Perinatal Obstetrical and Psychological Outcomes among Pregnant Women with COVID-19

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Abstract

Background: COVID-19 is a highly infectious disease with important indirect implications for the outcomes of maternal and neonatal health. **Aim:** to assess the perinatal obstetrical and psychological outcomes among pregnant women with COVID-19. **Design:** A descriptive cross – sectional research design was utilized. **Sample**: A purposive sample of 53 pregnant women who had infected COVID-19. **Setting**: This study was conducted in four different health setting at two governorates; Mansura and Fayoum Governorate. **Tools of data collection:** Four tools used to collect data: (I) Structured interview schedule and (II) Pregnancy & Maternal outcome assessment tool. (III) Neonatal outcome assessment tool and lastly (IV) Psychological consequences assessment tools. **Results**: The results of this study presented that the large proportion of studied women exhibited very sever level of depression, anxiety, and stress, there were statistical significant relation between the complications encountered among studied pregnant women that infected with COVID-19 and the associated risk of pregnancy either during pregnancy, labor or postpartum. **Conclusion:** Pregnant women with COVID-19 might have an increased risk of adverse obstetrical perinatal outcomes, such as; preterm labor, intrauterine fetal death, stillbirth, increase pregnancy related risk, increase fetal and maternal distress. **Recommendations:** Raise awareness of pregnant women in general and high-risk groups in particular about COVID-19 and its preventive measures and coping strategies across, activated antenatal class, the internet, media and other massive multimedia authorities concerned.

Keywords: COVID-19, Perinatal, Obstetrical, Psychological Outcomes.

Introduction

COVID-19 is a highly infectious disease with important indirect implications for the outcomes of maternal and neonatal health. In March 2020, the World Health Organization announced a global coronavirus disease pandemic 2019 (COVID-19) caused by extreme coronavirus acute respiratory syndrome (SARS-CoV-2). Both pregnant women and their fetuses are considered at high risk of transmitting infectious diseases during outbreaks in vulnerable populations (**WHO, 2020**).

Most studies of COVID-19 pregnancy cases to date have been either asymptomatic or self-limiting pneumonia. Immunological and physiological adaptations during pregnancy could, however, make women more susceptible than the general population to SARS-CoV-2 infection. In addition, cases of serious illness have been reported among pregnant women with comorbidities such as diabetes,

preeclampsia, and cardiovascular disease (**UNPF, 2020**). Moreover, previous human coronaviruses (e.g. pandemic influenza and SARS) have been associated with increased maternal and neonatal deaths The immaturity of the innate and adaptive immune systems makes them extremely vulnerable to infection with respect to the fetus and the newborn (**Schwartz DA.2020**).

Evidence indicates that extreme COVID-19 is correlated with iatrogenic preterm delivery in pregnancy (75%), mainly for maternal and third trimester indications. A large proportion of neonates born to mothers who had SARS-CoV-2 infection were asymptomatic and were discharged to their mothers at home. Just a few neonates showed signs of infection, and they were in the minority requiring admission to specialist neonatal care; only in a few cases did neonates have SARS-CoV-2 positive tests after birth. Three neonates had elevated serum IgM antibodies found in umbilical blood shortly after birth, but despite testing, SARS-CoV-2 was not identified in any of these infants in the neonatal period (**Zeng L, et al., 2020**).

In the current COVID-19 pandemic, pregnant women and their newborns should be tested for being possible risk categories. To date, there has been no epidemiological evidence available on the general population's psychological health issues during pandemic of COVID-19, it is unclear how to better react to challenges. Boredom, loneliness, and rage are frequently encountered by those in quarantine, and the virus has also been repeatedly portrayed on social media as a killer virus, perpetuating a feeling of danger and fear among the public.

Psychiatric morbidities such as chronic depression, anxiety, panic attacks, psychotic symptoms, and even suicidality were reported in the early stages of the 2003 SARS epidemic. As part of the public health response to the COVID-19 outbreak, obligatory contact tracing and a 14-day quarantine were enforced. Increased anxiety, feelings of alienation and stigma. COVID-19 is a new virus; thus, data available on health results that can guide clinical decision-making is focused on case studies/reports of poor quality and expert opinion (Evidence Based Birth 2020). Maternity nurses will provide triage, advice and refer women to maternal and mental health services and specialist services as required (**Mascio D., et al., 2020**). Infections are more likely to affect pregnant women and are usually known to be at higher risk for serious complications (**Guan, W. et al., 2019**). In addition, due to increased concern about vertical transmission to their fetus, pregnant women may be more susceptible to anxiety. To date, no research has been carried on pregnant women's wellbeing in response to the COVID-19 outbreak. This research tries to investigate the effect of COVID-19 outbreak on perinatal obstetrical and psychological outcomes.

Significance of the study

The COVID-19 pandemic is a global public health event that has resulted in considerable uncertainty and isolation. For pregnant women who have increased stress due to worries about their fetus, the negative effect may be much greater. Continuous data collection on the outcomes of infection during pregnancy would remain relevant in the sense of the COVID-19 pandemic. There is insufficient evidence available on the maternal and perinatal outcomes of pregnant women infected with COVID-

19. In the COVID-19 pandemic, millions of women will give birth, but the consequences for pregnant women and their offspring are uncertain. (**Dashraath P., et al.,2020**). In addition, in the absence of such definitive evidence on the effect of COVID-19 on perinatal outcomes with reported or suspected cases of COVID-19, as studies to date have focused on limited samples and case studies (**Chen,H., et al. 2020**). A lack of research on the psychological impact of the global epidemic on the general population, particular emphasis on pregnant women. Inquired into the impact of COVID-19 on perinatal, maternal and neonatal outcomes to fill this gap as well as shed light on the psychological state of pregnant women

Aim of the study

This study aimed to assess the perinatal obstetrical and psychological outcomes among pregnant women with COVID-19.

