

Knowledge Assessment of Pregnant Women and Maternity Nurses Regarding Coronavirus (COVID-19)

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Abstract: Background: The Coronavirus pandemic of 2019 has seen a rapid surge in cases and deaths since its first detection in Wuhan, China, in December 2019. **The purpose of the study** was to assess the pregnant women's and maternity nurses' knowledge regarding coronavirus (COVID-19). **Design:** A descriptive cross-sectional research design was utilized. **Sample:** A purposive sample of 290 pregnant women and a convenience sample of 40 maternity nurses were enrolled. **Settings:** The current study was conducted at the outpatient clinic of the Obstetrics department of Birket El Sab Hospital and MCH centers in Al-Birr Al-Sharqi and Al-Birr Al Gharbi in Birket El Sab. **Results:** the study findings reported that there was a poor knowledge score among the pregnant women and an average knowledge score among the maternity nurses regarding the Coronavirus (COVID-19). **Conclusion:** Most of the studied pregnant women had poor knowledge scores, and the majority of the studied maternity nurses showed an average knowledge score regarding the Coronavirus (COVID-19). **Recommendations:** Increasing the level of knowledge of pregnant women regarding coronavirus and providing training programs to the maternity nurses in hospitals and MCH is essential to improve their knowledge regarding coronavirus.

Keyword: Knowledge, Pregnant Women, Maternity Nurses, Coronavirus (COVID-19).

Introduction

The Coronavirus pandemic of 2019 has seen a rapid surge in cases and deaths since its first detection in Wuhan, China, in December 2019. There is limited data on coronavirus pandemic 2019 during pregnancy; however, information on illnesses associated with other highly pathogenic coronaviruses (i.e., severe acute respiratory syndrome (SARS) and the Middle East respiratory syndrome (MERS) may provide insights into coronavirus pandemic 2019's effects during pregnancy (Rasmussen et al., 2020).

Coronaviruses cause illnesses ranging in severity from the common cold to severe respiratory illness and death. Currently, the primary epidemiologic risk factors for the coronavirus pandemic of 2019 include travel from mainland China (especially Hubei Province) or close contact with infected individuals within 14 days of symptom onset. Data suggests an incubation period of 5 days (range, 2–14 days). The average age of hospitalized patients has been 49–56 years, with a third to half of them having an underlying illness (Rasmussen et al., 2020).

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The effect of COVID-19 infection on pregnancy is not completely known because of a lack of reliable data (Centers for Disease Control and Prevention, 2020). Predictions based on similar infections such as SARS and MERS suggest that pregnant women are at an increased risk of severe infection, but findings from studies to date show that the clinical characteristics of COVID-19 pneumonia in pregnant women are similar to those reported in non-pregnant women (Favre et al., 2020).

There is no data suggesting an increased risk of miscarriage or pregnancy loss due to COVID-19 and studies with SARS and MERS do not demonstrate a relationship between infection and miscarriage or second trimester loss (Royal College of Obstetricians & Gynecologists, 2020).

It is unclear yet whether conditions arising during pregnancy, including diabetes, cardiac failure, hypercoagulability, or hypertension, might represent additional risk factors for pregnant people as they do for nonpregnant women. From the limited data available, vertical transmission during the third trimester probably does not occur, or only occurs very rarely. There is no data yet on early pregnancy (Mimouni et al., 2020).

All available evidence suggests that pregnant women are at no greater risk of becoming seriously unwell than other healthy adults if they develop the Coronavirus. The large majority of pregnant women experience only mild or moderate cold or flu-like symptoms. Coughs, fever, shortness of breath, headaches and loss or change in your sense of smell or taste are other relevant symptoms. The most important thing to do is to follow government guidance (Royal College of Obstetricians and Gynecologists, 2020).

Everybody is at risk of becoming infected. However, an immunocompromised state, as seen in pregnancy with its physiological changes, could predispose a pregnant woman to an increased risk of SARS-COV-2 infection compared to the general population. It could predispose a developing fetus to intrauterine growth restriction (IUGR), preterm delivery with immediate and long-term sequelae, abortion, and stillbirth (Saccone, 2020).

Even though vertical transmission has yet to be confirmed, fear and anxiety associated with infection could lead to increased demand for abortion and operative deliveries. With the above background, it becomes imperative that great efforts be made to prevent pregnant women and their fetuses from being infected by the scourge of COVID-19. This can be achieved only if a woman is knowledgeable about how to prevent contracting the virus and its transmission to her family and others (Saccone, 2020).

