Effect of Guidelines About Covid-19 Precautions on Maternal and Neonatal Outcomes in Ismailia City, Egypt

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Abstract

Background: COVID-19 is a pandemic viral infection around the world. Starting in Wuhan city-china at December 2019.Egypt was affected by this viral infection at February 2020. Pregnant women are worried about infection during pregnancy and its outcome for mother and newborn. **Aim**: This study is aiming to explore the effect of guidelines about COVID-19 precautions on maternal and neonatal outcomes in Ismailia city, Egypt. **Study design**: A quasi-experimental design one group pre/posttest. **Study sample**: A convenient sample of 52 pregnant women **Setting:** Obstetrics and Gynecologic Clinics in governmental hospitals and private clinics at Ismailia city. **Four tools** were used to collect data in the current study namely, **Self-Administered Online Questionnaire,** Reported Practice Check list, Maternal and Neonatal Outcomes Record and Breast Feeding Record**. Results**: Maternal Knowledge and practice were improved with highly statistically significant differences (p=0.000), post the guidelines implementation. Maternal outcomes were improved regarding vaginal delivery, body temperature, cough, uterine bleeding, and puerperal sepsis and neonatal outcomes were improved regarding APGAR score, weight, and NICU admission. **Conclusion**: Pregnant women who received the guidelines regarding COVID-19 precautions had satisfactory knowledge & practice and had positive maternal& neonatal outcomes. **Recommendations:** Application of guidelines at Maternal Child Health (MCH) Centers in early pregnancy to avoid other waves of COVID 19.

Keyword: COVID-19, Maternal and Neonatal Outcomes

Introduction

Novel coronavirus (SARS-COV-2) is a new strain of coronavirus causing COVID-19, has reported in China in December 2019. More than 8.06 million cases of COVID-19 have been reported globally at July 18 2020, including more than 596.426 deaths. COVID-19 is up to 14 days from the time of exposure, with a median incubation period of 4 to 5 days. COVID-19 in Egypt as of the evening of 18 July, there were 87172 confirmed cases of Covid-19 and 4251 deaths in Egypt. Egypt is implementing 14- day quarantine periods and other preventative measures in all cases **(Breslin et al., 2020 & Rasmussen et al., 2020 & World Health Organization (WHO), 2020 & The Egyptian Ministry of Health and Population, 2020)**.

The spectrum of illness can range from asymptomatic infection to severe pneumonia with acute respiratory distress syndrome (ARDS) and death. The most common presenting symptoms were cough (86%), fever or chills (85%), and shortness of breath (80%), diarrhea (27%) and nausea (24%). Other reported symptoms have included, but are not limited to, sputum production, headache, dizziness, rhinorrhea, anosmia, taste loss, sore throat, abdominal pain, anorexia and vomiting **(Garg et al., 2020 & Wu and McGoogan, 2020)**.

While the maternal immune response changes during birth, the majority of pregnant women have a stable birth, which indicates that immunological changes do not significantly impact the mother's dignity. It has however been found that pregnant women are more vulnerable to other infections **(Silasi et al., 2015)**. All available evidence suggests that pregnant women are at no greater risk of becoming seriously unwell than other healthy adults if they develop coronavirus. The large majority of pregnant women experience only mild or moderate cold/flu-like symptoms. Cough, fever, shortness of breath, headache

and loss or change to sense of smell or taste are other relevant symptoms **(Bouaziz et al., 2020 & Liu et al., 2020)**.

The effect of COVID-19 on pregnant women or neonates hasn't been approved yet as a number of neonates have normal birth weight and normal Apgar scores ranging from 8 to 10 at 1 minute and at 5 minutes after birth. It isn't obviously approved but a little number of studies on COVID-19 found that pregnant women with COVID-19 delivered a preterm baby, respiratory distress syndrome, or low birth weight. The preterm delivery may have been caused by psychological stress during pregnancy associated with COVID-19 pneumonia followed by fetal distress **(Bouaziz et al., 2020 & Liu et al., 2020)**.

