Effect of the New Corona Virus Disease 2019 on Pregnancy Outcome at El- Gharbia Governorate

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Abstract

Background: Pregnancy is a state of partial immune suppression, which makes pregnant women more vulnerable to infection which have serious consequences onpregnancy outcome. **The aim of this study:**To assess the effect of thenew corona virus disease 2019 (COVID 19) on pregancy outcome. **Study design: Descriptive correlationa**l was used. **Setting**: It carried out at four isolation hospitals represented El- Gharbia Governorate.Tanta University hospital, El-Menshawy Hospital andEl Mehalla El-Kobra Hospital and Kafr El- Zayate General Hospital.**Subjects**:A convenientsample of 30 pregnant women who infected with COVID-19 and isolated at the previouslymentioned settings. **Four tools were used**; **Tool I,** it included two parts. Part 1: Socio- demographic characteristics. Part 2: Reproductive history. **Tool II:**Women's knowledge regarding COVID 19. **Tool III:** Women's practices regarding COVID 19. **Tool IV:** Assessment the effect of COVID 19 on pregnancy outcome. **Results:**It was found that almost one third of the studied women had unsatisfactory level of knowledge as well as almost two fifths had unsatisfactory level of practices regarding COVID 19.The result also revealed that COVID 19has negative effect on pregnancy outcome.**Conclusion and recommendations:** Based on the studyfindings ,it can be concluded that the studied pregnant women had satisfactory level of knowledge as well as unsatisfactory practices regarding COVID 19. It seems that there is a great need for further studies to assess the effect of COVID 19 on pregnancy outcome.

Keyword: Effect, COVID 19, pregnancy and pregnancy outcome.

Introduction

Coronavirus disease 2019 (COVID -19) is a universal health threat that creating a pandemic situation around the world. It is a respiratory disease caused by new strain of corona virus.Wuhan city in China is the origin of COVID-19, where the first case was reported in December 2019.It has spread very quickly, and by 1 September 2020, morethan 25,662,091 cases have been reported in almost 216 countries resulting in more than 855,352 deaths[1].In response to this serious situation, the COVID-19 was declared as a public health emergency of international concern by the World Health Organization (WHO) on 30 January and called for the importance of collaborative efforts of all countries to prevent the rapid spread of COVID-19[2,3]. While, in Egypt the first confirmed case was reported at Cairo International Airport on 14 February2020. However, the infection stayed at low level until the end of March 2020,by 1 September it reached 98,939 cases with 5,421 deaths.(3-4). COVID-19 has overcome geographical barriers achieving a remarkable proliferation which can affect any person especially that are immune compromised including old people more than 65 years, patients with chronic medical diseases health care providers in addition to pregnant women[5].

Pregnancy is a state of partial immune suppression which makes pregnant women more vulnerable to viral infections. Therefore, the COVID- 19 epidemic may have serious consequences for pregnant women [6].Pregnancy increases the risk of adverse obstetric and neonatal outcomes as a result of respiratory viral infections. The physiologic and immunologic changes that occur as a normal component of pregnancy can be affected by COVID-19 and increase the risk of complications which may increase the rate of maternal and neonatal death such as; changes in the maternal cardiovascular and respiratory systems functions, including increased heart rate, increase oxygen consumption, and decreased lung capacity, as well as the development of immunologic adaptations that allow a mother to tolerate the growing fetus, increase the risk for pregnant women to develop severe respiratory failure.

Most of pregnant women infected with corona virus will have mild to moderate flu-like symptoms such as cough, sore throat, and fever. Few of them have difficulty in breathing or shortness of breath. Pregnant women, especially those with medical diseases may complain from pneumonia and marked hypoxia. Also other symptoms may be appear such as fatigue, malaise, body ache and/or

gastrointestinal symptoms like nausea, vomiting and diarrhea.[7,8] .

Now there are many trails for drug to treat or vaccine to prevent COVID- 19 but not proven its success yet.So appropriate measures should be used to prevent its spread among pregnant women. Therefore, some precautions should be consideredincluding keeping social distancing at least one meter, stay away from public places, maintaining personal hygiene, daily life style modifications and maintain good psychological condition. The most important thing is to wash their hands regularly and effectively by using soap and water for at least 20 seconds or use hand sanitizer (with 70 % alcohol concentration) frequently and wearing mask and gloves[10]. All the previous measures should be followed by the health care providers who deal with pregnant women. Also enhancing women's immunity by eating well balanced diet and follow the protocol of corona virus management.[9]

A quarantine and isolation instructions as for general population is applicable to pregnant women also [11,12]. SO, pregnant women suspected with COVID-19 should be isolated and investigated properly. While, confirmed cases should be promptly admitted to a negative pressure isolation ward with adequate facilities and

multi-disciplinary expertise to manage critically ill obstetric patients [13].The recommended strategy for routine antenatal care is to reschedule routine visits. Telephonic consultation can be done for minor complaints and for any question. Only essential milestone visits such as the 12 and 19 week scans are needed. The next visit can be at 32 weeks pregnancy [14].

Time of delivery should not be altered on the basis of COVID-19 ,becausethe presence of infection is not an indication to induce labor or deliver the woman,but there is exception for the critically ill pregnant woman where delivery may be indicated to relieve the extra metabolic and pulmonary load and in case of maternal or fetal distress guided by the degree of clinical stability and the gestational age. The most suitable method of delivery is cesarean section [15, 16].

