Prevalence of Maternal Depression and Anxiety during COVID-19 Pandemic

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Abstract

Introduction: The declaration of the COVID-19 pandemic has impacted the mental well-being of individuals globally, among which the maternal population is among the most vulnerable. This study aims to explore the prevalence of maternal depression and anxiety during the COVID-19 pandemic.

Materials and Methods: This article is a rapid review, consisting of a compilation of 18 related studies to investigate the prevalence of depression and anxiety in maternal women. The studies were selected based on our pre-set inclusion and exclusion criteria. The databases used are PubMed, Google Scholar, Medline (Ovid), and EMBASE with the following keywords: "maternal", "depression", "anxiety", "COVID-19" and "pandemic".

Results: The data from 18 studies were assembled to formulate this rapid review. Multiple scales such as the State-Trait Anxiety Inventory, Generalized Anxiety Disorder Scale, Edinburgh Postnatal Depression Scale, Zung Self-Rating Depression Scale, and more, were used in the 18 studies. The total number of participants was 47,237, and the studies included data from 9 different countries, where the prevalence of depression ranged from 11.40% to 58% and of anxiety ranging from 8.30% to 72%.

Conclusion: The impact of the COVID-19 pandemic had increased the prevalence of maternal depression and anxiety around the world. As COVID-19 is an ongoing issue, more studies are required to find the correlation between the pandemic and its effect on maternal mental health, as well as develop new strategies and effective interventions to alleviate the effects of COVID-19 on the maternal population.

Keywords: *Maternal; Depression; Anxiety; COVID-19; Pandemic*

Introduction

COVID-19 (SARS-CoV-2) was first identified in Wuhan, China, in December 2019, and quickly spread across the world. Once the number of deaths increased due to the rapid spreading of the virus among several countries, the World Health Organization declared a Pandemic on March 11, 2020 [1]. The pandemic threat of COVID-19 has impacted many lives globally. Along with the social and economic disruptions [2], the pandemic has elicited an increase in mental health conditions, including depression and anxiety.

Depression is a frequent and severe medical disorder that adversely affects an individual's physical and mental well-being. The common symptoms are sadness, sleep cycle changes, feelings of guilt, loss of interest, changes in concentration and appetite, as well as suicidal tendencies in some cases [3]. In the case of maternal mental health, symptoms of depression are observed, along with maternal aggressiveness and poor parenting self-efficacy [4]. Nearly half of individuals who have major depression still have serious and ongoing anxiety during the postpartum period [5].

Anxiety is caused by a sense of fear, which occurs in the form of feelings of worry and tension. Oftentimes, physical changes may also be present; in the form of jitters, dizziness, palpitations, and perspiration [6]. High levels of anxiety in pregnancy can cause many complications for both mother and infant.

As the natural phenomena of childbirth continued throughout the pandemic, the detrimental effects of COVID-19 have taken a toll on maternal physical and mental health. This rapid review aims to explore the prevalence of maternal depression and anxiety during the COVID-19 pandemic.

Materials and Methods

Search strategy

We conducted a Rapid Review on previously published data. The reference databases used to search for publications were PubMed, Google Scholar, Medline (Ovid) and EMBASE. We searched for related articles matching our topic up to the 31st of March 2021.

Inclusion and exclusion criteria

Inclusion criteria:

1) Articles published on maternal anxiety and depression during COVID-19 pandemic.

2) Articles published in the English language.

Exclusion criteria:

1) Studies on general population regarding depression and anxiety during COVID-19 pandemic.

2) Only abstract articles (articles not in full text).

3) Studies not in English.

4) Case studies and editorial letters were excluded.

Data abstraction and screening

In total, 189 articles were chosen as potentially relevant to the study subject based on keywords. After removal of duplicate articles, 76 articles remained; these articles were reviewed. Following that, 60 articles were selected for full-text screening based on the inclusion criteria mentioned in figure 1. A total of 18 peer-reviewed papers were finalized for this study, with a total of 47,237 participants (Table 1).