Through the following objectives

1- Assess the effect of COVID-19 on pregnancy, labor, and postpartum outcome

2- Evaluate the effect of COVID-19 on pregnant women psychological state

3- Investigate the effect of COVID-19 on maternal and neonatal outcomes

Research questions:

1- What are the perinatal obstetrical outcomes among pregnant women with COVID-19?

2- What are the psychological outcomes among pregnant women with COVID -19?

3- What are the effects of COVID -19 on maternal and neonatal outcomes?

Operational definitions:

Perinatal obstetrical and psychological outcomes: these are including complications and consequences that occur during pregnancy, labour, and postpartum (up to 1 week) as well as evaluation of the negative emotions (stress, anxiety, and depression) that experienced by the infected pregnant women.

Maternal outcomes: these are including physical condition represented in, severity of COVID-19 symptoms, associated disease, admission to ICU, needing for intubation, maternal morbidities and mortalities.

Neonatal outcome: these are including gestational age, birth weight, Apgar score, neonatal morbidities and mortality up to 7 days after deliver, admission to NICU.

Subjects and Methods

Study design:

A descriptive, cross–sectional research design was utilized in this study. In this study design the disease or condition and potentially related factor are measured at specific point in time for a defined population, as well as investigate and describe a problem which is not clearly defined. It is conducted to have a better understanding of the existing problem.

Study Setting: This study was carried out in four different health setting

at two governorate; Mansura and Fayoum Governorate, first health sitting at health insurance hospital that affiliated to Ministry of Health at Fayoum governorate which considered a main isolation hospital that offers care for all infected cases who came from rural and urban areas in Fayoum Governorate, the remaining three isolation health sitting were at Mansura governorate included Temai El-Amdid Central Hospital, Mansoura chest hospital, and convalescence building at Mansura University Hospital which considered specialized building for cases with Covid 19 at Mansoura University Hospital. In addition, it offers health-care services to all of the neighboring villages.

Study Subjects

A purposive sample of 53 pregnant women who had infected COVID-19 from the period of beginning of June 2020 to the end of November 2020. Pregnant women coming and isolated at the previously stated setting they were recruited and followed up during labor, until the immediate postpartum period, consented to join the study based on the following criterion:

Inclusion criteria.

1.Either primigravida or multigravida**.**

2.Positively& definitely diagnosed with COVID-19

3.Willing to participate in the study

Exclusion criteria

1.Suspicious COVID-19 cases

2.Refuse to participate

Data collection tools:

Data collection of the current study was done through the use of the following tools:

Tool (I): Structured interview schedule:

A structured interview schedule was developed and filled by the researchers based on extensive review of literatures. The questionnaire consisted of (5) parts namely: first; socio – demographic data (age, residence, educational level, and occupation), initial diagnosis data, previous medical history, timing and duration of infection The fifth part considered the mother's attitude related to the impact of COVID-19 on pregnancy outcome.

Tool (II): Pregnancy & Maternal outcome assessment tool which includes three parts: this tool adopted from (WHO, 2015):

Part 1: Pregnancy outcome data: which included; current obstetrics history weeks of gestation, pattern and setting of current ANC follow-up visits current pregnancy condition, status of current pregnancy before getting infection,

Part 2: Labour outcome data: which included; mode of delivery, duration of labor stages, and indications of C.S, usage of analgesia, needing for O_2 therapy, severity of corona symptoms as well as maternal and fetal complications occur during delivery

Part 3: Postpartum data collected by Postpartum record: which included post- partum period complications that have risen to the woman as well as needing for O2 therapy, CPR, intubation, and intensive care unit admission, duration of hospital stay. Follow up

period started immediately following the delivery until patient's discharge from hospital).

Tool (III): Neonatal outcome assessment tool which include three parts:

Part 1: in which data were collected using the Apgar score tool, **(Apgar, V., 1952)** which was developed in 1952 by Dr. Virginia Apgar as a simple and repeatable method of quickly and summarily evaluating the health of the newborn soon after birth.

Part 2: which included data related to neonatal living condition, birth weight, weeks of gestation at time of delivery, neonatal complications, congenital anomalies, types of congenital anomalies, admission to NICU, reason for admission, breast feeding initiation and problems if present.

Part 3: including data related to newborn diagnosis with corona including the results of diagnostic swap

Tool (IV): Psychological consequences assessment tools:

The DASS (Lovibond & Lovibond, 1995) is a 21-item measure designed to measures the negative emotional states that includes 3 subscales assessing symptoms of depression, anxiety, and stress. S (Stress): Q1, 6, 8, 11, 12, 14, 18. A (Anxiety): Q2, 4, 7, 9, 15, 19, 20. D (Depression): Q3, 5, 10, 13, 16, 17, 21

Scoring: Respondents rate each item to reflect how much it applies to their experience over the preceding week on a Likert scale ranging from 0 ("did not apply to me at all") to 3 ("applied to me very much"). Subscale score totals are multiplied by 2 in order to be comparable

to the DASS means norms, which are based on the 42-item version of the scale. Thus, possible scores on each subscale range from 0 to 42. Recommended cut-off scores for conventional severity labels (normal, moderate, severe) are as follows:

1.Depression 0-9 = normal range; 10-13 = mild; 14-20 = moderate; 21-42 = severe

2.Anxiety 0-7 = normal range; 8-9 = mild; 10-14 = moderate; 15-42 = severe.