2020 is a distinguished year for the medical team in general and gynecology and obstetrics and pediatrics in particular, where the role of the nurse in facing challenges in the spread of Covid-19 is important among women who visit health care centers, gynecology and obstetrics emergencies, and even private clinics asking for consultations and medical advice as well as childbirth. During these unprecedented times it is more important than ever to educate pregnant women postpartum warning signs **(Association of Women's Health, Obstetric and Neonatal Nurses (AWHONN), 2020)**.

The COVID-19 pandemic affects women in ways that, for reasons including earlier hospital discharge, postpartum tele-health visits and reluctance to get care due to exposure concerns, may increase the risk of postpartum complications. Cautious review, especially at this time during the pandemic as the risk of postpartum depression may also increase due to isolation or limited family and friends support. Nurses should help to ensure women know about **(AWHONN, 2020)**.

Guidelines are generally defined as "systematically developed statements to assist practitioners and patients make decisions about appropriate health care for specific circumstances." (WHO, 1997). Guidelines are documents with the aim of guiding decisions and criteria regarding diagnosis, management, and treatment in specific areas of healthcare. The value of a guidelines depends on the quality of the evidence on which it is based, its relevance and applicability to clinical practice, and its consideration of patient preferences. In other words, the best guidelines are developed through a rigorous evidence-based approach **(Burgers et al., 2011)**. Numerous clinical guidelines have been issued for COVID-19, such as IDSA Guidelines for Management of COVID-19 (2020) , Managing Newborns of Mothers With COVID-19: Clinical Practice Guidelines (AAP, 2020) and Control of COVID-19 in Nursing Homes Guidelines (CMS, 2020) **(MedScape, 2020)**.

The nurse should depend on decision-making with pregnant women to improve awareness, level of satisfaction and outcome during pandemic. Women should be notified that they will be discharged in safe manner to limit the risk of infection to themselves, staff and other patients. Anticipated maternal discharge should be discussed with pediatrics/neonatology to determine timing of neonatal discharge. Home care with supplies for blood pressure follow-up will be critical to expediting discharge of patients with a hypertensive disorder **(AWHONN, 2020)**.

Significance of the study

Incidence of COVID-19 at 24 June reaches to 59561confirmed cases with 2.450 mortality met by 1420 daily infected cases. Although many studies have focused on infected patients from the general population; details related to pregnancy outcomes of women with COVID-19 are scarce.

Other studies concerned with maternal-neonatal outcomes and vertical transmission potential of COVID-19 pneumonia in pregnant women. Their report focused on pregnant women who delivered babies through C-section only, and no case for normal vaginal delivery has been reported. So this study will be conducted to provide the pregnant women in Ismailia city with guidelines precautions to take care for themselves and their neonates after delivery and during hospitalization and home care to avoid infection with COVID-19 otherwise if infected how to avoid spread of infection to her newborn.

Aim of the Study

This study is aiming to explore the effect of guidelines regarding COVID -19 precautions on maternal and neonatal outcomes in Ismailia city, Egypt.

The aim of the current study will be achieved through the following objectives:

I. Assess the effect of guidelines regarding COVID-19 precautions on the maternal knowledge.

II. Determine the effect of guidelines regarding COVID-19 precautions on the maternal practice.

III. Evaluate the effect of guidelines regarding COVID-19 precautions on maternal outcomes.

IV. Evaluate the effect of guidelines regarding COVID-19 precautions on neonatal outcomes.

Research hypothesis:

1. Pregnant women who will receive the guidelines regarding COVID-19 precautions will have satisfactory knowledge.

2. Pregnant women who will receive the guidelines regarding COVID-19 precautions will have satisfactory\enhanced practice.

3. Pregnant women who will receive the guidelines regarding COVID-19 precautions will have positive outcomes in relation to mode of delivery and maternal comorbidity.

4. Pregnant women who will receive the guidelines regarding COVID-19 precautions their neonates will have good health condition; as full term, normal birth weight, good APGAR score and not need admission in Neonatal Intensive Care Unit (NICU).

Subjects and method

▪ **Study design**:

A quasi-experimental design (one group pre/posttest) was utilized for the current study.

Setting:

The current study was conducted at Obstetrics and Gynecologic Clinics in Suez Canal University hospitals and general hospital in addition to private clinics at Ismailia city.

