# Women Perception Regarding the Risk of COVID19 on Pregnancy and its Outcome

**Naema Mamoud Farag[1], Om El-Saad Farouk [2], Walaa Fathy [3], Nageya Ezzat Said [4]**
*1-B.Sc. Nursing2009*, Nursing educator at Ashmoun Central General Hospital.
2-Professor of Maternity & Gynecological Nursing, Faculty of Nursing, Ain Shams University.
3-Assist. Prof of Maternity & Gynecological Nursing, Faculty of Nursing, Ain Shams University.
4-Lecturer of Maternity & Gynecological Nursing Faculty of Nursing, Ain Shams University.

## Abstract

**Background:** COVID - 19 pandemic is still present up to now; major concerns are being raised up about its effects on pregnant women and their fetus. **Aim of the study**: to assess women's perception regarding the risk of COVID-19 on pregnancy and its outcome. **Design:** A descriptive design was utilized in this study. **Setting**: The study was conducted at antenatal clinic at Ashmoun Central Hospital in El -Menoufia Governorate. **Sampling:** A purposive sample consists of (274) pregnant women. **Study Tools**: Three tools were used to achieve the aim of this study. **Tool I**: Structured interviewing questionnaire: it consisted of two parts, **first part:** Women general characteristics. **Second part:** Obstetric history. **Tool II:** Pregnant women knowledge regarding the risk of COVID-19 on Pregnancy and its Outcome and **Tool III:** Pregnant women attitude for the risk of COVID-19 on Pregnancy and its Outcome. **Results:** the results of the present study revealed that, {72.3%} of the studied pregnant women have unsatisfactory level of total knowledge about the risk of COVID19 on pregnancy and its outcome. While, {27.7%} of them have satisfactory level of total knowledge and {53.3%} of them have negative attitude for the risk of COVID-19 on pregnancy and its outcome. While,{ 46.7%} of them have positive attitude. **Conclusion:** the present study concluded that there was highly significant positive correlation between total knowledge of the studied pregnant women and their total attitude for the risk of COVID-19 on pregnancy and its outcome. **Recommendations:** Develop and implement educational campaigns aimed at pregnant women to increase their knowledge about the risks of COVID19 during pregnancy and its potential outcomes .

**Keywords:** Perception, COVID19, Pregnancy, Outcome

## Introduction

**Coronavirus disease 2019 (COVID-19)** is a highly infectious respiratory disease that is caused by a novel coronavirus. It first emerged in December 2019 in Wuhan, China. However, its spreading was very quick, affecting 222 countries and territories all over the world. The coronavirus disease 2019 (COVID-19) pandemic has had a major impact on health systems and societies worldwide. Pregnant women and their fetuses are at high risk during the outbreak of infectious diseases. In general, physiological and mechanical changes during pregnancy increase susceptibility to infection. According to recent findings, the risk of maternal mortality in COVID-19-pregnant women with severe illness appears to be considerable **(Hashem et al., 2022).**

Coronavirus disease-19 (COVID-19) causes severe problems such as acute respiratory distress syndrome (ARDS), pneumonia, multi-organ failure, septic shock, and cardiovascular complications that may include heart failure, arrhythmias, heart inflammation, and thrombosis, particularly venous thromboembolism. In addition, neurologic complications include seizures, strokes, encephalitis, and death **(Hussein et al., 2022).**

It is important to enhance ordinary preventive measures in healthcare settings. Preventive measures have been taken, such as social distancing, restriction of activities to prevent the spread of the virus, respiratory hygiene/cough etiquette, hand hygiene, gowns, gloves, masks for patients who are suspected of having COVID-19, eye protection, and covering

the nose and mouth with a tissue or elbow when coughing or sneezing. All of these measures are important in controlling the spread of the infection in the hospital and the community (**Pal et al., 2020**).

Over 95 percent of newborns from COVID-19-positive mothers are uninfected and in good condition at birth. Some newborns of infected mothers have developed symptoms of mild infection (i.e., not requiring respiratory support), and most of these cases have been attributed to transmission from respiratory droplets postnatally when the neonates were exposed to mothers or other caregivers with COVID-19. Neonatal morbidity (e.g., need for mechanical ventilation) has largely been related to preterm birth and to adverse uterine environments resulting from critical maternal COVID-19 (**Kharbanda et al., 2021**).

Maternity nurses play a vital role in healthcare setup in prevention, infection control, isolation, and continuous monitoring of patients. Because of their unique patient-facing nature, there are occupational risks to providing care during the COVID-19 outbreak. Great efforts have been made to prevent pregnant women and their fetuses from being infected by the scourge of COVID-19. Nurses developed a solid foundational understanding of the disease process to play a greater role in disease control. Responding to COVID-19 is critical to expediting positive outcomes (**Elhameed et al., 2022**).

