

## **The Psychological Effect of COVID-19 on Pregnant Women**

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### **Abstract**

#### ***Aims***

We aimed to conduct a narrative review on the direct and indirect psychological implications of COVID-19, amongst the pregnant population.

#### ***Methods***

Two medical databases (PUBMED and EMBASE) were analysed and papers describing the psychological impact of COVID-19 on pregnant women were included.

#### ***Results***

We identified a total of 35 papers in our study, 14% (5/35) focused on first time mothers, 71% (25/35) on depression among pregnant persons, 83% (29/35) examined anxiety, 40% (14/35) described the impact of stress and 43% (15/35) included a discussion on fear. The most common stressors were fear of contracting COVID-19 and uncertainty surrounding the situation. Protective factors include having accurate information regarding COVID-19, a higher level of education and a secure income.

#### ***Conclusion***

COVID-19 has had significant psychological effects amongst the pregnant population including increased levels of anxiety, depression, fear and stress. Many individuals experience suicidal ideation. Social isolation and increasing rates of emotional and physical abuse may be significant factors. Consideration needs to be given to enhance social support and self-care routines. Exercise has shown to alleviate some stress, anxiety and other subjective symptoms. Professional assistance and knowledge have also shown to decrease the severity of these effects.

## Introduction

The COVID-19 pandemic has had catastrophic effects not only on the physical health but also the mental health of individuals all over the world. Pregnant and nursing women are a vulnerable group that often bare a disproportionate brunt of social adversity<sup>1</sup>. Pregnant women face many challenges during the gestational period, and these have been exacerbated by COVID-19. Women experience many changes during pregnancy and these changes can mask or alter the presentation of mental illness, often causing it to be overlooked<sup>2</sup>.

This paper explores how the pandemic has impacted the mental wellbeing of pregnant women through a narrative review of the currently available literature. The study aimed to examine the psychological impact the current pandemic has had on pregnant women and attempted to identify any potential interventions that may minimize the negative psychological effects or help individuals protect their mental health.

## Methods

A systematic search was conducted in MEDLINE/PubMed and Excerpta Medica dataBASE (EMBASE) on December 2020. Three searches were conducted and then combined using the Boolean operation AND. First terms relating to COVID-19 were searched, using the boolean operation OR, these including coronavirus, covid 2019, SARS2, SARS-CoV-2 and severe acute respiratory pneumonia outbreak. Second terms relating to mental distress or illness were searched also using the Boolean operation OR. These included, *inter alia*, depression, mental health, PTSD, anxiety, self-harm. Finally, terms relating to pregnancy were searched, again using the Boolean operation OR, for example pregnant, pregnancy, and antenatal. The full search description is included in figures 1&2 below.

**Figure 1:** Search description.

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("coronavirus"[MeSH] OR "coronavirus infections"[MeSH Terms] OR "coronavirus"[All Fields] OR "covid 2019"[All Fields] OR "SARS2"[All Fields] OR "SARS-CoV-2"[All Fields] OR "SARS-CoV-19"[All Fields] OR "severe acute respiratory syndrome coronavirus 2" [supplementary concept] OR "coronavirus infection"[All Fields] OR "severe acute respiratory pneumonia outbreak"[All Fields] OR "novel cov"[All Fields] OR "2019ncov"[All Fields] OR "sars cov2"[All Fields] OR "cov22"[All Fields] OR "ncov"[All Fields] OR "covid-19"[All Fields] OR "covid19"[All Fields] OR "coronaviridae"[All Fields] OR "corona virus"[All Fields]) AND (((((((((((((((((anxiety) OR (depression)) OR (ptsd)) OR (post traumatic stress disorder)) OR (mental health)) OR (psychology)) OR (psycho)) OR (mania)) OR (bipolar)) OR (self-harm)) OR (self harm)) OR (suicide)) OR (suicidal)) OR (psychological impact)) OR (Stress Disorders[MeSH Terms])) OR (Traumatic[MeSH Terms])) OR (Post-Traumatic[MeSH Terms])) OR (psychology[MeSH Terms])) AND (((((((((antenatal) OR (pregnant women)) OR (pregnant)) OR (pregnancy)) OR (expectant mothers)) OR (maternal health)) OR (Pregnant Women)) OR (Pregnant Women[MeSH Terms])) OR (Pregnant[MeSH Terms]))
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**Figure 2: Papers Included.**