3.Stress 0-14 = normal range; 15-18 = mild; 19-25 = moderate; 26-42 = severe

Validity and reliability

The validity of the instruments was ascertained by a staff of medical and nursing expertise who checked the content accuracy tools. The reliability coefficient of the instruments was accounted for through the implementation of the correlation coefficient Alpha (Cronbach). It showed a fluctuation between 0.90 and 0.95 in the reliability coefficient value, which is still statistically important and reflects very high reliability.

Administrative and ethical consideration

A formal letter was issued from the two Faculties of Nursing, Mansoura and Fayoum, in order to obtain an official approval from responsible authorities of the previous stated setting where the data were collected to conduct the study. The letter outlined the purpose of the analysis, clarified its method, and obtained permission prior to initiating the collection of data. To each woman, the aims and nature of the study was

explained. Each woman gave her oral informed consent before inclusion in the research sample to participate in the present study. She was told that participation in the study was voluntary and that she could withdraw from the study if she decided to complete confidential participation.

Pilot study

A pilot study conducted to test the applicability of the tools, the feasibility of the study, also to estimate the time needed to collect the data. It was conducted on 10% of total number of women (6 cases). They were included in the main study sample. The results of the pilot were used to finalize the tool and to schedule the fieldwork time needed. No changes were done in the data collection tools based on findings of the pilot study.

Field work:

- To achieve the study aim, the researchers visited and connected with the previously mentioned 4 settings to thoroughly assess and continuously follow- up the allocated participants

- Data of this study was collected by the cooperation of the nursing and medical staff those working in the isolation hospitals and responsible on the care of the infected pregnant women.

- Firstly the researcher visited and connected the staff to explain the nature of the study to thoroughly illustrate data collection tool and told them the importance to report any case of infected pregnant woman with COVID- 19 admitted to the hospital immediately either in the antenatal inpatient department or in labour unit

- While the infected pregnant woman admitted either in antenatal inpatient department or labour unit the registered nurses told the researcher after receiving permission from the woman that if the her health status allowed, the researcher call the participant directly by telephone daily.

- Whenever; if the participants health condition not allows the researcher collect the required study data through the following ways till the health status of the woman improved

● Calling the responsible staff present in the shift through the telephone twice daily at the morning and afternoon to monitor the status of participants

● Calling the woman relatives

● Returning to woman admission sheet to filling out tool (I) & section A of tool (II).

- All the recovered participants who is in 2nd trimester and isolated in inpatient antenatal department and discharged from the hospital were followed up till delivery time to ensure from the maternal and their fetal outcomes either delivered in the same hospital or outside.

- The researcher assessed the maternal, and neonatal outcomes at the time of delivery and reported the labour outcome either normal or subjected to any complications through contacted with the medical and nursing staff, the hospital records or participant's relatives to complete study tools to filling out tool(II) from part 2 &3 & tool (III).

- Tool (IV) concerned with assessment of women's psychological condition it collected when a participant's women health status is allow before discharged from the hospital.

- In all previously mentioned study settings, all prior actions were applied universally.

Statistical analysis:

Collected data were coded, computed and statistically analyzed using SPSS (statistical package of social sciences), version 21. Data were presented as frequency and percentages (qualitative variables) and mean ± SD (quantitative continuous variables). Chi square (χ^2) was used for comparison of categorical variables. Student's t test was used for comparison of continuous quantitative variables (two groups) and one way anova (F test) was used for comparison of continuous quantitative variables (more than two groups). The difference was considered significant at P ≤ 0.05.

Results

Table 1. Demonstrate that the mean age of total study sample were 27.81 ± 4.60 years Ranged between 20-38 years, more than two thirds of participants 71.7% was residents of rural areas. Also the majority of participants 90.6% were had secondary and university education while the minority 9.4% were had basic or less education. Regarding occupation it observed that nearly two thirds of participants 58.5 % were housewives.

Table 2. Represents the characteristics of COVID-19 infection among studied women as it was found that the great majority of participants 92.5 % reported that they infected with COVID -19 during their 3rd trimester while the remaining minority infected while they in 2nd trimester 7.5%. Duration of COVID-19 infection were spending from 1-4 weeks among more than half of infected participants 58.5%.

In addition to the severity of COVID-19 symptoms during participants admission to hospital it obvious that, the majority of participants exhibited moderate to severe symptoms which indicates that nearly more than two thirds of the participants 62.3 % had unstable health condition and needed for oxygen therapy. Consequently, those participants needed to be hospitalized in Obstetrics inpatient department.

Table 3. shows that the majority of studied women were multigravida 88.7% with a history of 1,2, 3 and more delivery time meanwhile; the minority of them 9.5% were had a history of abortion for more than 3 times. Also mean age of gestational weeks were 33.71 ± 4.18 ranged between 20-39 weeks. Moreover; study sample 100% were follow their pregnancy as well as 69.8% & 79.2 % of them were followed their pregnancy in private clinic with a regular pattern.