In fact, there is limited information regarding nurses' knowledge, attitudes, perceptions, and knowledge about the COVID-19 outbreak. Thus, it is crucial to understand what nurses know about the virus and their knowledge of pandemic complications and disease prevention. Further, Paitiraki et al. (2012) pointed out that nurses' perceptions change as the patient suffers from the disease. Nurses may have varied perceptions of COVID-19 and therefore may apply different clinical management strategies, leading to different outcomes (Paitiraki et al., 2012).

Nurses need to develop a solid foundation understanding of the disease process to play a greater role in disease control. How nurses perceive and respond to COVID-19 is critical to expediting positive outcomes.

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Individual attitudes toward the disease are another factor that influences individual perception of the disease (Hessels et al., 2019).

The significance of the study

The emergence of a novel coronavirus, termed SARS-CoV-2, and the potentially life-threatening respiratory disease that it can produce, COVID-19, has rapidly spread across the globe, creating a massive public health problem. Previous epidemics of many emerging viral infections have typically resulted in poor obstetrical outcomes, including maternal morbidity and mortality, maternal-fetal transmission of the virus, and perinatal infections and death (Schwartz, 2020). This communication reviews the effects of two previous coronavirus infections-severe acute respiratory syndrome (SARS) caused by SARS-CoV and Middle East respiratory syndrome (MERS) caused by MERS-CoV on pregnancy outcomes. In addition, it analyzes literature describing 38 pregnant women with COVID-19 and their newborns in China to assess the effects of SARS-CoV-2 on the mothers and infants, including clinical, laboratory, and virologic data, and the transmissibility of the virus from mother to fetus (Schwartz, 2020).

This analysis reveals that unlike coronavirus infections of pregnant women, caused by SARS and MERS, in these 38 pregnant women COVID-19 did not lead to maternal deaths. Importantly, and similar to pregnancies with SARS and MERS, there were no confirmed cases of intrauterine transmission of SARS-CoV-2 from mothers with COVID-19 to their fetuses. All neonatal specimens tested, including, in some cases, placentas, were negative by PCR for SARS-CoV-2. At this point in the global pandemic of COVID-19 infection,

there is no evidence that SARS-CoV-2 undergoes intrauterine or transplacental transmission from infected pregnant women to their fetuses (Schwartz, 2020).

There are few studies about the knowledge of pregnant women and maternity nurses regarding coronavirus. So, the researcher found that it is important to assess the knowledge of pregnant women and the nurses who provide prenatal care to identify if they need health education in this aspect to increase awareness of pregnant women and the nurses.

The purpose of the study

The purpose of the present study is to assess the pregnant women's and maternity nurses' knowledge regarding the coronavirus (COVID-19).

Research Questions

- What is the pregnant women's knowledge regarding coronavirus (COVID-19)?
- What is the maternity nurses' knowledge regarding coronavirus (COVID-19)?

Method

Research design: A descriptive cross-sectional research design was used to carry out the present study.

Research settings: The study was carried out in the outpatient clinic of the Obstetric department of Birket El Sab Hospital, the MCH center in Al-Birr Al-Sharqi and MCH center in Al-Birr Al Gharbi in Birket El Sab.

Sampling

Sample type:

A purposive sample of 290 pregnant women and a convenient sample of 40 maternity nurses were enrolled.

Sample size:

A purposive sample of 290 pregnant women who visited the Obstetrics

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outpatient clinic and the MCH centers in Birket El Sab Hospital and a convenient sample of all maternity nurses working in the obstetrics department in the previously mentioned settings were included in the study.

Based on the estimated population and response distribution of 50%, a confidence level of 95% and a 5% margin of error, the targeted sample size were 290 pregnant females.

This sample size would be distributed proportionally between the three selected settings according to the flow rate as follows: 150 pregnant women from Birket El Sab Hospital, 100 pregnant women from Al-Birr Al-Sharqi MCH center, and 80 pregnant women from Al-Birr Al Gharbi MCH center. For maternity nurses, 18 nurses from MCH centers, and 22 nurses from Birket El Sab hospital.

Instruments for Data Collection

Data were collected using instruments developed by the researcher and revised by qualified experts throughout the course of the current study, and then tested for validity and reliability. Three instruments were developed and used for data collection.

Instrument (Appendix A)

A structured interviewing questionnaire was used to collect data from the pregnant women and maternity nurses. It is comprised of four parts:-

- **Part 1:** Socio-demographic characteristics of the pregnant women, such as age, and level of education.
- **Part 2:** Knowledge of pregnant women related to corona virus (COVID-19). It included different questions about clinical manifestations, mode of transmission, and prevention of the corona virus.
- **Part 3:** Socio-demographic characteristics of the nursing staff

such as age, level of education, sex and work experience.