### Operational definition:

### Perception :

Perception is the sensory experience of the world. It involves both recognizing environmental stimuli and taking actions in response to these stimuli. Through the perceptual process, gain information about the properties and elements of the environment that are critical to survival. (***Zakaria et al., 2019***).

### Risk perception:

Risk perception is a central component of health-specific behavioral theories, such as the health belief model and protection motivation theory. (***Tagini et al., 2021***).

### Significance of the Study

WHO data shows that 810 women die each day around the world due to pregnancy- and childbirth-related causes. Alongside maternal mortality and morbidity, neonatal mortality and stillbirths are other concerns for policymakers, especially in low- and middle-income countries (LMICs). In Egypt, from January 2020 to November 2021, there have been {354,836} confirmed cases of COVID-19 with {20,237} deaths, reported by the Egyptian Ministry of Health COVID-19, which has now spread throughout the country during an outbreak of infectious diseases (***Hashem et al., 2022***).

The severe acute respiratory syndrome coronavirus has become a public health concern worldwide. From January 2020 to May 2023, there have been{ 516,023} confirmed cases of COVID-19 with{ 24,830} deaths, reported to WHO. It is important for pregnant women to know about the mode of transmission, symptoms, and preventive measures against COVID-19 (***Jhirwal et al., 2022***).

Pregnant women are at high risk of various infections as compared to the general population, which can lead to morbidity and mortality. COVID-19 has an adverse effect on perinatal outcomes in the form of miscarriage, preterm labor, and stillbirth. A great effort should be made to protect the pregnant mother and the fetuses from the infection of COVID 19. It can only be achieved by educating pregnant women and increasing their awareness about COVID-19 (***Anikwe et al., 2020***).

Pregnancy is an immune-suppressed state, which makes pregnant women generally more susceptible to COVID-19 infection and severe illness. Extensive precautions have been recommended to avoid exposure to the virus. Knowledge and attitude toward the disease play an integral role in readiness to accept public health measures. (***Besho etal ., 2021***)

And also , this study was conducted in a rural area of Ashmoun Central General Hospital

in Ashmoun City, which is considered the largest center in Menoufia Governorate. The hospital serves about 54 neighboring villages, and there has been an increase in flow rates at the hospital. This study aimed to assess the knowledge and attitude towards COVID-19 among pregnant women attending antenatal clinics in the hospital, increase their health awareness, and promote their health **.**

This Topic is reflectively new, and there's gap in understanding how pregnancy is affected by COVID19 risk perception standpoints , and this study can contribute to fulfilling this gap .

## Aim Of The Study

The aim of the study is to assess women's perceptions regarding the risk of COVID-19 on pregnancy and its outcome through:

• Identify women's knowledge regarding the risk of COVID-19 on pregnancy.

• Identify women's knowledge regarding the risk of COVID-19 on pregnancy outcome.

• Assess women's attitudes regarding the risk of COVID-19 on pregnancy and its outcome.

• Assess women's attitudes regarding the risk of COVID-19 on pregnancy outcome.

### Research questions:

1-What are women's knowledge Regarding the Risk of COVID19 on Pregnancy and its Outcome?

2-　　What are women's attitude Regarding the Risk of COVID19 on Pregnancy and its Outcome?

## MATERIALS & METHODS

### Research design:

Descriptive design will be utilized in this study.

### Research Setting:-

This study was conducted at antenatal clinic at Ashmoun Central General Hospital In El -Menoufia Governorate that contains 2 floors, the first floor consisted of 4 clinics (prenatal clinic, family planning clinic, ultrasonography room and laboratory). The second floor consisted of obstetric and gynecological clinics, delivery unit and operation unit.

### The Rational:

Ashmoun General Hospital is located in the city of Ashmoun, which is considered the largest center in Menoufia Governorate, and it has the second rank at the level of the centers of the Arab Republic of Egypt in terms of area and the number of villages affiliated to it, Which serves about (54) neighboring villages The hospital includes ante natal clinic, which has an ultrasound device, and there is also a Doppler device in the hospital, as well as a CT scan device, as well as a gynecological department, a natural birth booth, as well as a well-equipped operating room for cesarean delivery and there are Corona isolation and Corona care departments.

In addition to this, this study in rural area and there are an increase in rates on the hospital.

### Subjects:

Two hundred seventy four (274) pregnant women's with different gestational ages were participated in the study.

