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April 21, 2022

COVID-19 Pandemic Risks and Effects on Maternal Mental Health, United States, 2022

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An abstract of a thesis submitted to the Faculty of the Rollins School of Public Health of Emory University in partial fulfillment of the requirements for the degree of Master of Public Health in Hubert Department of Global Health, 2022

Abstract

COVID-19 Pandemic Risks and Effects on Maternal Mental Health,

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Introduction

Risk factors that lead to anxiety and depression among women experiencing pregnancy and are associated with the COVID-19 pandemic are not well defined. I systematically reviewed the literature reporting negative effects on mental health among pregnant women and women who recently gave birth and their long-term impacts on maternal and child health.

Methods

Using PubMed™ and Web-of-Science™ I searched for studies linking COVID-19 and maternal mental health. Articles reporting cross-sectional designs of pregnant women with levels of anxiety and depression before and after the COVID-19 pandemic were included. Studies were reviewed with implications of the COVID-19 pandemic, symptoms of anxiety and depression, adverse birth outcomes, and implications on pregnant women in the post-pandemic era.

Results

Among 21 eligible articles, most focused on accessing pregnant women and related psychosocial stresses from the COVID-19 pandemic. Five revealed elevated levels of anxiety and depression compared to pre-pandemic times, with the pandemic cohort reporting 37% more depression and 57% more anxiety than the pre-pandemic cohort.

Discussion

We found an association between the stresses of the COVID-19 pandemic and anxiety and depression among pregnant women. The initial studies during the COVID-19 pandemic used many study designs and were important to identify vulnerable groups and the implications of the current pandemic. Given the newness of these health outcomes, further research should provide a better understanding of pandemic effects on pregnant women, the association with anxiety and depression, long-term effects on maternal and child health, and insight into a vulnerable population to mental health disorders from stress. This could help build effective mental health resources for vulnerable groups, evidence-based strategies, and recommendations for pandemic mental health management and prevention.

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Table of Contents

1. Introduction

a. Rationale

The severe acute respiratory syndrome coronavirus 2 (SARS-CoV2) is a novel coronavirus causing coronavirus disease (COVID-19). (4) Cases from the outbreak were first found in Wuhan, China in late 2019. The World Health Organization (WHO) classified it as a pandemic Mar 11, 2020. (4) SARS-CoV2 affects the lung through different entry points; in adults, the virus invades the body triggering the host's immune response and initiates protective mechanisms from the body that lead to severe respiratory distress syndrome. (4) Common clinical symptoms reported from COVID-19 include fever, fatigue, shortness of breath, dry cough, gastrointestinal, cardiac, and renal symptoms. (4)

The number of infected individuals in United States reached 81,601,951 by Mar 26, 2022, with 1,003,232 deaths. (22) Cases and outbreaks have rapidly spread across the globe, infecting tens of millions of individuals. (11) This study focused on cases in the United States.

As the pandemic spread, the public grew increasingly concerned about risks to life and health, healthcare burdens, and economic consequences. (5) Containment strategies became a priority to governments imposing restrictions, which lead to limited social interaction and movement. (5) These restrictions impact the mental health of individuals because of social isolation and loneliness; additionally, the risk of infection impacts the economy. (5) The COVID-19 pandemic is associated with psychological distress and mental health symptoms (e.g., depression, anxiety, and posttraumatic stress disorder) especially in women. (4)

Pregnant women are more susceptible to respiratory infection. (4) During pregnancy, their body undergoes physical changes supporting fetal wellbeing. (6) Women experience decreased pulmonary capacity and immunosuppression and may be more at risk for poor outcomes from COVID-19. (4,6) Information regarding COVID-

19 is limited and constantly changing. (6) Fears about acquiring COVID-19 (or the complications) as well as impact on the fetus or newborn may increase anxiety and

depression. (4) Pregnant and postpartum women are fearful for the unborn child's health which combined with the stress and fear of COVID-19 may exasperate their susceptibility to mood and anxiety disorders. (6) The COVID-19 pandemic can have negative implications for the mental health of mothers. (6)