- **Part 4:** Assessment of the nurses' level of knowledge related to corona virus (COVID-19). The nurses' level of knowledge was evaluated through different questions about the aspects of causes, diagnosis, clinical manifestations, and modes of transmission, treatment, complications, and prevention of the corona virus.

Scoring system

The questionnaire contained items related to the pregnant women's demographic criteria as well as 20 knowledge assessment items. Each was a three points Liker scale (0–2) with (0) for wrong answer and don't know, (1) for incomplete correct answer, and (2) for complete correct answer. The pregnant women's knowledge regarding the coronavirus (COVID-19) was evaluated giving a score of 0-40. The total score of each pregnant woman was categorized into "poor knowledge" when she achieved 0 - 23 points, and those who had 24 - 30 points were considered as "average knowledge", and those who had 31 – 40 points were considered as "good knowledge".

The questionnaire also contained 27 items related to the maternity nurses' knowledge assessment. Each was a three points Liker scale (0–2) with (0) for wrong answer or don't know, (1) for incomplete correct answer, and (2) for a complete correct answer. The nurses' knowledge regarding the coronavirus (COVID-19) was evaluated, giving a score of 0-54. The total score of each nurse was categorized into "poor knowledge" when she achieved 0-31 points those who had 32 - 41 points were considered as "average knowledge", and those who had 42–54 points were considered as "good knowledge".

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Validity of Instrument:

The validity of the instrument was checked by three experts (two Professors from Maternal and Newborn Health Nursing and one from Obstetrics and Gynecology) who reviewed the instruments for content accuracy and internal validity. Also, professors were asked to judge the items for completeness and clarity (content validity). Suggestions were incorporated into the instrument.

Reliability of the Instrument:

The reliability of the instrument was tested by the researcher for testing the internal consistency of the instrument, using test-retest reliability, and this method was done through the administration of the same instruments to the same participants under similar conditions on one or more occasions. Results from repeated testing were compared.

Pilot study:

A pilot study was carried out before data collection on 10% of the maternity nurses and the pregnant women in the Obstetrics outpatient clinic in Birket El Sab and the MCH centers in Birket El Sab hospital. This was done to evaluate the applicability and clarity of the instrument and was out of the sample size of the study to ensure stability of the answers.

Ethical consideration:

An approval from the committee of hearing and ethics was obtained from the Faculty of Nursing Menoufia University.

Approaches to ensure ethics were considered in the study regarding confidentiality and informed consent. The researcher introduced herself to the women and maternity nurses in the sample and explained the purpose of the study and nature of the research in order to obtain their acceptance to be

recruited in the study as well as to gain their cooperation.

Confidentiality was achieved by the use of locked sheets with the names of the participating women replaced by numbers. All participating pregnant women and maternity nurses were informed that the information they provided during the study would be kept confidential and used only for statistical purposes after finishing the study. The finding would be presented as group data with no personal participant's information remained.

After explanations prior to enrollment in the study, informed consent was obtained verbally from all pregnant women and maternity nurses. Each woman and nurse were informed that participation in the study was voluntary and that they could withdraw from the study whenever they decided to do so, and each one was given the opportunity to freely refuse participation. They were free to ask any questions about the study details.

Administrative approval

An official letter was taken from the Dean of Faculty of Nursing Menoufia University and submitted to the directors of the above mentioned study settings to carry out the study before starting data collection. An official permission was obtained from the directors of the above-mentioned settings to carry out the study. A full explanation of the rationale for the present study was provided to the directors of the study settings.

Study procedure (study fieldwork)

The data was collected over a period of three months from the beginning of November 2021 to the end of January 2022.

The researcher went to the Obstetrics clinics in the previous mentioned settings three days a week.

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Each setting took about one month to collect the required data. The researcher attended from 8:30 am to 2:00 pm.

During the initial contact, the researcher greeted the women and maternity nurses, introduced herself and explained the purpose of the research in order to obtain their acceptance and recruit them in this research, as well as to gain their cooperation. Each participant was informed that participation in the study was voluntary and they could withdraw from the study at any time.

After taking verbal agreement from the pregnant women and maternity nurses, they were given the instrument to collect the data related to socio-demographic and knowledge related to corona virus.

Statistical Analysis

Data was entered and analyzed using the SPSS (Statistical Package for Social Science) statistical package version 22. The graphics were done using an Excel program.

Quantitative data was presented by mean (X) and standard deviation (SD). It was analyzed using a student t- test for comparison between two means and an ANOVA (F) test for comparison between more than two means.