### Sampling type:

Simple random sample was used to achieve the aim of the study**.** The sample was selected for the study according to the following criteria:

### Inclusion criteria:

▪ Planning to become pregnant or all pregnant women with different gestational ages.

▪ Healthy pregnancy (free from medical or obstetric disease)

▪ Primi gravid and multiparous women.

▪ Age is most relevant to the research (18-35) .

**Exclusion criteria:**

Pregnant women with ( chronic medical diseases or surgical complications) that may affect pregnancy outcomes

**Sampling**

Two hundred seventy four (274) pregnant women's with different gestational ages were participated in the study as the following formula;

$$n = \frac{N \times p(1-p)}{\left[\left[N-1 \times \left(d^2 \div z^2\right)\right] + p(1-p)\right]}$$

**While:**
**P= Probability (0.5)**
**N= Total population**
**Z= Z value "1.96"**
**D= Standard Error (0.05)**
**n= sample size (274).**

**Sample technique :**

The subjects of this study was obtained by (274) pregnant women's with different gestational ages who attending to the ante natal clinic at Ashmoun Central General hospital which representing (25%) of the total number (950) pregnant women's during the period of (2019 - 2020). So, sample size was calculated by adjusting the power of the test to 80% and the confidence interval to 95% with margin of error accepted adjusted to 5% and a known total population of (274) pregnant women's using the following equation :

Type I error (α)= (0.05)

Type II error (B) = 0.2

With power of test 0.80

**Tools of data collection:**

Three tools was used to achieve the aim of this study

**Tool I: A Structured interviewing questionnaire:**

It was Adapted from *(Tekelab et al., 2019)* and modified by researcher in Arabic language to assessed women's regarding the risk of COVID19 on pregnancy and its outcome it was consisted of {11questions multiple choice} the questionnaire was divided into 2 parts as the following .

**Part1: pregnant women's general characteristics:** This part assessed the women's general characteristics of the pregnant women as name, age, marital status, level of education, occupation, family income and residence. It included questions from {1- 9} multiple choice questions.

**Part 2**: Including current and past Obstetric history of the pregnant women as { LMP, EDD, GA, Gravidity, Parity Miscarriages, Terminations, Number of live births, The number of dead births, current pregnancy problems Previous Pregnancies, Length of Pregnancy, Mode of Delivery and Past Complications of Pregnancy (Before / during / after delivery) that included questions from{10-11}open ended questions.

**Tool II: Questionnaire assessment for pregnant women knowledge regarding the risk of COVID19 on Pregnancy and its Outcome** it was consisted of {12 – 33questions multiple choices}**.** Adapted from *(Gaheen et al., 2020)* and modified by the researcher: as causative agent of COVID 19, mood of transmission route, incubation period, clinical manifestation, specific complain appear on the infected pregnant woman with COVID 19, the most vulnerable group to the transmission of COVID 19, are the worrying symptoms for patients with COVID 19 who should return to the hospital, the procedures in case of feeling symptoms of COVID19, Measures to protect others from infection, effect of COVID 19 on the mother and fetus, signs of fetal distress, the effect of COVID19 on women after childbirth, the effect of COVID19on newborns, Measures followed while breastfeeding a mother infected with COVID19, the presence of effective cure and methods of COVID 19 prevention}**.**

**Scoring system**:

It included two points for a complete correct answer and one point for an incorrect answer. The total score of pregnant women's knowledge was considered satisfactory if the total percent score was 60% or more from {27–44} and unsatisfactory if the total percent score was less than 60% from **{13–26}.**

**Tool III: Likert scale to assess pregnant women attitude for the risk of COVID19 on Pregnancy and its Outcome.** Adapted from *(Nemat et al., 2021)* and modified by the researcher. It included {20 closed-ended questions} related to the seriousness of COVID-19 and whether it was important to wash hands constantly and wear a mask as part of the preventive measures against COVID-19 to prevent infection. Other questions asked were: whether a COVID-19 patient could be treated at home without being referred to a doctor; whether handling COVID-19 patients put the career at risk of getting the disease; the impact of home health isolation; the impact of COVID-19 on sleep quality; reducing the frequency of prenatal follow-up; the groups most at risk of contracting COVID-19; maintaining social distancing; and whether health education was important in disease prevention and reduction.

**Scoring system:**

The scale covered 20 clear simple statements, and pregnant women had five possible responses for each statement: strongly disagree scored by one, disagree scored by two, somehow agree scored by three, agree scored by four, and strongly agree scored by five. Total scores were then converted to percentages. Scores of 60% or less (12–59) were considered negative attitudes, and scores of more than 60% (61–100) were considered positive attitudes.