Regarding the current pregnancy associated risk among studied women **table 4.** illustrates that the associated risk were classified as underling pre-pregnancy medical conditions that encountered among 20/53 of total participants in the form of cardiovascular disorders50.0% followed by obesity 25.0%, HTN 20% and DM. 15.0%. in addition; pregnancy related risks were reported among 13/53 of total studied participants such as anemia 53.8% followed by gestational diabetes 15.4% and equal percentage of them 7.7% were had preeclampsia, APhge, PROM and multiple pregnancy.

Table 5. demonstrates the features of Impact of COVID-19 infection on perinatal outcome among studied women, that evidenced in a group of complications occurs during pregnancy such as preterm labour, premature rupture of membrane, maternal and fetal distress

with an equal percentage of 39.6% followed by pregnancy related risk complications among 13(24.5%) of total studied participants, in addition; intrauterine fetal death, still birth that reported among 3.8 %. Regarding labour outcome the same table pointed to the large proportion of studied participant 86.8% delivered by cesarean section, the main indications of Cesarean delivery were COVID-19 infection (73.9%) followed by PROM, maternal and fetal distress (45.6%). Moreover; nearly more than half of studied women who delivered by C.s 52.2% were complicated with bleeding, respiratory distress, and anesthesia complications

While regarding to postpartum period nearly two thirds of studied women 58.5% were exposed to variable types of complications that leading to maternal death among 5 cases these complications represented in increase severity of COVID -19 symptoms 48.4%, respiratory problems 45.2% so nearly 73.3 of them admitted to ICU and 8(25.8%) of them were connected with ventilator. Regards duration of hospital stay nearly half of studied women 47.2% stayed in hospital for 1-7 days and only 22.6% stayed for 15-30 days after delivery.

Concerning neonatal outcomes **table 6**. Clear up that more than one third of neonates 39.6%, 43.3 %were preterm with low birth weight from the total sample compared to 60.1%,56.7% were full-term with normal weight. Also it obvious from this table

that only 10 of entire delivered babies were died (18.9%) while the remaining ones were alive 81.1%. In addition to Apgar score at 1 minute 60.4 % of neonate reported moderate distress while this percentage were decreased in the subsequent assessment at 5 minutes to

45.2% and 47.2 % with normal condition. Nearly 41.5 of those still distressed neonate were admitted to NICU, the main indications for admission were respiratory problems, preterm birth, and low birth weight (100.0, 95.5%). The large proportion of them (81.8%) stayed for <7-30 days in NICU. Moreover; only 21(48.8%) of total living neonate were initiating breastfeeding on a sequent time after birth beginning immediately 42.8% to two days after birth 23.8%. Furthermore; neonates who initiated breastfeeding 21/48 were checked according to hospital policy for the acquisition of COVID-19 and their swap showed a negative result (100%).

Figure 1. Portray that more than half of studied women 56.3% were had a negative attitude towards impact of COVID-19 on pregnancy compared to 43.7% with appositive attitude.

Regards birth experience among studied women **figure 2**. Illustrates that more than two thirds of studied women 68.8% pointed to that their birth experience were worse than they expected, 14.6 % had a mixed feelings compared to 10.4% &6.2% their experience were better and as they expected.

Table 7. Reports that the large proportion of studied women exhibited very sever level of depression, anxiety, and stress 58.1%, 83.2%, and 48.0% respectively.

Table 8. Shows that the **associated** risk and severity of COVID-19 symptoms were had a significant negative impact on the psychological condition represented by high level of depression, anxiety and stress among studied women with COVID-19 P. 0.026,P0.034 respectively. Meanwhile; the gestational age affect negatively on

psychological status of participants but with no statistical difference P.0.275.

Table 9. clear up that there were statistical significant relation between the complications encountered among studied pregnant women that infected with COVID-19 and the associated risk of pregnancy either during pregnancy, during labor or during postpartum. P0.043, P0.009, and P0.021 respectively.as well as the associated risk of pregnancy impact negatively on the infected pregnant women with COVID-19 on antepartum, intrapartum, and postpartum period.

Table (1): Socio-demographic data of the studied women (N.53)

Characters	No	%
Age (years)		
• < 20	2	3.8
• 20 -	12	22.6
• 25 -	18	34.0
• 30 –	14	26.4
• 35 +	7	13.2
Mean ± SD	27.81 ± 4.60 years	
Range	20-38	
Residence		
• Rural	38	71.7
• Urban	15	28.3
Education		
• Basic or less	5	9.4
• Secondary	29	54.7
• University	19	35.8
Occupation		
• House wife	31	58.5
• Employee	22	41.5

Table (2): Characteristics of COVID-19 infection among studied women (N.53)

Items	No	%
Trimester of COVID-19 infection		
• 1st trimester	0	0.0
• 2nd trimester	4	7.5
• 3rd trimester	49	92.5
Duration of COVID-19 infection		
• < 1 week	20	37.7
• 1-4 weeks	31	58.5
• > one month	2	3.8
Severity of symptoms at admission		
• Mild	5	9.4
• Moderate	17	32.1
• Severe	31	58.5
Women health stability at admission		
• Stable	20	37.7
• Un stable	33	62.3
Need oxygen at admission		
• Yes	33	62.3
• No	20	37.7
Needing for inpatient hospital admission(obs. Department till delivery		
• Yes	33	62.3
• No	20	37.7

Table (3): Obstetric history and pattern of antenatal care among studied women (N. 53)