It was analyzed using the chi-square (χ^2) test. However, if the expected value of any cell in the table was less than 5, the Fisher Exact test was used (if the table had four cells), or the Likelihood Ratio (LR) test (if the table had more than four cells). The level of significance was set at a P value of < 0.05 for all significant tests.

Results

The results of this study were answered the research questions which are what is the pregnant woman's knowledge regarding coronavirus

(COVID-19)? and what is the maternity nurses' knowledge regarding coronavirus (COVID-19)?

Table 1 reveals the distribution of the pregnant women according to their sociodemographic characteristics. The majority of them had at least some intermediate education (45.2%), while less than one fifth were illiterate (17.6%). Concerning their occupation, housewives showed the highest percentage (95.9%), while only 4.1% were employees.

In addition, the majority of the pregnant women were from rural areas (86.9%).

Table (2) showed that, the majority of the studied pregnant women demonstrated I do not know/ wrong answers which percentages ranged between 3.7% (for the definition of the Corona pandemic) and 92.8% (for Q8 Is the Corona virus transmitted from pregnant women to their fetuses during pregnancy). Pregnant women with correct answers ranged from 2.4% (for Q13: What does physical distance mean to you) to 92.1% (for Q20: What is the reason for the spread of the Corona virus from your personal perspective). The mean total score of the studied pregnant women was 1.3 ± 0.8 . The mean total nursing knowledge score was 15.7 ± 2.1 with a Range=5 – 28.

Fig(1) showed the groups of knowledge about COVID-19 among pregnant women. The majority of them showed poor knowledge (67.9%). One third of pregnant women had average knowledge (30.7%), and the lowest percentage was good knowledge with (1.4%).

Fig (2) reveals the groups of knowledge about COVID-19 among maternity nurses. The majority of them showed average knowledge (62.5%). Approximately one quarter of nurses

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had poor knowledge (22.5%), and the lowest percentage was good knowledge with (15%).

Figure (3) In relation to their occupation, there was statistically

significant difference between housewives and employee regarding poor knowledge (69.8% vr 25%, (P<0.0001).

Table 1: Demographic characteristics of the studied pregnant women (N=290)

Variables	N0.	%
Age groups:		
<19 Y	2	0.7
20 -25 Y	97	33.4
26-30 Y	108	37.2
31-35 Y	40	13.8
> 35 Y	43	14.8
<u>Educational Level:</u>		
Illiterate	51	17.6
Primary education	24	8.3
Secondary education	131	45.2
University	79	27.2
Post graduate	5	1.7
<u>Occupation:</u>		
Housewife	278	95.9
Employee	12	4.1
<u>Residence:</u>		
Rural	252	86.9
Urban	38	13.1
Total	290	100

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Table 2: Level of knowledge of the studied pregnant women regarding COVID-19 (N = 290)

Variables	Wrong answer& I don't know		Incomplete correct answer		Complete correct answer	
	No	%	No	%	No	%
Q1What.does.the.Corona.pandemic.mean.to.you	10	3.7	280	96.6	0	0
Q2Are.you.worried.about.the.spread.of.the.Corona.virus	0	0	242	83.4	27	10
Q3If the answer is yes, describe how you feel about the spread of the Corona virus no						
Q4 Has.a.family.member.been.infected.with.the.Corona.virus	212	73.1	0	0	78	26.9
Q5What are the ways of transmission of Corona virus	23	7.9	181	62.4	86	29.7
Q6Who is the most vulnerable group to infection with the Corona virus	64	22.1	145	50	81	27.9
Q7What.are.the.symptoms.of.corona.virus2	13	4.5	175	60.3	102	35.2
Q8Is Corona virus transmitted from pregnant women to their fetuses during pregnancy	269	92.8	0	0	21	7.2
Q9If.the.answer.is.yes.when.is.the.infection2						
Q10 What are the preventive measures to avoid infection with the Coronavirus (Covid-19)	15	5.2	161	55.5	114	39.3
Q11 Do you go to public places while taking preventive measures	116	40	0	0	174	60
Q12 What is the best way to protect yourself and your pregnancy from the Corona virus	4	1.4	167	27.6	119	41
Q13What.does.physical.distancing.mean.to.you	115	39.7	168	57.9	7	2.4
Q14 Are pregnant women more susceptible to infection with the virus that causes Covid-19 disease	186	64.1	0	0	104	35.9
Q15Does.covid.19. cause. miscarriage2	363	90.7	0	0	27	9.3
Q16Does.COVID.19. infection. cause. premature. labour2	267	92.1	0	0	23	7.9
Q17 How long does it take for symptoms of corona virus to appear	168	57.9	0	0	122	42.1
Q18 Is.the.vaccine.safe.for.pregnant.women2	261	90	0	0	29	10
Q19 Are antibiotics effective in preventing or treating COVID-19	215	74.1	0	0	75	25.9
Q20 What is the reason for the spread of the Corona virus from your personal point of view	23	7.9	0	0	267	92.1
Mean total pregnant women Kn. score	15.7 ± 2.1 (Range=5 – 28)					