**Content validity and reliability:**

**Tools Validity**

*Tools* of the study given to three panel expertise in the field of obstetric and gynecological nursing from faculty of nursing to measure the content validity of the tools and clarifies the sentences as well as. Appropriateness of content, modification was done and rephrasing to some statement.

**Tools Reliability;**

Testing reliability of proposed tools was done by cronbach alpha test. That was calculated to assess the reliability that indicated the tool consisted of reliability homogenous items as indicated by the moderate to high reliability the cronbach alpha test was (0.82) for first tool and (0.87) for second tool.

**Pilot Study:**

A Pilot study was carried out on 10% of total studied sample for a period of sixteen days .which was included twenty eight {28} women who met the criteria. It was conducted and evaluated the reliability and applicability of the tools that found the possible obstacles and problems that was faced during data collection., the pilot study sample was excluded from the study.

**Administrative design:**

An official approval to carry out this study obtained from Dean of Faculty of Nursing, Ain Shams University and An official permission letter containig the title and aim of the study was sent to the directors of Ashmoun Central General Hospital in El -Menoufia Governorate.

**Ethical considerations:**

The ethical research considerations in this study included the following:

• The research approval was obtained from the Scientific Research Ethical committee in the faculty of nursing at Ain Shams University before starting the study.

• An official permission was taken from the authoritative personnel in the mentioned hospital and written or oral consent will be obtained from all pregnant women.

• The researcher clarified the objective and the aim of the study to the pregnant women included in the study.

• The researcher assured maintaining anonymity and confidentiality of the subject data.

• Pregnant women were informed that they are allowed to choose to participate or not in the study and that they have the right to withdraw from the study at any time without penalties.

• Offered answer to all the pregnant women's questions.

• Tools of data collection did not touch women's religious ,dignity, culture and ethical issues.

• Tools of data collection were burnet after statistical analysis done.

**Field work**

o The study was implemented within three months, from the beginning of July to the end of  September 2022. After receiving approval from the dean of the previous study setting, the researcher visited the previous study setting three days a week at the morning shift from 9.00 a.m. to 2.00 p.m. at the setting room area  at antenatal clinic at Ashmoun Central General Hospital until a total sample was obtained .

o The researcher took into consideration the universal precautions against COVID-19 and hospital rules regarding its prevention while interviewing pregnant women, such as: keeping an appropriate distance from pregnant women sitting (1 meter) and me; frequent hand washing; using alcohol gel; and wearing a surgical face mask.

o The researcher interviewed 10–12 pregnant women per day with the previously mentioned sample criteria individually in the setting room area. Each interview lasted 20–30 minutes.

o At the beginning of the interview, the researcher started by introducing herself and explaining clearly the aim of the study to the studied pregnant women to gain confidence and trust, then took oral consent from her.

o Then the researcher collected data related the women's general characteristics, current and past obstetric history, and used tool {I}.

o Then the researcher assessed the women's knowledge by using tool{II}, which contained questions about the women's knowledge regarding the risk of COVID-19 on pregnancy and its outcome.

o After that, the researcher used tool {**III**} to assess the women's attitude toward the risk of COVID-19 on pregnancy and its outcome.

o Finally, the researcher repeated the previous steps until she finished and reached the target sample**.**

**Preparatory phase:**

It included reviewing current and past, local and international related literature and theoretical knowledge of various aspects of the study using books, articles, journals, and internet to develop tools of data collection.

**Statistical Design:**

The statistical analysis of data was done by using the computer software of Microsoft Excel Program and Statistical Package for Social Science (SPSS) version 25. Data were presented using descriptive statistics in the form of frequencies and percentage for categorical data, the arithmetic mean (X) and standard deviation (SD) for quantitative data. Qualitative variables were compared using chi square test (X) 2, P-value to test association between two variables and Pearson correlation test (R- test) to the correlation between the study variables.

Degrees of significance of results were considered as follows:

- P-value > 0.05 Not significant (NS)

- P-value ≤ 0.05 Significant (S)

- P-value ≤ 0.01 Highly Significant (HS).

## Results

**Table (1)** shows that, 94.2% of the studied pregnant women were aged between 18 years, the Mean SD of age is 28.70 ± 5.91 years. As regard to marital status, 98.2% of them are married. Also, 44.5% of them have diploma. Moreover, 61.7% of them do not work. Furthermore, 81.8% of them reside in rural areas. Also, 74.5% of them have enough income.