Subjects:

A purposive sample of 52 pregnant women were recruited based on **inclusion criteria** as: educated women aged 18-40 years; their gestational age from 34 to 36 weeks; Outpatient visits; private clinics visits and have smart phone and able to use what's app application. **Exclusion criteria**: high-risk pregnancies; women with a history of abnormal labor; women who have acute or chronic medical disorders such as (hepatitis, pyelonephritis or diabetes).

The sample received guidelines concerning Coronavirus precautions including (definition, life span, mode of transmission and incubation period) and COVID-19 aspects including (definition, clinical manifestations, how to be protected before, during and after childbirth, breastfeeding what should be done in case of having contact with affected person with COVID-19, protective measures concerning mask wearing, hand washing, alcohol usage and medical treatment regarding COVID-19).

Sample size:

Sample size was calculated using G power program using the following data: effect size 0.5, α error prop 0.05, two tail, power (1-β err prop) 94 % using independent t test to detect difference between two dependent means. Sample size is 52 women.

52 pregnant women received the guidelines precautions then the results were compared with historical control from literatures.

Tools of data collection:

Four tools were used to collect data in the current study, as the following:

Tool (1):   Self-Administered Online Questionnaire:

It was developed by the researchers to collect the data from the pregnant women and consists of four parts as the following:

Part 1: included socio-demographic data as (age, level of education, occupation, address, telephone number and What's app account).

Part 2: included past obstetrical history as: number of previous pregnancies, mode of delivery, abortions, stillbirth, preterm neonates and the number of living children.

Part 3: included current obstetrical history/ current antenatal history it included data about L.M.P and gestational age.

Part 4: This part assessed the studied women's knowledge regarding COVID-19 including (causative agent, mode of transmission, risk factors, available vaccines, routes of preventions and the precautions that should be taken for protection from COVID-19 infection) (pre and post guidelines intervention).

Scoring:

For the knowledge items, the correct response was scored one and was statistically coded two and the incorrect response was scored zero and statistically was coded one. For each area of knowledge, the scores of the items were summed-up and the total was divided by the number of the items, giving a mean score for the area. These scores were converted into a percent score, and means and standard deviations were computed. The studied women's knowledge was considered satisfactory if the total percent score equal 75% or more and unsatisfactory if the total percent score less than 75% **(Erfani et al., 2020)**.

Tool (2): Reported practice Check list: reported by the studied women regarding practice they perform against COVID-19 infection including (handwashing, wearing the protective measures as gloves and mask and using alchol and chloride) (pre and posttest).

Scoring:

Practice: For practice, the practice was scored one and was statistically coded two in case of well done and the in case of not done, the response was scored zero and statistically was coded one. A total score for every group of items and for the whole questions were calculated. The scores were then converted into percent scores, by dividing the total by the maximum, and multiplying by 100. A score of less than 80% was considered as "unsatisfactory", while a score of 80% or more was considered as "satisfactory" **(Erfani et al., 2020)**.

Tool (3): Maternal and Neonatal Outcomes Record: was filled by the researchers; maternal outcomes as mode of delivery, maternal comorbidity as COVID-19 affection, cough, fever, uterine bleeding and sepsis, while the neonatal outcomes as maturity, birth weight, APGAR score, neonatal intensive care unit admission (NICU) in case of not receiving the guidelines precautions regarding COVID-19) posttest-post-delivery) **(Unicef Organization, 2020)**.

Tool (4): Breast Feeding Record: assessed during 1st 5 days and within two weeks on the 14th day after delivery through assessing the frequency of feeding\24 hrs, duration of feeding, sucking rhythm and depth, the neonatal skin condition, quietness and weight loss or gain, No. of wet diapers\24 hrs and No. of dirty diapers\24 hrs. in addition to assessing the maternal breast and nipple condition (posttest-post-delivery) **(Unicef Organization, 2020)**.

Content validity

Validity was used to modify the study tools of data collection. It was ascertained by a jury consisting of seven expertise from nursing and medical staff who reviewed the study tools for clarity, relevance, comprehensiveness, understanding and applicability.