Neonates born from mothers with COVID-19 infection are tested within 14 days of delivery or up to 28 days after birth [17]. If baby's initial sample is negative, another sample should be repeated after 48 hours. Postnatal care of the mother infected with COVID-19 should include continued medical evaluation for respiratory status and routine postnatal care. The mother who is recovering from an acute illness and/or is isolated from the infant may be at risk for developing anxiety, postpartum

blues and other psychological health problems. At this time the woman should be offered counseling and psychological support [18,19].

COVID 19 s is a new strain of corona virus, little is known today about its effect on the pregnancy outcome [20]. Regarding the effect of corona virus infection on maternal condition, there is no evidence that pregnant women with COVID-19 are more prone to experience severe respiratory problems than non-pregnant. Moreover, there is no evidence of higher risks of abortion or preterm labor among pregnant women with COVID-19 as well as there were no traces of the virus in the mother's amniotic fluid, umbilical cord blood or breast milk. Concerning effect of corona virus infection on fetus condition, there is no evidence that COVID 19 undergoes intrauterine or trans-placental transmission from infected pregnant women to their fetuses. [20-21]

Further researches should be done for better understanding the effect of this new virus and its health hazards on both the mother and fetuses so this study was conducted to assess the effect of new COVID-19 on pregnancy outcome at El-GharbiaGovernorate.

Aim of the study

The aim of this study was to assess the effect of thenew corona virus disease 2019 on pregnancy outcome at El- Gharbia Governorate.

Research Questions:

1- What are the knowledge and practices of pregnant women regarding COVID-19?

2- What is the effect of COVID-19 on pregnancy outcome?

Subjects and Methods: -

Study design:A descriptiveCorrelational study design was used to conduct this study.

Study setting: The study was conducted at the isolation hospitals at El-Gharbia Governorate including:Tanta University hospital,El-Menshawy Hospital affiliated to the Ministry of Health and Population .El Mehalla El Kobra General Hospital affiliated to ministry of healthand Kafer El-Zayate General Hospital.

Study subjects: Aconvenient sample of 30 pregnant women who had infected with COVID-19 and isolated at the previously mentioned settings according the following criteria.

- Free from medical or obstetrical complications.
- Willing to participate in this study.

Tools of data collection: -

To achieve the aim of this study thefollowingtoolswereused for datacollectionasfollows:

Tool I: A structured interview schedule: Itwasdevelopedby theresearcherafterreviewing therecentrelated literature. It was consisting of 2 parts:

Part 1: Socio-demographiccharacter- isticsof pregnant women: This part was used to collect data such as: name, age, level of education, occupation, family income and residence.

Part 2: Reproductive history including: last menstrual period, gestational weeks, antenatal follow up visits, number and place of antenatal visits, number of gravida, number of abortion,number of parity and mode of last delivery**Tool II:Women knowledge regarding COVID-19**:such ascausative agent of COVID-19, the main transmission route, incubation period,who are susceptible to COVID-19, general clinical manifestation, discover the time of infection with COVID-19, specific complain appear on the infected pregnant woman with COVID-19, measures to protect others from infection, effect of COVID-19 on the fetus and mother, signs of fetal distress, the presence of effective cure and methods of COVID-19 prevention. Correct and complete answers will be scored as (2),correct and incomplete answers will be scored as (1), and incorrect and didn't know will be scored as (0). Result of test was interpreted as follows; A scoring of $\geq$ 75% was considered "satisfactory knowledge" A scoring of 50% - <75% was considered "unsatisfactory knowledge".The higher participant score means greater knowledge about COVID 19.

Tool III: Assessment of women's practices regarding COVID-19: It consisted of (10) items each item of these had two categories, one category in the form of (done) and another category in the form of (not done) including the following items frequent hand washing, using antiseptic solution(alcohol) on the hand frequently, wearing face mask frequently, having adequate amount of rest, assessing the number of fetal movement daily, drinking warm fluid frequently, eating planned hospital diet, practice daily exercise, taking breathing exercise and having compliance with the recommended medication. A scoring of <50% of the total score indicated to unsatisfactory practice. While a score of $\geq$ 50% of the total score indicated "satisfactory practice"

Tool IV: Assess the effect of COVID-19 on pregnancy outcome: It included two parts.

Part (1): Assess the effect of COVID-19 on pregnant woman included: Abortion, bleeding in late pregnancy, maternal

distress, pre -term labor, vaginal infection and maternal death.

Part (2): Assess the effect of COVID-19 on the fetus included:

Intra-uterine growth restriction, hypoxia, asphyxia,polyhydromnise, oilghydrominse, congenital anomalies, fetal distress, premature infant and intra-uterine fetal death.

Methods:

1. **Before conducting the study** an officialpermission to carry out the study Afterclarifyingthepurpose of thestudywasobtainedfrom the dean of the Faculty ofNursing Tanta Universityand was submittedtotheresponsible authoritiesoftheselectedsettingforper missionfor data collection.

2. **2-Ethical consideration ,women oral consent was obtained**including the right to withdraw at any time,**rights and confidentiality and privacy of the respondents were respected** and was taken into consideration regarding data collection **through the all phases of the study and all the women informed about the aim and benefits from the study.** The researcher was ensuring that the nature of the study do not cause any harm or pain for the women or their fetuses.