Items	No	%
Gravidity		
• Primigravida	6	11.3
• 2	17	32.1
• 3+	30	56.6
Parity		
• None	11	20.8
• 1-	17	32.0
• 2-	12	22.6
• 3+	13	24.6
Abortions		
• None	48	90.5
• 1-2	3	5.7
• 3+	2	3.8
Gestational age /weeks		
• 20- 25	4	7.6
• 26-30	19	35.8
• 31- >35	30	56.6
Mean +SD	33.71 ± 4.18	
Range	20 - 39	
Pattern of antenatal care		
Follow up during pregnancy	53	100.0
Place of follow up visits		
• MCH	9	17.0
• Private clinic	37	69.8
• Hospital	7	13.2
Type of follow up visits		
• Regular	42	79.2
• Irregular	11	20.8

Table (4): Pregnancy associated risk among studied women (N.53)

Medical history	No	%
Underling pre-pregnancy medical conditions (20)*		
• -DM	3	15.0
• -HTN	4	20.0
• -cardiovascular diseases	10	50.0
• -Respiratory diseases	1	5.0
• -Obesity	5	25.0
• -Psychological diseases	2	10.0
Pregnancy related conditions (13)		
• -Preeclampsia	1	7.7
• -Gestational diabetes	2	15.4
• -Anemia	7	53.8
• -Ante partum hemorrhage	1	7.7
• -Premature Rupture Of Membrane	1	7.7
• -Multiple pregnancy	1	7.7

(*) not mutually exclusive

Table (5): Perinatal outcome among studied women (N.53)

Pregnancy outcome	No	%
Impact of COVID-19 on pregnancy (53) *		
• Intra Uterine Fetal Death (IUFD)	2	3.8
• Still birth	2	3.8
• Pre- term labour	21	39.6
• Pre Premature Rupture Of Membrane (PROM)	21	39.6
• Ant Partum hemorrhage (Aphge)	1	1.9
• Maternal distress	21	39.6
• Fetal distress	21	39.6
• Pregnancy related risk	13	24.5
Labour outcome		
Mode of delivery		
1- Normal vaginal delivery (7)	**7**	**13.2**
• SVD	1	14.3
• Iinduced	6	85.7
2-Caesarean section (46)	**46**	**86.8**
• Elective C.S	17	37.0
• Emergency C.S	29	63.0
Indications of C.S (46) *		
• COVID-19 infection	34	73.9
• Pre Premature Rupture Of Membrane (PROM)	21	45.6
• Intra Uterine Fetal Death	2	4.3
• Maternal distress	21	45.6
• Fetal distress	21	45.6
• Previous C.S	4	8.7
• Obstructed labour	3	6.5
• Bleeding	1	2.2
• Failure of induction	1	2.2
Need for analgesia during normal vaginal delivery (7)	5	71.4
Intra-partum complications		
1- Complications occurs during normal vaginal delivery (7)	**4**	**57.1**
Types of complications (4)*		
• Precipitated labor (< 3 hours)	2	28.6
• Increase severity of COVID-19 symptoms	1	14.3
• Bleeding	2	28.6
• Need for blood transfusion	1	14.3
2- Complications occur during C.S (46)	**24**	**52.2**
Types of complications (24)*		
• Bleeding	15	62.5
• Anesthesia complications	7	29.2
• Respiratory distress	10	4.2
Postpartum outcome		
Postpartum complications	**31**	**58.5**
Types of complications (31)*		
• Maternal death	5	16.1
• Pyrexia	8	25.8
• Increase severity of COVID-19 symptoms	15	48.4
• Respiratory problem	14	45.2
• Need CPR	13	41.9
• ICU admission	22	73.3
• Connect with ventilator	8	25.8
• Post- partum hemorrhage	13	41.9
• Sub Involution	7	22.5
• Wound infection	4	12.9
• Deep Vein Tthrombosis	2	6.5
Duration of hospital stay / days		
• 1-7	25	47.2
• 8-14	16	30.2
• 15-30	12	22.6

(*) non mutually exclusive

Table (6): Neonatal outcome among studied women (N.53)

Items	No	%
Gestational age at birth:		
• < 37 weeks (preterm)	21	39.6
• ≥ 37 weeks (term)	32	60.1
Birth weight:		
• Low birth weight (< 2500gm)	23	43.3
• Normal weight (2500 – 3500gm)	30	56.7
• Overweight (>3500gm)	0	0.0
Neonatal condition:		
• Living	43	81.1
• Dead	10	18.9
Apgar score at 1 minute:		
• 0– 3	6	11.3
• 4 – 6	32	60.4
• 7 – 10	15	28.3
Apgar score at 5 minute:		
• 0– 3	4	7.6
• 4 – 6	24	45.2
• 7 – 10	25	47.2
Admission to NICU	**22**	**41.5**
Indications NICU admission (22) *		
• -Premature baby	21	95.5
• -Respiratory problems	22	100.0
• -Low birth weight	21	95.5
• -Hypoglycemia	5	22.7
• Jaundice	4	18.2
Duration of NICU stay / days		
• <1-7	10	45.5
• 8-14	4	18.2
• 15-30	8	36.3
Breastfeeding problem (43)	**21**	**48.8**
Initiate breastfeeding (21)		
• -Immediately after birth	9	42.8
• -One hour after birth	2	9.5
• -Two hour afterbirth	3	14.3
• -One day after birth	2	9.5
• -Two day after birth	5	23.8
Done swab for living newborn (43)	**21**	**48.8**
Swab results		
• Negative	21	100.0
• Positive	0	0.0