Reliability:

The study tools of data collection were assessed by Cronbach's alpha to check the internal consistency and the reliability for tool I namely; Self- Administered Online Questionnaire was 0.91, which refers to be highly reliable, while for tool II namely; Reported Practice Checklist was 0.87, while for tool III namely; Maternal and Neonatal Outcomes Record was 0.89 and for tool IV namely; Breastfeeding Record was 0.92.

Pilot study

Pilot study was carried out on 10 % (6 pregnant women) of the study sample going to antenatal clinic of obstetric and gynecologic department at Suez Canal University, General hospitals and private clinics in Ismailia city to test applicability of the tool then necessary modifications were done according to the results of pilot study. The pilot sample was excluded from the study sample.

Field of the work:

1st phase:

The preparatory phase was the first phase in the current study. The researchers reviewed the local and international related literature about the

various aspects of the research problem as (**AWHONN, 2020; The Egyptian Ministry of Health and Population,2020& World Health Organization,2020).** Reviewing literature enabled the researchers to be acquainted with the magnitude and seriousness of the problem, and guided the researchers to prepare the required tools of data collection.

Preparation included an electronic page on what's app group. Electronic tools (the previously mentioned four tools) were applied in a suitable electronic form to be filled easily by the studied women in tools no (I, II and IV), while tool III was assessed and recorded by the researchers.

2nd phase

In antenatal clinic of obstetric and gynecologic department of Suez Canal University the study was conducted. Depending on the inclusion and exclusion criteria; suitable pregnant women were asked to participate in the study and signed the written informed consent form. The studied women were informed that they could withdraw from the study at any time. Women who were willing to participate in the study were interviewed; and the tools of data collection were filled by the studied women (pre-test) after explaining to them the purpose of the study.

An electronic guidelines precaution mainly as recommended by *(World Health Organization (WHO), 2020 & Indiana State Department of Health (Epidemiology Resource Center), 2020 & CDC, 2020)* were introduced to the studied women through What's-app. The information was conducted in 2 sessions, one session per week for two weeks. Each session duration approximately lasting from 20 to 30 minutes including teaching various activities and precautions for the studied women to protect themselves and their neonates from COVID-19 infection and answering any questions.

Immediately, after the application of the electronic guidelines precautions the studied women were instructed to refill in the study tools (post-test) in order to evaluate the effect of the guideline on the studied women's' knowledge and practice. post-test postpartum was done to explore the maternal and neonatal outcomes.

2- Administrative design:

An official letter was issued from the Faculty of Nursing, Suez Canal University to the directors and heads of antenatal clinic of obstetric and gynecologic department in Suez Canal University, General hospitals and private clinics centers to obtain their permission to conduct the study.

Ethical considerations:

The researcher had an ethics committee acceptance code no. 85/ 7-2020 Written approvals were obtained from the studied women. The studied women were informed about the nature, purpose and expected outcomes of the study. The studied women were reassured regarding the study safety, obtained information confidentiality and the rights to refuse to participate in the study or withdraw at any time throughout the study.

4-Statistical analysis:

Collected data were arranged and analyzed by using Statistical Package for the Social Sciences (SPSS) program for windows version 20.0 (SPSS, Chicago, IL). Continuous data were normally distributed and were expressed in mean± standard deviation (SD). Categorical data were expressed in frequency and percentage. Chi-square test was used for comparison of variables with categorical data. Statistical significance was set at $p<0.05$.

Limitation of the Research:

The current research study has some limitations, as follow:

The 1st wave have been ended with September 2020, which restricted sample size because of 2nd wave started with new manifestation.

The lack of national and international researches that study the current research topic., sometimes the sessions were protracted due to online program and weak internet.

Results

Table (1) represented distribution of the studied women according to their socio-demographic characteristics. It was found that (55.8%) of the studied women were < 25 years old, with mean age of 26.250 ± 4.817 years. In relation to the studied women's' level of education, it was revealed that (50%) of the studied women had Bachelor education. Regarding the studied women's' occupation, it

was found that (76.9%) of the studied women were housewives.

Table (2) represented distribution of the studied women according to their previous obstetric history. It was found that (59.6%) of the studied women had number of parity ranging from one to two times. 40.4% of the studied women had delivered through cesarean section mode. In relation to the studied women's' previous history regarding to having abortion, stillbirth and preterm labor, it was found that (71.2%, 86.5 % and 98.1%) of the studied women had no history of abortion, stillbirth and preterm labor respectively.

