Exploring Knowledge, Safety Practices, and Anxiety Level among Women of Reproductive Age During COVID-19 Outbreak: A Cross-Sectional Study

Abstract

Background: The global outbreak of coronavirus disease 2019 (COVID-19) and its consequences compromise the health of Women of Reproductive Age (WRA). The aim of this study was to assess the level of knowledge, safety practices, and anxiety levels among WRA during COVID-19 outbreaks. **Materials and Methods:** A cross-sectional, correlational design was used to recruit a convenience sample of 453 WRA in Saudi Arabia. Data were collected using an electronic self-administered questionnaire of Spielberger state-trait anxiety and an adapted authors-developed knowledge and practices scale using an extensive literature review. Data were collected between September and December 2020 targeting all women in the country. Pearson correlation coefficient has been used to test correlation utilizing the Statistical Package for the Social Sciences (SPSS) 25. **Results:** The mean score of anxiety was 46.0 (13.40). Women have a high mean score of knowledge (24.50, standard deviation (SD) = 3.40) while having a low mean score of practices (19.70, SD = 3.10) indicating inappropriate practices. A significant difference was found in anxiety (t_{479} = 2.52, p = .012) and knowledge (t_{479} = −1.98, p = .048) between pregnant and non-pregnant women, while no statistically significant difference was found in relation to practices. The mean score of anxiety was higher among pregnant women than non-pregnant women, while a slightly higher mean score of knowledge was observed for non-pregnant women compared to pregnant ones. **Conclusions:** Although women had good knowledge about safety precautions, their practices did not indicate that. There is a need to educate women about safety practices and interventions that buffer their anxiety levels.

Keywords: *Anxiety, childbearing women, COVID-19, knowledge, safety practices*

Ayman M. Hamdan-Mansour[1], Atallah Alenezi[2], Hanan F. A. Soliman[3], Hadayat A. Amasha[4], Amira M. Ali[5], Fahad M. Alhowaymel[6], AbdulAziz F. Abaoud[6], Alia I. Mahadeen[7], Reda M. N. Aboushady[8]

[1]Psychiatric Nursing, School of Nursing-The University of Jordan, Amman, Jordan, [2]Department Head of Nursing, College of Applied Medical Sciences, Shaqra University, KSA, [3]Department of Nursing at College of Applied Medical Sciences at Shaqra University, KSA and Maternity and Gynecological Nursing, Faculty of Nursing, Ain Shams University, Egypt, [4]Maternal Health Nursing and Newborn, Faculty of Nursing, Damietta University, Egypt, [5]Department of Mental Health and Psychiatric Nursing, Faculty of Nursing, Alexandria University, Smouha, Alexandria, Egypt, [6]Department of Nursing, College of Applied Medical Sciences, Shaqra University, Shaqra, Saudi Arabia, [7]School of Nursing- The University of Jordan, [8]Maternal and Newborn Health Nursing, Faculty of Nursing, Cairo University, Egypt

Introduction

Women are at higher rates of morbidity and mortality from infectious pathogens than men.[1] Women of Reproductive Age (WRA) are in specific conditions that can increase their susceptibility to infections and low immune diseases,[2] and put them at higher risk of a number of infectious and risk-related problems that might affect their health and wellbeing.[3] WRA are also at greater risk if infected with coronavirus disease 2019 (COVID-19) due to the infectiousness effect of the virus and the suppression of the immune system as a result of stress and anxiety produced related to apprehension of infection.[3] In particular, pregnant women were found to be at higher risk of severe illnesses associated with COVID-19.[4] The fact that pregnancy is a state of partial immune suppression and increased vulnerability to viral infections and morbidity has increased the concern and risk of intrauterine transmission of COVID-19 from mother to fetus.[4,5] Globally, the proportion of pregnant women among the confirmed cases is low; however, pregnant women are susceptible to respiratory pathogens and severe pneumonia, which makes them at greater risk of severe consequences and maternal mortality if they get the infection.[4] The occurrence of pneumonia during pregnancy is associated with several adverse obstetric outcomes that may lead to neonatal death.[5]

Previous studies showed that increased uncertainty among those confirmed with COVID-19 and titling the disease "pandemic" has been associated with increased levels of anxiety among the vast majority of people around the world.[6-8] Such psychological disturbances are not only due to the disease process but also due to the harmful consequences of the disease

