The Relationship Between Age and COVID-19 in Pregnancy

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ABSTRACT

COVID-19 is a novel viral pandemic. It is believed that due to physiological changes within the pregnancy, pregnant women may be more susceptible to COVID-19. Currently, there exists no reliable evidence being available regarding the likelihood of infection for pregnant women compared to the general population. On the other hand, given the previous experiences with SARS and MERS, pregnant women are likely to be at high risk for COVID-19 and its complications. Comparing the results of studies on COVID-19 during pregnancy and that of the general population, it can be concluded that pregnant women develop COVID-19 at a younger age than the general population. The results showed that due to changes during pregnancy, pregnant women have a higher risk for COVID-19 than other people, perhaps due to the lower mean age of COVID-19 in pregnant women, which leads to less COVID-19 on the adverse pregnancy outcomes.

Keywords: Age, Birth, COVID-19, High Risk, Pregnancy

Introduction

COVID-19 is a rapidly expanding acute respiratory disease that emerged in late 2019 in Wuhan, China (1). Clinical features of COVID-19 may be either asymptomatic or associated with some clinical features such as fever, fatigue, headache, dry cough, sore throat, anorexia, myalgia, rhinorrhea, gastrointestinal symptoms (nausea, diarrhea) Dyspnea, and sputum (2-7).

Currently, there exists no reliable evidence being available regarding the likelihood of infection for pregnant women compared to the general population (8). It is believed that due to physiological changes within the pregnancy, pregnant women may be more susceptible to COVID-19 (9). On the other hand, given the previous experiences with SARS and MERS, pregnant women are likely to be at high risk for COVID-19 and its complications (8). Possible complications of COVID-19 in pregnancy and its consequences are mortality, preterm labor, and preterm rupture of membranes, fetal distress, and respiratory distress (10, 11).

Age of Diagnosis in the General Population

People of all ages have been reported to be susceptible to COVID-19; however, the highest suffering ages have been reported to be adulthood and the elderly (over 40). In a case report on 138 patients with coronavirus in Wuhan, it was reported that the median age for infection was 56 years old (7). In an epidemiological study on 41 patients with coronavirus, Huang et al. showed that the median age of those affected was 49 years old (6). In a descriptive study performed by Chen et al. on 99 patients with coronavirus, the obtained results revealed that the mean age of patients was 55.5 (SD=13.1) (4). The results of a study in Italy reported a median age of 64 years (12). Furthermore, Young et al. reported a median age of 47 years in a case series of 18 coronavirus infections in Singapore (13). Also, Arentz et al. reported a mean age of 70 years in a case report of 21 COVID-19 patients in Washington (14).

Age of Diagnosis in Pregnancy

The analysis of the results of studies on COVID-19 in pregnancy reveals that most pregnant women were
between the ages of 20 and 40 years old with the median age of 30 years old. Liu et al. reported the age range of pregnant women with coronavirus from 30 to 34 years old (15). Moreover, results from a case-control study in Wuhan, China showed that the mean age of pregnant women with COVID-19 was 30.9 ± 3.2 years old (16). Analysis of 38 pregnant women with COVID-19 in China suggested that the age range of affected women tends to be 26 to 40 years old (8). Also, the results of a case-control study in China on 16 patients with COVID-19 indicated that the mean age was 29.3 (SD = 2.9) years old (17). In an analysis performed by Liu et al. on 15 pregnant women in China, the results showed that the mean age range was 23-40 years old and the mean age of affected women was 32 (SD = 5) years old (18). Still in another study carried out by Zhu et al. in China, on 9 pregnant women with COVID-19, the age range of women was 25 to 35 years old (11). In a study on 103 pregnant women in China, Dong et al. reported a median age 31 for women (age range of 27–38 years old) (19). In addition, Chen et al. reported a case-control study in China of 9 pregnant women with the age range of 26 to 40 years old (3).

It is recommended that all pregnant women be screened for coronavirus. Pregnant women with suspected or COVID-19 diagnosis should be identified before they give birth to their neonates and referred to a specific maternity ward or section for delivery. The midwife and the physician should triage the women and advise them about the type of delivery based on the severity of the disease, the patient's condition, and the progress of the childbirth (20).

