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*Coronavirus Pandemic*

# A survey on Iranian midwives' knowledge about COVID-19 during pregnancy, delivery, postpartum, and neonatal feeding

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## Abstract

Introduction: The COVID-19 pandemic has impacted the care that maternal and newborn health professionals, especially midwives, provide. If they know how to care for COVID-19 patients during pregnancy, delivery, and postpartum, they can manage these cases better. The study aimed to identify the knowledge of Iranian midwives about COVID-19 during pregnancy, delivery, postpartum, and neonatal feeding.

Aim: The study aimed to identify the knowledge of Iranian midwives about COVID-19 during pregnancy, delivery, postpartum, and neonatal feeding.

Methodology: This cross-sectional study was conducted on 438 Iranian midwives from March to April 2021. Personal data and knowledge of them were gathered using an electronic web-based questionnaire. The statistical analysis was performed using the SPSS software version 18.

Results: The mean age of participants was 31.8 ± 2.3. The mean knowledge score of midwives was 11.2 ± 2.8, which was moderate. 91.55% of Midwives were more knowledgeable about COVID-19 infection symptoms in pregnant women. 34.93% and 31.05% of midwives had correct knowledge about vaccination against COVID-19 during pregnancy and breastfeeding, respectively. Results showed no statistically significant relationship between personal characteristics and knowledge of them ($p > 0.05$).

Conclusions: Midwives' knowledge about COVID-19 during pregnancy, delivery, postpartum, and neonatal feeding was moderate. Recommendations: Continuing educational programs are needed by the Ministry of Health and Medical Education to design and implement for improving healthcare professionals' knowledge about COVID-19 during pregnancy, delivery, postpartum, and neonatal feeding.

**Key words:** Breastfeeding; COVID-19; knowledge; midwifery; pregnancy; postpartum.

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## Introduction

In December 2019, the Chinese government announced clusters of pneumonia patients in Wuhan, Hubei Province [1]. The virus that caused the disease was named Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2) in February 2020 [2]. The sudden spread of its consequent disease, named Coronavirus Disease 2019 (COVID-19), has encountered many countries with trials and tribulations in providing adequate care to patients. Most departments of the hospitals were full of patients with respiratory symptoms [3].

The first case of COVID-19 in Iran was confirmed on 19th February 2020. In Iran from the time of diagnosis of the first case to 21 October 2022, there have been 7,555,355 confirmed cases of COVID-19 with 144,531 deaths, reported to the world health organization (WHO). Globally, as of 21 October 2022, there have been 623,893,894 confirmed cases of COVID-19, including 6,553,936 deaths reported to WHO [4,5]. This issue forced many healthcare organizations worldwide to use personnel to combat the pandemic [6]. Sufficient knowledge of healthcare providers (HCPs) who are exposed to patients with COVID-19 is essential. A systematic review of the evaluation of knowledge, attitude, practice, and clinical recommendations of HCPs towards COVID-19 showed that nearly 73% and 79% of HCPs had good knowledge and practice, respectively, and 70.9% had a positive attitude [7].

An online global survey showed that two-thirds of maternal and newborn health professionals did not receive training on COVID-19 from their health facility, 53% of healthcare providers in low-income and middle-income countries (LMIC) and 31% in high-income countries did not feel knowledgeable in how to care for a COVID-19 maternity patient. Only 19% of LMIC respondents perceived that they were thoroughly knowledgeable about providing care [8].

Midwives are well placed as the best healthcare professionals providing care for women. Different services are provided by midwives for pregnant women

and children in hospitals and health care centers, including antenatal, childbirth, postnatal, family planning, newborn and child health, breastfeeding, and immunization. Primarily, antenatal and postnatal care is provided in primary health care centers while labor and birth occur at hospitals. The COVID-19 pandemic led to changes in all aspects of healthcare and impacted maternal and perinatal health. Midwives, as members of the health care team, play a very crucial role in caring for women with COVID-19 infection during pregnancy and the postpartum period [9-11]. Qualitative research on the experiences of HCPs in pregnancy and childbirth care and especially midwives during the COVID-19 pandemic showed that they experience emotional and psychological stress alongside work challenges [12,13].

Most studies focused on knowledge, attitudes, and preventive behaviours toward COVID-19 among HCPs [14-19]. Limited studies which assessed the knowledge of midwives evaluated their general information about clinical and biological manifestations and the prevention of COVID-19 and did not focus on midwives' knowledge about COVID-19 associated with pregnancy [20,21]. Therefore, we tried to measure their knowledge about COVID-19 during pregnancy, delivery, postpartum, and neonatal feeding.

