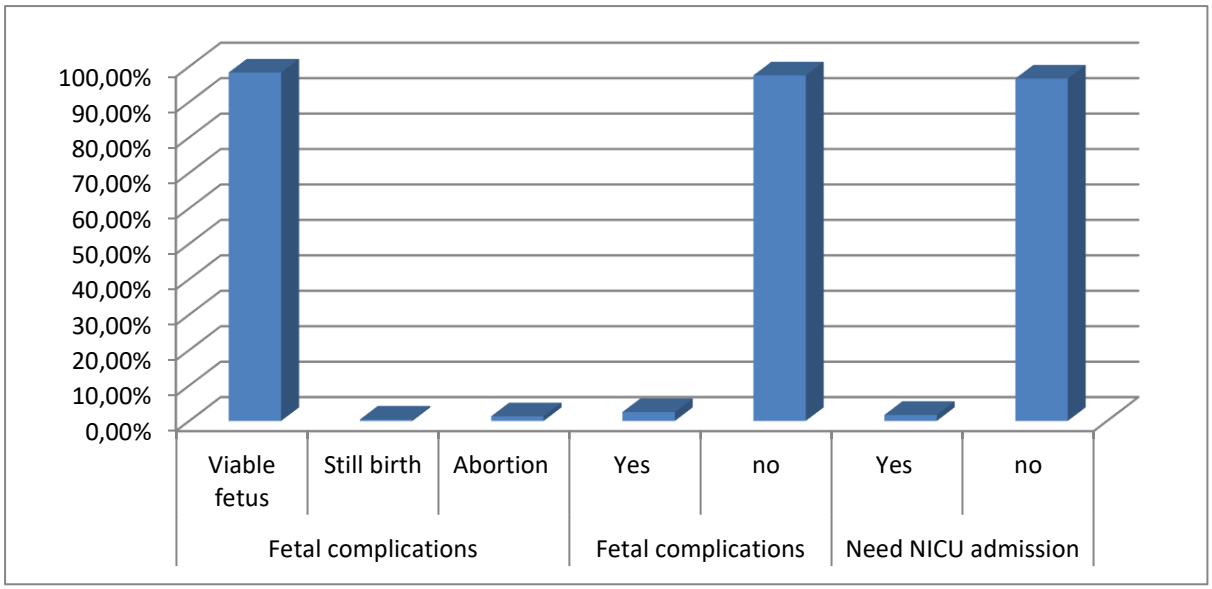

Fig.2. Fetal complications of the studied groups

There was significant negative correlation between maternal complications and EFW (P-value = 0.014) and BPD (P-value = 0.023). There was significant negative correlation between neonatal complications and AST (P-value = 0.033) and ALT (P-value = 0.039) levels, (**Table .5**).

Table 5. Correlation between neonatal and maternal complication with other variables

Correlations	Neonatal complication		Maternal complications	
	r	P. Value	r	P. Value
Age	-0.03842	0.55954	-0.07193	0.27418
BMI	-0.09562	0.14563	-0.07774	0.23721
GA at birth	0.047304	0.4724	.135*	0.04023
Still birth	-0.00868	0.89519	-0.01067	0.87126
Labor	-0.00511	0.93817	-0.06052	0.35776
Parity	-0.08685	0.18647	-0.06031	0.35942
AFI at labor	0.077616	0.23794	0.103202	0.11618
EFW	-0.12705	0.05278	-.161	**0.01372***
BPD	-0.11658	0.07572	-.149	**0.02331***
HB	0.058088	0.37742	0.011608	0.8601
HCT	0.058088	0.37742	0.011608	0.8601
WBCs	-0.00689	0.91665	-0.01877	0.77565
Plat	0.051704	0.43216	-0.00301	0.96354
CRP	-0.07	0.28728	-0.10006	0.12778
HR	-0.02049	0.75576	-0.04719	0.47346
RR	-0.04119	0.53152	-0.05067	0.4414
Temperature	-0.04479	0.49632	-0.05509	0.40255
SBP	0.018345	0.78059	0.022567	0.73185
PT	-0.10118	0.12355	-0.07718	0.24062
PTT	-0.10118	0.12355	-0.07718	0.24062
INR	0.027082	0.6809	0.033314	0.61291
Urea	0.046927	0.47594	-0.0056	0.93226
Creatinine	-0.11548	0.07855	-0.0263	0.68958
AST	-.140	**0.03279***	-0.04429	0.5011
ALT	-.135	**0.03924***	-0.03761	0.56786
Interval months	0.092141	0.16095	0.0932	0.15617

Discussion

In recent months and during the rapid global spread of coronavirus disease 2019 (COVID-19), many expectant women have contracted the virus, as have other individuals. However, there is insufficient data on the clinical manifestations, outcomes, and complications of this virus during pregnancy. Pregnant women may be at higher risk for complications from a COVID-19 infection due to changes in their respiratory and non-respiratory physiologies. **(Dashraath et al., 2020)**.