Sl. No	Authors	Country	Sample size	Age	Depression (N)	Measurement Tools	Anxiety (N)	Measurement Tools
1.	Margie H. Davenport., *et al.* [7]	Canada	900	18-45	360	EPDS	648	STAI Short Form
2.	Catherine Lebel., *et al.* [8]	Canada	1987	18.6-47.6	735	EPDS	1132	Pregnancy Related Anxiety Questionnaire
3.	Emily E Cameron., *et al.* [9]	Canada	641	30-45	278	EPDS	190	GAD - 7
4.	Sarah Perzow., *et al.* [10]	USA	135	20-45	45	EPDS	90	STAI Short Form
5.	Helen Chen., *et al.* [11]	USA	4124	30-40		EPDS		Perinatal Anxiety Disorder Scale (PAD)
6.	Michael Ceulemans., *et al.* [12]	UK	9041	18-45	2,442	EPDS	1,899	STAI Short Form
7.	Victoria Fallon., *et al.* [13]	UK	614	30-35	70	EPDS	113	STAI Short Form
8.	Chuanxiao Li., *et al.* [14]	China	2201	30-35	780	Patient Health Questionnaire (PHQ-9)	687	GAD - 7
9.	Xue Yang., *et al.* [15]	China	19515	26-30	8,712	Patient Health Questionnaire-9 (PHQ-9)	5,696	GAD - 7
10.	Haoxu Dong, et a [16]	China	156	20-50	79	SDS (Self rating Depression Scale)	13	Self-Rating Anxiety Scale (SAS)
11.	Yongjie Zhou., *et al.* [17]	China	859	31-35	84	PHQ-9	92	GAD-7
12.	Yanting Wu., *et al.* [18]	China	4124	27-32	495	EPDS	908	EPDS Anxiety Scale
13	Christian Loret de Mola., *et al.* [19].	Brazil	1136	25-34	1,042	EPDS and web-based questionnaire.	1,028	GAD - 7
14	Covadonga Chaves., *et al.* [20]	Spain	724	25-35	420	EPDS	369	EPDS Anxiety Scale
15.	Reyhan Ayaz., *et al.* [21]	Turkey	63	30-37		IDAS II scores.		Beck Anxiety Inventory (BAI)
16.	Ferit Durankus., *et al.* [22]	Turkey	260		92	EPDS, Beck Depression Inventory (BDI)	168	Beck Anxiety Inventory (BAI)
17.	Fatemeh Effati., *et al.* [23]	Iran	205	29-34	67	DASS-21 (DEPRESSION, ANXIETY AND STRESS SCALE-21	90	Depression Anxiety and Stress Scale-21 (DASS-21)
18.	Ayesha Shahid., *et al.* [24]	Pakistan	552	18-45	216	EPDS	332	STAI Short Form
	Total	9 Countries	47237 Participants		15497		13086	

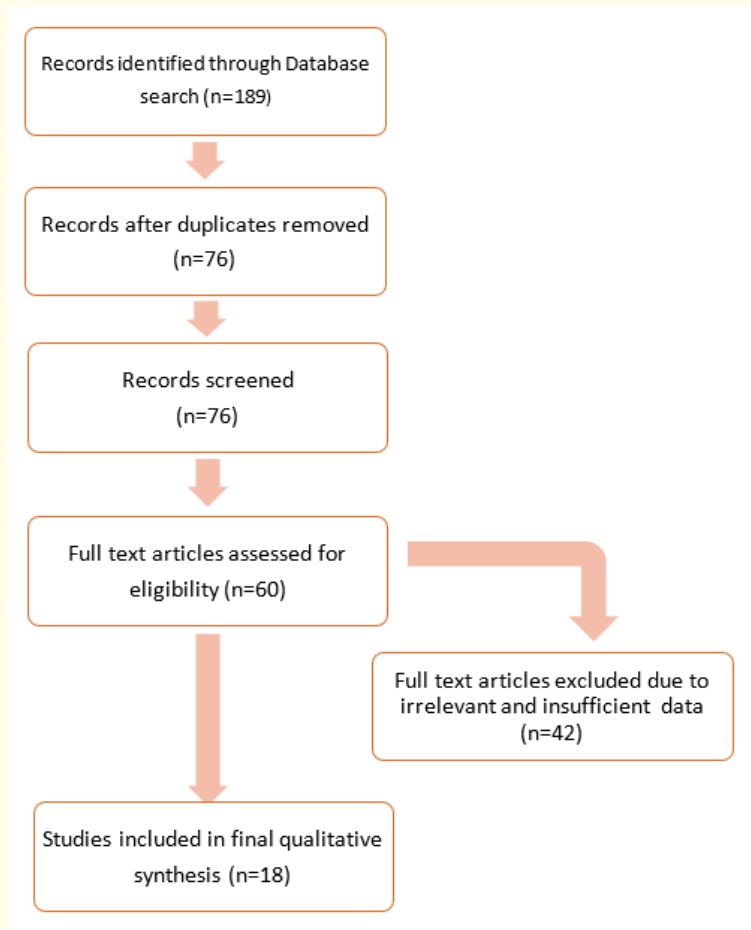***Table 1:** Study characteristics.*

Figure 1: PRISMA flow chart of the article selection.