Figure (1): Total knowledge score of the pregnant women regarding the COVID-19 (N=290)

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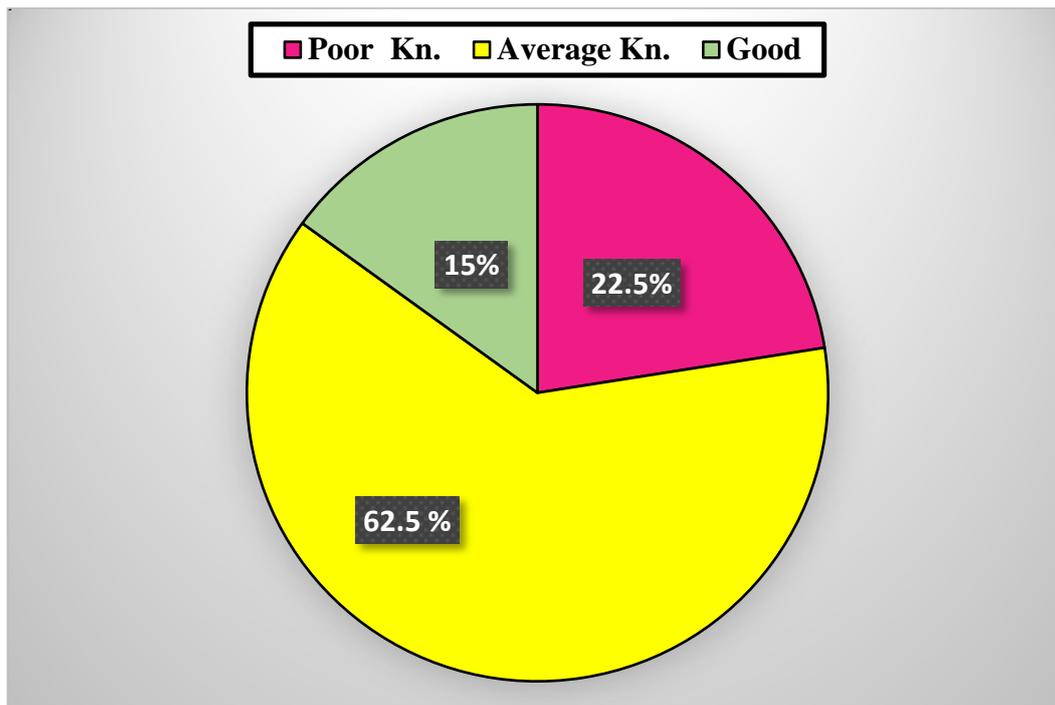


Figure (2): Level of Knowledge among the maternity nurses (N=40)