Table (3) showed that 76.9% and 100% of the studied women had unsatisfactory total knowledge and reported total practice scores regarding COVID-19 pre- guidelines respectively. While 86.5% and 32.7% of the studied women had satisfactory total knowledge and reported total practice scores regarding COVID-19 post- guidelines respectively. There is highly statistical significant difference between the studied women for both total knowledge and total reported practices scores regarding COVID-19 pre\post guidelines (*P*=0.000).

Table (4) showed that (59.6%) of the studied women had normal vaginal delivery, while (40.4%) of the studied women had cesarean section. It's clear that (73.1%) of the studied women had body temperature less than 38

Celsius. 65.4% of the studied women had no cough postpartum. In relation to the uterine bleeding and puerperal sepsis, it was found that (92.3% and 92.3%) of the studied women had no uterine bleeding and puerperal sepsis respectively.

Table (5) showed that (75%) of the neonates were full term and less than (71.2%) of the neonates had normal birth weight. The majority (82.7%) of the neonates had good status that evidenced by APGAR score mean ± SD was 8.250 ±1.702. Although; (32.7%) of the neonates had been admitted to NICU because of respiratory problems (76.4%) and/ or physiological jaundice (70.5%).

This table (6) shows distribution of the studied neonates according to breast feeding adequacy on the 5th and 14th day postpartum post guidelines\program regarding COVID-19. Breast feeding all items improved but without statistically significant differences on the 5th and the 14th day except breast feeding duration and changing diaper per 24 hours (P<0.02, 0.000) respectively.

Table (7) was clarified that there was a negative correlation between the studied women's' total mean scores of knowledge and practice pre-guidelines; while post- guidelines, there was a positive correlation (r= - 0.210 and 0.131 respectively) with no statistically significant difference pre\post- guidelines (P < 0.05).

Table (1): Distribution of the studied women according to their socio-demographic characteristics (n=52).

Socio-demographic characteristics:	No.	%
Age:		
17-25yrs	29	55.8
26-35 yrs	21	40.4
+ 35 yrs	2	3.8
Mean age ± SD	26.250 ± 4.817	
Level of education:		
Read &write	2	3.8
Basic	3	5.8
Technical / secondary	19	36.5
Bachelor	26	50.0
Postgraduate	2	3.8
Occupation:		
Housewife	40	76.9
Employee	12	23.1

Table (2): Distribution of the studied women according to their previous obstetric history (n=52).

Obstetric history	No.	%
No. of parity:		
Null	5	9.6
1-2 times	31	59.6
3- 4 times	13	25.0
≥ 5 times	3	5.8
Mode of previous delivery:		
Normal Vaginal	17	32.7
Cesarean Section (CS)	21	40.4
No labor before (nulliparous)	14	26.9
No. of abortion:		
Null	37	71.2
1-2	14	26.9
3-4	1	1.9
Still birth:		
Yes	7	13.5
Not found	45	86.5
Preterm labor:		
Yes	1	1.9
No	51	98.1
No of living children:		
null	16	30.8
1-2	16	30.8
3-4	18	34.6
+5	2	3.8

Table (3): Distribution of the studied women according to their total knowledge and total reported practice scores regarding COVID-19 pre\post- guidelines (n=52).

Items	Level of satisfaction	Pre test		Post test		X²	p
		No	%	No	%		
Total knowledge Levels	Unsatisfactory	40	76.9	7	13.5	42.275	0.000**
	Satisfactory	12	23.1	45	86.5		
Total reported practice	Unsatisfactory	52	100	35	67.3	20.322	0.000**
	Satisfactory	0	0	17	32.7		

X² refers to chi square test,
(**) highly significance if *p value is* less than 0.001

Table (4): Distribution of the studied women according to their maternal outcomes post guidelines regarding COVID-19 (n=52).

Maternal outcome:	No	%
Mode of delivery:		
Normal Vaginal	31	59.6
Cesarean Section (CS)	21	40.4
Temperature within 2hrs postpartum:		
< 38	38	73.1
38-39°	13	25.0
> 39°	1	1.9
Cough:		
Yes	18	34.6
No	34	65.4
Uterine bleeding:		
Yes	4	7.7
No	48	92.3
Puerperal sepsis:		
Yes	4	7.7
No	48	92.3

Table (5): Distribution of the Neonatal Outcomes Post Guidelines Regarding COVID-19 (n=52).

