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COVID-19 pandemic: Impacts on mothers' and infants' mental health during pregnancy and shortly thereafter

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Abstract

The COVID-19 pandemic brought about a global crisis, with profound implications on public mental health. The current review focuses on the impact of the pandemic on the mental health of mothers and their infants during pregnancy and shortly after delivery. Literature shows that in similar disaster situations, mothers' stress reaction and mental health have a critical impact on infant development. Research data on perinatal mental health during the current COVID-19 pandemic is reviewed in conjunction with studies on the relationship between maternal stress, infant development, and psychopathology. Recommendations for perinatal mental health enhancement are discussed and topics for future research suggested.

Keywords

Pandemic, pregnancy, fetus/infant development, psychopathology, depression, anxiety

Introduction

The outbreak of the Coronavirus (COVID-19) infection started in Wuhan (Hubei, China) at the end of 2019 and was declared a pandemic by WHO on March 11, 2020. COVID-19 is still a new and largely unknown entity, still changing, and presenting unexpected challenges. Therefore, at the current time, when attempting to predict the impact of the pandemic on mothers and their fetuses or infants, researchers can mainly look at previous pandemics, crises, or other occurrences causing high stress to mothers. Previous research has shown that stress during pregnancy has a significant impact on pregnancy progression and outcomes, thus probably impacting the fetus (Keren et al., 2015). Notably however, contrary to the expected results from the previously cited study, Barzilay et al.

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(2020) found no impact on the psychopathology of children, up to age 9, resulting from their mothers experiencing frequent rocket attacks during pregnancy and for about a month after delivery.

This review focuses on the expected mental health implications of the COVID-19 pandemic on perinatal mental health. Reports on the effects on the mental health of mothers and the development of their very young children, of other stressful events with relevance to the COVID-19 pandemic, are reviewed and discussed.

Mental health in pregnancy and perinatal period during the COVID-19 pandemic

This review investigates the impact of the COVID-19 pandemic on the perinatal period, which is defined here as the second half of the pregnancy and the first month after delivery.

Delivery, a stress inducing life event even at peaceful times, may pose a greater challenge during a pandemic. Preliminary reports indicate no vertical transmission of COVID-19 (Dumitriu et al., 2020; Poon et al., 2020) or a very low rate (Fenizia et al., 2020), as well as very low risk for infection from skin to skin contact and breastfeeding of COVID-19 positive mothers (Chambers et al., 2020; Dumitriu et al., 2020; Pereira et al., 2020). Although WHO recommends skin to skin contact and breastfeeding even for mothers suspected or confirmed with COVID-19, procedures of separating mothers from their newborns and prohibiting breastfeeding still prevail in different countries and certain hospitals (Matvienko-Sikar et al., 2020). These hardships in conditions of delivery and early handling of the newborn could by themselves lead to attachment problems related to parent–child bonding (Moore et al., 2016; Olza-Fernández et al., 2014; Olza et al., 2018). The pandemic effects on the perinatal mental health of pregnant women is studied vigorously around the world. While data is accumulating, it is important to keep in mind that since these research efforts are carried out under time-pressure, data quality varies, and some reports are preliminary while others may not be properly validated.

The largest up-to date study on prenatal mental health is a Chinese multicenter, cross-sectional study (Wu et al., 2020). It was initiated in China prior to the formal declaration of the COVID-19 epidemic (end of December 2019), and was designed to identify mental health manifestations during pregnancy using the Edinburgh Postnatal Depression Scale (EPDS). Later, it made it possible to compare the mental state of pregnant women before and after the COVID-19 epidemic. The study included 4,124 pregnant women in their third trimester, 2,839 of whom completed assessment before January 20, 2020. Another 1285 were assessed after that date, when the Chinese government declared a new Coronavirus epidemic in China. The authors of the study report that pregnant women assessed after the declaration of the Coronavirus epidemic had significantly higher rates of depression symptoms (26.0% vs. 29.6%), and a higher prevalence (34.2%) of EDPS scores $\geqslant$10 in the subgroup studied between January 20 and February 9. Self-harm ideation rates were higher in women evaluated after the epidemic declaration compared to women assessed before it. Higher depression rates were found to be positively associated with several factors related to the COVID-19 epidemic progression, such as the number of newly confirmed cases of COVID-19, suspected infections, and number of deaths per day. Risk factors for depression and anxiety included the mother being underweight before pregnancy, being primiparous, age younger than 35 years, employed full time, middle income category, and low level of physical activity.