Address for correspondence:
Prof. Ayman M. Hamdan-Mansour, Psychiatric Nursing, School of Nursing-The University of Jordan, Amman - 11942, Jordan. E-mail: a.mansour@ju.edu.jo

such as guilt and grief for those who experience the loss of loved ones.[9] A state of fear and intense panic as a result of COVID-19 have been observed. People with special health conditions have also been warned of being at greater risk of COVID-19 infection. Therefore, WRA, in particular the pregnant ones, would feel very intimidated. Previous studies showed that transmitting COVID-19 infection from mothers to their fetuses during pregnancy is not a real concern; however, it might expose mothers to premature birth.[12,13] However, the symptoms and complications of COVID-19 might affect pregnant women and fetuses negatively.[6] Although previous studies did focus on the direct effect of COVID-19 on mothers and their fetuses, such studies did not emphasize knowledge of women regarding the effect of COVID-19 on their health and their fetuses and whether their practices are safe. This is one cornerstone component in the prevention of complications of COVID-19. Such an experience would also apply to other infectious diseases similar to COVID-19. Therefore, it is important that WRA receive accurate information and ensure their capability of conducting and following safety practices during pandemics. This study aimed to explore whether WRA has the appropriate knowledge and practices related to COVID-19. The purpose of this study was to assess the level of knowledge, safety practices, and anxiety levels among WRA during the COVID-19 outbreak. The primary aim of the study was to assess the level of knowledge, safety practices, and anxiety levels among WRA during COVID-19 outbreaks. The secondary aim of the study was to identify the differences between pregnant and non-pregnant women in relation to COVID-19 knowledge, safety practices, and anxiety.

Materials and Methods

A cross-sectional, descriptive-correlational design has been used to recruit WRA in Saudi Arabia. Data were collected using electronic Arabic versions of self-administered questionnaires. Data were collected between September and December 2020. The calculated effect size is based on the available literature at a moderate level (Effect Size (ES) = 0.3) at α = 0.05, two-tail level significance, and power (1-β) = 0.80, at least 356 women at least needed. We sought higher sample size seeking a higher power level and minimizing type II error. With a sample of 453, the power increased from .80 to .87. A convenience sampling technique was used to approach 480 WRA; 453 women agreed and filled out and returned the survey. The targeted sample included all Saudi WRA (18–49 years of age for the purpose of this study) in Saudi Arabia. Inclusion criteria were as follows: 1) women age ranges from 18 to 49 years, 2) able to read the Arabic language, and 3) they have access to an electronic device such as smart phones, laptops, or computers to fill out the survey. According to the World Health Organization (WHO),[11] WRA are those aged 15–49; however, we decided to recruit women aged

18 or above for ethical consideration below the age of 18 are considered vulnerable. Exclusion criteria included those women who suffer/diagnosed with mental illness or are in the grief phase, as it may affect their report of anxiety-related issues. After obtaining ethical approval, the researchers announced the study through social media and networks. Those interested in participation were sent the electronic informed consent to be signed. Once the consent form is signed electronically, they will be referred to the electronic form of the survey. Data were collected using an adapted self-reported survey utilizing international guidelines.[9,10] Face, content, and construct validity have been carried out by a panel of experts in the field of epidemiology and maternal-child care to address issues related to COVID-19 and those related to maternal and child healthcare. Translation is conducted according to the WHO translation guidelines. To check on cultural and language appropriateness, a pilot study was conducted on 10 women. The tools were the knowledge and practices scale which is formed of two parts: part-I measuring knowledge, which is designated to collect data regarding knowledge and practices of women in relation to COVID-19 (eight items), mode of transmission of infection (seven items), and preventing the spread of infection (14 items) utilizing international guidelines.[9,10] The responses ranged from no (0) to yes (1) assuming all correct responses had to be yes. The possible range of scores for the whole scale is from 0 to 29. A higher score indicates a higher level of knowledge. In this study, reliability was checked and showed good internal consistency with a Cronbach's alpha of .78. Part II is measuring practices. This part is composed of 11 items utilizing the available literature and international guidelines.[9,10] Women had to make their response on a three-point Likert scale from 1 (never) to 3 (always). The possible range of scores for the whole scale is from 11 to 33 with higher scores indicating a higher level of accurate conduct of safety practices. Quantification of content validity is done using the content validity index (CVI) and content validity ratio (CVR; Lawshe test). CVR is computed by asking the expert panel to give a score of 1 (essential) to 3 (not necessary) to each item. The formula for computation of CVR = (Ne−N/2)/(N/2) in which Ne is the number of panelists indicating "essential" and N is the total number of panelists. CVR ranged from .66 to .95. Regarding the CVI, For CVI, the panel of experts was asked to rate each scale item in terms of its relevance to the underlying construct. A four-point scale was used to avoid a neutral point. The four points used along the item rating continuum were 1 = not relevant, 2 = somewhat relevant, 3 = quite relevant, and 4 = highly relevant. CVI ranged from .88 to .98. In this study, the reliability was checked and showed good internal consistency with a Cronbach's alpha of .84.