**Table (2)** shows that, 60.9% of the studied pregnant women have unsatisfactory level of total knowledge about the risk of COVID19 on pregnancy. Also, 60.9% of them have unsatisfactory level of total knowledge about the risk of COVID19 on pregnancy outcome. Regarding total knowledge score,

72.3% of the studied pregnant women have unsatisfactory level of total knowledge about the risk of COVID19 on pregnancy and its outcome. While, 27.7% of them have satisfactory level of total knowledge

**Figure (1)** shows that, 54.4%, 51.1% and 55.5% of the studied pregnant women have negative attitude toward physical, psychological and social status, respectively.

**Table (3)** shows that, 53.3% of the studied pregnant women have negative attitude for the risk of COVID19 on pregnancy and its outcome. While, 46.7% of them have positive attitude.
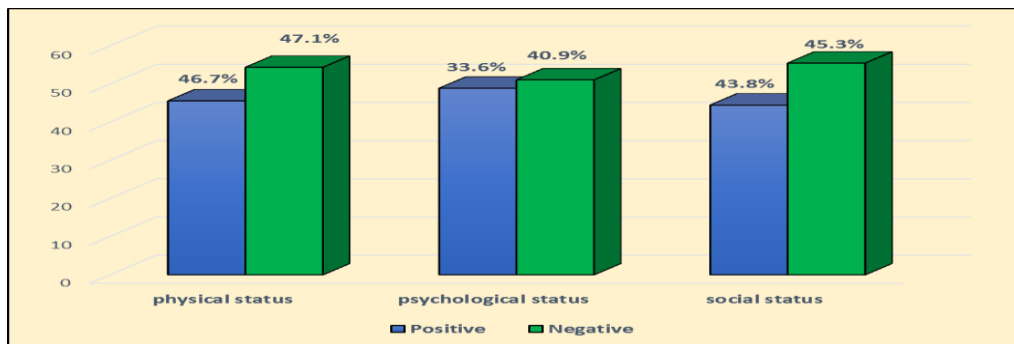
**Table (4)** indicate that, there is highly significant positive correlation between total knowledge of the studied pregnant women and their total attitude for the risk of COVID19 on pregnancy and its outcome at (P= < 0.01).

**Table (1):** Frequency and percent distribution of the studied pregnant women according to their general characteristics (**n =274 ).**

| General characteristics | No. | % |
|---|---|---|
| **Age (years)** | | |
| 18 | **258** | **94.2** |
| 36 - 40 | 16 | 5.8 |
| **Mean SD          28.70 ± 5.91** | | |
| **Marital status** | | |
| Married | **269** | **98.2** |
| Widow | 5 | 1.8 |
| Divorced | 0 | 0.0 |
| **Educational level** | | |
| Do not read or write | 16 | 5.8 |
| Primary education | 16 | 5.8 |
| Preparatory education | 21 | 7.7 |
| Secondary education | 15 | 5.5 |
| Diploma | **122** | **44.5** |
| High education | 84 | 30.7 |
| **Occupation** | | |
| Working | 105 | 38.3 |
| Do not work | **169** | **61.7** |
| **Residence** | | |
| Urban | 50 | 18.2 |
| Rural | **224** | **81.8** |
| **Family income** | | |
| Not enough | 57 | 20.8 |
| Enough and not save | **204** | **74.5** |
| Enough and save | 13 | 4.7 |

**Table (2): Frequency and percent distribution of the studied pregnant women according to their total knowledge about the risk of COVID19 on pregnancy and its outcome (n = 274).**

| Items | Satisfactory | | dissatisfactory | |
|---|---|---|---|---|
| | No. | % | No. | % |
| Knowledge about the risk of COVID19 on pregnancy | 107 | 39.1 | 167 | 60.9 |
| Knowledge about the risk of COVID19 on pregnancy outcome | 62 | 22.6 | 212 | 77.4 |
| Total knowledge score | 76 | 27.7 | 198 | 72.3 |



**Figure (1):** Percentage distribution of the studied pregnant women according to their total subscales of attitude for the risk of COVID19 on pregnancy and its outcome **(n = 274).**

**Table (3):** Frequency and percent distribution of the studied pregnant women according to their total attitude for the risk of COVID19 on pregnancy and its outcome **(n = 274).**

| Levels of total attitude | No. | % |
|---|---|---|
| Positive | 128 | 46.7 |
| Negative | 146 | 53.3 |

**Table (4):** Correlation between total knowledge of the studied pregnant women and their total attitude for the risk of COVID19 on pregnancy and its outcome (n=274).

| Items | Total knowledge | |
|---|---|---|
| Total attitude | r | P-value |
| | 0.532 | 0.000** |

r= correlation coefficient test.          **highly significant at p ‹ 0.01.