Quality assessment

The authors independently scanned and evaluated the enrolled literature to ensure reliability.

Analysis

The data was extracted and analyzed from 18 studies to establish and validate conclusions on COVID-19 and its effect on maternal depression and anxiety. The potential association between COVID-outcomes and prevalence of maternal depression and anxiety were reviewed. Three studies, Helen Chen., *et al,* Covadonga Chaves., *et al*. and Reyhan Ayaz., *et al.* did not provide any data on depression or anxiety but provided variables including socioeconomic status (SE), education level, social support and exercise.

Results

Characteristics of included studies

Data on depression and anxiety was reported by 18 studies. Of the included studies, the majority of studies were cross sectional questionnaires or online surveys conducted before 31st of March, 2021. The research included 47,237 participants spanning 9 countries (USA-2, Canada-3, Brazil-2, Spain-1, UK-2, Turkey-2, China-5, Pakistan-1, Iran-1). In the 16 cross-sectional studies, numbers of participants ranged from 63 to 19,515. The characteristics of included studies are shown in table 1.
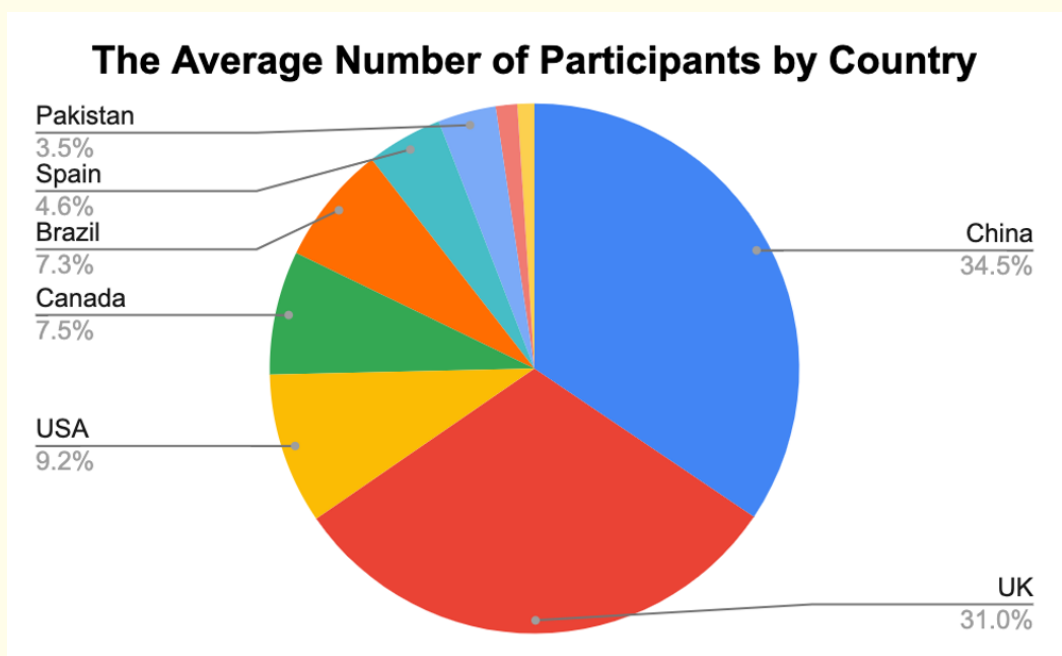

Figure 2: *The figure illustrates the average number of participants by country.*

Studies from China were dominant, with 34.5% of articles written on maternal anxiety and depression, with the UK following in second. The least studies conducted were in Pakistan with 3.5% followed by Spain with 4.6 percent.

Prevalence of depression

We observed mixed results for the prevalence of depression during COVID-19. Depression was diagnosed using various scales, including the Edinburgh Postnatal Depression Scale (EPDS), Patient Health Questionnaire-9 (PHQ-9), Beck's Depression Inventory (BDI), expanded version of the inventory of depression and anxiety symptoms (IDAS-II), Zung Self-Rating Depression Scale (SDS) and Depression, Anxiety and Stress Scale - 21 Items (DASS-21).