3. **3-Developingthetools**: Study tools were developed by the researcher based on the literature review.

4. **4-Validity test:** Tools of data collection were distributed to a jury of 5 academic professors in Maternity and Gynecological Nursing Department to test its face and content validity. Accordingly, corrections and modifications were done. The validity of the expertise judgments of the questions of the Arabic translated version of pregnant women knowledge and practices regarding COVID 19 was 0.98 and 0.96 respectively.

5. **The reliability** of the translated Arabic tools was done by using Cronbach's Alpha which was0.87 and 0.88 respectively

6. **6-The pilot study:** After development of the tools, a pilot study was carried out on 10 % of the pregnant woman (3 women), from previously mentioned setting to test the clarity and applicability of the tools to detect any obstacles that might be encountered during data collection, as well as to determine the length of time needed to collect the data from each woman. The

necessary modifications were done according to the pilot study. Those women were excluded from the study sample.

7. **Data collection: -**

   – The researcher collected the data within four months startedfrom the beginning of April to the end of July 2020.

   – Data of this study was collected by the cooperation of the registered nurses working in the isolation hospitals at El-Gharbia Governorate and responsible about the care of the infectedpregnant women.

   – At first the researcher wear the suitable personal protective equipment and met the registered nurse who working in the isolation hospitals at El-Gharbia Governorateto explain the purpose of the study discussed the tool of data collection completely with the nurse to ensure that she understood it perfectly.

   – The researcher explain to the nurses the importance to report anycase of infected pregnant woman with COVID 19 admitted to the hospital immediately

   – When pregnant women infected with COVID 19 were admitted to the isolation hospital, the registered nurses notified the researcher after taking permission from the woman that the researcher will call her by telephone if the health status of woman allow.

   – If the health status of the woman not allows the researcher collect the necessary study data though the nurse and the women admission sheet till the health status of the woman improved.

   – Then theresearcher contacted by the registered nurses through the telephone twice daily at the morning and afternoon to monitor the status of pregnant women infected with COVID-19 regarding the maternal or fetal health condition .

   – Daily calling the pregnant women by telephone if their health status allow.

   – At the time of the study 12 out of 30 pregnant women were at the first or second trimester while the other 18 pregnant women were atthe third trimester.

   – All the women who recovered and discharged from the hospital,

the researcher followed up those women and their relatives such as ,mothers or husbands to ensure from the women and fetuses health status during the time of data collection

− At the time of delivery, the researcher assessed the maternal, fetal and neonatal condition and recorded the delivery outcomes as normal or exposed to any complications from their hospital files and relatives.

- The researcher used **Tool I**: part 1, 2 to collect data about the socio-demographic characteristics, reproductive history of pregnant women infected with COVID 19, **tool II** was used by the researcher to assess women's knowledge regarding COVID-19, **tool III** was used to assess women's practice regarding COVID-19, which observed by the registered nurses and then reported to the researcher by the telephone and **tool IV**: part (1) and part (2) was used to assess the effect of COVID-19 virus on pregnancy outcome which evaluated by the researcher.

8- The data were coded,entered and analyzed using SPSS (version 20).Statistical significant was set at P value <0.05%. Spearman correlation was used to examine the relation between COVID 19 andknowledge ,

practice of women and pregnancyout come.

Results:

Table (1): Shows the distribution of the studied women according to their socio-demographic characteristics. It was observed that the mean age of the studied women was 31.57±4.63years. It was also, noticed that slightly less than three fifths (56.7%) of them were housewives. Concerning the residence, it was found that three fifths (60.0%) of the studied women were from urban residence. The table also reveals that, almost half (53.5%) of the studied women had finished university or post graduate education. Furthermore, the majority (93.3%) of studied women had enough income and almost three quarters (76.7%) of them were from nuclear families.

Table (2): Demonstrates the distribution of the studied women according to their reproductive history. It was obvious that about two third (66.7% and 70.0%) of the studied women were multigravida and multipara respectively. As regard number of abortion, it was observed that almost three quarters (76.6%) of them had not abortion. In addition, it was demonstrated that three fifths (60%) of them were in the third trimester when found their infection with corona virus. Also it is found that the

entire sample (100%) had the initial antenatal visit at the first trimester and majority (96.7%) of them received the antenatal follow up at private clinics. Regarding number of follow up visits, it was evident that nearly three quarters (73.3%) of pregnant women had more than seven visits. The table also reveals that almost half (55%) of the studied women had Cs in the last delivery.

Table (3) illustrates the distribution of the studied women according to their knowledge regarding COVID-19. It was observed that the majority of the studied women (83.3%, 100%, 96.7, 100%, 100%, 90%, 100%, 100% respectively) had correct answer regarding the type of COVID 19 infection, route of transmission, effective way to reduce its spread, wearing protective mask , avoid going to the crowded places, isolation after contact with infected personnel as well as the place of isolation. The table also reveals that (100%, 100%, 93.3%, 80%, 76.7%, 76.7%) respectively had incorrect answer regarding maternal and fetal effect of corona virus infection, transmission of infection when the person is asymptomatic, persons who susceptible to COVID 19 in addition to the presence of effective treatment to COVID 19 and if contacting wild animals can cause corona virus infection. Concerning the

psychological reaction after corona virus infection, it was observed that almost half (56.6%) of the studied women were excited and almost two fifths (43.3%) of them had episodes of severe crying.