A contradictory finding regarding perinatal mental health effects of COVID-19 was reported in a smaller cross-sectional study from Israel (Sade et al., 2020). This study also used the – EPDS, but investigated women hospitalized during the COVID-19 quarantine in Israel, due to high risk pregnancies ($n=84$). They were compared to women with high-risk pregnancies, who had been

hospitalized in the same units prior to the pandemic ($n=279$). The propensity to score high on the EPDS (>10) was found to be similar in both groups (25.0% vs. 29.0%) when controlling for maternal age, ethnicity, and known mood disorder. Positive suicidal ideations rates were also similar between the two groups (8.6% vs. 5.0%; Sade et al., 2020). Notably, despite the contradictory results in Wu et al. and Sade et al.'s studies, the raw data differences between controls and study group in each of the studies, were similar.

In the midst of a pandemic, increased anxiety over health is to be expected. Anxiety related to pregnancy, during the COVID-19 pandemic, was assessed in an online survey which was completed anonymously by 2,740 pregnant women from 47 US states (April 2020; Moyer et al., 2020). It used a modified pregnancy-related anxiety scale (PRAS) to investigate respondents' perception of pregnancy-related anxiety before and during COVID-19. They report increased stress about running out of food, job-loss, loss of household income and loss of childcare (56.3%–63.7%). As could be expected, the highest stress rates (93%) were found to be related to getting infected with COVID-19.

A similar study (Preis et al., 2020a) surveyed online 4,451 US pregnant women (April–May 2020), using a recently validated questionnaire – Preparedness Stress and Perinatal Infection Stress (PREPS) (Preis et al., 2020b) – which includes the pandemic-specific prenatal stress factors making up the questionnaire's name. The study reports high rates of preparedness stress and perinatal infection stress in almost 30% of subjects.

A systematic review of 24 studies on the mental health outcomes of quarantined people, during former infectious disease outbreaks in Southeast Asia (including SARS, Ebola, H1N1 influenza, MERS, and equine influenza) concluded that longer durations of quarantine were associated with poorer mental health, particularly post-traumatic stress symptoms, avoidant behaviors, and anger (Brooks et al., 2020). A very small study ($n=52$) looking into school closures during the 2009 H1N1 influenza pandemic, revealed higher levels of concern among pregnant women and those with young children, about being infected, or transmitting the virus to others (Braunack-Mayer et al., 2013).

The effect of disasters on infants' and toddlers' mental health trajectories and the possible relevance to the COVID-19 pandemic

The WHO defines 'disaster' as 'an occurrence disrupting the normal conditions of existence and causing a level of suffering that exceeds the capacity of adjustment of the affected community' (World Health Organization [WHO], 2002). Pandemics, such as COVID-19 could thus be classified as disasters. The study of previous disasters reveals that they may affect the mental development of babies through various mechanisms.

Disasters and other high stress situations could affect intra-uterine growth as well as later child development (King et al., 2015; Light et al., 2019). The mother's mental health during pregnancy and in early stages of infancy may have a stronger impact on child development than the direct effect of disaster-related prenatal stress (Harville et al., 2010). Moreover, pregnant and postpartum women are more vulnerable to the mental health consequences of disasters (Harville et al., 2010; St-Pierre et al., 2018; Vesga-López et al., 2008), and may thus impact their infants' and toddlers' mental health.

A recent publication by a multidisciplinary team of experts addressed the possible immediate and long term implications of COVID-19 on child development (Yoshikawa et al., 2020). They argue that high levels of distress, lack of mobility, lack of access to timely medical care and financial decline, caused by world crises, may affect early development. The study called for urgent establishment of inclusive public interventions.