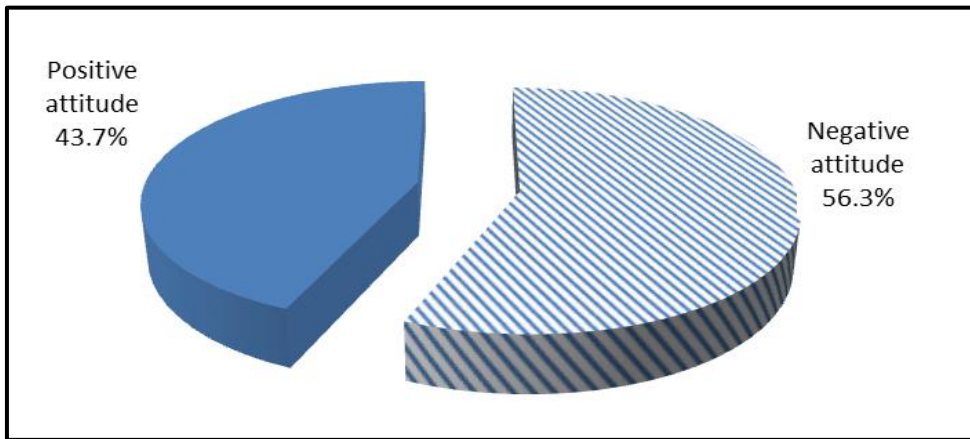**(*) not mutually exclusive**

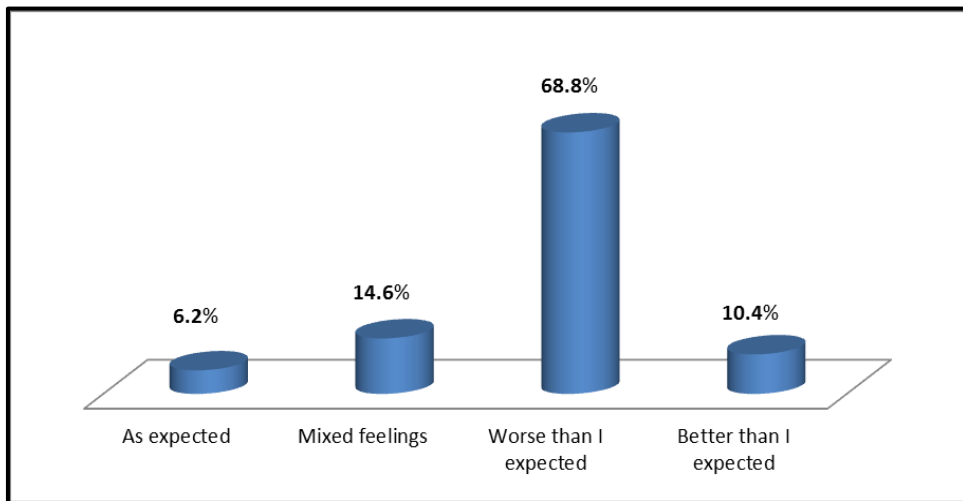**Figure (1): Women's attitude towards impact of COVID-19 on pregnancy (N.48)**

Figure (2): Percentage distribution of birth experience among studied women (48)

Table (7): Depression, anxiety and stress of the studied women (N.48)

Level	Depression		Anxiety		Stress	
	No	**%**	**No**	**%**	**No**	**%**
Normal	0	0.0	1	2.1	4	8.2
Mild	0	0.0	0	0.0	2	4.2
Moderate	5	10.4	3	6.5	8	16.7
Severe	15	31.5	4	8.2	11	22.9
Very severe	28	58.1	40	83.2	23	48.0

Table (8): Average scores of depression, anxiety and stress of the studied women in relation to their gestational age at admission, associated risk and severity of COVID-19 symptoms

Variable	Items	NO	Depression Mean ±SD	Anxiety Mean ± SD	Stress Mean ± SD
Gestational age (weeks)	20-	4	33.60±11.79	35.00±8.45	37.50±9.00
	28-	14	28.79±9.56	28.00±11.99	30.26±11.45
	35+	30	25.73±4.71	28.00±5.09	29.33±7.96
Significant test			**F=2.484,P0.094**	**F=1.211,P0.306**	**F=1.324,P0.275**
Associated diseases and risk	Yes	33	30.35±8.21	31.35±9.17	33.75±9.21
	No	20	25.64±6.66	27.12±7.71	28.18±9.20
Significant test			**t=2.287,P0.026**	**t=1.801,P0.078**	**t=2.142,P0.037**
Severity of symptoms	Mild	5	20.80±4.15	21.00±9.49	20.00±5.96
	Moderate	12	28.12±7.79	28.64±8.58	30.88±10.33
	Severe	31	28.09±7.51	30.00±7.83	31.61±8.64
Significant test			**F=2.210,P0.120**	**F=2.584,P0.086**	**F=3.605,P0.034**

Table (9): Relation between high risk pregnant woman and complications of COVID-19 during pregnancy, labor and postpartum