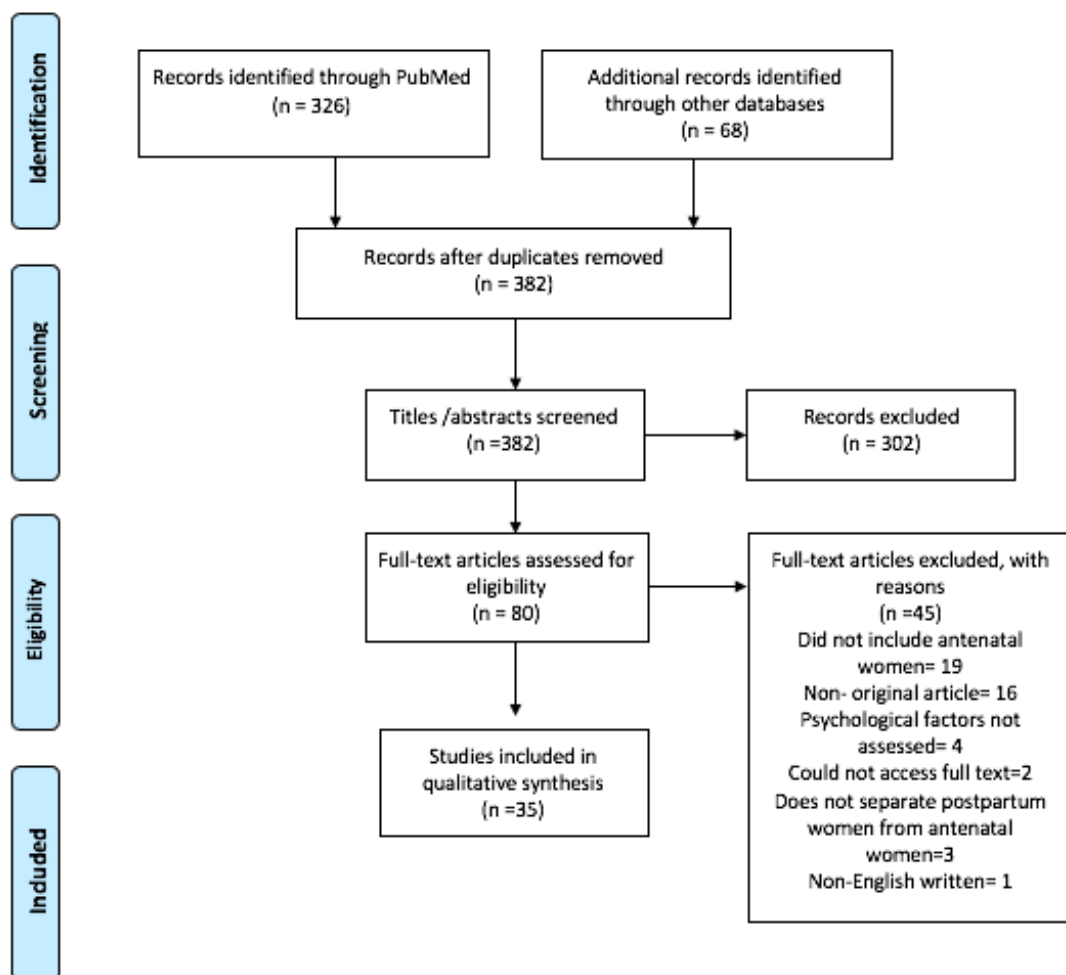
1. COVID-19 pandemic - C. R. Ahlers-Schmidt, A. M. Hervey, T. Neil, S. Kuhlmann and Z. Kuhlmann
2. Associations Between Fear of COVID-19, Mental Health, and Preventive Behaviours Across Pregnant Women and Husbands: An Actor-Partner Interdependence Modelling - D. K. Ahorsu, V. Imani, C. Y. Lin, T. Timpka, A. Broström, J. A. Updegraff, K. Årestedt, M. D. Griffiths and A. H. Pakpour
3. Pregnancy and birth planning during COVID-19: The effects of tele-education offered to pregnant women on prenatal distress and pregnancy-related anxiety -
4. Coronavirus disease 2019: Knowledge, attitude, and practice of pregnant women in a tertiary hospital in Abakaliki, southeast Nigeria
5. Anxiety and depression symptoms in the same pregnant women before and during the COVID-19 pandemic - R. Ayaz, M. Hocaoglu, T. Günay, O. D. Yardımcı, A. Turgut and A. Karateke
6. Uptrend in distress and psychiatric symptomatology in pregnant women during the coronavirus disease 2019 pandemic - Nicolas Berthelot, Roxanne Lemieux, Julia Garon-Bissonnette, Christine Drouin-Maziade, Élodie Martel, Michel Maziade
7. Analysis of the Impact of the Confinement Resulting from COVID-19 on the Lifestyle and Psychological Wellbeing of Spanish Pregnant Women: An Internet-Based Cross-Sectional Survey - Gemma Biviá-Roig, Valentina Lucia La Rosa, María Gómez-Tébar, Lola Serrano-Raya, Juan José Amer-Cuenca, Salvatore Caruso, Elena Commodari, Antonio Barrasa-Shaw, Juan Francisco Lisón
8. The prevalence of psychiatric symptoms of pregnant and non-pregnant women during the COVID-19 epidemic - Yongjie Zhou<sup>1</sup>, Hui Shi<sup>2</sup>, Zhengkui Liu<sup>3</sup>, Songxu Peng<sup>4</sup>, Ruoxi Wang<sup>5</sup>, Lingqi<sup>6</sup>, Zezhi Li<sup>7</sup>, Jiezhong Yang<sup>8</sup>, Yali Ren<sup>9</sup>, Xiuli Song<sup>10</sup>, Lingyun Zeng<sup>1</sup>, Wei Qian<sup>3</sup> and Xiangyang Zhang
9. Mental Health Outcomes in Perinatal Women During the Remission Phase of COVID-19 in China - Xiaoqin Zeng, Wengao Li, Hengwen Sun, Xian Luo, Samradhvi Garg, Ting Liu, Jingying Zhang and Yongfu Zhang