Neonatal outcomes	No	%
Gestational age:		
Preterm: less than 37 weeks	11	21.2
Full term: 37-42 weeks	39	75.0
post term: more than 42 weeks	2	3.8
Neonatal birth weight:		
Low birth weight: less than 2500 gm.	15	28.8
Normal birth weight: 2700-4000 gm.	37	71.2
Neonatal status:		
Good	43	82.7
Poor	9	17.3
Mean Apgar score ± SD	8.250 ±1.702	
The neonates fed:		
Through breast directly	35	67.3
Through squeezed breast milk	12	23.1
Artificially	5	9.6
Neonatal Intensive Care Unit (NICU) admission:		
Yes	17	32.7
No	35	67.3
Causes of NICU admission: #	**n=17**	
Respiratory problems	13	76.4
Physiological jaundice	**12**	70.5
Pathological jaundice	2	11.7
#Responses are not mutually exclusive.		

Table (6): Distribution of the studied neonates according to breast feeding adequacy on the 5th and on the 14th day postpartum post guidelines regarding COVID-19 (n=52).

Items	Day 0- 5						Day 10-14						X^2	P-value
	Yes		No		NA		Yes		No		NA			
	No	%	No	%	No	%	No	%	No	%	No	%		
No. of breast feeds/24 hours: 8-12	28	53.8	19	36.5	6	11.5	29	55.8	18	34.6	6	11.5	0.045	0.978
Breast feeding duration: 5-40 min.	30	57.7	16	30.8	6	11.5	42	80.8	5	9.6	6	11.5	7.853	**0.020***
Sucking pattern: Regular and deep	40	76.9	6	11.5	6	11.5	44	84.6	3	5.8	6	11.5	1.281	0.527
Neonatal skin: natural	37	71.2	9	17.3	6	11.5	42	80.8	5	9.6	6	11.5	1.550	0.461
Quietness of the neonates: quite	37	71.2	9	17.3	6	11.5	43	82.7	4	7.7	6	11.5	2.464	0.292
Neonatal weight loss: >10%	39	75	7	13.5	6	11.5	42	80.8	5	9.6	6	11.5	0.535	0.765
No of wet diapers/ 24 hours: 5-6	36	69.2	10	19.2	6	11.5	33	63.5	14	26.9	6	11.5	0.888	0.641
No of dirty diaper / 24 hours: 2	28	53.8	6	11.5	6	11.5	27	51.9	20	38.5	6	11.5	19.648	**0.000****
Breast and nipple condition: Comfort	27	51.9	19	36.5	6	11.5	30	57.7	17	32.7	6	11.5	0.360	0.835
Nipple changes: no	31	59.6	15	28.8	6	11.5	28	53.8	19	36.5	6	11.5	0.714	0.700
Nipple protector	34	65.4	12	23.1	6	11.5	39	75	8	15.4	6	11.5	1.233	0.540
Sound of the swallowed breast milk/ Sucking rhythm							41	78.8	5	9.6	6	11.5		

Table (7): Correlation between the total mean scores of knowledge and Practice pre and post guidelines among the studied women (n=52).

Variables	Knowledge			
	Pre guidelines		Post guidelines	
	R	P	r	P
Practice	-0.210	0.136	0.131	0.356
r: Pearson's correlation coefficient.				

Discussion

This study was conducted during the first wave of COVID-19 pandemic in Egypt. Pregnant women were worried about COVID - 19 effect on pregnancy (mother and fetus), and their outcomes. This study is aimed to explore the effect of guidelines regarding COVID -19 precautions on maternal and neonatal outcomes in Ismailia city. Pregnant women decrease their attendance at antenatal care clinics and Maternal Child Health Centers. They had their follow-up by WhatsApp and telephone. So, **the** determined sample was collected from online clinics for pregnant women groups and followed up until and after delivery

The present study revealed that; The guidelines regarding COVID-19 precautions affect positively maternal knowledge and practice pre\post guidelines, with highly statistically significant difference. This is may be due to the seriousness of the situation and the concern of pregnant women about the global viral infection, and therefore they responded to the information circulated in the mass, social media and health workers related to the Corona virus before the conducted study.