Perinatal outcome	High risk (33)		Not high risk (20)		χ^2 P. value
	No	%	No	%	
Complications during pregnancy					
• Yes	21	63.6	7	35.0	χ^2=4.100,
• No	12	36.4	13	65.0	P0.043
Complications during labor					
• Yes	22	66.7	6	30.0	χ^2=6.720,
• No	11	33.3	14	70.0	P0.009
Postpartum Complication(#)					
• Yes	19	57.6	5	25.0	χ^2=5.330,
• No	14	42.4	15	75.0	P0.021

(#): (including 5 deaths)

Discussion

The COVID-19 pandemic is a significant problem, threatening all population groups, especially pregnant women, because of many physiological and immunological changes that occur during pregnancy, making pregnant women more

vulnerable than others to respiratory pathogens and severe respiratory problems. Their risk of acquiring infection with COVID19 increases, especially if they suffer from other morbidities. A few researches on COVID-19 during pregnancy have been published so far **(UNPF, 2020**). The aim of this study was to examine the perinatal obstetric and psychological outcomes of COVID-19 pregnant women.

Concerning clinical characteristics of COVID-19 infection among studied women it was found that the great majority of participants reported that they infected with COVID -19 during their 3rd trimester, while the remaining minority infected while they in 2nd trimester. Duration of COVID-19 infection was spending from 1-4 weeks among more than half of infected participants. Moreover, the majority of participants exhibited moderate to severe symptoms which indicates that nearly more than two thirds of the participant had unstable health condition and needed for oxygen therapy. Consequently, those participants needed to be hospitalized in Obstetrics inpatient department.

This agree with **Liu, Y.; Chen, H.; Tang, K.; Guo, Y(2020)** who study Clinical manifestations and outcome of SARS-CoV-2 infection during pregnancy In cross-sectional descriptive studies. The majority of participants were in the 3rd trimester of pregnancy. These results were consistent with **Lopes de Sousa, A.F., (2020)** who studied the effects of COVID19 during pregnancy and neonatal prognosis. These searchers reported that the majority of the pregnant women had infected with corona virus during the third trimester.

This is inconsistent with **Laake,L,: et al (2018)** who study Risk of pregnancy complications and adverse birth outcomes after maternal A (H1N1

pdm 09 influenza). As regards to the low prevalence of severe infection among pregnant women, many of them could be asymptomatic and/or with mild symptoms, without the need for hospital care, corroborating findings from previous viral pandemics.

Regarding pattern of ANC follow-up pattern the current findings stated that more than two third of participant women were followed their pregnancy in private clinic with a regular pattern. This may be explained by the most risky pregnant mother more anxious and keener to follow their pregnancy and with high perception level toward risk.

These finding were in line with **Ahmed Gaheen,M., (2020)** who study effect of the New Corona Virus Disease 2019 on Pregnancy Outcome at El-Gharbia Governorate. Reported that the large proportion of participants received the antenatal follow up at private clinics with a regular manner.

Current study results cleared up the main adverse outcome that reported among studied participant during pregnancy were represented in preterm labor, premature rupture of membrane, maternal and fetal distress followed by pregnancy related risk complications

A systematic review with **Khan, M., (2020)** & **Nova,R., et al., (2021)** showed that near half of participant had premature delivery and others adverse obstetrics outcomes included: intrauterine fetal distress (5.9%), premature rupture of membranes (1.7%) women and (0.3%) stillbirth at 30 weeks of gestation.

Meanwhile; labour outcome in the current study represented in raised rate of cesarean section, followed by adverse consequences like bleeding, anesthesia complications, respiratory distress, in

addition to 2 cases exposed to precipitated labour increase intra-partum complications like; bleeding, increased severity of COVID-19 symptoms, among the minority who delivered vaginally.

A systematic review of 108 pregnancies **Zaigharn ,M., & Andersson,O., (2020)** and reporting data from 108 pregnancies in Eighteen articles they reported that 91% of the women were delivered by cesarean section, Cesarean delivery was the main mode of delivery among pregnant women.

From the analysis of the current study data, nearly two thirds of studied women were exposed to a variety of postpartum complications that leading to maternal death among 5 cases these complications represented in increase severity of COVID -19 symptoms, respiratory problems, postpartum heamorrhage, postpartum pyrexia, needing for CPR, so nearly 22 cases of them admitted to ICU, and 8 were connected with ventilator.

Recently, the Public Health Agency of Sweden released a report on 13 pregnant and postpartum women with a substantial higher risk of being admitted to ICU and, additionally, a higher risk of requiring mechanical ventilation support, raising concern about the real impact of COVID-19 in pregnant women **Collin,J.,et al. (2020).**

Also study by **Nayak,A., et al., (2020)**who investigated the (Impact of the Coronavirus Infection in Pregnancy: A Preliminary Study of 141 Patients) demonstrated that the maternal death rate was (2.12%) and (19.5%) had maternal distress.

COVID19 infection during pregnancy can be associated with severe maternal morbidity, according to **Zaigham,M., and Andersson ,O.,(2020).** Current evidence indicates the risk of severe maternal morbidity requiring ICU admission and perinatal mortality with COVID19 infection during pregnancy.On the other hand **Nova,R., et al., (2021)** study reported that maternal mortality is rare. But there were a considerable proportion of women that required ICU due to complication of COVID-19 infection.

Concerning neonatal outcomes, the findings of the present study revealed that more than one third of neonates were preterm with low birth weight from the total sample, neonatal mortality were represented among only 10 neonates, respiratory distress was commonly reported to as indication to NICU admission among 22 neonates and stayed for a period ranged from <1-30 days

These findings were agreed with **Schwartz D. &Graham, A.,& Nayak,A.,et al., (2020)** they found out that nearly one third of the fetus were born prematurely.