Anxiety was measured using the Arabic version of the Spielberger state-trait anxiety questionnaire.[14] The scale

is formed of two domains; 20 items each. In this study, domain one (S-anxiety) which is formed of 20 items used. Responses are made on a four-point Likert scale ranging from not at all (1) to very much so (4). The total score ranges from 20 to 80 with a higher score indicating a higher level of anxiety. The scores are also categorized as follows: 20–40 (mild anxiety), 41–60 (moderate), and 61–80 (severe anxiety).[14] The Arabic version had high internal consistency reliability (Cronbach's alpha: 0.90).[14] In addition, a sociodemographic profile was developed by researchers to collect information regarding age, gender, place of living, pregnancy status, etc. Data were analyzed using the statistical package for social sciences (IBM Statistical Package for the Social Sciences (SPSS) 24). Knowledge, practices, anxiety, sociodemographic, and health-related variables were described using the central tendency measures (mean) and dispersion measures (standard deviation (SD) and range). *t*-test, analysis of variance (ANOVA) when appropriate, and Pearson *r* were used to test associations and differences and compare groups of the participants. Alpha was set to .05.

Ethical considerations

Ethical approval was obtained from Shaqra University (Approval No: E1030-06/05/2020). Ethical considerations were addressed for all women during data collection. All participants signed consent forms.

Results

Descriptive characteristics

A total of 480 women approached; 453 agreed to participate and filled out and returned the survey. The mean age of women was 29.50 years (9.80). Of them, 27.80% (n = 126) were pregnant. The majority of women had a university level of education or above (76.0% (n = 344)). Only 28.4% (n = 129) of the women reported having at least one chronic illness: diabetes mellitus, hypertension, or respiratory disease. [See Table 1]. Regarding women's obstetric history of pregnant women (a total of 126), the analysis showed that multigravida and primigravida were equally represented (49.20 and 50.80%, respectively).

Knowledge level: As shown in Table 2, the mean score was 24.50 (3.40). The results indicated that women have moderate to high levels of knowledge related to signs and symptoms, and moderate to low levels of preventive measures. The analysis also showed that women were able to define COVID-19 (95.80%), and the majority (71.0%) were able to identify the risk of COVID-19 in the fetus. In general, women showed a high level of knowledge regarding signs and symptoms of COVID-19 (>90%) such as sneezing, coughing, direct contact with infected persons, and sharing food utensils. While practices such as eating uncooked meals and eggs, placentas for the

Table 1: Descriptive characteristics of women (*n*=453)

Characteristics	*n* (%)
Level of education	
Primary/preparatory education	47 (10.37)
Secondary education	62 (13.68)
University education	316 (69.75)
Master/PhD	28 (6.18)
Occupation	
Student	167 (36.86)
Employee	151 (33.33)
Teacher	67 (14.79)
Housewife	68 (15.01)
Current residence	
Urban	231 (50.99)
Rural	222 (49.01)
Study group	
Pregnant	126 (27.81)
Non-pregnant	327 (72.19)
Medical history (*n*=129)	
Diabetes mellitus	35 (7.72)
Hypertension	44 (9.71)
Respiratory diseases	50 (11.03)

Table 2: Knowledge of COVID-19 and its preventive measure (*n*=453)