Discussion

The COVID-19 pandemic has tremendous effects on human life around the globe, whether by the direct consequences of infection, disease and death or the numerous, and profound implications it brought to the basics of daily routines. Different forms of physical distancing, quarantines, economic crises, and political turmoil are evident worldwide.

All of these influence the extremely delicate social balance and individuals' wellbeing and mental health. Pregnant women may be more prone to physical distancing, restriction of mobility, and difficulty in accessing medical services and social services, as this group is already in higher need for familial and social support and care (Matvienko-Sikar et al., 2020). Practitioners and researchers should be familiar with the risk factors for perinatal mental disorders which include disasters, emergency situations, increased exposure to domestic abuse, economic hardship, social isolation, and lack of support (Harville et al., 2010; King et al., 2015; Laplante et al., 2004; Tees et al., 2010; Vesga-López et al., 2008). Furthermore, despite the lack of direct data, we assume that pregnant women with existing psychopathology or of younger age would be at particularly increased risk and therefore need tailor-made prevention strategies and excessive care. Youngsters are more prone to be negatively affected by psychosocial stressors, such as media (Shoval et al., 2005) and are more prone to suicidal behaviors with most types of psychopathology (Shoval et al., 2006). Recently, adults with psychiatric disorders were also documented to have a more severe course of illness, once infected by COVID-19 (Wang et al., 2020). Therefore, we suggest considering them during pandemic times – as a population at heightened risk until proven otherwise.

At this time, there are no prevention and treatment guidelines for perinatal crisis-related distress. Intervention consists of treatment of perinatal depression with adjustments to the pandemic changing status and treatment modalities. The US Preventive Services Task Force recommendations for perinatal depression (Curry et al., 2019) advise on comprehensive assessment of the existence of depression risk factors followed by early intervention. The recommended approach is cognitive behavior therapy (CBT). A publication concerning perinatal women's mental health during COVID-19 suggests the importance of the women maintaining support networks and social contacts as well as using CBT and mindfulness techniques to relieve stress (Matvienko-Sikar et al., 2020). A group from Japan suggested using smartphone-based cognitive-behavioral therapy (iCBT) for prevention of antenatal and postpartum depression and anxiety (Haruna & Nishi, 2020).

Similarly, a recent systematic review and meta-analysis also suggested improved internet-based services as a means to alleviate COVID-19 related anxieties and depression during pregnancy and shortly after delivery. They also emphasize the importance of regular physical exercise in assisting with these issues (Hessami et al., 2020).

Researchers studying the effects of COVID-19 on pregnant and post-partum women stress the importance of early mental health assessment and treatment (Caparros-Gonzalez & Alderdice, 2020; Matvienko-Sikar et al., 2020; Yoshikawa et al., 2020). Unfortunately, there are only scarce data regarding the ramifications of crisis situations on mental health of fathers or parental partners and the impact on their infants' and family's wellbeing (Griffith, 2020; Spinelli et al., 2020). Data is also scarce on the balance between parental resilience, protecting factors, and risk factors for perinatal mental health during crises. These issues should be investigated in the future in addition to the identification of factors contributing to efficient public health measures during an epidemic or pandemic.

Author contributions

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References

Barzilay, R., Lawrence, G. M., Berliner, A., Gur, R. E., Leventer-Roberts, M., Weizman, A., & Feldman, B. (2020). Association between prenatal exposure to a 1-month period of repeated rocket attacks and neuropsychiatric outcomes up through age 9: A retrospective cohort study. *European Child and Adolescent Psychiatry*, *29*(8), 1135–1142. https://doi.org/10.1007/s00787-019-01426-1

Braunack-Mayer, A., Tooher, R., Collins, J. E., Street, J. M., & Marshall, H. (2013). Understanding the school community's response to school closures during the H1N1 2009 influenza pandemic. *BMC Public Health*, *13*(1), 344. https://doi.org/10.1186/1471-2458-13-344

Brooks, S. K., Webster, R. K., Smith, L. E., Woodland, L., Wessely, S., Greenberg, N., & Rubin, G. J. (2020). The psychological impact of quarantine and how to reduce it: Rapid review of the evidence. *The Lancet*, *395*(10227), 912–920. https://doi.org/10.1016/S0140-6736(20)30460-8