Figure (1): shows the distribution of the studied women according to their overall total score level of knowledge regarding COVID-19. It was found that slightly less than two thirds had satisfactory level of knowledge compared to almost one third who had unsatisfactory level of knowledge

Table (4) demonstrates the distribution of the studied women according to their practice regarding COVID-19. It was evident that (100%, 100, 93.3%, 86.7% respectively) had correct practice regarding frequent hand washing, compliance with the recommended medication, eating planned hospital diet as well as taking adequate amount of rest compared to (100%, 100%, 80% and 70% respectively) who had incorrect practices regarding practicing daily and breathing exercise, wearing face mask frequently and drinking warm fluid frequently.

Figure (2): reveals the distribution of the studied women according to their overall total score level of practice regarding COVID-19. It was found that almost half of the studied women had satisfactory practice while almost two fifths had

unsatisfactory practice regarding corona virus infection.

Table (5) shows the distribution of the studied women according to the maternal and fetal effect of COVID-19. It was demonstrated that two fifths (40%) of the pregnant women continue normal course of pregnancy at the time of the study as well as the entire sample (100%) of them delivered by cesarean section while almost one fifth (23.3%) had pre term labor also the minority (10%, 10% and 6.6% respectively) had maternal death, maternal distress and connected with mechanical ventilator due to decreased O2 saturation. As regard the fetal effect of COVID 19, it was found that almost two-fifths (40%) had no complicationat the time of the study compared to (23.3%, 10%, 10% and 6.6%) who delivered prematurely, exposed to fetal distress, intrauterine fetal death and oligohydramnios.

Table (6) demonstrates the correlation between pregnant women total score level of knowledge and their total score level of practice regarding COVID 19. It was found that a highly statistically significant correlation between pregnant women total score level of knowledge and their total score level of practice regarding COVID 19 as p-value was <0.001**

Table (7): Clarifies the relation between Socio-demographic characteristics of the pregnant women infected with COVID-19 Virus and their total score level of knowledge. It was evident that a statistically significant deference between pregnant women total score level of knowledge and their occupation, residence and educational level as p-value was <0.05*. The table also reveals that there is no statistically significant relation between pregnant women total score level of knowledge and their income and family type.

Table (8): Demonstrates the relation between Socio-demographic characteristics of the pregnant women infected with COVID-19 Virus and their total score level of practice. It was evident that a statistically significant deference between pregnant women total score level of practice and their occupation as p-value was <0.05*. The table also reveals that there is no statistically significant relation between pregnant women total score level of practice and between their age, residence, educational level, income and family type.

Table (9): Illustrates the relation between the studied pregnant women total score level of knowledge and the effect of COVID-19 virus on pregnancy outcome. Concerning the effect of COVID-19 on pregnant women, it was evident that (100%, 100%, 100%, 71.4% and 61.1%)

respectively of women who attained unsatisfactory level of knowledge exposed to maternal distress, maternal death, mechanical ventilator, pre-term labor and cesarean section delivery. While regarding the effect of COVID-19 virus on the fetus, it was observed that (100%, 100%, 100%, 100%, 85.7%, and 66.7%) respectively of pregnant women who attained unsatisfactory level of knowledge their fetuses exposed to fetal distress, intrauterine fetal death, neonatal death and still birth.

Table (10): Shows the relation between the studied pregnant women total score level of practice and the effect of COVID-19 virus on pregnancy outcome. Concerning the effect of COVID-19 on pregnant women, it was evident that (100%, 100%, 100%, 77.8% and 85.7%) respectively of women who attained unsatisfactory level of practice exposed to maternal distress, maternal death, mechanical ventilator, pre-term labor and cesarean section delivery. While regarding the effect of COVID-19 virus on the fetus, it was observed that (100%, 100%, 100%, and 66.7%) respectively of pregnant women who attained unsatisfactory level of practice their fetuses exposed to fetal distress, intrauterine fetal death, neonatal death and still birth.

Table (1): Distribution of the studied women according to their socio-demographic characteristics.

Socio-demographic characteristics	N=30	%
Age (years)		
<25	10	33.3
25-35	14	46.7
35 or more	6	20.0
Mean±SD	**31.57±4.63**	
Job		
House wife	17	56.7
Employee	13	43.3
Residence		
Rural	12	40.0
Urban	18	60.0
Educational level		
Secondary or diplome	14	46.7
University or postgraduate	16	53.3
Income		
Not enough	2	6.7
Enough	28	93.3
Enough and more	0	0
Family type		
Nuclear family	23	76.7
Extended family	7	23.3

Table (2): Distribution of the studied women according to their reproductive history

Reproductive history	N=30	%
Primigravida	10	33.3
Multigravida	20	66.7
Parity		
Primipara	6	30
Multi-para	14	70
Number of abortion		
None	23	76.7
One	7	23.3
Gestational age		
First trimester	5	16.7
Second trimester	7	23.3
Third trimester	18	60.0
Time of initial antenatal visits		
First trimester	30	100.0
Place of receiving the antenatal follow up		
Governmental hospital	1	3.3
Private clinic	29	96.7
Number of follow up visits:		
More than three visits	3	10
More than four visits	5	16.7
More than six visits	4	13.3
More than seven visits	18	60
Mode of last delivery		
Cesarean section	11	55
Normal vaginal delivery	9	45
When did you find out your infection with corona virus		
First trimester	5	16.7
Second trimester	7	23.3
Third trimester	18	60.0

Table (3): Distribution of the studied women according to their knowledge regarding COVID-19.