In contrast with our findings **Novoa, et al.,(2021)** found that most of the neonates scored Apgar greater than 7 at first and 5 min, suggesting no acute intrauterine hypoxic environment at delivery in the infected women.

Regarding neonates screening for acquisition of COVID-19 in the current study, their results showed a negative result (100%). SARS-CoV-2 was not detected in the placenta, amniotic fluid, umbilical cord, or breast milk, according to **Novoa,R., et al. (2021).**

On the other hand, **Dong,L., et al., (2020)** indicate that the presence of SARS-CoV-2 IgM antibody in newborn blood could indicate vertical transmission. More over; current study

findings found that more than half of studied women had a negative attitude towards impact of COVID-19 on pregnancy compared to 43.7% with appositive attitude. This may be due to lack of information about COVID-19 and its effect on pregnancy and prevalence of covid in Egypt. This is in contrast to **Anikwe,C., et al. (2020),** whose research (Coronavirus disease 2019: Awareness, attitude, and practice of pregnant women in a tertiary hospital in Abakaliki, southeast Nigeria) found that the majority of pregnant women in Nigeria's third trimester had a positive attitude toward COVID-19 prevention.

This is controversially with This is in contrast to **Yassa,M., et al (2020)**, whose research (Near-term pregnant women's attitude toward, concern about, and awareness of the COVID-19 pandemic) found that about 80% of women felt vulnerable to Covid -19, 45 percent were confused or uncertain about the mode of delivery, and 50% weren't sure if breast feeding was healthy during the pandemic. This was dissimilar with **Lee,R., et al., (2020)** who are investigating the attitudes and precautionary practices of pregnant women in Singapore when it comes to COVID-19. They found that 74% of women were concerned about contracting COVID-19, that 53% of women would choose a caesarean section over a vaginal birth, and that only 35% of women would choose to breastfeed if they were diagnosed with COVID-19.Regards psychological outcome of COVID-19 in current study the large proportion of studied women exhibited a negative emotions represented in; very sever level of depression, anxiety, and stress. The COVID-19 pandemic, according to the Royal College of Obstetricians and Gynecologists **(RCOG) (2020**), raises the risk of perinatal anxiety, depression, and domestic abuse in pregnant women. Also,

Saccone,G., et al (2020) who study Psychological impact of coronavirus disease 2019 on pregnant women. They found that exceeding half of women rated that the psychological impact of COVID - 19 as severe and about two-thirds reported anxiety higher than normal

Lastly; current study findings cleared up that there was statistical significant relation between the complications encountered among studied pregnant women that infected with COVID-19 and the associated risk and comorbidities of pregnancy either during pregnancy, during labor or during postpartum. P0.043, P0.009, and P0.021 respectively. as well as the pregnancy aggravated risk impact negatively on the infected pregnant women with COVID-19 during peripartum period.

These were consistent with **Guan,W.T., et al., (2019)** who study Clinical characteristics of coronavirus disease 2019 in China. they found advanced age and comorbidities are the greatest risk factors of developing serious medical conditions and even death due to coronavirus-induced bilateral pneumonia. This is comparable to **Breslin,N., et al (2020)** study whose investigated Coronavirus disease 2019 in pregnancy found that mother with BMI > 35 and complicated medical history admitted to ICU and COVID 19 increases risk of severe morbidity.

Conclusion

Based on what is reported in this study findings, we can concluded that:

COVID-19-positive pregnant women could have a higher risk of obstetrical and perinatal complications, such as; preterm labour intrauterine fetal death, stillbirth increase pregnancy related risk, increase fetal and maternal distress, increase

rate of cesarean deliveries, increase intrapartum and postpartum maternal morbidities and mortalities like; bleeding, increased severity of COVID-19 symptoms, needing CPR, ICU admission, connection with ventilator, maternal death. As well as; significant negative psychological adverse effects also were reported with a severe form. Regarding neonatal outcome; it was represented in preterm birth, low birth weight, neonatal death, respiratory problems. Additionally high risk pregnant women were at an increased risk for perinatal complications either obstetrical or psychological from COVID-19 compared to low risk pregnant women.

Recommendations:

It seems, based on the results of this study findings, that there is a tremendous need for

● Raise awareness of pregnant women in general and high-risk groups in particular about COVID-19 and its preventive measures and coping strategies across, activated antenatal class, the internet, media and other massive multimedia authorities concerned.

● Nurses, midwives, health care professionals need fully up-to-date training programs to increase their COVID-19 knowledge, skills from all backgrounds (physical, emotional, social psychological component of health).

● Further longitudinal studies to expand the understanding of any perinatal period pandemic.

● Propose a long-term disaster plans that give clear guidelines that keep women and their newborns healthy in their communities without exposing them to unnecessary risks.

● Applying a virtual support either for mothers or their newborn in the ICU to overcome psychological consequences of COVID-19.

● A dedicated telephone line with direct access to mothers should be established in each health care sitting.

Limitation of study

● Not all pregnant women infected with COVID- 19 were admitted to the hospital; instead, they were advised to be isolated at home and follow a treatment regimen at home so that hospital records would not be kept. So sample was not representative.

Conflict of interest

The authors have stated explicitly that there are no conflicts of interest in connection with this article.

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