Additionally, a study using a modified pregnancy-related anxiety scale (PRAS) before and after COVID-19 showed a profound effect on pregnant women's mental health. (15) In a multivariable analysis there were increased reports from participants about COVID-19 related stressors causing pregnancy-related anxiety. (15) Further, another multinational study found increased levels of depression and anxiety among pregnant and breastfeeding women during the COVID-19 pandemic. (3) Among 9,000 women in the study, the highest response (15%) was major depression symptoms and moderate to severe anxiety among 11%. (15) Additional factors included having a chronic mental illness present, chronic illness, smoking, unplanned pregnancy, and professional working status. (15)

COVID-19 is associated with death, strained healthcare systems, and uncertainty in economics. (12) There also may be secondary implications for our psychological and social wellbeing that are equally important. (12) People have been separated from social outlets (e.g., school, work, community, friends, and family). (12) A study of 1,987 pregnant participants were surveyed in Apr 2020 regarding COVID-19 stress and measures of depression, anxiety, and social support levels. (12) Results showed elevated symptoms of depression 37% and symptoms of anxiety 57%. (12) After reviewing published articles of various study designs, populations, and results associating COVID-19 with mental health symptoms in pregnant women, conducting a systematic review of published COVID-19 articles was beneficial. This study reviewed pregnant women undergoing the COVID-19 pandemic and summarized the risks to mental health disorders, depression, and anxiety. It should aid public health prepare and respond to COVID-19 related mental health clinical care approaches, understand outcomes, and help outline the process of policy making.

b. Objectives

This systematic review aimed to comprehensively summarize available data about the risk of mental health symptoms and illnesses associated with COVID-19. It compared these risks among studies, regardless of location. Conducted according to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines, it measured risk of mental health symptoms, anxiety, and depression, and compared those at risk, by pre- and post-pandemic levels including case reports and series, case-control, retrospective, and observational studies, and public health surveillance (PHS) reports.

2. Methods

This study did not require IRB approval because it did not meet the definition of research with “human subjects” or “clinical investigation”; a letter of exemption was received from Emory University.

a. Eligibility criteria

Study design

All studies that measured or studied mental health (“anxiety” or “depression”) and maternal health (“pregnant” or “women”) were included. Reports published as conference abstracts, clinical trials, editorials, letters, reviews, and articles without abstracts were excluded.

Participants

Studies describing the complications and anxiety and depression levels of United States pregnant women were included.

Outcomes

Primary outcomes included …

- prenatal anxiety
- prenatal depression
- mental Health

Outcomes were not handled as dichotomous variables but expressed as proportions.

Setting

Studies based in the United States were included. Studies based outside of the United States were excluded.

Language

Articles published in English between Mar 2020 and Feb 2022 were included. Articles published in other languages were excluded.

b. Information sources

Published studies of COVID-19 pandemic pregnant women in the United States were retrieved from PubMed™ and Web of Science™.

c. Search strategy

The search was restricted to the English language and human subjects; the following search terms were used to identify relevant published articles.

- “COVID-19” OR “coronavirus” OR “SARS-CoV-2”
- “anxiety” OR “depression” OR “stress” OR “mental health”
- “Pregnant” OR “pregnancy”

The reference lists of articles included were explored for better saturation of literature.

d. Study selection

Published studies were required to meet the following characteristics for eligibility of inclusion: (i) studies on COVID-19 or coronavirus pandemic and (ii) studies reporting clinical and non-clinical studies and research of pregnant or prenatal women in the United States.