It was clarified that there was a negative correlation between the studied women's total mean scores of knowledge and practice pre-program; while post-program, there was a positive correlation with no statistically significant difference pre\post-program.

These findings agreed with **Mohamed et al., (2020) who** studied knowledge, attitude and self-protective measures practice regarding Corona virus prevention. Their educational intervention guideline had a highly statistical significant positive effect on knowledge, attitude and self –protective measures practice of pregnant women regarding COVID 19 prevention (p-values< 0.001). This significance

may be due to the large sample that **Mohamed et al., (2020)** depend on in his study**.**

Another cross-sectional perceptual study from Saudi Arabia conducted by **Zakaria et al., (2020)** aimed to report pregnant women's knowledge and perception of feto-maternal care during the pandemic's lockdown. They found that there is poor knowledge about Saudi Pregnant women. In addition to poor maternal care during the COVID 19 era. These results were referred to interested women with complicated pregnancies who need to more knowledge improvement and care promotion. in contrast with those; women who with normal pregnancies not interested any were by neither knowledge improvement nor care promotion.

Nwafor etal., 2020 studied Knowledge and practice of preventive measures against COVID-19 infection among pregnant women in a low-resource African setting. They were conducted among pregnant women attending antenatal care at Alex Ekwueme Federal University Teaching Hospital, Abakaliki. They use self-administered questionnaire from February to March 2020 among 284 of participants. Although they agreed with our results that having adequate knowledge of the preventive measures against COVID-19 infection; they disagreed with our results regarding the overall practice of these preventive measures against the coronavirus were poor. The determinants of poor practice of the preventive measures among the participants were being in age group 31-40 years, married, grand multiparous, residing in rural area, and having no formal education. It was thought that sociodemographic data may be the leading cause for poor practice.

These finding agreed with **Zhang et al., (2020)** who studied "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" applied heath education regarding infectious disease prevention. They found that knowledge improved with highly statistical significant for studied group. This may be due to effective educational program that applied.

In view of the novelty of this research, which aimed to evaluate the effect of guidelines regarding COVID -19 precautions on maternal and neonatal outcomes in Ismailia city, Egypt, the study differed from the pattern of other studies, which dealt with confirmed cases of COVID 19 infection and the evaluation of pregnancy outcomes for mother and neonates.

The result of this study reported that more than half of the studied women had a normal vaginal delivery, and less than three-quarters of the studied women had normal body temperature and had no cough post-partum. Also, most of the studied women had no uterine bleeding or puerperal sepsis. These findings revealed that the guidelines have affected positively the woman's health.

Among these studies are the following:

Zakaria et al., (2020) depend on Sonographic data for maternal outcome that - only- reveled more than third quarters of studied sample had one fetus. **Delahoy et al.;(2020) studied "**Characteristics and Maternal and Birth Outcomes of Hospitalized Pregnant Women with Laboratory-Confirmed COVID-19 ". They reported signs and symptoms on the case report form were eleven women with upper-respiratory illness/influenza-like illness, six women wheezing, and one with hemoptysis/bloody sputum, conjunctivitis, rash and altered mental state.

In addition to; 0.9% of completed pregnancy loss occurred at <20 weeks' gestation, 1.1% at ≥20 weeks' gestation, 0.2% at unknown gestational age. Among 445 pregnancies resulting in live births with known gestational age at delivery, 87.4% were ≥37 weeks' gestation, and 12.6% were preterm <37 weeks. preterm delivery was 23.1% and 8.0% of symptomatic and asymptomatic women of all live newborn respectively. There were two symptomatic women who need to mechanical ventilation delivered newborns who were died.

Wang et al. (2020) reported a case of neonatal COVID-19 in China with pharyngeal swabs testing positive by real-time reverse-transcription polymerase chain reaction assay. The swab was done 36 hours after birth. **Wang et al. (2020)** not able to confirm which infection transmit from mother to fetus before or during labor or immediately after labor.