**Pregnancy Outcome**

In a review study by Yee et al. conducted on 9032 pregnant women with Covid-19, the results showed that their abnormal laboratory parameters compared to others have increased (21). Also, the results of other studies showed an increased risk of preterm, IUGR, preeclampsia, cesarean section, prenatal infections (11, 19, 22). But the results of some other studies showed that pregnancy did not increase the symptoms of coronavirus and no adverse maternal and neonatal outcomes were observed (15-17).

**Recommendation**

After childbirth and discharge from the maternity ward, a daily evaluation is recommended to ensure the recovery of mothers. It seems that providing distance education to pregnant women helps increase their awareness of COVID-19 transmission and symptoms, their self-isolation, and their self-care. Midwives and providers of health services to pregnant women should also receive the adequate and appropriate training in COVID-19 as well as in pregnancy care.

**Discussion**

In this study, 25 (OH) D level was higher in Iranian women and their neonates, however, the neonatal anthropometry was not different between Iranian and Afghan refugee women except for neonatal height which was surprisingly higher in Afghans irrespective of their lower 25(OH) D umbilical cord level. Therefore, maternal and neonatal 25(OH) D levels did not influence neonatal anthropometry and this could be related to other factors, including genetics. However, further studies need to investigate this subject independently. Also, no relationship was reported between maternal characteristics and 25(OH) D level. Furthermore, socio-cultural challenges to natural methods of vitamin D intake deserve attention, as both Iran and Afghanistan benefit from sufficient hours of sunlight.

Different serum levels of vitamin D in various ethnicities has been shown in other studies (12-16). Also, a correlation between neonatal and maternal serum levels of vitamin D has been shown in some studies (12, 13). However, in the study by Jacquemyn (2013), no differences were made by taking supplements and gravidity did not affect vitamin D levels (12). This is in accordance with the present study. It can therefore be questioned whether taking vitamin D supplements during pregnancy should be recommended.

There are some controversies on the effects of maternal serum level of vitamin D on anthropometric characteristics of newborns. In a cohort study on 107 women and their neonates, Við Streym et al. (17) reported no correlation between anthropometric indexes of neonates and vitamin D level, which is similar to the present study. In contrast, Bowyer et al. (13), showed that vitamin D deficiency can influence the neonatal weight which is different with the results of the present study and the study by Við Streym et al. (17). Also, Sarma et al. (18), reported lower neonatal height and femur length in vitamin D deficient mothers, which is not comparable with the present study and the other mentioned studies (17, 19). A systematic review (20), reported high correlation between maternal and neonatal vitamin D levels, similar to the present study. Therefore despite the fact that vitamin D deficiency is common in mothers and neonates, it is not clear whether prescribing vitamin D supplements during pregnancy can cause any changes in neonatal anthropometric characteristics (21-23). There were also limitations to the present study. For one, participants’ nutritional habits were not recorded. This could have led to a better understanding of the potential effects of such habits on this study’s results. Also, the Afghan refugee women are expats living in Iran, although their duration of residence in Iran is not known. There could have been cultural or pre and post immigration factors that have led to this study’s outcomes. For future studies, these extra information could potentially facilitate a better understanding of the results. Further randomized clinical trials are recommended in order for clearer conclusions to be reached.
**Conclusion**

Comparing the results of studies on COVID-19 during pregnancy and that of the general population, it can be concluded that pregnant women develop COVID-19 at a younger age than the general population. It is normal for pregnant women to match the maximum fertility age. On the other hand, according to the review of study results, there is no agreement on the outcome of pregnant women with COVID-19. Due to changes during pregnancy, pregnant women have a higher risk for COVID-19 than other people, perhaps due to the lower mean age of COVID-19 in pregnant women, this leads to less COVID-19 on the adverse pregnancy outcomes.

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FR and ZK made a substantial contribution to writing of the paper draft and met the four criteria for authorship recommended by the International Committee of Medical Journal Editors.

**Conflict of Interest**

The authors have no conflict of interest.

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