10. Association between social support and anxiety among pregnant women in the third trimester during the coronavirus disease 2019 (COVID-19) epidemic in Qingdao, China: The mediating effect of risk perception - Chongyu Yue, Cuiping Liu, Jing Wang, Meng Zhang, Hongjing Wu, Chunrong Li and Xiuling Yang
11. Anxiety levels and obsessive compulsion symptoms of pregnant women during the COVID-19 pandemic - Murat Yassa, Ahmet Yassa, Cihangir Yirmibes, Pınar Birol, Umur Göktuğ Ünlü, Arzu Bilge Tekin, Kemal Sandal, Memiş Ali Mutlu, Gül Çavuşoğlu, Niyazi Tug
12. Near-term pregnant women's attitude toward, concern about and knowledge of the COVID-19 pandemic - M. Yassa, P. Birol, C. Yirmibes, C. Usta, A. Haydar, A. Yassa, K. Sandal, A. B. Tekin and N. Tug
13. Whether and how lockdown and mandatory quarantine regarding COVID-19 may affect mental health among pregnant women in China: Potential social, cognitive, and eHealth-related mechanisms - Xue Yang<sup>1</sup>; Bo Song; Anise Wu; Phoenix K. H. Mo; Jiang Li Di; Qian Wang; Joseph T. F. Lau; Lin Hong Wang
14. Perinatal depressive and anxiety symptoms of pregnant women during the coronavirus disease 2019 outbreak in China - Yanting Wu, PhD<sup>1</sup>; Chen Zhang, MSc<sup>1</sup>; Han Liu, MSc<sup>1</sup>; Chenchi Duan, MSc<sup>1</sup>; Cheng Li, PhD; Jianxia Fan, PhD; Hong Li, MSc; Lei Chen, MSc; Hualin Xu, MSc; Xiangjuan Li, PhD; Yi Guo, MSc; Yeping Wang, MSc; Xiufeng Li, BA; Jing Li, BA; Ting Zhang, MD; Yiping You, BA; Hongmei Li, PhD; Shuangqi Yang, BA; Xiaoling Tao, BA; Yajuan Xu, BA; Haihong Lao, BA; Ming Wen, BA; Yan Zhou, BA; Junying Wang, BA; Yuhua Chen, BA; Diyun Meng, MSc; Jingli Zhai, MSc; Youchun Ye, MD; Qinwen Zhong, BA; Xiuping Yang, BA; Dan Zhang, PhD; Jing Zhang, BA; Xifeng Wu, PhD; Wei Chen, BA; Cindy-Lee Dennis, PhD; He-feng Huang, MD
15. COVID-19-related financial stress associated with higher likelihood of depression among pregnant women living in the United States - Zaneta M. Thayer, Theresa E. Gildner