Caparros-Gonzalez, R. A., & Alderdice, F. (2020). The COVID-19 pandemic and perinatal mental health. *Journal of Reproductive and Infant Psychology*, *38*(3), 223–225. https://doi.org/10.1080/02646838.2020.1786910

Chambers, C., Krogstad, P., Bertrand, K., Contreras, D., Tobin, N. H., Bode, L., & Aldrovandi, G. (2020). Evaluation for SARS-CoV-2 in breast milk from 18 infected women. *Journal of the American Medical Association*, *324*(13), 1347–1348. https://doi.org/10.1001/jama.2020.15580

Curry, S. J., Krist, A. H., Owens, D. K., Barry, M. J., Caughey, A. B., Davidson, K. W., Doubeni, C. A., Epling, J. W., Grossman, D. C., Kemper, A. R., Kubik, M., Landefeld, C. S., Mangione, C. M., Silverstein, M., Simon, M. A., Tseng, C. W., & Wong, J. B. (2019). Interventions to prevent perinatal depression: US preventive services task force recommendation statement. *Journal of the American Medical Association*, *321*(6): 580–587. https://doi.org/10.1001/jama.2019.0007

Dumitriu, D., Emeruwa, U. N., Hanft, E., Liao, G. V, Ludwig, E., Walzer, L., Arditi, B., Saslaw, M., Andrikopoulou, M., Scripps, T., Baptiste, C., Khan, A., Breslin, N., Rubenstein, D., Simpson, L. L., Kyle, M. H., Friedman, A. M., Hirsch, D. S., Miller, R. S., . . . Gyamfi-Bannerman, C. (2020). Outcomes of neonates born to mothers with severe acute respiratory syndrome coronavirus 2 infection at a Large Medical Center in New York City. *JAMA Pediatrics*, *175*(2), 157–167. https://doi.org/10.1001/jamapediatrics.2020.4298

Fenizia, C., Biasin, M., Cetin, I., Vergani, P., Mileto, D., Spinillo, A., Gismondo, M. R., Perotti, F., Callegari, C., Mancon, A., Cammarata, S., Beretta, I., Nebuloni, M., Trabattoni, D., Clerici, M., & Savasi, V. (2020). Analysis of SARS-CoV-2 vertical transmission during pregnancy. *Nature Communications*, *11*(1), 5128. https://doi.org/10.1038/s41467-020-18933-4

Griffith, A. K. (2020). Parental burnout and child maltreatment during the COVID-19 pandemic. *Journal of Family Violence*. Advance online publication. https://doi.org/10.1007/s10896-020-00172-2

Haruna, M., & Nishi, D. (2020). Perinatal mental health and COVID-19 in Japan. *Psychiatry and Clinical Neurosciences*, *74*(9), 502–503. https://doi.org/10.1111/pcn.13091

Harville, E., Xiong, X., & Buekens, P. (2010). Disasters and perinatal health: A systematic review. *Obstetrical and Gynecological Survey*, *65*(11), 713–728. https://doi.org/10.1097/OGX.0b013e31820eddbe

Hessami, K., Romanelli, C., Chiurazzi, M., & Cozzolino, M. (2020). COVID-19 pandemic and maternal mental health: A systematic review and meta-analysis. *The Journal of Maternal-Fetal & Neonatal Medicine* . Advance online publication. https://doi.org/10.1080/14767058.2020.1843155

Keren, M., Keren, N., Eden, A., Tsangen, S., Weizman, A., & Zalsman, G. (2015). The complex impact of five years of stress related to life-threatening events on pregnancy outcomes: A preliminary retrospective study. *European Psychiatry*, *30*(2), 317–321. https://doi.org/10.1016/j.eurpsy.2014.10.004