The prevalence of depression ranged from 11.40% to 58% among 18 studies.

In our paper, 15 studies were used to calculate the prevalence rate of depression which was 36.61%. The remaining three studies, Helen Chen., *et al,* Covadonga, Chaves., *et al.* and Reyhan Ayaz., *et al.* did not provide any data on depression or anxiety but provided variables.

Prevalence of anxiety

For anxiety, the studies consistently concluded that maternal anxiety had increased during the COVID-19 pandemic. It could be attributed to the fear of the unknown effects on fetal health, unclear data about fetal transmission, or the potential adverse effects on the baby. A majority of mothers reported feeling anxious and were tested positive for anxiety [25]. Various questionnaires used in the study were EPDS scale (the anxiety section), State-Trait Anxiety Inventory (STAI), Generalized Anxiety Disorder Scale (GAD-7), Beck Anxiety Inventory (BAI), SDS scale and DASS-21.

The prevalence of anxiety ranged from 8.30% to 72% in 18 studies. In our paper, data on anxiety was calculated using 15 studies, and the prevalence was calculated by taking the values of anxiety prevalence rates of these 15 studies and the average value was found to be 30.91%. This rate is more compared to a study which showed pre-covid maternal anxiety prevalence rate to be 20.7% [38]. As mentioned earlier, the remaining three studies: Helen Chen., *et al*, Covadonga Chaves., *et al.* and Reyhan Ayaz [did not include data on depression or anxiety.
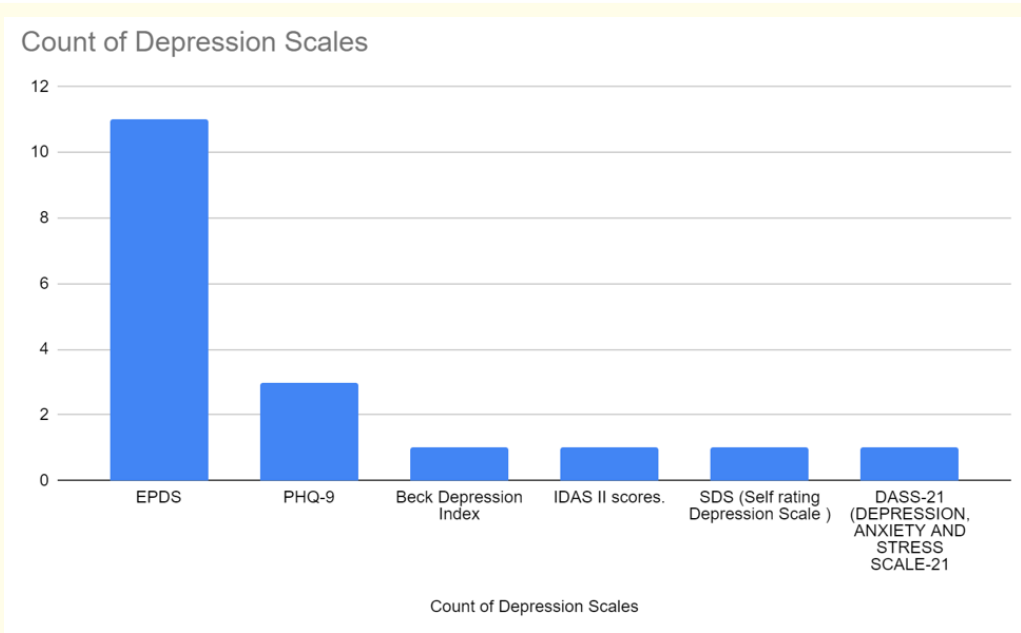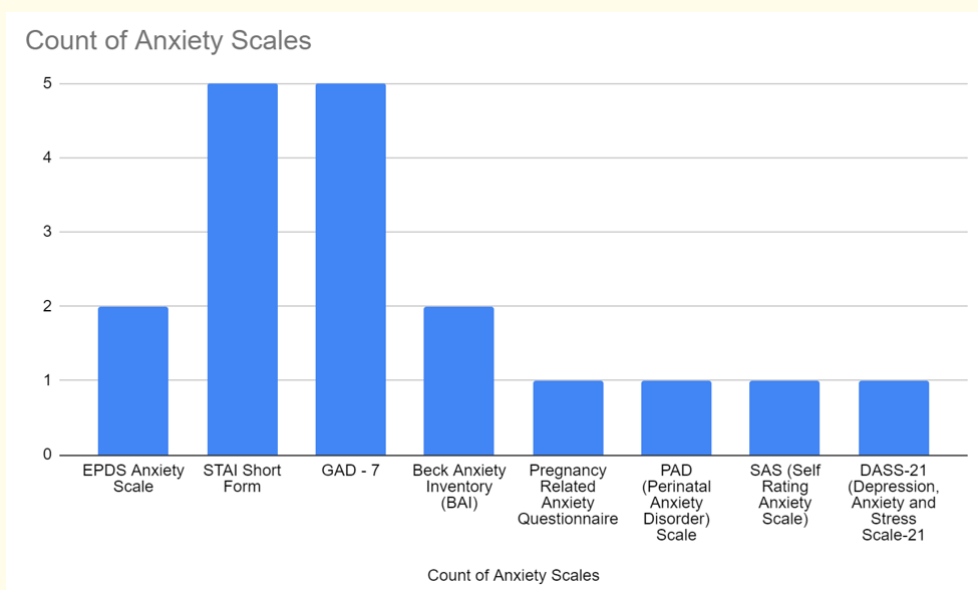