A systematic narrative synthesis of the results in the text and tables summarized the findings of included studies. The narrative synthesis explained the relationship and findings within the included studies.

e. Data collection

The following data (if available) were extracted from each article: authors names, publication year, study design, COVID-19 pandemic or coronavirus pandemic mentioned, pregnant women reporting levels of depression, anxiety, and dress.

f. Data synthesis and analysis

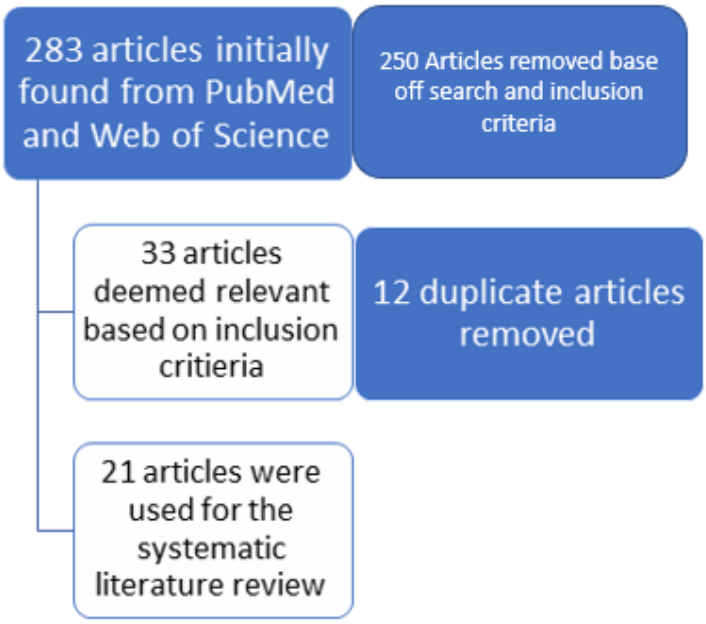
A formal meta-analysis was not performed. Therefore, the main outcomes extracted from eligible articles were summarized to describe the results of the study (i.e., COVID-19 pandemic, prenatal anxiety, prenatal depression, prenatal stress, and mental health)

3. Results

a. Study selection

A total of 283 relevant articles were first identified through a search of PubMed™ and Web-of-Science™; 250 articles were excluded by initial screening abstracts and titles. After screening of duplicates, another 12 were excluded. This resulted in a total of 21 articles selected for full-text assessment. All 21 were included in the qualitative synthesis of the systematic review (Figure 1).

Figure. 1. Flow Diagram of Study Selection, COVID-19, Worldwide, 2022



b. Study characteristics

Nineteen studies were conducted worldwide from 2020 through 2022 among prenatal and pregnant women in different regions of the world. The definition of mental health was dependent on the author. Most articles defined a case as any patient screened for anxiety and depression based on surveys and screenings during COVID-19 pandemic. Some authors added other characteristics to the case definition such as: bipolar disorder, substance abuse, stress, mental health crisis, and psychological wellbeing. Variations in sample size were noted depending on study design. Sample size in case reports and series ranged from 67 to 297 women; larger samples were identified in studies with different designs such as cross-sectional and web-based studies. The reviewed articles included …

- three prospective studies; three describing mental health studies in pregnant women in Istanbul, Turkey, and other parts of Turkey. [14-20]
- five cross-sectional studies conducted in a hospital in Iran, inner-city London, Kuwait, Qatar, and Norway. [5-15]
- three systematic literature reviews were conducted compiling literature material on COVID-19 and maternal mental health. [6,7,17]
- four online studies were conducted in Canada and United States. [3 - 21]
- one analysis of a longitudinal pathway was conducted in Argentina. [18]

Hospital studies demonstrated pregnant women having a higher risk of anxiety when compared to non-pregnant women. The proportions of anxiety were available in twenty-one articles, while proportions of depression being available in twenty.

The proportion of anxiety ranged from 22.1% to 26% throughout the study. The proportion of depression ranged from 7.9% - 13.1% respectively. Only eight articles additionally included proportions of non-pregnant studies. Although pregnant women predominance of psychological affects is observed in most studies, one article was an exception studying substance abuse. [18]

Looking closer at one study conducted on 204 women throughout Argentina with social isolation being relevant to study participants. [13] The age range was from 8 to 45 years old, and they were divided into two groups 102 pregnant women and 102 non-pregnant women. [13] The inclusion criteria were that they were mainly healthy and not affected by current COVID-19 conditions. [13] The online survey distributed through Google forms measured three months from Mar 2021, Apr 2021, and May 2021 beginning from the lockdown to day 51st. [13] Significant changes were noted throughout this time, relating to an increase in anxiety and depression measured by the survey as the pandemic continued. [13] Comparing pregnant women to non-pregnant women there was a significant increase in depression and anxiety but less in the non-pregnant women group. (Table 1)

Table 3
Descriptive statistics of the administered tests.