16. COVID-19 positive mothers are not more anxious or depressed than non COVID pregnant women during the pandemic: A pilot case-control comparison - P. Kotabagi, M. Nauta, L. Fortune and W. Yoong
17. Impact of COVID 19 on psychosocial functioning of peripartum women: A qualitative study comprising focus group discussions and in-depth interviews - A. Kumari, P. Ranjan, K. A. Sharma, A. Sahu, J. Bharti, R. Zangmo and N. Bhatla
18. Elevated depression and anxiety symptoms among pregnant individuals during the COVID-19 pandemic - Catherine Lebel, Anna MacKinnon, Mercedes Bagshawe, Lianne Tomfohr-Madsen, Gerald Giesbrecht
19. Attitudes and precaution practices towards COVID-19 among pregnant women in Singapore: a cross-sectional survey - Ryan Wai Kheong Lee, See Ling Loy, Liying Yang, Jerry Kok Yen Chan and Lay Kok Tan
20. PMH4 The Psychological and Behavioral Responses to Covid-19 Epidemic in Pregnant Women in China: A Nationwide Survey - He Z, Chiu WT, Wu H, Ming WK
21. The mental health status and approaches of accessing antenatal care information among pregnant women during COVID-19 epidemic : a cross-sectional study in China - Hong Jiang, MD, PhD ; Longmei Jin, MD ; Xu Qian, MD, PhD ; Xu Xiong, DrPH ; Xuena La, MD ; Weiyi Chen, MD ; Xiaoguang Yang, PhD ; Fengyun Yang, MD ; Xinwen Zhang, MD ; Nazhakaiti Abudukelimu ; Xingying Li ; Zhenyu Xie, MD ; Xiaoling Zhu, MD ; Xiaohua Zhang, MD ; Lifeng Zhang, MD ; Li Wang, MD, PhD ; Lingling Li, MPH ; Mu Li, MD, PhD
22. Anxiety, depression, and related factors in pregnant women during the COVID-19 pandemic in Turkey: A web-based cross-sectional study - Hatic Kahyaoglu Sut PhD, Burcu Kucukkaya Msc
23. Impact of COVID-19 on psychosocial functioning of peripartum women: A qualitative study comprising focus group discussions and in-depth interviews - Archana Kumari, Piyush Ranjan, K. Aparna Sharma, Anamika Sahu, Juhi Bharti, Rinchen Zangmo, Neerja Bhatla
24. Mental health status of pregnant and breastfeeding women during the COVID-19 pandemic: A call for action - M. Ceulemans, T. Hompes and V. Foulon
25. Jewish and Arab pregnant women's psychological distress during the COVID-19 pandemic: the contribution of personal resources - M. Chasson, O. Taubman-Ben-Ari and S. Abu-Sharkia
26. Health anxiety and behavioural changes of pregnant women during the COVID-19 pandemic - G. A. Corbett, S. J. Milne, M. P. Hehir, S. W. Lindow and P. O'Connell M
27. Impact of the COVID-19 lockdown on antenatal mental health in Greece - T. Dagklis, I. Tsakiridis, A. Mamopoulos, A. Athanasiadis, R. Pearson and G. Papazisis
28. Investigation on the mental health status of pregnant women in China during the Pandemic of COVID-19 - H. Dong, R. Hu, C. Lu, D. Huang, D. Cui, G. Huang and M. Zhang
29. Effects of the COVID-19 pandemic on anxiety and depressive symptoms in pregnant women: a preliminary study - F. Durankuş and E. Aksu
30. Depression, stress, anxiety and their predictors in Iranian pregnant women during the outbreak of COVID-19 - F. Effati-Daryani, S. Zarei, A. Mohammadi, E. Hemmati, S. Ghasemi Yngyknd and M. Mirghafourvand
31. The impact of the COVID-19 pandemic on the perinatal mental health of women - T. Farrell, S. Reagu, S. Mohan, R. Elmidany, F. Qaddoura, E. E. Ahmed, G. Corbett, S. Lindow, S. M. Abuyaqoub and M. A. Alabdulla
32. Exercise routine change is associated with prenatal depression scores during the COVID-19 pandemic among pregnant women across the United States - T. E. Gildner, E. J. Laugier and Z. M. Thayer
33. Birth plan alterations among American women in response to COVID-19 - T. E. Gildner and Z. M. Thayer
34. How to prevent in-hospital COVID-19 infection and reassure women about the safety of pregnancy: Experience from an obstetric center in China - X. X. Gu, K. Chen, H. Yu, G. Y. Liang, H. Chen and Y. Shen
35. The Disproportionate Burden of the COVID-19 Pandemic Among Pregnant Black Women - R. E. Gur, L. K. White, R. Waller, R. Barzilay, T. M. Moore, S. Kornfield, W. F. M. Njoroge, A. F. Duncan, B. H. Chaiyachati, J. Parish-Morris, L. Maayan, M. M. Himes, N. Laney, K. Simonette, V. Riis and M. A. Elovitz