King, S., Kildea, S., Austin, M. P., Brunet, A., Cobham, V. E., Dawson, P. A., Harris, M., Hurrion, E. M., Laplante, D. P., McDermott, B. M., McIntyre, H. D., O'Hara, M. W., Schmitz, N., Stapleton, H., Tracy, S. K., Vaillancourt, C., Dancause, K. N., Kruske, S., Reilly, N., . . . Yong Ping, E. (2015). QF2011: A protocol to study the effects of the Queensland flood on pregnant women, their pregnancies, and their children's early development. *BMC Pregnancy and Childbirth*, *15*(1), 109. https://doi.org/10.1186/s12884-015-0539-7

Laplante, D. P., Barr, R. G., Brunet, A., Du Fort, G. G., Meaney, M. L., Saucier, J. F., Zelazo, P. R., & King, S. (2004). Stress during pregnancy affects general intellectual and language functioning in human toddlers. *Pediatric Research*, *56*(3), 400–410. https://doi.org/10.1203/01.PDR.0000136281.34035.44

Light, A. E., Holt-Lunstad, J., Porter, C. L., & Light, K. C. (2019). Early life trauma: An exploratory study of effects on OXTR and NR3C1 gene expression and nurturing self-efficacy in mothers of infants. *International Journal of Psychophysiology*, *136*, 64–72. https://doi.org/10.1016/j.ijpsycho.2018.03.018

Matvienko-Sikar, K., Meedya, S., & Ravaldi, C. (2020). Perinatal mental health during the COVID-19 pandemic. *Women and Birth*, *33*(4), 309–310. https://doi.org/10.1016/j.wombi.2020.04.006

Moore, E. R., Bergman, N., Anderson, G. C., & Medley, N. (2016). Early skin-to-skin contact for mothers and their healthy newborn infants. *Cochrane Database of Systematic Reviews*, *11*(11): CD003519. https://doi.org/10.1002/14651858.CD003519.

Moyer, C. A., Compton, S. D., Kaselitz, E., & Muzik, M. (2020). Pregnancy-related anxiety during COVID-19: A nationwide survey of 2740 pregnant women. *Archives of Women's Mental Health*, *23*(6), 757–765. https://doi.org/10.1007/s00737-020-01073-5

Olza-Fernández, I., Marín Gabriel, M. A., Gil-Sanchez, A., Garcia-Segura, L. M., & Arevalo, M. A. (2014). Neuroendocrinology of childbirth and mother-child attachment: The basis of an etiopathogenic model of perinatal neurobiological disorders. *Frontiers in Neuroendocrinology*, *35*(4), 459–472. https://doi.org/10.1016/j.yfrne.2014.03.007

Olza, I., Leahy-Warren, P., Benyamini, Y., Kazmierczak, M., Karlsdottir, S. I., Spyridou, A., Crespo-Mirasol, E., Takács, L., Hall, P. J., Murphy, M., Jonsdottir, S. S., Downe, S., & Nieuwenhuijze, M. J. (2018). Women's psychological experiences of physiological childbirth: A meta-synthesis. *BMJ Open*, *8*(10), e020347. https://doi.org/10.1136/bmjopen-2017-020347

Pereira, A., Cruz-Melguizo, S., Adrien, M., Fuentes, L., Marin, E., Forti, A., & Perez-Medina, T. (2020). Breastfeeding mothers with COVID-19 infection: A case series. *International Breastfeeding Journal*, *15*(1), 69. https://doi.org/10.1186/s13006-020-00314-8

Poon, L. C., Yang, H., Kapur, A., Melamed, N., Dao, B., Divakar, H., McIntyre, H. D., Kihara, A. B., Ayres-de-Campos, D., Ferrazzi, E. M., Di Renzo, G. C., & Hod, M. (2020). Global interim guidance on coronavirus disease 2019 (COVID-19) during pregnancy and puerperium from FIGO and allied partners: Information for healthcare professionals. *International Journal of Gynecology & Obstetrics*, *149*(3), 273–286. https://doi.org/10.1002/ijgo.13156

Preis, H., Mahaffey, B., Heiselman, C., & Lobel, M. (2020a). Vulnerability and resilience to pandemic-related stress among U.S. women pregnant at the start of the COVID-19 pandemic. *Social Science and Medicine*, *266*, 113348. https://doi.org/10.1016/j.socscimed.2020.113348