Figure 3

Figure 4

A majority of the articles used the EPDS scale for measuring levels of depression among mothers. For investigating levels of anxiety, a majority of the studies used the STAI and GAD-7 scales. DASS-21 was least frequently used to investigate the levels of anxiety and depression.

Characteristics

We noticed seven characteristics in our research articles that influence maternal anxiety and depression like: age, employment status, socioeconomic status (SE), education level, social support, exercise and planned versus unplanned pregnancies.

Younger maternal age, lower SE status, and lower education were all found to be associated with risk factors for developing anxiety and depression in 4 out of 18 research studies. In 8 articles out of 18, the lack of social support was identified as a risk factor for developing maternal anxiety and depression. Physical inactivity (less than 150 minutes per day) was identified as a risk factor in 5 papers. Additionally, unplanned pregnancies were also been linked to negative mental outcomes during the COVID-19 pandemic.

Discussion

This study examined the prevalence of maternal depression and anxiety during the COVID-19 pandemic. The current study is a rapid review of 18 selected articles taken on the basis of inclusion criteria of maternal mental health with the outcome of maternal depression and anxiety. Most of the 18 articles are cross sectional studies and consist of online surveys using social media. Almost 47,237 participants from 9 different countries were included and different measurement tools were used, such as EPDS or PHQ9 for depression and STAI for anxiety. Most of these studies showed a noticeable effect on the mental status of pregnant women due to the pandemic, not to mention the increased risk has doubled for mothers who had been diagnosed prior to the pandemic [28]. There are many contributing factors, mainly the fear of getting the infection during hospital visits and transmitting it to the newborn [17,25]. Regular prenatal and postnatal exercise has a positive effect on maternal mental and physical health [7]. Hence, less physical activity due to pandemic restriction and closures of recreational centres and indoor exercise facilities may also contribute to maternal anxiety and depression. The global health crisis caused by COVID-19, and the subsequent governmental and societal action to reduce the virus' spread have had far-reaching and stress inducing economic and social consequences, including loss of income and housing, which may negatively impact maternal mental health [10].

Anxiety

COVID-19's aggressive and lethal nature has resulted in a significant community mental health crisis. Pregnant women may be more vulnerable and susceptible to the negative mental health effects of such a large-scale epidemic [11,24]. Pregnancy generally has an increased risk of anxiety and it is usually difficult to differentiate fear of pregnancy from generalized anxiety disorder (GAD), as symptoms may overlap. Uncertainties regarding COVID-19 have increased the incidence of maternal anxiety. Despite a lack of evidence in support of COVID-19 transmission via transplacental route, this does not limit the fear and anxiety it experienced by pregnant mothers [11]. The worry and fear that an unborn infant may be infected by the COVID-19 virus has created a significant strain on maternal mental well-being [8].

Social support is important for pregnant women as they take on new responsibilities. The lack of social support can exacerbate the effects of stress during pregnancy, and the current situation of social isolation and fear of less availability of prenatal care, may greatly trigger anxiety [8].