SARS-CoV-2 infection during pregnancy can have devastating consequences, as evidenced by higher rates of hospitalization and intensive care unit (ICU) admittance, maternal mortality, stillbirth, preeclampsia, & preterm birth **(Villar et al., 2021; Allotey et al., 2020)**. In the United Kingdom, the incidence of hospital and ICU admissions, as well as the associated co-morbidities, has risen with each wave. **(Vousden et al., 2022)**.

The current study included 236 patients: with a mean age of 27.75 ± 5.709 years. The mean BMI value was 28.075 ± 1.419. Their GA ranged between

34 – 40 weeks, with a mean value of 37.567 ± 1.382. The majority got pregnant spontaneously.

Our study was supported by **Pirjani et al. (2020)** who reported that the mean age in infected pregnant women with COVID-19 was 30.97 (6.38) years, BMI was 29.45 (4.23), and gestational age was 32.64 (9.68) weeks.

Also, **Zaigham et al. (2020)** study on pregnant women with Covid-19 reported that the majority presented with fever (68%) and cough (34%). 70% of the women had elevated levels of C-reactive protein, and 91% of the women gave birth via cesarean section. There were three admissions to a maternal intensive care unit, but no maternal fatalities. Also reported were one neonatal death and one intrauterine death.

Cesarean section is the most prevalent delivery method reported among individuals with a confirmed COVID-19 infection **(Karami et al., 2020)**.

Regarding laboratory data of the studied population, we found that HB ranged within 9.200-14.200 with mean value of 10.431±1.174 and WBCs ranged within 6200-8.800 mm3 with a mean value of 8.010±0.527 and lymphocytes% ranged between 28 – 33 with a mean value of 8.026 ± 0.527. None of them have lymphopenia. As for the bleeding profile, biochemical investigations, and vital data at assessment, they were within the normal range.

In accordance with the results of our research, **Li et al. (2020)** reported that the mean WBC count × 109/L in cases of COVID-19 was 8.6 ± 1.8 and the AST was 16.3 ± 5.2. However, the mean lymphocyte count (109/L) was 1.5 ± 0.4, the mean ALT was 11.6 ± 5.0, and the mean CRP was 4.8 ± 4.8. Indicating that all the previously mentioned parameters were within the reference range except for CRP.

Among our studied population 1.7% developed maternal complications (1 developed maternal hemorrhage, 1 developed chorioamnionitis, and both went into preterm labor). 98.3% had viable fetus, 0.4% had still birth while 1.3% suffered from abortion. Fetal complications were present in 2.5% with 1.3% suffering from IUGR and 1.3% had RD. 1.7% required NICU admission. There was significant negative correlation between maternal complications and EFW (P-value = 0.014) and BPD (P-value = 0.023). There was significant negative correlation between neonatal complications and AST (P-value = 0.033) and ALT (P-value = 0.039) levels

Thomas et al. (2020) aimed to study the impact COVID-19 infection during pregnancy, involving effects on the mother and her baby. According to their findings, about 2.5% had maternal complication with preterm labor occurring in 50% of mothers who suffered from complication. Furthermore, they found that more than 3% had fetal complications.

Consistent with our findings, a comprehensive review by **Yang et al. (2022)** found that adverse fetal and neonatal outcomes of COVID-19 involve preterm delivery (21.3 %), fetal distress (10.7 %), stillbirth (1.2 %), neonatal death (1.2 %), and newborn asphyxia (1.2 %).

In contrary to our findings, a case series by **Juusela et al. (2020)** from who found that 28.5% of pregnant females with COVID-19 experienced complication with most of them requiring ICU admission.

Conclusion

In pregnant women with post-COVID-19 infections, severe maternal and newborn problems were common. However, because this study had a small sample size, generalizations of our results should be taken cautiously.

Conflict of Interest: The authors declare no conflicts of interest.

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