Variables	Correct answers *n* (%)
Know definition and symptoms of COVID-19	350 (77.26)
Knowledge regarding risks to the pregnancy and fetus	390 (86.09)
Knowledge regarding methods of transmission	
1. Dispose of the tissue immediately in the trash can	426 (94.04)
2. Isolating people who have contact with COVID-19	428 (94.48)
3. Wear a mask in sickness	426 (94.04)
4. Hand washing with soap and water/disinfectant	385 (84.99)
5. Staying indoors	310 (68.43)
6. Avoid touching the eyes with hands	188 (41.50)
7. Cover up when you cough or sneeze	420 (92.72)
8. Clean and disinfect items and laundry	254 (56.07)
Knowledge regarding preventive measures	
9. Sneezing and cough	417 (92.05)
10. Touching infected surfaces	185 (40.84)
11. Direct contact with patients	435 (96.03)
12. Sharing food utensils	416 (91.83)
13. Eat uncooked meat and eggs	184 (40.62)
14. Through placenta to the fetus	315 (69.54)
15. Through breast-feeding to the baby	329 (72.63)

fetus, and breastfeeding were less reported accurate information. The results indicated also that women had knowledge about generally disseminated information rather than information related to their health as women or pregnant women.

Table 3: Differences in knowledge, practices, and anxiety level between pregnant and non-pregnant women (*n*=453)

Variables	Mean (SD)	*t*-test	*p*
Knowledge			
Pregnant	24.0 (3.90)	−1.98	0.048
Non-pregnant	24.6 (3.10)		
Practices			
Pregnant	13.3 (3.10)	−0.13	0.899
Non-pregnant	13.1 (3.30)		
Anxiety			
Pregnant	48.5 (14.80)	2.52	0.012
Non-pregnant	45.0 (12.70)		

Sources of information: In relation to sources of information, women reported that the internet, social media, and television are the most used sources of information, representing 91.60%, followed by the healthcare providers (73.30%).

Safety practices: As shown in Table 2, in relation to women's safety practices regarding COVID-19 and its preventive measures, the mean score was 13.40 (3.30). The results indicated that women had low mean scores of total practices indicating inappropriate practices by women. The analysis showed that the most frequent responses of women indicated as "always" were practicing social distancing (24.90%) and increasing drinking warm fluids (23.20%). In addition, the majority of women (70–90%) were "sometimes" practicing preventive measures. Notably, about 8–10% of women have never practiced some of the core preventive measures such as avoiding exposure to cold and avoiding any iced drinks, starting to gargle and drink warm if they feel pain in the throat, and increasing their intake of warm liquids. In general, women are not practicing preventive measures sufficiently; on the contract, many women did not practice preventive measures that may risk their lives and their children's lives (fetus if pregnant).

Anxiety: Regarding anxiety among women, the analysis showed that the mean score was 46.0 (13.40). The analysis also showed that 16.30% (n = 74) of the women had severe levels of anxiety, while 42.40 (n = 192) and 41.30% (n = 187) had mild and moderate levels of anxiety, respectively.

To examine the relationship between anxiety, knowledge, and practices, the analysis, using Pearson r, found that anxiety had a negative and statistically significant association with practices (r = −0.12, *p* = 0.01), while negatively and not statistically significant association with knowledge (r = −0.05, *p* = 0.35). The results indicated that those with a higher level of anxiety are less likely to practice preventive measures for COVID-19. On the other hand, knowledge and practice total scores were positively and statistically associated (r = 0.39, *p* < 0.001). This indicates that those women with more correct information about preventive measures for COVID-19 are more likely to practice accurate and correct safety practices and preventive measures. Using the ANOVA test to examine the differences in practices and knowledge total scores in relation to level of anxiety (mild to severe), the analysis showed that there is a significant difference was between the level of anxiety and total score of practices ($F_{480, 3} = 4.60$, *p* = 0.01), while no statistically significant difference was found in relation to total score of knowledge (F = 0.98, *p* = 0.38). Post-hoc comparison (Scheffe) showed that the only significant difference in anxiety level found between those who have mild and moderate levels (*p* = 0.011).

To identify differences in knowledge, practices, and anxiety regarding COVID-19 among pregnant and non-pregnant women. The analysis [see Table 3] showed that there is a significant difference in anxiety and knowledge between pregnant and non-pregnant women (*p* < 0.05), while no statistically significant difference was found in relation to practices. The mean score of anxiety was higher among pregnant women than non-pregnant ones.