Variable		Pregnant women			Non-pregnant women			Total		
		Time 1	Time 2	Time 3	Time 1	Time 2	Time 3	Time 1	Time 2	Time 3
Depression	*Mean*	8.71	10.02	15.42	7.92	9.06	10.83	8.32	9.55	13.15
	SD	6.08	6.43	8.50	4.53	4.86	6.79	5.37	5.71	8.02
	Absent	57.8%	52.0%	27.7%	60.6%	54.5%	43.0%	59.2%	53.3%	35.3%
	Minimum	20.6%	17.3%	18.8%	26.3%	23.2%	28.0%	23.4%	20.3%	23.4%
	Mild	12.7%	23.5%	20.8%	11.1%	16.2%	19.0%	11.9%	19.8%	19.9%
	Moderate	8.8%	7.1%	19.8%	2.0%	6.1%	6.0%	5.5%	6.6%	12.9%
	Severe	0%	0%	12.9%	0%	0%	4.0%	0%	0%	8.5%
	Moderate+Severe	8.8%	7.1%	32.7%	2.0%	6.1%	10.0%	5.5%	6.6%	21.4%
Anxiety	*Mean*	22.66	22.52	28.10	21.51	21.69	23.97	22.09	22.11	26.04
	SD	9.48	8.76	9.60	8.44	8.20	9.27	8.98	8.49	9.63
Negative Affect	*Mean*	16.88	18.14	20.07	17.22	17.18	17.42	17.05	17.67	18.75
	SD	4.65	5.48	5.93	5.04	4.46	5.41	4.84	5.01	5.81
Positive Affect	*Mean*	22.13	21.12	19.29	21.99	21.64	21.44	22.06	21.38	20.36
	SD	6.77	7.24	7.23	6.52	6.97	6.82	6.63	7.09	7.10

Table 1. Prevalence of depression, anxiety, negative affect, and positive affect in studies conducted in Argentina between 2021-2022. [13]

Demonstrations of the negative effects of the pandemic on pregnant women when compared to non-pregnant women during the study were observed. (Table 2)