## Discussion

The current study was conducted to assess the women's knowledge and attitude regarding the risk of COVID-19 on pregnancy and its outcome.

The general characteristics of the studied sample. Study findings revealed that the age of the studied sample ranged between (18 to 35) years old, with a mean age and SD of age is ( 28.70 ± 5.91) years, and most of them were married. The present study findings go in line with *Hashem et al. (2022)* who investigated" pregnant women's concerns about Coronavirus disease 2019 and its relationship to their preventive behaviors" and showed that the majority of them their mean age are (27.03±5.19) years old**.**

Also, the present study findings are supported by *Elmashad et al., (2021).* Who assessed "COVID-19 risk perception of pregnant women and its relationship with their protective behaviors " found that the majority of them were married and had a mean age of (27.3 ±5.0) years.

Regarding the educational level and the residence area of the pregnant women understudy, the present study findings revealed that less than half of the studied pregnant women had secondary education. It also illustrated that the majority of them were living in rural areas.

The present study findings were agreed with **El** *Sayed and Sarhan (2022).* Who studied " Effect of health belief model-based educational intervention on COVID-19 preventive behaviors among pregnant women" and reported that less than half of the two groups completed secondary education and more than three-quarters of the two groups resided in rural areas.

On the other hand, the present study findings disagrees with *Mohamed et al., (2020)* who examined "Pregnant Women's Knowledge, Attitude, and Self-Protective Measures Practice Regarding Corona Virus Prevention: Health Educational Intervention" and reported that more than half of the studied subjects had secondary education, while more than two-thirds of them lived in rural areas.

Also, the findings of the present study disagree with *West et al., (2021).* Who studied "Knowledge, attitudes, and practices of pregnant women attending the antenatal clinic of Rivers State University Teaching Hospital, Nigeria, towards the coronavirus (COVID-19) pandemic", and reported that the majority of studied subjects were urban residents and most of studied subjects had tertiary level of education. **This disagreement** between the studies may be related to the different settings of the studied sample.

Regarding the working status, this study revealed that less than two-thirds of the pregnant women under study were housewives. This may be due to the social beliefs of rural areas, such as considering women's work outside the home unnecessary. The present study findings were agreed upon by *El Sayed and Sarhan (2022),* who stated that less than two-thirds of the study and control groups were housewives.

However, the findings of the present study disagreed with those of **Sabry** *et al., (2021).* Who studied "Effect of What-Sapp Educational Program Reminder on Pregnant Women's Knowledge, Attitude, and Practice Regarding the COVID-19 Pandemic" and reported that more than two-thirds of them were unemployed.

Regarding family income, this study revealed that three-quarters of the pregnant women under study have enough income. The present study findings are supported by a study done by *Yazdi et al., (2022)* entitled "Latent class analysis of knowledge, attitude, and practice of a population-based sample of Iranian pregnant women toward COVID-19" and found that more than two-thirds of pregnant women had sufficient income.

However, the findings of the present study disagree with *Ali and Ahmed (2022).* In their study entitled "Knowledge, Attitude, and Practice toward Corona Virus Infection among Pregnant Women Attending Antenatal Care Clinics at Kaffer Elsheikh, Egypt," they reported that most of the pregnant women in their study did not have enough income.

Also, the present study findings disagree with those of Kamal *et al., (2020)* in a study entitled "Knowledge, attitude, and practice toward COVID-19 among pregnant women," which demonstrated that near to half of the participants did not have enough income.

**Regarding the total score level of knowledge regarding COVID-risk in pregnancy and its outcome,** The present study findings showed that less than three-quarters of the studied pregnant women had an unsatisfactory level of total knowledge about the risk of COVID-19 on pregnancy and its outcomes. While more than one quarter of them had a satisfactory level of total knowledge about the risk of COVID-19 on pregnancy and its outcomes, this may be related to the fact that coronavirus is a new disease, and the information about it is little and not clear at this time.

The present study findings agreed with those of **El** *Sayed and Sarhan (2022),* who studied "Effect of health belief model-based educational intervention on COVID-19 preventive behaviors among pregnant women" And reported that the study findings demonstrated that a quarter of the two groups had satisfactory knowledge about COVID-19, its effect on pregnancy, and its outcome before the educational intervention.

On the other hand, considering the total score level of COVID-19 knowledge, the present study findings disagree with those of **Maharlouei** *et al., (2020)* who published "Knowledge and Attitude Regarding COVID-19 among Pregnant Women in Southwestern Iran in the Early Period of Its Outbreak: A Cross-Sectional Study", who reported that more than half of pregnant women had a high level of knowledge about COVID-19 and its effect on pregnancy and its outcome.