Original articles that described the psychological impact that COVID-19 had on antenatal women were included. Studies were excluded if; they did not contain original research, they were not written in English, they did not include antenatal women, or if psychological factors were not assessed.

All papers were retrieved, and two researchers independently identified papers meeting the inclusion criteria from the titles and abstracts. All identified papers were read in full, additional papers that did not meet the inclusion criteria were excluded at this point.

## Results



**Figure 3:** PRISMA flow chart showing the included and excluded studies.

### *Study Characteristics*

We included a total of 35 papers in our study. These included a wide range of mental health diagnoses including depression (28/35), anxiety (27/35), stress (2/35), fear (15/35), worry (11/35), PTSD (2/35) and suicidal ideation (2/35).

The populations included in the studies were all aged between 15 to 47 years with the majority being non COVID-19 infected.

We reviewed studies from 14 different countries.

The sample sizes of the studies ranged between a minimum of 14 participants and a maximum of 19515 participants. Of these papers the majority were cross sectional studies (19/35). The papers included both quantitative and qualitative studies. Twelve percent (4/35) of the articles focused on first time mothers.

### *Screening Tools*

Thirty-three different scales were used across the papers we reviewed. The Edinburgh Postnatal Depression Scale (EPDS), Generalized Anxiety Disorder scale (GAD-7) and Patient Health Questionnaire (PHQ-9) were used multiple times.

### *Prevalence of Psychological Impact*

#### *Anxiety*

After the onset of COVID-19 a markedly increased level of anxiety has been seen amongst pregnant women<sup>3</sup>. One paper recorded that 10.9% of pregnant women during the pandemic experienced anxiety and depression, a contrast to only 6% experiencing this pre COVID<sup>4</sup>.

Overall anxiety has been shown to be higher for women who had a lower level of education, were unemployed, already had a chronic illness, did not engage in physical exercise, were smokers, and had no/poor knowledge of COVID-19<sup>5</sup>.

Pregnant women were also anxious about the wellbeing of their unborn baby and the safety of their relatives<sup>6</sup>. Adding to this, some women also worried about inadequate prenatal care<sup>7</sup>.

#### *Depression*

Multiple papers recorded high levels of depression among their participants. Levels varied around 50%, Yang et al found a rate of 44.6% in a Chinese population<sup>8</sup>, Jiang et al found a rate of 45.9%<sup>9</sup> and Kahyaoglu Sut et al 56.3%<sup>5</sup>. A study of the pregnant population in Ethiopia found that the rate of depression spiked from 25.8% pre-COVID to 66.4% post-Coronavirus<sup>10</sup>. It was also discovered that the rate of depression was positively related to the deaths due to COVID-19 per day, as well as confirmed cases<sup>11</sup>.

## *Stress*

It is evident that women during the COVID-19 pandemic are suffering more prenatal distress than their peers pre-COVID-19<sup>4</sup>. One study found that 89.1% of participants were experiencing stress during this time<sup>12</sup>.

## *Sleep Disorders*

The fears and concerns of pregnant women as a result of COVID-19 can lead to numerous adverse consequences one of which is increased sleep disorders<sup>4</sup>. Women documented that their sleep cycle had been disturbed, they found themselves going to sleep later, waking up later, taking daytime naps and overall sleeping more than normal<sup>13</sup>.

## *Identified stressors*

There are multiple factors that were identified as contributing to the psychological distress experienced by pregnant women during this COVID-19 pandemic. Among these were lack of social support<sup>14</sup>, fear and concern in partners<sup>3</sup>, managing high levels of uncertainty<sup>3</sup>, being confined to their own homes<sup>6</sup>, fear of contracting Covid-19<sup>15</sup>, lack of a sense of security<sup>16</sup> and financial stress caused by the pandemic<sup>17</sup>.

## *Risk factors and protective factors*

Certain attributes correlated with the development of negative psychological symptoms in antenatal women. These included being younger, multiparous<sup>9</sup>, having a lower level of educational attainment<sup>12</sup>, having a lower total household income, living rurally<sup>9</sup>, having prior psychiatric issues<sup>4</sup> and having previous unpleasant pregnancy experiences<sup>18</sup>. Conversely, women who had higher levels of education, had jobs, were free from pregnancy complications and had better knowledge and understanding regarding the COVID-19 pandemic were less likely to experience these negative consequences<sup>9</sup>.