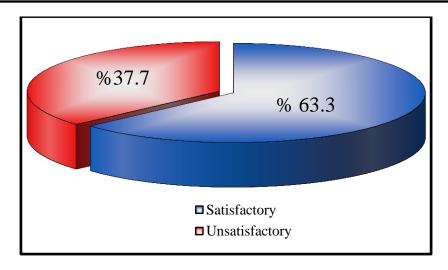| Knowledge about Clinical characteristics of COVID-19	Correct		Incorrect	
	N=30	%	N=30	%
Causative agent of COVID-19	25	83.3	5	16.7
The route of COVID-19 transmission	30	100.0	0	0.0
Incubation period f COVID-19	16	53.3	14	46.7
Risk group of COVID-19	6	20.0	24	80.0
clinical manifestation of COVID-19	10	33.3	20	66.7
Isolation is effective method to prevent spread of infection	29	96.7	1	3.3
Presence of effective cure for COVID-19	7	23.3	23	76.7
Methods of transmission	2	6.7	28	93.3
Methods of prevention	30	100.0	0	0.0
Effect of COVID-19 virus on pregnant women	0	0.0	30	100.0
Effect of COVID-19 virus on fetus	0	0.0	30	100.0
Warning signs of pregnancy	12	40.0	18	60.0
Signs of fetal distress	11	36.7	19	63.3
Available places of isolation	30	100.0	0	0.0
Methods to assess fetal wellbeing by pregnant women	13	43.3	17	56.7
What about your psychological reaction when you knew that you infected with corona virus##				
Excited	17		56.6	
Severe crying	13		43.3	
Depressed	10		33.3	
Very anxious	10		33.3	
Total	19	63.3	11	36.7
Mean±SD	11.5±1.91			

indicate more than one answer.

Figure (1): Distribution of the studied women according to their overall total score level of knowledge regarding COVID-19.

Table (4): Distribution of the studied women according to their practice regarding COVID-19.

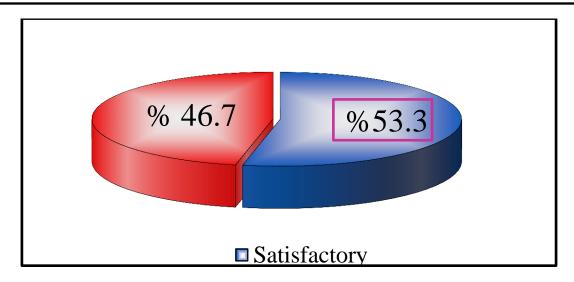| Women's practice regarding COVID-19 virus	Done		Not done	
	N=30	%	N=30	%
Frequent hand washing	30	100.0	0	0.0
Using antiseptic solution (alcohol) on the hand frequently	16	53.3	14	46.7
Wearing face mask frequently	6	20.0	24	80.0
Have adequate amount of rest	26	86.7	4	13.3
Do you assess the number of fetal movement daily	15	50.0	15	50.0
Drinking warm fluid frequently	9	30.0	21	70.0
Eating the planned hospital diet	28	93.3	2	6.7
Practice daily exercise	0	0.0	30	100.0
Practice breathing exercise	0	0.0	30	100.0
Compliance with the recommended medication	30	100.0	0	0.0
Total	16	53.3	14	46.7
Mean±SD	**5.33±1.06**			

% 46.7   %53.3

☐ Satisfactory

Figure (2): Distribution of the studied women according to their overall total score level of practice regarding COVID-19.

Table (5): Distribution of the studied women according to the effect of COVID-19 on pregnant women and fetal condition.

Effect of COVID-19 virus on the pregnant woman ##	N=30	%
Normal course of pregnancy	12	40.0
Maternal distress	3	10
Pre-term labor	7	23.3
Cesarean section delivery (n=18)	18	100
Maternal death	3	10
Mechanical ventilator due to decreased o_2 saturation	2	6.6
Effect of COVID-19 virus on the fetus ##		
Congenital anomalies	1	3.3
Oilgo-hydrominse	2	6.6
Fetal distress	3	10.0
Premature baby	7	23.3
Intrauterine fetal death	3	10
Still birth	3	10
Neonatal death	1	3.3
None of the above	12	40.0

indicate more than one answer.

Table (6):Correlation between pregnant women total score level of knowledge and their total score level of practice regarding COVID 19.

Items	Total knowledge	
	R	P-value
Total practice	0.813	<0.001**

Table (7): The relation between Socio-demographic characteristics of the pregnant women infected with COVID-19 Virus and their total score level of knowledge

Socio-demographic characteristics	Total knowledge					
	Satisfactory		Unsatisfactory		Chi-square	
	N	%	N	%	X^2	P-value
Age (years)						
<25	5	26.3	5	45.5		
25-35	9	47.4	5	45.5	1.805	0.406
35 or more	5	26.3	1	9.1		
Job						
House wife	8	42.1	9	81.8	4.474	0.034*
Employee	11	57.9	2	18.2		
Residence						
Rural	5	26.3	7	63.6	4.043	0.044*
Urban	14	73.7	4	36.4		
Educational level						
Secondary	6	31.6	8	72.7	4.739	0.029*
University or postgraduate	13	68.4	3	27.3		
Income						
Not enough	1	5.3	1	9.1	0.164	0.685
Enough	18	94.7	10	90.9		
Family type						
Nuclear family	16	84.2	7	63.6	1.648	0.199
Extended family	**3**	**15.8**	**4**	**36.4**		

Table (8):The relation between Socio-demographic characteristics of pregnant women infected with COVID-19 Virus and their total score level of practice.