The finding of the current study showed that three quarters of the studied neonates were **full term**, which come in the same line with **Yang et al., (2020),** whose study entitled **"**Coronavirus disease 2019 (COVID-19) and pregnancy: A systematic review", retrospective Chinese study which revealed that, most neonates were live births, full-term and with good Apgar score, also tested negative for SARS-CoV-2 infection, except a newborn who had high IgG and IgM levels 2 h after birth but tested negative in repeated RT-PCR, and also agreed with **Yu et al., (2020),** whose study aimed to clarify the clinical features and obstetric and neonatal outcomes of pregnant patients with COVID-19; the mean gestational age was 39 weeks plus 1 day (range 37 weeks to 41 weeks plus 2 days) among seven neonates. The outcomes of the neonates were good. one neonate was infected with SARS-CoV-2 36 h after birth.

While the finding of the current study contradicted with **Smith et al., (2020)** study namely; "Maternal and neonatal outcomes associated with COVID-19 infection: A systematic review"**,** who reported through a global systematic review 9 publications on COVID−19-positive pregnant women (n = 92), Preterm births equal 63.8% and the fetal distress was 61.1%, Also, the finding of the current study contradicted with **Liu et al., (2020)** study which entitled "Clinical manifestations and outcome of SARS-CoV-2 infection during pregnancy". China Retrospective study 13, preterm delivery (46%), fetal distress (30%), and stillbirth (10%) and found no evidence of intrauterine transmission of COVID−19, Finally, **Zaigham and Andersson, (2020),** China Systematic review and meta-analysis 13 publications (n = 114) (retrospective studies, cohort study, case series, and case reports) Preterm infants pooled proportion: 23.0% (95% CI 11.0–39.0)

Regarding the neonatal **birth weight**, the current study clarified that less than three quarters of the studied neonates had normal birth weight, while, more than one quarter of them had low birth weight; this may be referred to maternal nutrition that effect on baby's weight directly. **Dubey et al., (2020) & Smith et al., (2020)** found that less than one quarter and less than half of the neonates had low birth weight respectively and one percent neonatal COVID-19 infection was present.

The current study verified that the majority of the neonates had good status that evidenced by **APGAR** score mean ± SD was 8.250 ±1.702; which agreed with **Trocado et al., (2020) & Chen et al., (2020)** who found no neonatal asphyxia, 1 min Apgar score 8–9 and 5-min score 9–10, also agreed with **Liu et al., (2020),** Retrospective Chinese study who found no cases of neonatal death or asphyxia with normal Apgar scores at 1 min and 5 min.

Less than one third of the neonates had been admitted to NICU because of respiratory problems and/ or physiological jaundice; **Smith et al., (2020)** found that more than three quarters of the neonates were admitted to NICU.

The findings of the current study showed that the majority of the studied mothers had practiced breast feeding either directly or through expressed/squeezed breast milk, and the researchers followed the studied mothers up to 14 days postpartum to recognize the continuity pattern and prognosis of breast feeding; which contradicted with **Raskovalova et al., (2015),** who reported that the Breastfeeding Assessment Score (BAS) predicts early breastfeeding cessation with moderate accuracy during COID-19 pandemic. This is may be due to the fact that the high belief among the Egyptian mothers with the importance of breast feeding for both their neonates and themselves; as colostrum and breast milk contain antimicrobial, anti-inflammatory and immunomodulation agents and acts as a laxative to ease meconium passage, and for the mothers allow less postpartum bleeding and rapid uterine involution.

Conclusion:

Pregnant women who received the guidelines regarding COVID-19 precautions had satisfactory knowledge with highly statistically significant difference. Also, they had satisfactory\enhanced practice. They had a positive maternal outcome in relation to mode of delivery, temperature, cough and puerperal sepsis. Their Neonates had a good health condition in relation to term, birth weight, APGAR score and not need admission in Neonatal Intensive Care Unit (NICU).

Recommendations

Based on the results of this study we recommended that:

1. Application of guidelines at Maternal Child Health (MCH) Centers in early pregnancy to avoid other waves of COVID 19.
2. Further researches using large sample size are recommended.
3. Encourage an effective online communication for all pregnant women with MCH centers and all private clinics.

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