## *Direct implications*

### *Negative*

Direct impacts on antenatal care were also identified.

In one study, 89% of the cohort reported experiencing changes to their care, most notably appointments being cancelled (one study reported 36%)<sup>7</sup> experiencing cancellations with another reporting that figure to be 52.2%<sup>19</sup> and not being allowed to bring a family member for support (90%). As a result of this most participants felt they received a lower quality of care<sup>7</sup>. Some women around (22.5%) also cancelled their own appointments due to fear of contracting COVID-19<sup>19</sup>.

It was noted that 87.7% of one cohort found themselves engaging in less exercise than before the confinement with the main reason being not having sufficient space<sup>19</sup>.

## *Positive*

Conversely, pregnant women also reported some positive effects of the current pandemic. Although we noted that many women found that their level of physical activity decreased, a small group found the opposite and that they had the time to engage in more exercise than before the pandemic<sup>14</sup>. Although elevated fears and concerns had a negative effect on their mental health, it resulted in increased participation in COVID-19 preventative measures<sup>3</sup>.

## *Proposed Interventions*

Four studies explored interventions to improve the psychological wellbeing of pregnant women during this time. Self-care strategies such as physical activity, meditation, limiting exposure to social media or news which promote fear and staying in touch with family and friends via the phone were all proved to have a positive impact on the mental wellbeing of patients<sup>14</sup>.

A Turkish study examined a tele education system which proved to be very effective in reducing perinatal stress and anxiety in pregnant women<sup>20</sup>. It has been shown that the more knowledge pregnant women have on COVID-19 the more confident they are that they can overcome the virus and the challenges it presents to them in this time<sup>6</sup>. It was also shown that women who made use of antenatal care information were at a significantly lower risk of suffering from anxiety, stress and depression<sup>9</sup>.

## **Discussion**

Although many of the pregnant women in these studies showed high levels of depression, anxiety and stress<sup>21, 14, 15</sup>, there was a study carried out in China which found that women who were pregnant during the pandemic showed fewer depression, anxiety, PTSD and insomnia symptoms than non-pregnant women<sup>22</sup>. The reason for this may be that pregnant women have more access to healthcare professionals to reassure them than non-pregnant women. This is supported by another study which showed that pregnant women had lower anxiety levels compared to non-pregnant women<sup>23</sup>. It was also suggested that pregnant women were less disappointed in the disruption the pandemic caused to social and recreational activities as they were less likely to be attending these anyway. In addition some pregnant participants enjoyed the opportunity that lockdown gave them to spend more time with their family<sup>13</sup>.

Screening measures and treatment plans need to be put into place in order to identify those who are suffering from psychological distress and measures to mitigate these effects need to be implemented<sup>15</sup>. Tying in with this identifying women with a history of psychiatric disorders or a lack of support at home at their first antenatal visit is important, as they are at a higher risk of developing subsequent mental health problems<sup>4</sup>. Identifying these women early on would allow more regular reviews and more targeted help to be offered to them in an effort to preemptively put the necessary supports in place.



The main strength of our study is that a review has not been conducted on this topic to date. This study pulls data from different parts of the world, including fourteen different countries, the heterogeneity of our study data is a strength as well as a weakness. However, the fact that knowledge about the virus is rapidly evolving and that we can only review data from less than one-year period is a recognized limitation.

While COVID-19 has impacted millions of people all over the world, it is vital that vulnerable groups receive specific consideration. The psychological well-being of pregnant women has been disproportionately affected by the virus and the social changes that have occurred secondary to it. The illness has implications for mental health conditions like anxiety and depression, it has resulted in significant social stressors with increasing rates of social isolation. Clinicals and policy makers must be cognisant of these concerns and identify that it is not just the illness itself that is harmful to pregnant women's mental health, but the fear, uncertainty and public health measures that have been put in place. Studies have identified social supports and lifestyle modification that can help address some of these concerns, including exercise and the provisions of reliable information. Professional clinical input has also been shown to decrease the severity of these effects. It is vital that Specialist perinatal mental health teams, community mental health teams and GPs continue to function and where these teams have not been fully staffed that priority is given to fill the remaining vacancies, this is of particular relevance in the North West of Ireland.

**Declaration of Conflicts of Interest:**

The authors declare no conflict of interest.

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