Socio-demographic characteristics	Total practice					
	Satisfactory		Unsatisfactory		Chi-square	
	N	%	N	%	X^2	P-value
Age (years)						
<25	3	18.8	7	50.0		
25-35	9	56.3	5	35.7	3.291	0.193
35 or more	4	25.0	2	14.3		
Job						
House wife	6	37.5	11	78.6		
Employee	10	62.5	3	21.4	5.129	0.024*
Residence						
Rural	4	25.0	8	57.1		
Urban	12	75.0	6	42.9	3.214	0.073
Educational level						
Secondary	5	31.3	9	64.3		
University or postgraduate	11	68.8	5	35.7	3.274	0.070
Income						
Not enough	0	0.0	2	14.3		
Enough	16	100.0	12	85.7	2.449	0.118
Family type						
Nuclear family	14	87.5	9	64.3		
Extended family	2	12.5	5	35.7	2.249	0.134

Table (9): The relation between the studied pregnant women total score level of knowledge and the effect of COVID-19 virus on pregnancy outcome.

Effectof COVID-19 virus on pregnancy outcome	Total knowledge						
	Satisfactory		Unsatisfactory		Total	Chi-square	
	N	%	N	%		X2	P-value
Effect of COVID-19 virus on the pregnant woman							
Maternal distress	0	0.0	3	100.0	3	5.758	0.016*
Pre-term labor	2	28.6	5	71.4	7	4.751	0.029*
Cesarean section delivery	7	38.9	11	61.1	18	11.579	<0.001**
Maternal death	0	0.0	3	100.0	3	5.758	0.016*
Mechanical ventilator	0	0.0	2	100.0	2	3.701	0.054
Effect of COVID-19 virus on the fetus							
Fetal distress	0	0.0	3	100.0	3	5.758	0.016*
Intrauterine fetal death	0	0.0	3	100.0	3	5.758	0.016*
Still birth	1	33.3	2	66.7	3	1.292	0.256
Neonatal death	0	0.0	1	100.0	1	1.787	0.181

Table (10): The relation between the studied pregnant women total score level of practice and the effect of COVID-19 virus on pregnancy outcome.

Effect of COVID-19 virus on pregnancy outcome	Total practice						
	Done		Not done		Total	Chi-square	
	N	%	N	%		X2	P-value
Effect of COVID-19 virus on the pregnant woman							
Maternal distress	0	0.0	3	100.0	3	3.810	0.051
Pre-term labor	1	14.3	6	85.7	7	5.593	0.018*
Cesarean section delivery	4	22.2	14	77.8	18	17.500	<0.001**
Maternal death	0	0.0	3	100.0	3	3.810	0.051
Mechanical ventilator	0	0.0	2	100.0	2	2.449	0.118
Effect of COVID-19 virus on the fetus							
Fetal distress	0	0.0	3	100.0	3	3.810	0.051
Intrauterine fetal death	0	0.0	3	100.0	3	3.810	0.051
Still birth	1	33.3	2	66.7	3	0.536	0.464
Neonatal death	0	0.0	1	100.0	1	1.182	0.277

Discussion

COVID-19 pandemic is a huge problem, threatening all the population groups especially pregnant women due to many physiological and immunological changes occurring during pregnancy that render pregnant women more vulnerable to respiratory pathogens and serious respiratory problems than others. Their chance to catch COVID19 infection increases, especially, if they are suffering from other morbidities. Up till now, there are a few published studies regarding COVID-19 during pregnancy. The aim of the current study is to highlight the effect of new corona virus disease 2019 (COVID19) on pregnancy outcome. [20-22]

The findings of the present study illustrated that the mean age of the studied pregnant women were31.57±4.63years old. This finding goes in lines with **David A, , Schwartz (2020)** [23]who study (An analysis of 38 Pregnant Women With COVID-19, Their Newborn Infants, and Maternal-Fetal Transmission of SARS-CoV-2: Maternal Corona virus Infections and Pregnancy Outcomes) the researcher demonstrated that the study age range from 30-34 years old. In the same line, **El shaffeey F et al, (2020)** [22] who study (A systematic scoping review of COVID 19 during pregnancy and childbirth), the researcher reported that mean age of the studied pregnant women were ranging from 21-42 years old. This agreement between the two studies related to the studied samples was taken during their reproductive age.

The findings of the current study also illustrated that slightly less than three fifths of the pregnant women were house-wives and three fifths of them were from urban residence. The table also reveals that, almost half of the studied women had finished university or post -graduate education. The findings of this study disagreed with **Nwafor J et al, (2020)** [24] who study the (Knowledge and practice of preventive measures against COVID-19 infection among pregnant women in a low-resource African setting)**,** the researcher concluded that the majority of the study sample were farmers, were living in rural areas and had no formal education. This disagreement between the two studies from the researcher point of view may be related to the different setting of the sample.