Discussion

The study found that women, in general, have a high level of knowledge about the signs and symptoms of COVID-19, a lack of knowledge about preventive measures and practices related to COVID-19, and had a moderate level of anxiety related to COVID-19. The results do agree with previous studies conducted on the general population, where people are knowledgeable about the signs and symptoms of COVID-19.[15,16] Several factors contributed to such findings. For example, most people around the world, in particular in Saudi Arabia, were under curfew and restriction of travel and mobilization and lockdown. At the same time, there was huge information disseminated through national and international campaigns to orient people to the signs and symptoms of COVID-19. Social media, also, played a significant role in disseminating such information, although it was considered less reliable. This has been confirmed in this study by women who asserted that the most common sources of information were the internet and media. However, we found controversial reports where women lacked the appropriate knowledge about preventive measures while having a high level of knowledge about the signs and symptoms of COVID-19. This is one novel finding of this study. One explanation is related to the extensive flow of information about signs and symptoms of the disease and the number of confirmed cases and deaths, while less emphasis is given to orienting people to safety measures, pregnant women in particular. Moreover, anxiety related to COVID-19 was a global concern, and this study confirmed such concern finding that WRA had mild to moderate levels of anxiety (>80%)

as well. Although less than one-quarter of women had severe levels of anxiety, the percentage is large enough to warrant professionals to psychological consequences of anxiety on the health and wellbeing of women.

One significant finding of this study is that anxiety was negatively associated with practices while not significantly associated with knowledge. This is also another novel finding and has not been examined before. While the practices of women were associated positively with their level of knowledge, they were only associated negatively with anxiety. The results indicated that those with lower scores of anxiety also have lower scores of preventive practices inferring low adherence or a lack of appropriate practices. One explanation is related to reliance on media which primarily emphasizes signs and symptoms, the number of cases of COVID-19, and legal and ethical consequences following confirmation of infection rather than raising the public awareness toward using preventive and safety practices which have come later on media priority. Women in this study indicated that their anxiety is caused by and associated with practices rather than the information about COVID-19. While the literature confirmed that pregnant women are at risk of COVID-19 and are vulnerable to high levels of stress and anxiety,[16] we found that pregnant women are risking their lives and their family health due to inappropriate preventive practices.[17] In addition, women were not aware of the fact that being pregnant increases their vulnerability and risk to COVID-19 and its negative consequences.[18] This study added to our knowledge that anxiety among pregnant women is caused and associated with practices rather than information about COVID-19. In other words, anxiety did negatively affect their willingness to use appropriate preventive practices. The study provokes attention toward the risk of poor prevention practices for pregnant women's health and fetuses. Caring for individuals with COVID-19 and suffering anxiety and psychological disturbances is a priority. Reports from previous studies indicated that healthcare professionals lack the knowledge and skills to manage the psychological needs of patients with COVID-19[19] and stigmatize patients with COVID-19.[20] Another significant finding is related to differences between pregnant and non-pregnant women, in which pregnant women had higher levels of anxiety. The study supported previous reports that pregnant women infected with COVID-19 and Middle East respiratory syndrome coronavirus (MERS-CoV) are at higher risk, as evidenced by the report that more than half of the recruited pregnant women had preterm birth,[21] and neonatal deaths.[22] This contributed to higher levels of anxiety and psychological distress, and consequently, they are more likely to develop mental disorders and impaired social function.[22] Few reports found that pregnancy does not worsen COVID-19 due to the effect of pregnancy on the pathophysiology of the virus and the capability of lung tissues to adapt, resulting in a lessening risk of lung injury.[23,24] On the contrary, others found that pregnant women suffered severe pulmonary problems and hemodynamic instability due to COVID-19 compared to non-pregnant ones.[24,25] Such contradictory findings evoke attention to the need to have more clinical-based studies that emphasize the pathophysiology of the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) chain among pregnant women.

One limitation of this study is related to the use of the online self-report format only. Another limitation is related to the lack of information about the women's psychiatric history and medications which such information would reveal further understanding regarding the prevalence of anxiety and psychiatric co-morbid that might influence the knowledge and practices of women. In addition, using a convenience sample would affect the generalizability of the findings.

Conclusion

The study found that Saudi WRA had appropriate knowledge about the signs and symptoms of COVID-19 while lacking appropriate preventive practices and suffering moderate levels of anxiety. Pregnant women are not aware of their lack of appropriate and accurate preventive practices that may endanger their lives and their fetuses. Anxiety was connected to practices and not to knowledge. The study has implications for nurses, midwives, healthcare workers, and policymakers caring for WRA. There is a need to increase the level of awareness and precautions used by women, and in particular, pregnant women. Women need to be educated to manage anxiety and be informed about the severe consequences of COVID-19 on their health if pregnant. More research is needed using a mixed methods approach to address reasons for low levels of safety practices and their consequences on their health and wellbeing.

Conflicts of interest

Nothing to declare.

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