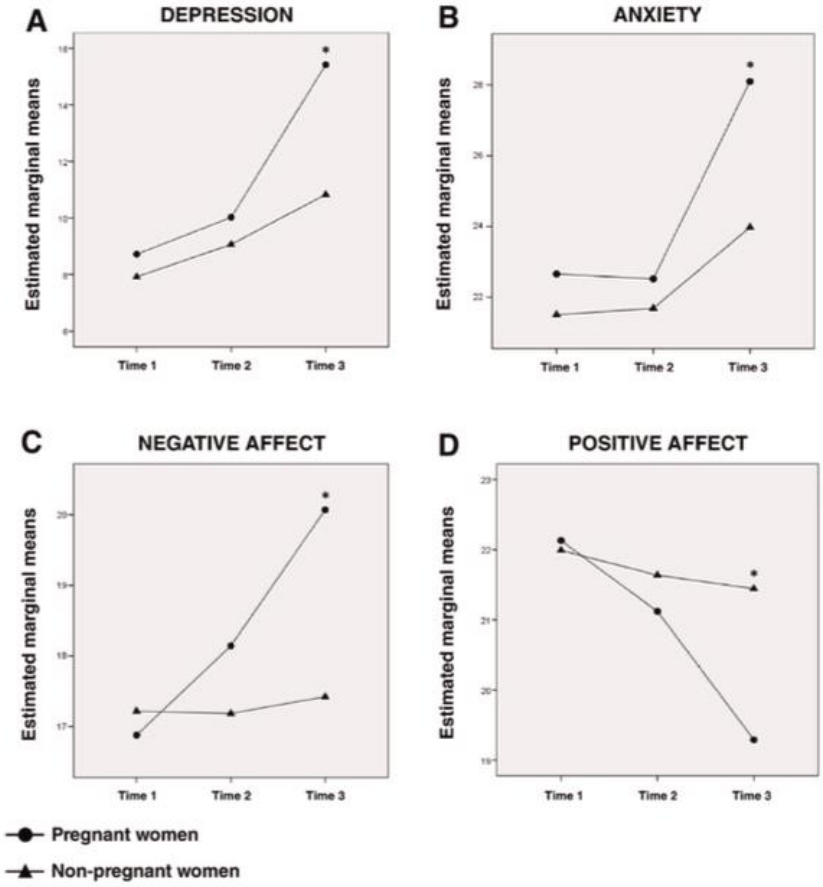


Fig. 2. Comparison of the adjusted mean of the psychopathological variables in both groups, during the three phases of the study. Fig. 2 compares the adjusted means for depression (A), anxiety (B), negative affectivity (C) and positive affectivity (D) in pregnant women (circles) and non-pregnant women (triangles), during the three phases of the study (Time 1, Time 2 and Time 3). *p <0.01

Table 2. Comparison of the adjusted mean of the psychopathological variables of both groups during the three study phases in Argentina between 2021-2022. [13]

4. Discussion

I reviewed the risk of depression and anxiety, as well as mental health disorders associated with COVID-19 pandemic in pregnant women by systematically searching published articles worldwide. Most studies examined pregnant or post-natal women either online, in-person, or in hospitals, where COVID-19 outbreaks and restrictions were relevant. This resulted in higher estimates of depression and anxiety as well as mental health disorders due to perceived risk in a hospital setting, onset of a new ongoing pandemic, and social and life restrictions.

One article observed significant changes in substance abuse. It was clear most pregnant women in the United States reported higher substance abuse for coping. For instance, elevated stress and depressive symptoms associated with poorer mental health and emotional health resulted in higher substance abuse among pregnant women in Apr 2021 through May 2021. This finding amplifies the severity of COVID-19 pandemic and its association with mental health disorders as well as possible negative impacts on maternal and child health.

The variation of study designs impacted the results and estimates extracted from the articles greatly. Cross-sectional studies in hospitals yielded elevated risk estimates for severe anxiety of contracting COVID-19 with the highest positive direct correlation among them being significantly correlated to being in a hospital setting. Noting that pregnant women in a hospital setting may be prone to anxieties of contracting COVID-19 then compared to those at home or in personal settings due to risk being perceived or higher in a healthcare setting. Meanwhile, estimates from studies conducted online or

in other in-person study groups were lower. These findings raise concerns of potential unintentional biases associated with study settings and population selection.

Further, previous studies showed that women are more susceptible to stress and increased mental health problems after stressful life events. This may pertain to psychological changes that are common during pregnancy and many other factors contributing to the increasing and decreasing. Stressful events such as death of relatives, natural disasters, pandemics, isolation, job loss, etc. could contribute to life stress. Nonetheless, both sexes show the same clinical presentations during the pandemic.

Limitations

Considering the novelty of the COVID-19 pandemic and its long-term outcomes, limited studies were available to review. Although there was a constant outbringing of new studies and push to further explore the complications of COVID-19 pandemic on maternal mental health, one important implication was the lack of studies regarding long-term effects and understandings of the implications on children, future generations, and development. In addition, there was limited information on pregnant women in home or personal settings using a hospice or factoring socioeconomic status. Failure to review grey literature (I.e., websites, governmental organizations) is another limitation of this study.

Recommendations

It may be important to pay more attention and aid in mental health of pregnant women during a pandemic. Given the complications and associations with development of child

associated with mental health disorders, further research should occur to better understand mental health disorders especially related to stressful events such as pandemics. The initiation of well-designed cross-sectional studies in hospitals and online surveys worldwide are important to preparing for future mental health crises related to stressful events as well as strategic planning in possible future situations that may arise. This could help with building effective mental health support, evidence-based strategies, and recommendations for mental health disorder management and prevention. Providing support and awareness is crucial for mental health among pregnant women, as well as focusing on the joy of childbirth and pregnancy.

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