And also, the present study findings disagree with *West et al., (2021).* Who studied "Knowledge, attitudes, and practices of pregnant women attending the antenatal clinic of Rivers State University Teaching Hospital, Nigeria, towards the coronavirus (COVID-19) pandemic" and reported that there was an overall high knowledge of the COVID-19 pandemic in the study amongst pregnant women.

**This varying knowledge** could be attributable to the varying study population and time of study in relation to when the pandemic began, as well as differences in the questions asked in the various studies.

**Regarding the total attitude toward the risk of COVID-19 on pregnancy and its outcome,** the findings of the present study show that more than half of the studied pregnant women had a negative attitude toward the risk of COVID-19 on pregnancy and its outcome, while more than two-fifths of them had a positive attitude, the total scores of attitudes of the studied pregnant women regarding the risk of COVID-19

The present study findings disagree with *Ali     et al., (2022),* who studied "Assessment of Knowledge, Attitudes, and Self-Protective Measures of Pregnant and Postpartum Women Regarding COVID-19" and clarified that more than half of the studied women had a positive attitude regarding COVID-19.

Also, the present study findings disagree with ***Kamal et al., (2020)***, who investigated "Knowledge, Attitude, and Practice towards COVID-19 among Pregnant Women in a Tertiary Care Hospital during the COVID-19 Outbreak" and made it clear that the majority of respondents three -quarters had a positive attitude.

Regarding to the Correlation between total knowledge of the studied pregnant women and their total attitude for the risk of COVID19 on pregnancy and its outcome indicate that, there is highly significant positive correlation between total knowledge of the studied pregnant women and their total attitude for the risk of COVID19 on pregnancy and its outcome at ($P = < 0.01$).

## Conclusion

pregnant women's perception in terms of knowledge and attitude related to the risk of COVID-19 on pregnancy and its outcome The present study findings emphasized that more than one quarter of them had a satisfactory level of total knowledge about the risk of COVID-19 on pregnancy and its outcome, while the majority of the studied samples had an unsatisfactory level of total knowledge. As well, more than two-fifths of them have a positive attitude. While more than half of the studied samples had a negative attitude toward the risk of COVID-19 on pregnancy and its outcome, In addition, there was a highly significant positive correlation between the total knowledge of the studied pregnant women and their total attitude toward the risk of COVID-19 on pregnancy and its outcome. And with this the present study findings achieved the aim of the study and answered the study questions .

## Recommendations

**Based on findings of present study it can be recommended that;**

• Regular health education and counseling programs provided by maternity nurses about the COVID-19 pandemic for all pregnant women who visit obstetrics and gynecology outpatient clinics are supported by distributing pamphlets and booklets, especially to pregnant women from rural areas.

• Establish virtual training classes and counseling to enhance protective behaviors related to COVID-19 infection among pregnant women.

• Develop and implement educational campaigns aimed at pregnant women to increase their knowledge about the risks of COVID19 during pregnancy and its potential outcomes .

• Ensure that accurate and update information about COVID19 and pregnancy is readily available through health care providers , Website and other .

• Promote COVID19 Vaccination for pregnancy .Its safety and benefits for both the mother and the fetus .

• **Further studies**

• Assessment of risk perception and protective behaviors related to COVID-19 among high-risk pregnant women.

• Assessment of COVID-19 vaccine acceptance among pregnant women.

• Impact COVID19 on pregnancy outcome and monitor the evolving situation to adapt recommendation on need .

## References

Ali, H. A., Ramadan, S., & Ahmed, N. H. (2022). Knowledge, attitude, and practice toward corona virus infection among pregnant women attending antenatal care clinics at Kafrelsheikh, Egypt. International Egyptian Journal of Nursing Sciences and Research, 2(2), 241-252.

Anikwe, C. C., Ogah, C. O., Anikwe, I. H., Okorochukwu, B. C., & Ikeoha, C. C. (2020). Coronavirus disease 2019: Knowledge, attitude, and practice of pregnant women in a tertiary hospital in Abakaliki, southeast Nigeria. International Journal of Gynecology & Obstetrics, 151(2), 197-202.

Besho, M., Tsegaye, R., Yilma, M. T., Kasaye, H. K., Tolossa, T., Hiko, N., ... & Wakuma, B. (2021). Knowledge, attitude and practice toward corona virus infection among pregnant women attending antenatal care at public hospitals in three wollega zones, ethiopia. International Journal of General Medicine, 3563-3573.