The results of the present study also reported that none of the studied women had enough income and more. The results of the present disagreed with **Alahdal H et al, (2020)** [25] who study (An analytical study on the awareness, attitude and practice during the COVID-19 pandemic in Riyadh, Saudi Arabia) who find out that

the majority of the study sample had high income. This disagreement between the studies related to different setting of the studied samples.

The results of the current study demonstrated that two third of the studied women were multigravida and multipara, Also all of the study sample had their initial antenatal visit at the first trimester and majority of them received the antenatal follow up at private clinics and nearly three quarters of pregnant women had more than seven visits. In addition, almost half of them had Cs delivery. The findings of the present study relatively matching with **Wu Y et al, (2020)** [26] who investigate (Corona virus disease 2019 among pregnant Chinese women: case series data on the safety of vaginal birth and breastfeeding)

Concerning the infection of the pregnant women with COVID-19, the findings of the present study illustrated that three fifths of the study sample were infected with COVID-19at the third trimester. These results were consistent with **De sousa A et al, (2020)** [27] who study the (Effects of COVID19 during pregnancy and neonatal prognosis). The researchers reported that the majority of the pregnant women had infected with corona virus during the third trimester.

Concerning women's knowledge regarding COVID-19, the findings of the current study showed that the majority of the studied women had correct answer regarding the type of COVID 19 infection, route of transmission and the protective measures. The findings of the current study in a path with **Anikwe C et al, (2020)** [28] who study (corona virus disease 2019: knowledge, attitude, and practice of pregnant women in a tertiary hospital in Abakaliki Southeast Nigeria) and **Reuben R, et al, (2020)** [29] who study the (Knowledge, Attitudes and Practices Towards COVID-19: An Epidemiological Survey in North-Central Nigeria) the researchers reported that the majority of the study subjects had correct answer regarding knowledge about corona virus infection. From the researcher point of view this high level of knowledge is expected due to the social impact of the COVID-19 pandemic on the studied areas.

Regarding, the most reported symptoms of COVID19 the findings of the current study demonstrated that the fever followed by muscle aches, cough and headache were the most common symptoms reported by pregnant women. The findings of the present study agreed with **Nwafor J et al, (2020)** [24] who reported that fever followed by cough and headache were the most common symptoms associated

withCOVID19. Also, this study goes hand to hand with **Pereira A et al, (2020)**[30]who investigate the (Clinical course of corona virus disease2019 in pregnancy), the researcher illustrated that fever, cough and dyspnea are the common symptoms associated with corona virus infection.

Regarding the women's knowledge about the effect of COVID-19 infection on pregnancy outcome. The results of the study reported that all the women had incorrect answer regarding the effect of corona virus infection on pregnancy. This finding disagreed with **Bhagavathula A et al, (2020)** [31] who study(novel Corona virus (COVID-19) Knowledge and Perceptions: A Survey on Healthcare workers) the researchers reported that health care workers had correct answer regarding the effect of corona virus infection on pregnancy outcome. This incongruity between the current study and the previous study related to different level of education of the two study samples, where the study sample in that study are doctors.

Concerning the woman psychological reaction toward corona virus infection, it was observed that almost half of the studied women were excited and had episodes of severe crying. The results of the current study relatively matching with **Mappa I et al, (2020)** [32] who study the

(Effects of coronavirus 19 pandemic on maternal anxiety during pregnancy) the researchers illustrated that the pregnant women who infected with corona virus had very high level of anxiety and becoming very stressed. This matching was accepted because it might be related to the fear of women from the effect of corona infection on the pregnancy.

Considering the total score level of knowledge regarding COVID-19. It was found that slightly less than two thirds of the pregnant women had satisfactory level of knowledge. The findings of the current study matchwith **Azlan A et al, (2020)**[33]who study (Public knowledge, attitudes and practices towards COVID-19: A cross-sectional study in Malaysia) they illustrated that most of the study subject had reported satisfactory level of knowledge this agreement related to that most of the studied subject in both samples were educated.

As regard the women's practice toward COVID-19, the findings of the present study illustrated that all of the women had correct practice regarding frequent hand washing and compliance of the recommended medication and most of them hadeaten the planned hospital diet as well as taking adequate amount of rest. The findings of the present study goes in line with **Zhong B et al, (2020)** [34]who

study the (Knowledge, attitudes, and practices towards COVID-19 among Chinese residents during the rapid rise period of the COVID-19 outbreak: a quick online cross-sectional survey). The researchers demonstrated that the majority of women had correct practice regarding hand washing, compliance of the recommended medication and taking adequate amount of rest.

Concerning, women's practice of frequent wearing face mask and drinking warm fluid. The findings of this study showed thatthe majority of women had incorrect practice. The results of these study disagreed with **Zhong B et al, (2020)** [34]they illustrated that the majority of the study subject had correct practice regarding frequent wearing face mask and drinking warm fluid.This disagreement may be attributed to the economic status of the two studies, in the other study the subjects had high income which enable them to buy and change the face mask frequently while in our study none of the subjects had enough income and more

As regard the effect COVID-19 on maternal condition. The findings of the current study illustrated that almost one fifth (23.3%) of pregnant women had pre-term labor and three fifths (60%) of them delivered by cesarean section.This finding relativelyagreed with **Khan M (2020)**

[35]who study (COVID-19 during pregnancy: A systematic review to summaries possible symptoms, treatments and pregnancy outcome) they showed that (30.4%) had premature delivery and (83.9%) delivered by cesarean section.