A decrease in physical activity during COVID-19 may be linked to an increase in maternal anxiety. The brain releases endorphins during exercise, which in return enhances mental health [27]. Any form of physical activity triggers an increase in vital fluids to circulate into the brain in order to regulate the hypothalamic-pituitary-adrenal communication as well as other parts of the brain. These parts of the brain

are responsible for movement (limbic) and response to fear during stress (amygdala), along with the hippocampus, that is responsible for mood, motivation and memory formation which all play a major role in reducing anxiety levels [28]. During this pandemic, physical activity by pregnant woman has significantly decreased, especially, when in comparison to the level of exercise they had implemented prior to the pandemic [25]. Less than half of pregnant women had continued with their usual exercise routines, while the majority could not [25].

Depression

The COVID-19 pandemic had varying effects on the mental health of pregnant and postpartum women, depending on interpersonal and contextual factors. Loneliness was linked to an increase in depressive symptoms in pregnant women [10]. We have studied articles which included different maternal characteristics like age, family size, financial status, educational and socioeconomic background. It has been observed that there is correlation between the severity of symptoms, socioeconomic background and age; women belonging to the low socio economic background with an age that is less than 35 years are affected more negatively during this pandemic [17]. Below college level education was also a risk factor for maternal anxiety and depression [17].

Informal support from partners, family and friends have a significant positive impact on women's early motherhood experiences [29]. During the pandemic, social support was greatly constrained due to restrictions imposed to reduce the risk of COVID-19 transmission,[13] which may have contributed to maternal mental health issues as they feel less supported.

The uncertainties associated with the pandemic added to psychological stress and even lead to increased rates of pregnancy terminations [30]. Women may choose home deliveries or refuse breastfeeding to prevent transmission of the virus to their newborns. Prolonged pandemic chaos may cause an economic crisis and financial uncertainties which are likely to further increase the psychological burden and worsen the mental well-being of pregnant women and new mothers. Such circumstances may lead to an increase in using alcohol and substance abuse, thus further leading to mental health problems [32]. An increase of domestic violence may lead to suicide among low-income families and immigrant communities [31].

Limitation

As the COVID-19 pandemic is ongoing, only cross-sectional data was used for data collection and compilation in this rapid review. This limited our ability to make inferences about the long-term impact of COVID-19 and maternal depression and anxiety.

Intervention

As a result of the COVID-19 pandemic, many countries have experienced a rapid increase in the number of confirmed cases, which aggravates maternal mental health and decreases access to mental health services, which leads to the decline of psychological or pharmacological treatment, which further deteriorate symptoms of depression, stress and anxiety in pregnant women [33]. In this global public health crisis, there is a crucial need to prioritize interventions for perinatal mental health, as well as ensure timely availability and access to maternal and child mental health services by healthcare providers [9,34,45].

It is important to acknowledge that during these unprecedented times, women with mental illnesses prior to the pandemic are at an increased risk for developing maternal depression and anxiety [36]. Telemedicine and online services can be easily accessible as a safe platform for providing support to patients who are in great need of it [9]. Any form of exercise has proven to alleviate depression of mild or moderate forms among pregnant woman [37]. Although, there are restrictions to visit recreational centres, outdoor parks and fields, if maternal mothers were to continue with routine exercise regimens during the pandemic, this would greatly benefit their mental wellbeing. In this era of technology, encouraging pregnant woman to join online fitness classes would be advantageous for physical and mental

well-being. It is also recommended that family members, as immediate social support, should be educated about techniques of strengthening family bonds and alleviating maternal depression and anxiety during these times.

Conclusion

The COVID-19 pandemic has impacted countries and communities around the world. The pandemic has been associated with negatively impacting the mental health of various populations, including pregnant women.

This rapid review highlighted the impact of COVID-19 on maternal depression and anxiety. In terms of maternal depression during COVID-19, our study found an increase in prevalence of maternal depression (36.61%). In terms of anxiety, the data of our study indicated that maternal anxiety had steadily increased (30.91%) during COVID-19. This may be due to lack of information on COVID-19 and its impact on fetal transmission, fetal health and negative consequences to infants.

Overall, our study highlights the need for more research to be conducted on the repercussions of COVID-19 on maternal depression and anxiety to further evaluate the extent of its impact. There is also a need to develop tailored programs to improve access of mental health initiatives for pregnant women. Pregnant women specifically are considered as a vulnerable population during COVID-19, therefore the negative mental health impacts highlighted in this study should not be overlooked.

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Volume 5 Issue 11 November 2021