EL Sayed, H. A., & Sarhan, A. E. (2022). Effect of health belief model-based educational intervention on COVID-19 preventive behaviors among pregnant women. Tanta Scientific Nursing Journal, 24(1), 305-335.

Elmashad, A. M., Mohamed Abd El-Maksoud, M., & Youssef Abd-Ella, N. (2021). COVID-19 risk perception of pregnant women and its relationship with their protective behaviors. Egyptian Journal of Health Care, 12(3), 421-437.

Gaheen, A., & Sayed, M. A. (2020). Effect of the New Corona Virus Disease 2019 on Pregnancy Outcomeat El-Gharbia Governorate. Tanta Scientific Nursing Journal, 19(1), 181-210.

Hashem, S. M., El-Kurdy, R., & Abdelmenem, E. E. (2022). Pregnant women's concerns about Coronavirus disease 2019 (COVID-19) and its relationship to their preventive behaviors. Tanta Scientific Nursing Journal, 24(1), 274-304.

Hussein Sayed Abdel Gaowad, A., Hamdio, S., & Fathi Nabaweya Saleh, A. (2022). Effect of Covid19 Pandemic on Pregnant Women Utilization of Antenatal Care Services. Egyptian Journal of Health Care, 13(4), 668-681

Jhirwal, M., Singh, P., Sharma, C., Kathuria, P., Shekhar, S., & Meena, S. P. (2022). Awareness and understanding of COVID-19 among pregnant woman in Northern India. Journal of Education and Health Promotion.

Kharbanda, E. O., Haapala, J., DeSilva, M., Vazquez-Benitez, G., Vesco, K. K., Naleway, A. L., & Lipkind, H. S (2021). Spontaneous abortion following COVID-19 vaccination during pregnancy. JAMA, 326(16), 1629-1631

Maharlouei, N., Asadi, N., Bazrafshan, K., Roozmeh, S., Rezaianzadeh, A., Zahed-Roozegar, M. H., ... & Lankarani, K. B. (2020). Knowledge and attitude regarding COVID-19 among pregnant women in Southwestern Iran in the early period of its outbreak: a cross-sectional study. The American journal of tropical medicine and hygiene, 103(6), 2368.

Mohamed, A. I., Elsayed, D. M. S., Abosree, T. H., & Eltohamy, N. (2020). Pregnant women's knowledge, attitude and self-protective measures practice regarding Corona virus prevention: health educational intervention. Egyptian Journal of Health Care, 11(4), 260-278.

Nemat, A., Bahez, A., Salih, M., Raufi, N., Noor, N. A. S., Essar, M. Y., ... & Asady, A. (2021). Public willingness and hesitancy to take the COVID-19 vaccine in Afghanistan. The American Journal of Tropical Medicine and Hygiene, 105(3), 713.

Pal, M., Berhanu, G., Desalegn, C., & Kandi, V. (2020). Severe acute respiratory syndrome coronavirus-2 (SARS-CoV-2): an update. Cureus, 12(3)

Sabry, F., Mohamed, A., Ghanem, A., Ahmed, N., & Mohamed, N. (2021). Effect of What Sapp Educational Program Reminder on Pregnant Women's Knowledge, Attitude and Practice Regarding COVID-19 pandemic. Egyptian Journal of Health Care, EJH, 3, 12.

Tagini, S., Brugnera, A., Ferrucci, R., Mazzocco, K., Pievani, L., Priori, A., ... & Poletti, B. (2021). Attachment, personality and locus of control: Psychological determinants of risk perception and preventive behaviors for COVID-19. Frontiers in Psychology, 12, 634012.

Tekelab, T., Chojenta, C., Smith, R., & Loxton, D. (2019). The impact of antenatal care on neonatal mortality in sub-Saharan Africa: A systematic review and meta-analysis. PloS one, 14(9), e0222566.

West, B. A., Aitafo, J. E., & Kalio, D. G. B. (2021). Knowledge, attitudes and practices of pregnant women attending the antenatal clinic of rivers state university teaching hospital, Nigeria towards the coronavirus (COVID-19) pandemic. infection, 5, 8.

Yazdi, M., Bemanalizadeh, M., Mohebpour, F., Goli, P., Daniali, S. S., & Kelishadi, R. (2022). Latent class analysis of knowledge, attitude, and practice of a population-based sample of Iranian pregnant women toward COVID-19. Advanced biomedical research, 11.

Zakaria M, Xu J, Karim F, Cheng F. (2019): Reproductive health communication between mother and adolescent daughter in Bangladesh: a cross-sectional study. Reproductive health;16(1):1-2.