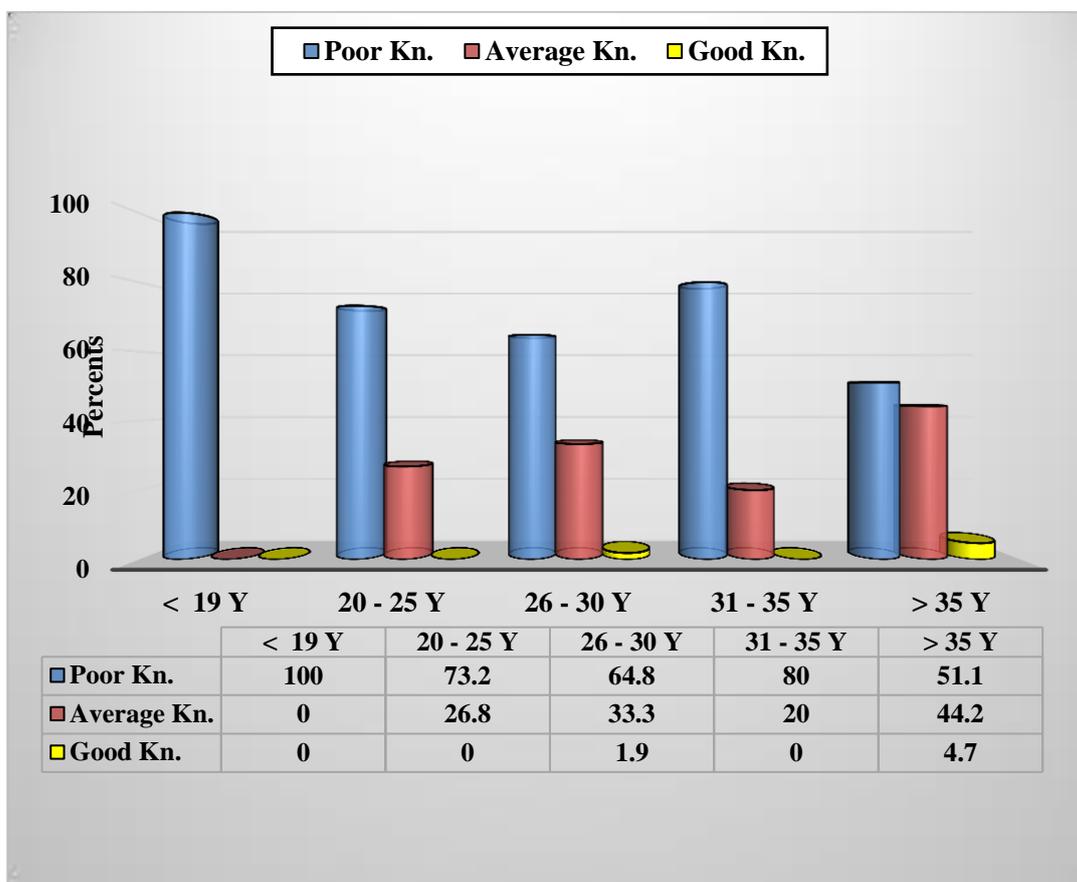
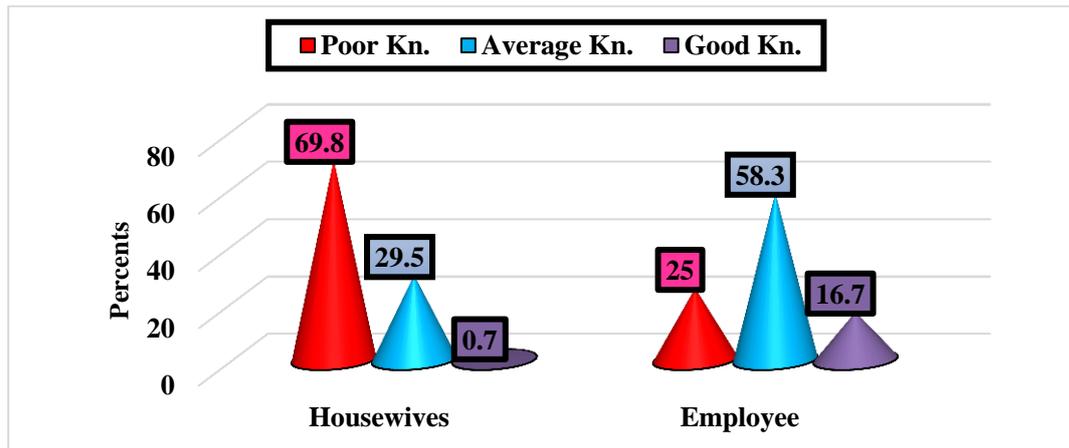


Figure (3): Sources of information about COVID-19 infection and vaccines among studied maternity nurses (N=40).

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Discussion

COVID-19 is a novel type of coronavirus family with an incompletely described clinical course, especially for vulnerable populations including pregnant women (Murthy et al., 2020). Pregnant women are known to be more susceptible to the complications and adverse outcomes of coronavirus infections, as observed in SARS and MERS (Schwartz and Graham, 2020).

It is thought that COVID-19 may significantly increase maternal and fetal risks (Liu et al., 2020), while others suggest that pregnant women possess similar morbidity and mortality compared to the general population (Nie et al., 2020). As a result, it is critical to assess pregnant women's knowledge regarding coronavirus infection in order to prevent the spread of COVID-19 and the negative outcomes of coronavirus infection in pregnant women.

Globally, nurses are a dynamic part of the healthcare system, and since the outbreak of COVID-19, they have had challenging experiences and problems. Currently, in comparison to other healthcare providers, they are on the frontlines of the battle against the COVID-19 outbreak, and they are working hard to help their patients in all areas (Garca-Martn et al., 2021).

Maternity nurses play a vital role in healthcare setup in prevention, infection control, isolation, and continuous monitoring of the patients. Because of their unique patient facing nature, there are occupational risks to providing care during the COVID-19 outbreak (Smith et al., 2020).

This study aimed to assess the knowledge of pregnant women and maternity nurses regarding the coronavirus.