Preis, H., Mahaffey, B., & Lobel, M. (2020b). Psychometric properties of the Pandemic-Related Pregnancy Stress Scale (PREPS). *Journal of Psychosomatic Obstetrics and Gynecology*, *41*(3), 191–197. https://doi.org/10.1080/0167482X.2020.1801625

Sade, S., Sheiner, E., Wainstock, T., Hermon, N., Yaniv Salem, S., Kosef, T., Lanxner Battat, T., Oron, S., & Pariente, G. (2020). Risk for depressive symptoms among hospitalized women in high-risk pregnancy units during the COVID-19 pandemic. *Journal of Clinical Medicine*, *9*(8), 2449. https://doi.org/10.3390/jcm9082449

Shoval, G., Zalsman, G., Polakevitch, J., Shtein, N., Sommerfeld, E., Berger, E., & Apter, A. (2005). Effect of the broadcast of a television documentary about a teenager's suicide in Israel on suicidal behavior and methods. *Crisis*, *26*(1), 20–24. https://doi.org/10.1027/0227-5910.26.1.20

Shoval, G., Zalsman, G., Sher, L., Apter, A., & Weizman, A. (2006). Clinical characteristics of inpatient adolescents with severe obsessive-compulsive disorder. *Depression and Anxiety*, *23*(2), 62–70. https://doi.org/10.1002/da.20135

Spinelli, M., Lionetti, F., Pastore, M., & Fasolo, M. (2020). Parents' stress and children's psychological problems in families facing the COVID-19 outbreak in Italy. *Frontiers in Psychology*, *11*, 1713. https://doi.org/10.3389/fpsyg.2020.01713

St-Pierre, J., Laplante, D. P., Elgbeili, G., Dawson, P. A., Kildea, S., King, S., & Vaillancourt, C. (2018). Natural disaster-related prenatal maternal stress is associated with alterations in placental glucocorticoid system: The QF2011 Queensland Flood Study. *Psychoneuroendocrinology*, *94*, 38–48. https://doi.org/10.1016/j.psyneuen.2018.04.027

Tees, M. T., Harville, E. W., Xiong, X., Buekens, P., Pridjian, G., & Elkind-Hirsch, K. (2010). Hurricane Katrina-related maternal stress, maternal mental health, and Early Infant Temperament. *Maternal and Child Health Journal*, *14*(4), 511–518. https://doi.org/10.1007/s10995-009-0486-x

Vesga-López, O., Blanco, C., Keyes, K., Olfson, M., Grant, B. F., & Hasin, D. S. (2008). Psychiatric disorders in pregnant and postpartum women in the United States. *Archives of General Psychiatry*, *65*(7), 805–815. https://doi.org/10.1001/archpsyc.65.7.805

Wang, Q. Q., Xu, R., & Volkow, N. D. (2020). Increased risk of COVID-19 infection and mortality in people with mental disorders: Analysis from electronic health records in the United States. *World Psychiatry*, *20*(1), 124–130. https://doi.org/10.1002/wps.20806

World Health Organization. (2002). *WHO disaster definition*. Author. https://apps.who.int/disasters/repo/7656.pdf

Wu, Y., Zhang, C., Liu, H., Duan, C., Li, C., Fan, J., Li, H., Chen, L., Xu, H., Li, X., Guo, Y., Wang, Y., Li, X., Li, J., Zhang, T., You, Y., Li, H., Yang, S., Tao, X., . . . Huang, H. F. (2020). Perinatal depressive and anxiety symptoms of pregnant women during the coronavirus disease 2019 outbreak in China. *American Journal of Obstetrics and Gynecology*, *223*(2), 240.e1–240.e9. https://doi.org/10.1016/j.ajog.2020.05.009

Yoshikawa, H., Wuermli, A. J., Britto, P. R., Dreyer, B., Leckman, J. F., Lye, S. J., Ponguta, L. A., Richter, L. M., & Stein, A. (2020). Effects of the Global Coronavirus Disease-2019 pandemic on early childhood development: Short-and long-term risks and mitigating program and policy actions. *The Journal of Pediatrics*, *223*, 188–193. https://doi.org/10.1016/j.jpeds.2020.05.020

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