## Methodology

This cross-sectional study was conducted on Iranian midwives to assess their COVID-19-related knowledge during pregnancy, delivery, postpartum and neonatal feeding. The target population was midwives employed in governmental and non-governmental sectors all over the country, with an estimated population of 32000. The sample size was calculated by the Raosoft sample size calculator. Based on the estimated population and response distribution of 50%, 95% confidence interval (CI), Z of 1.96, and 5% margin of error, the required sample size was 381. Given that a further 15% (N = 57) was added to counteract any errors in completing the questionnaire, the final sample size was 438. The survey was done between 16th March 2021 and 30th April 2021. Online software in the Persian language (https://porsline.ir/online-questionnaire) was used to design an electronic web-based questionnaire for collecting data. The aim of the study and the link to the questionnaire were available to the participants through social media (WhatsApp and Telegram). Participants could access the questionnaire if they selected the yes option of a question regarding informed consent to participation. The questionnaire was divided into two parts. The first part included personal data such as age, marital status, and education level. The second part assessed midwives' knowledge about COVID-19 during pregnancy, delivery, and neonatal feeding using 16 items based on the Centers of disease control (CDC) considerations about COVID-19 and pregnancy and breastfeeding and triage guidelines of pregnant mothers during the COVID-19 outbreak was released by the Ministry of Health and Medical Education (MOHME) in Iran on 2nd March 2021 [22]. In the second part of the questionnaire, there were 16 items about diagnosis, transmission, prevention, risk of vulnerability, management during labor, delivery, and post-natal care. The validity of these items was established by a panel of experts, including an infectious disease specialist, five expert midwives, and four obstetricians and gynecologists. Reliability was tested in a pilot study by 30 participants and the original study used Cronbach's alpha. The results were alpha = 0.87 and 0.80, respectively. A correct answer was assigned "1" point, and an incorrect answer or 'I don't know' was assigned 0 points. The total scores ranged from 0 to 16. A score of ≥ 12 was a high level of knowledge, 8-12 was moderate, and ≤ 8 was a low level of knowledge.

The research project was approved by the Ethics Committee of Iranshahr University of Medical Sciences (IR.IRSHUMS.REC.1398.013). Data analysis was performed using SPSS 18 software (Chicago: SPSS Inc. IBM Corp.) using descriptive statistics (percentage and mean) and analytical tests including ANOVA, Chi-square, and Pearson correlation coefficient at a 5% significance level.

**Table 1.** Classification of knowledge of midwives about COVID-19 during pregnancy, delivery, postpartum, and neonatal feeding.

| Knowledge | n (%) |
|---|---|
| Low (< 8) | 13 (2.96) |
| Moderate (8–12) | 345 (78.76) |
| High (>12) | 80 (18.26) |

## Results

This study was conducted on 438 Iranian midwives. The mean age of participants was 31.8 ± 2.3 years. About 53.42% of participants had bachelor's degrees, and only 13.24% of them had Ph.D. degrees. 34.7% and 65.2% were single and married, respectively.

The mean knowledge score of midwives about COVID-19 during pregnancy, delivery, and breastfeeding was 11.2 ± 2.8, which was moderate. The classification of knowledge is presented in Table 1.

According to Table 2, 91.55% of midwives had suitable awareness of the "COVID-19 infection symptoms in pregnant women". The next item was the

"difference between the vulnerability of pregnant women and the general population against COVID-19 infection", of which 87.89% were aware. "Awareness about the risk for severe pregnancy outcomes in infected pregnant women" was another item that 81.27% were aware. Midwives had less knowledge about the possibility of vaccination against COVID-19 in pregnant and breastfeeding women. 34.93% and 31.05% of midwives had correct knowledge about vaccination against COVID-19 during pregnancy and breastfeeding, respectively.

As shown in Table 3, there is no significant relationship between age, marital status, and education with knowledge ($p > 0.05$). Two hundred and seventy-nine participants (63.7%) received their information through the MOHME and their local universities of medical sciences.

**Table 3.** The relationship between demographic characteristics of midwives and their knowledge about COVID-19 during pregnancy, delivery, postpartum and neonatal feeding.

| Variables | Mean ± SD | Knowledge |
|---|---|---|
| Age | 31.8 ± 2.3. | r = 0.2; $p = 0.25$* |
| **Education** | **N (%)** | |
| Bachelor degree | 234 (53.42) | |
| Master degree | 146 (33.33) | $p = 0.78$** |
| PhD degree | 58 (13.24) | |
| **Marital status** | **N (%** | |
| Single | 152 (34.71) | |
| Married | 286 (65.29) | $p = 0.77$*** |

*Pearson correlation coefficient; **ANOVA; ***Chi-squared test; SD: Standard deviation.

