Psychological impact of coronavirus disease 2019 in pregnant women

OBJECTIVE: The coronavirus disease 2019 (COVID-19) outbreak poses significant risk to public health, including mental health. A survey conducted in China showed that 53.8% of the respondents rated the psychological impact of the outbreak as moderate or severe, and 28.8% reported moderate to severe anxiety symptoms and stress levels.[1] During pregnancy, women may experience stress and anxiety associated with potential adverse obstetrical outcomes such as fetal death or fetal abnormalities. Stress and anxiety level may also increase during infectious disease outbreaks. Currently, there is no known information on the psychological impact, the effect on individual's social and/or psychological aspects, and mental health of pregnant women during the COVID-19 epidemic. This study aimed to survey pregnant women to evaluate psychological impact and anxiety during the COVID-19 outbreak.

STUDY DESIGN: This was a cross-sectional survey study aimed to assess the psychological response of pregnant women during the COVID-19 epidemic. The study was conducted at the University of Naples Federico II (Napoli, Italy) from March 15, 2020, to April 1, 2020. Women with singleton pregnancies were eligible to participate in the study regardless of gestational age.

After a written informed consent was obtained from eligible participants, women were asked by their counselor to fill out 2 questionnaires. A combination of validated measures in the questionnaires was used to assess the psychological impact and anxiety.

Psychological impact questionnaire

The psychological impact of COVID-19 was measured using an Italian version of the Impact of Event Scale-Revised (IES-R). The IES-R is a 22-item self-administered questionnaire composed of 3 subscales aimed to measure the mean avoidance, intrusion, and hyperarousal. Each item can be scored from 0 to 4. Total score therefore can ranges from 0 to 88, with higher scores representing higher psychological impact. The total IES-R score was divided into 0—23 (normal), 24—32 (mild psychological impact), 33—36 (moderate psychological impact), and ≥37 (severe psychological impact).[2]

Anxiety questionnaire

Anxiety of COVID-19 was measured by an Italian version of the 6-item short form of the state scale of the Spielberger State-Trait Anxiety Inventory (STAI), as described by Marteau and Bekker.[3] Women can be scored on a scale of 20—80, with higher scores representing higher levels of anxiety. A STAI score of 34—36 was considered normal.

Women were also asked to fill out the visual analog scale (VAS) for anxiety.[4] VAS for anxiety ranged from 0 (not at all anxious) to 100 (extremely anxious) and referred to the following question: *How anxious are you regarding the coronavirus epidemic and the possibility of vertical transmission to your offspring?*

To evaluate the anxiety of pregnant women during the COVID-19 outbreak, we also assessed the following:

- Rate of cell-free DNA compared with combined screening as first-trimester screening test (only in women who are enrolled in the first trimester of pregnancy)
- Mode of delivery and rate of cesarean delivery on maternal request (only in women who delivered during the study period)

Statistical analysis

Univariate comparisons of dichotomous data were performed using the chi-square test with continuity correction. Comparisons between groups to test group means with standard deviation were performed using *t*-test by assuming equal within-group variances or using one-way analysis of variance. A 2-sided *P* value less than .05 was considered statistically significant. Questionnaire scores were also analyzed according to the gestational age at patient's enrollment.

RESULTS: During the study period, a total 100 women were enrolled; 17, 35, and 48 women were in the first, second, and third trimester of pregnancies, respectively. None of the enrolled women had a history of postpartum depression in a prior pregnancy or of psychiatric disorders.

Overall, the COVID-19 outbreak had a moderate psychological impact on pregnant women with a mean IES-R score of 36.9±10.1. More than half of the respondents (53 of 100, 53%) rated the psychological impact as severe. Mean score at STAI questionnaire was 45.2±14.6, with an overall incidence of STAI >36 of 68% (68 of 100). Mean score at VAS for anxiety for COVID-19 vertical transmission was 43.0±26.9, with an overall incidence of score >50 of 46% (46 of 100) (Table 1).

Of the 17 women who were in the first trimester of pregnancy during the COVID-19 outbreak, 52.9% (9 of 17) opted for cell-free DNA as first-trimester risk assessment, whereas 41.7% (8 of 17) underwent combined screening with nuchal translucency.

Of the 48 women enrolled in the third trimester of pregnancy, 18 delivered during the study period. Of them, 10 women underwent vaginal delivery (55.6%), and 8 women (44.4%) underwent cesarean delivery. Of the 8 cesarean deliveries, 1 was planned breech delivery, 4 were emergency

cesarean deliveries performed during labor, and 3 were planned cesarean deliveries on maternal request.