Regarding the personnel characteristics of the studied pregnant women, the average age group was 25 to 30 years among one-third of them. Meanwhile, more than one-third of them had secondary education, but more than two thirds of them were housewives and lived in rural areas. These findings were in the same line with Nwafor et al., (2020) study entitled “Knowledge and practice of preventive measures against COVID-19 infection among pregnant women in a low-resource African setting,” as the mean age of the study subjects was 24.6 ± 6.3 years, averaged from 18 to 42 years, and more than one-third had secondary education.

This is also supported by Mohamed et al. (2020) who examined " Pregnant Women’s Knowledge, Attitude and Self-Protective Measures Practice regarding the Corona virus prevention:

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Health Educational Intervention," and reported that one-half of studied subjects their age between 25 to <30 years with a mean age of 27.84 ± 3.75 & 26.97 ± 2.76 years. Also, more than one-half of the studied subjects had secondary education; while more than two thirds of them did not work and lived in rural area.

According to our findings, nearly one-half of the pregnant women had poor knowledge score regarding the COVID-19 pandemic. These results were in disagreement with Lee et al. (2020) in China, who examined "COVID-19-related risk perceptions, knowledge, and information sources among prenatal and postnatal Chinese women during the initial phase of the COVID-19 pandemic". They found a high level of knowledge regarding COVID-19 among the studied participants.

In contrast, Fikadu et al. (2021) who examined "COVID-19 Preventive Measure Practices and Knowledge of Pregnant Women in Guraghe Zone Hospitals" reported that more than one-half of the studied participants had adequate knowledge.

The possible explanations for the observed difference might be due to the variation in the study settings. Most of the pregnant women who participated in the study were from rural areas, and one-fifth of them were illiterate. In hospitals and the MCH, there was not enough awareness among the pregnant women about regarding the corona virus.

The present study showed that the majority of the studied pregnant women had a high level of anxiety about the spread of coronavirus which was revealed in question two of the pregnant women's questionnaire "Are you worried about the spread of the coronavirus? This present finding comes in agreement with Ding et al.

(2021), who examined " Knowledge, attitudes, practices, and influencing factors of anxiety among pregnant women in Wuhan during the outbreak of COVID-19: a cross-sectional study" and found a high prevalence of anxiety among pregnant women in Wuhan.

The investigator's point of view is that the cause of the high level of anxiety is the low level of knowledge about the corona virus in pregnancy and the fetus. It's because they were worried about her child and older relatives being infected by COVID-19 and physical activity changes resulting from pregnancy were significantly correlated with anxiety disorder.

The present study revealed that women in urban areas have more knowledge than women in rural areas. This was supported by Fikadu et al., (2021) who examined "COVID-19 Preventive Measure Practices and Knowledge of Pregnant Women in Guraghe Zone Hospitals" and found urban residents were more likely to practise COVID-19 preventive measures compared to rural residents. Consistently, a study conducted in India shows urban residents are more likely to practise COVID-19 preventive measures (Pal et al., 2020).

From the investigator's point of view, is that might be due to urban residents' having better access to different types of communication media carrying messages about the pandemic. Additionally, people living in urban areas of were relatively surrounded by educated people who would have the chance to obtain information informally, like on transport, in their neighborhood, or in informal social meetings. These findings answered the first research question.

By looking at sociodemographic data, it was found that the majority of the nurses were from nursing institutes. This study was supported by Abd-

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Elhamed and Hasab Allah (2022) who examined "Effect of Educational Program on Nurses' Knowledge, Practice, and Attitude Regarding COVID-19 at Maternity Care Units." They found more than half of them were institute nurses.

These results didn't affirm the study of Said et al. (2021), who found that the majority of them had bachelor's education. These results also contradicted those of Al-Dossary et al. (2020), who found that more than two-thirds of the studied sample had bachelor's degrees.

In this study, the majority of the studied maternity nurses showed average knowledge about coronavirus. This present finding comes in agreement with Al-Dossary et al. (2020), who examined "Awareness, Attitudes, Prevention, and Perceptions of the COVID-19 Outbreak among Nurses in Saudi Arabia" and found that nurses had awareness and had highly positive perceptions about COVID-19. Studies show nurses in other countries with a COVID-19 outbreak, such as Iran (Taghrir et al., 2020), Saudi Arabia (Alsehafi and Cheng, 2016) and Korea (Kim, 2018) with MERS-CoV, had higher perception and awareness levels.

This may be due to the need for nurses to know more and more about new developments in the disease as a result of its rapid spread and to improve their knowledge and quality of care at different maternity care units to help protect themselves, their families and their patients because hospitalized patients are more prone to infection (nosocomial infection).