## Discussion

HCPs are the first line of defense in health crises, especially pandemics. During the COVID-19 pandemic, awareness of the group about care for patients with COVID-19 can reduce pressure on the health systems by providing comprehensive and preventive care and avoiding risks that lead to unexpected surges in demand for patient care in Intensive Care Units [23,24].

In this study to examine the knowledge of midwives about COVID-19 during pregnancy, delivery, postpartum, and neonatal feeding, their knowledge score was moderate. A majority of the midwives knew about COVID-19 infection symptoms in pregnant women. Most of them were informed about the vulnerability status of pregnant women against the infection and the higher risk of severe pregnancy outcomes in infected pregnant women, respectively. The awareness of maternal and newborn health professionals in the study of Semaan *et al.* was poor [8]. Only less than one-fifth of them knew that they were thoroughly knowledgeable about providing care for a pregnant woman with COVID-19. The reason for the difference with the current study is the time of doing these studies. The study by Semaan *et al.* was

**Table 2.** Knowledge of midwives about COVID-19 during pregnancy, delivery, postpartum, and neonatal feeding.

| Questions | Correct, n (%) | Incorrect, n (%) | IDK, n (%) |
|---|---|---|---|
| 1. Do you know Covid-19 infection symptoms in pregnant women? | 401 (91.55) | 34 (8.45) | 0 |
| 2. Can the Covid-19 virus be transmitted through sexual relationships in pregnant mothers? | 307 (70.09) | 123 (28.08) | 8 (1.82) |
| 3. Is there the possibility of vertical transmission of COVID-19? | 222 (50.68) | 138 (31.5) | 78 (17.8) |
| 4. Are pregnant women more vulnerable than the general population to Covid-19 infection mortality or severe outcomes? | 385 (87.89) | 37 (8.44) | 13 (3.65) |
| 5. Are infected pregnant women at high risk for severe pregnancy outcomes such as abortion, preterm delivery, and preeclampsia? | 356 (81.27) | 40 (9.13) | 42 (9.58) |
| 6. Can the Covid-19 virus be increased the risk of congenital anomaly and stillbirth? | 335 (76.48) | 42 (9.58) | 61 (13.92) |
| 7. Can the Covid-19 virus be found in the breast milk of infected pregnant women? | 263 (60.04) | 109 (24.88) | 66 (15.06) |
| 8. How should neonatal feeding be done if the mother has Covid-19? | 212 (48.40) | 226 (51.59) | 0 |
| 9. What are essential measurements in prenatal care visits during the Covid-19 pandemic? | 370 (84.47) | 68 (15.52) | 0 |
| 10. When is it necessary for infected pregnant women to be referred to hospital immediately? | 305 (69.63) | 70 (15.98) | 60 (13.69) |
| 11. When is it necessary for infected pregnant women to be intubated? | 270 (61.64) | 70 (15.98) | 98 (22.37) |
| 12. Which route of birth is appropriate for infected pregnant women? | 213 (48.63) | 225 (51.36) | 0 |
| 13. What are critical points which should be considered during the delivery of infected pregnant women? | 275 (62.78) | 44 (10.04) | 119 (27.16) |
| 14. What are critical points which should be considered during postnatal care of infected mothers? | 257 (58.67) | 132 (30.13) | 49 (11.18) |
| 15. Can pregnant mothers be vaccinated against Covid-19? | 153 (34.93) | 175 (39.95) | 110 (25.11) |
| 16. Can breastfeed women be vaccinated against Covid-19? | 136 (31.05) | 193 (44.06) | 109 (24.88) |

IDK: I do not know.

performed in the early months of the pandemic, and the lack of information could cause the lack of educational programs and informational resources. Another study by González-Timoneda *et al.* confirmed that midwives lacked knowledge of COVID-19 infection during the months of the pandemic [25].

Half of the midwives said that vertical transmission of COVID-19 is possible. Systematic reviews showed the lowest rate of COVID-19 transmission from mother to fetus. However, some evidence of infection of the placenta in women affected with SARS-CoV-2 and positive real-time reverse transcription-polymerase chain reaction (rRT-PCR) test for the virus in newborns in the early hours after birth seems to make the perception of midwives that there is the possibility of vertical transmission in infected pregnant women [26-28]. 70% of midwives believed that pregnant women could not get COVID-19 from sex. Most studies showed that the virus had been detected in the semen of infected men, but there is not any evidence of its sexual transmission [29,30].