Psychological impact of the COVID-19 outbreak was more severe in women in the first trimester of pregnancy; they reported significantly higher mean STAI score, higher rate of STAI score >36, higher mean score at VAS for anxiety for COVID-19 vertical transmission, and higher rate of VAS score ≥50 (Table 2).

Discussion

This cross-sectional survey study aimed to evaluate psychological impact and anxiety in pregnant women during the COVID-19 outbreak in Italy using validated questionnaires.

The study showed that the COVID-19 outbreak had a moderate to severe psychological impact on pregnant women. More than two-thirds of the women also reported higher than normal anxiety. Almost half of the women (46%) reported high anxiety regarding the vertical transmission of the disease, assessed as VAS for anxiety score ≥50. Sensitivity analyses according to gestational age showed that women in the first trimester of pregnancy during the COVID-19 epidemic had higher anxiety and more severe psychological impact than those in the second or third trimester of pregnancy.

We also found that 52.9% of women who were in the first trimester during the COVID-19 outbreak opted for cell-free DNA as first-trimester risk assessment compared with combined screening. This quite high rate of noninvasive prenatal testing may be explained by the fact that first-trimester risk assessment for trisomy 21 with cell-free DNA is associated with better maternal reassurance and less anxiety compared with the standard first-trimester combined screening based on nuchal translucency. Of the 18 women who delivered during the study period, we reported a 16.7% rate of cesarean delivery on maternal request. This rate is significantly higher than the 5%−10% rate reported in the literature.[5] Notably, anxiety for fetal injury or fetal death and emotional aspects are 2 of the main reasons for planned cesarean delivery on maternal request.[6] However, assessment of the rate of cell-free DNA and mode of delivery was limited to a very small subgroup according to gestational age at the time of the study period, and therefore, the study was not powered for these 2 analyses.

Findings from the study were limited by the single-center study design and small sample size.

COVID-19 is spreading rapidly through Europe and North America. Governments have imposed quarantines and travel bans on an unprecedented scale, with lockdown of several cities. So far, COVID-19 has caused thousands of deaths worldwide. Fear and psychological impact of the disease may be as harmful as the infection, with suicidal cases also reported.

Pregnancy is a well-known period of profound change. Adequate mental and physical health is a protective factor for mood disorders, and for some women, pregnancy may increase vulnerability to psychiatric disease such as depression. Antenatal depression affects about 10% of women in developed countries, and the number of pregnant women prescribed antidepressants has increased over the last decade.[7] Isolation, social distancing, and extreme changes in daily life may increase the risk of depression among vulnerable population such as pregnant women. Therefore, it is of paramount importance to assess the psychological impact of the COVID-19 outbreak.

CONCLUSION: In summary, among pregnant women, more than half of the respondents rated the psychological impact of the COVID-19 outbreak as severe, and about two-thirds reported higher than normal anxiety. Almost half of the women reported high anxiety regarding the vertical transmission of the disease. Psychological impact and anxiety of the COVID-19 epidemic seems to be more severe in women who are in the first trimester of pregnancy during the outbreak. Our findings can be used to formulate psychological interventions to improve mental health and psychological resilience during the COVID-19 epidemic. ∎

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REFERENCES

1. Wang C, Pan R, Wan X, et al. Immediate psychological responses and associated factors during the initial stage of the 2019 coronavirus disease (COVID-19) epidemic among the general population in China. Int J Environ Res Public Health 2020;17:1729.
2. Creamer M, Bell R, Failla S. Psychometric properties of the Impact of Event Scale - Revised. Behav Res Ther 2003;41:1489–96.
3. Marteau TM, Bekker H. The development of a six-item short-form of the state scale of the Spielberger State-Trait Anxiety Inventory (STAI). [published correction appears in Br J Clin Psychol 2020;59:276]. Br J Clin Psychol 1992;31:301–6.
4. Williams VSL, Morlock RJ, Feltner D. Psychometric evaluation of a visual analog scale for the assessment of anxiety. Health Qual Life Outcomes 2010;8:57.
5. Robson SJ, Tan WS, Adeyemi A, Dear KB. Estimating the rate of cesarean section by maternal request: anonymous survey of obstetricians in Australia. Birth 2009;36:208–12.
6. Jenabi E, Khazaei S, Bashirian S, Aghababaei S, Matinnia N. Reasons for elective cesarean section on maternal request: a systematic review. J Matern Fetal Neonatal Med 2019. [Epub ahead of print].
7. Noordam R, Aarts N, Verhamme KM, Sturkenboom MCM, Stricker BH, Visser LE. Prescription and indication trends of antidepressant drugs in the Netherlands between 1996 and 2012: a dynamic population-based study. Eur J Clin Pharmacol 2015;71:369–75.