The findings of the present study revealed that more than two thirds of the sample got their information from social media. These results agreed with Huynh, et al. (2020), who found that the main sources of COVID-19

information among nurses were social media and the Ministry of Health website. Similar with Ejeh et al. (2020), they reported that the most important sources of COVID-19 information were social media and television.

On the other hand, this disagreed with Nemati et al. (2020), who found that the sources of information for the nurses were the World Health Organization, the Ministry of Health and the media.

This may indicate that the Egyptian media and TV are keen to improve awareness of COVID-19 epidemic to help in preventing the spread of the disease.

This study showed that the majority of the studied nurses had no previous training course regarding COVID-19. The findings of this study are in agreement with Said et al. (2021), who found that all studied nurses had no previous training course regarding COVID-19.

This may be due to Corona virus, is a new disease that was under study and has spread rapidly across the world, and the medical team was busy treating the infected cases.

In this study, nurses had good knowledge of COVID-19 management and prevention through question # 10, "What are the preventive measures to avoid infection with the Coronavirus (COVID-19)?". All the nurses answered the correct answer. This agrees with a previous study that showed a positive perception from healthcare workers when dealing with a MERS-CoV outbreak in Saudi Arabia (Alsehafi and Cheng, 2016). The results are also in agreement with a Vietnam study pertaining to perception and attitude toward COVID-19 among healthcare professionals (Huynh et al., 2020).

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Regarding the correlation between nurses' socio-demographic data and their level of knowledge, it was found that there was a positive correlation between nurse's knowledge and their educational level and years of experience. This agrees with Al-Dossary et al. (2020), who examined "Awareness, Attitudes, Prevention, and Perceptions of the COVID-19 Outbreak among Nurses in Saudi Arabia" and showed that nurses with a bachelor's degree had better prevention and perception of COVID-19 compared to nurses with other educational backgrounds.

These results agreed with Said et al. (2021), who found that there was a highly statistically significant positive correlation between knowledge and socio demographic characteristics (age, education, and experience) pre and post program.

This matches with the study of Asif. (2019), who found that nurses with a bachelor's degree had better prevention and perception towards COVID-19 compared to other educational backgrounds. And nurses with master's degrees have more positive clinical roles, with higher-level clinical competence and more knowledge than bachelor's degree nurses.

On the other hand, results of Nemati et al. (2020), didn't match the current findings. They found that the total knowledge score was not affected by education level and it was not significantly different between nurses with less or more work experience. This also contradicts the findings of Kamineni et al. (2020), who concluded that there was no significant relationship between knowledge levels and sociodemographic variables such as age, gender, and education. It is possibly due to differentiation between different areas of residence. It is

possibly due to differentiation between different areas of residence.

This might be related to the fact that bachelor's degree nurses are accountable for overseeing the provision of safe patient care; thus with greater exposure and consistent care, it may expand their field of knowledge and skills of practice to provide for suitable outcomes for patients. This might be the reason why bachelor's degree nurses have better prevention and perception of COVID-19: because of more exposure in bedside care.

Limitations of the study

There are several limitations to our study. Firstly, forty pregnant women refused to participate in the study. Therefore, the sample size for the participating pregnant women during this study was 290 rather than 330. Secondly, the current study was conducted in a single period during the COVID-19 outbreak.

Conclusions

Based on the findings of the present study, it could be concluded that the majority of the studied pregnant women showed poor knowledge score regarding the COVID-19 pandemic. This answers the first research question.

In addition, the majority of the studied maternity nurses showed an average knowledge score regarding the COVID-19 pandemic. This answers the second research question.

Based on the present study findings, all research questions are answered.

Recommendations

Based on the findings of the present study, the following recommendations are suggested:

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Health educational intervention regarding prevention of COVID-19 is essential for all pregnant women at all MCH centres and hospitals until the total management of the COVID-19 virus is completed.

Antenatal health care should have a plan to communicate online with pregnant women to manage these crisis situations.

During health education, special consideration should be given to those who are from rural areas, and to less-educated pregnant women.

Continuous training programs for nurses can supplement their knowledge of risks and preventive strategies related to COVID-19, which will help them deliver proper care to their patients and keep themselves safe from the virus.

Continuous provision of PPE and training of all nurses on proper infection prevention measures are serious and substantial.

There should be informational educational materials or charts given to nurses to update their knowledge.

Further research:

Clinical guidelines for women with COVID-19 care during pregnancy, childbirth, and the immediate postpartum period.

Complementary public health education programs are important to increase awareness and obtain sufficient knowledge.

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