More than three-quarters of midwives knew the necessary measures in prenatal care visits, including protective behaviors towards COVID-19 and a reduction in the number and duration of visits. Studies reported the changes in prenatal care in the form of shorter visiting hours and fewer allowed visitors. Therefore, the changes lead to a decreased number of clinic visits and to increase in remote or virtual care provision [8,11].

Two hundred and seventy-nine participants (63.7%) received their information through guidelines of the MOHME in Iran and their local universities of medical sciences. Since the beginning of the COVID-19 pandemic, The MOHME provides "New Coronavirus National Guidelines" focusing, on the flowchart of how to treat patients especially pregnant women on an outpatient and inpatient level, which has been approved by the Coronavirus Scientific Committee and they are updated at required intervals [22]. It seems that this scientific source of information led to nearly two-thirds of midwives having accurate information regarding the referral of pregnant women to maternity hospitals, intubating hospitalized affected mothers, and considering critical points during their delivery and postpartum. In contrast with the current study, Semaan *et al.* in a global survey showed that maternal and newborn health professionals in LMIC worried about the lack of access to evidence for providing maternal, neonatal, and postnatal care to COVID-19 maternity patients and only one-fifth of them preserved themselves thoroughly knowledgeable [8].

Three-fifths of midwives knew no evidence of the virus had been found in the breast milk of women with COVID-19. Despite the issue, less than half of them said neonatal feeding should be done with breast milk in affected mothers. They were however worried about mother-to-neonate transmission by close contact with mothers with COVID-19 during breastfeeding. Studies showed there is no infectious COVID-19 in breast milk [31,32]. The CDC and WHO advise that breastfeeding should be determined by the mother with all possible prevention measures [33,34]. However, findings of systematic reviews have shown that a majority of neonates born to infected mothers received artificial feeding [26,35].

Knowledge of midwives regarding the vaccination of pregnant women and breastfeeding mothers was poor. The guideline for pregnant mother vaccination against COVID-19 was released on 7th August 2021, by MOHME in Iran, and at the time of the study, midwives did not have access to the evidence for vaccination in this group. On the other hand, a study showed that more than half of Australian midwives had concerns about the COVID-19 vaccine for women in pregnancy and breastfeeding despite national guidelines recommending the vaccination of these groups [36]. Deruelle *et al.* showed that French midwives were less likely to recommend vaccination against COVID-19 during pregnancy and breastfeeding than other prenatal care providers such as general practitioners and obstetricians, and gynecologists. They worried about the lack of data on adverse effects or effectiveness and the need for access to extra information from medical societies regarding the safety of the vaccine in these groups [37]. Swiss pregnant and breastfeeding women were also concerned and showed a low willingness to COVID-19 vaccine during the first pandemic wave [38].

There was no significant relationship between knowledge and the personal characteristics of midwives in this study. This finding was consistent with the other studies which evaluated midwives' knowledge of COVID-19 [21,39]. It seems that COVID-19 infection during pregnancy and postpartum is a more severe subject that all midwives with various personal and professional characteristics have more concerned to receive information on how to care for COVID-19 maternity patients.

According to what we know, this is the first study on midwives' knowledge about COVID-19 during pregnancy, delivery, postpartum, and neonatal feeding. The limitation of the study was using an electronic web-based questionnaire for the assessment of the

knowledge of midwives because it was not possible to complete questionnaires in hospitals due to the nature of the outbreak and the prevention and control guidelines and protocols. This can provide some limitations to not the possibility of evaluating midwives' attitudes and practices due to the increase in the number of questions and less willingness to participate in the study.

## Conclusions

Midwives' knowledge about COVID-19 during pregnancy, delivery, postpartum, and neonatal feeding was moderate.

## Recommendations

- Continuing educational programs are needed by the Ministry of Health and Medical Education to design and implement for improving healthcare professionals' knowledge about COVID-19 during pregnancy, delivery, postpartum, and neonatal feeding.
- Simple illustrative booklets and brochures, including the required knowledge and practices about COVID-19 during pregnancy, delivery, postpartum, and neonatal feeding should be available for midwives and other healthcare professionals at hospital departments and outpatient clinics.
- Further research about the prevention of COVID-19 complications during pregnancy, delivery, postpartum, and neonatal feeding to provide health teaching to health care professionals and mothers.

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### Ethical approval and informed consent

This study was conducted in accordance with the principles of the Declaration of Helsinki. This study was conducted with the permission of the National Committee of Ethics in Biomedical Research (Approval ID: IR.IRSHUMS.REC.1398.013) and in accordance to the ethical principles and the national norms and standards for conducting Medical Research in Iran. Written consent form was obtained from all participants.

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