Furthermore, the findings of the current study reported that (10%) of women had maternal distress and maternal death.This finding ofthe current study disagreed with **NayakAet al, (2020)** [36]study who investigated the (Impact of the Coronavirus Infection in Pregnancy: A Preliminary Study of 141 Patients) the researchers demonstrated thatthe maternal death rate was (2.12%) and (19.5%) had maternal distress. The findings of this study also reported that (6.6%) of women connected with mechanical ventilator, the findings of the current study disagreed with **Sentilhes L et al, (2020)** [37]who study(Coronavirus disease 2019 in pregnancy was associatedwith maternal morbidity and preterm)the researchers find out that the percent of pregnant women who connected to themechanical ventilator were (23.1%). This disagreement might be attributed to that the sample size in our study was greater than the sample size in the other studies.

Regardingthe effect of COVID 19 on fetal outcome it was found that almost two

fifths (40%) had no complication compared to (23.3%, 10% and10%) who delivered prematurely, exposed to fetal distress and intrauterine fetal death.The findings of the current study agreed with **Schwartz D, ,Graham A (2020)** [38] who study the (Potential Maternal and Infant Outcomes from (Wuhan) Coronavirus 2019 Infecting Pregnant Women: Lessons from SARS, MERS, and Other Human Corona virus Infections,) they find out that nearly one third of the fetus were born prematurely.Furthermore, the finding of the present study relatively doesn't go in the line with **Nayak A et al, (2020)** [36]they reported that the percent of intrauterine fetal death was (2.23%), and the percent of fetal distress was (24%).

In relation to the correlation between pregnant women total score level of knowledge and their total score level of practice regarding COVID 19. The findings of the present study found that a highly statistically significant correlation between pregnant women total score level of knowledge and their total score level of practice regarding COVID 19.The findings of the current study agreed with **Schwartz D, ,Graham A (2020)** [38]who found that a positive correlation between pregnant women knowledge and practices regarding COVID 19 and also demonstrated that

good knowledge will result in best practices regarding COVID 19.

Considering the relation between the socio-demographic characteristics of the pregnant women infected with COVID-19 and their total score level of knowledge. The findings of this study reported that there was a statistically significant deference between pregnant women total score level of knowledge and their occupation, residence and educational level. This result goes in line with **Abdelhafiz A. et al, (2020)** [39] (Knowledge, Perceptions, and Attitude of Egyptians Towards the Novel Coronavirus Disease (COVID19). The researchers reported that there was significant relation between the subject total score level of knowledge and their occupation, residence and educational level.

As regard the relation between socio-demographic characteristics of the pregnant women infected with COVID-19 and their total score level of practice. The finding of the current study demonstrated that there is astatistically significant deference between pregnant women total score level of practice and their occupation. The findings of the present study agreed with **Azlan A et al, (2020)** [33] who proved that there significant

relation between the subject total score level of practice and their occupation.

Regarding the relation between the studied pregnant women total score level of knowledge and the effect of COVID-19 on pregnancy outcome. The findings of this study reported that the majority of pregnant women who had unsatisfactory level of knowledge exposed to maternal distress, maternal death, mechanical ventilator, pre-term labor and cesarean section delivery as well as their fetuses exposed to fetal distress, intrauterine fetal death, neonatal death and still birth more than those who had satisfactory level of knowledge. This study was in line with **Alfaraj SH et al, (2019)**[40]whoobserved that the most perinatal complications among pregnant women with poor knowledgeregarding COVID-19 was preterm delivery, intrauterine growth restriction, spontaneous abortion, infants with small for gestational age, and neonates admitted to intensive care unit.

Concerning the relation between the studied pregnant women total score level of practice and the effect of COVID-19 on pregnancy outcome. The findings of this study showed that majority of pregnant women who attained unsatisfactory practice exposed to maternal distress, maternal death, mechanical ventilator, pre-term labor and cesarean section delivery as

well as their fetuses exposed to fetal distress, intrauterine fetal death, neonatal death and still birth more than those who attained satisfactory practice. This study agreed with **Lu R et al,(2020)**[41]who declared that the effect of COVID-19 among women with unsatisfactory performance was fetal distress, premature rupture of the fetal membrane and maternal admission to intensive care unit as well as septic shock.

Conclusion

Based on the findings of the present study, it can be concluded that the studied pregnant women had satisfactory knowledge as well as unsatisfactory practices regarding COVID 19. Moreover, it was found that the effect of COVID 19 on pregnant women was included cesarean section, preterm labor, maternal death, and maternal distress as well as connection to mechanical ventilator while regarding the effect of COVID-19 on fetus; it was included premature baby, fetal distress, intrauterine fetal death and oligohydramnios and neonatal death.

Recommendations

Based on the findings of the current study, it seems that there is a great need for improving knowledge and practices of pregnant women about COVID 19 and further studies needed to assess the effect of COVID 19 on pregnancy outcome.

Thus the following recommendations are derived and suggested including refreshing online courses especially for newly appointed nurses can be successful in improving nurse's level of knowledge and practices regarding COVID 19 prevention.

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