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Impact of the Maternity Care Changes of the COVID-19 Pandemic on Pregnant Women and Their Birth Partners: An Integrative Literature Review

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The emergence of the COVID-19 virus has had a dramatic effect on the lives of everyone worldwide. Originally identified as a pneumonia of unknown cause, COVID-19 was first reported to the World Health Organization (WHO) Country Office in China on New Year's Eve 2019 (Hocaoglu et al., 2020). This virus, that has since come to be known as a pandemic, emerged on the global scene in late 2019 and early 2020 out of the Wuhan province of China and is part of the family of coronaviruses. Coronaviruses are RNA viruses enveloped with the genome consisting of a single stranded positive sense RNA, and are divided into four sections, A-D (Rahaman, 2020). B coronaviruses contain the extreme acute respiratory syndrome (SARS) and the novel SARS-CoV-2 ("COVID-19"). C coronaviruses are linked to Middle Eastern Respiratory Syndrome (MERS). SARS-CoV-2, or COVID-19, is the newest and most virulent member of the coronavirus family. Uncertainty exists surrounding the exact origin of the SARS-CoV-2 virus. In the scientific community there is discussion that SARS-CoV-2 originated in horseshoe bats with pangolins proposed to be the intermediate host between animals and humans (Lam et al., 2020; Rahaman, 2020; Wrobel et al., 2021; Xiao et al., 2020; Zhang et al., 2021). Roberts et al. (2021) address the uncertainty surrounding the origin of COVID-19 through the application of the Optimal Linear Estimation (OLE) method originally proposed by Roberts and Solow (2003) for dating extinctions. By applying OLE, Roberts et al. (2021) were able to examine exceptionally early cases of SARS-CoV-2, calling into question the theory of zoonotic overproduction from the Huanan Seafood Market in Wuhan, China. According to Roberts et al. (2021), rationale for investigating the origin of SARS-CoV-2 is contained in the existence of earlier potential cases of COVID-19 and phylogenetic analyses placing the most recent ancestor occurring between mid-November and early December 2019. Roberts et al. (2021) discovered a

COVID-19 case in France through a retrospective review of medical records. The identified patient had presented to the emergency department on December 27, 2019, with influenza symptoms and was then admitted to the intensive care unit (ICU). Further, Roberts et al. (2021) discovered that in the United States, SARS-CoV-2 RNA was detected through retrospective RT-PCR testing of a woman who had become ill on January 31, 2020 and died on February 6, 2020. This case occurred over three weeks before the first recognized American case on February 26, 2020. Andersen et al. (2020), Nsoesie et al. (2020), and Zhang and Holmes (2020) support Roberts et al. (2021) in the purporting of early cases of COVID-19 in the fall of 2019. Authors claim manipulation of the SARS-CoV-2 virus in the intermediary stages between species would allow it to originally go undetected and explanation the early cases.

The family of B coronaviruses is known for causing illnesses that range from the common cold to severe respiratory disease and death (Rahaman, 2020). Transmission occurs primarily through contact between a person and the virus host. More specifically, transmission occurs through the infected person's respiratory droplets which are deposited into the air and then onto nearby surfaces. According to the Centers for Disease Control and Prevention (CDC), there are three specific categories of transmission, which are inhalation of the virus, deposition of the virus on exposed mucous membranes, and touching mucous membranes with soiled hands contaminated with virus (CDC, 2021). Respiratory droplets are capable of infecting people within a distance of six feet and the ability of the virus to survive on nonliving surfaces makes regular cleaning of touched surfaces important. Symptoms include fever, cough, myalgia, vomiting, and diarrhea with an onset of approximately 14 days post exposure. Extent and severity of an individual infection is primarily dependent upon that individual's underlying health. Patients with pre-existing conditions like diabetes, lung disease, and the elderly are

among those who are most vulnerable to severe infection. Another group vulnerable to COVID-19 are pregnant women. From a physical health perspective, the physiological changes of edema and increased pulmonary expansion that occur in the respiratory tract during pregnancy make pregnant women more susceptible to viral respiratory infections, including COVID-19 (de Oliveira et al., 2021). Therefore, when a pregnant woman is diagnosed with COVID-19 increased inflammatory processes are observed leading to an exacerbation of the illness. Additionally, the increased blood flow that occurs in pregnancy for the transportation of nutrients to the fetus results in more severe and intense infections among pregnant women.

As SARS-CoV-2 has continued to mutate, variants of the virus have emerged as causes of concern due to their ability to cause infection to a susceptible host (Cheng, 2022). The WHO have classified the four SARS-CoV-2 variants of Alpha, Beta, Gamma, and Delta as variants of concern (VOC). Alpha and Beta were both officially classified as VOC in December 2020 with Alpha first detected in the United Kingdom in September 2020 and Beta first detected in South Africa in May 2020. Gamma was first detected in Brazil in November 2020 and officially classified as a VOC in January 2021. Delta was first detected in India in October 2020 and was classified as a VOC in May 2021 due to its rapid global spread. The most recent VOC, Omicron, was first detected in South Africa in November 2021 when it was also classified as a VOC (Waltz, 2022). Omicron boasts dozens of mutations in its genetic code, approximately four times as many as previous variants and differs drastically, both physically and genetically from other variants.

Clinical Problem

In response to the COVID-19 pandemic, multiple vaccines have been developed by various pharmaceutical companies. BNT162b2 (Pfizer–BioNTech) and mRNA-1273 (Moderna)

were the first COVID-19 vaccines available in the United States and were granted emergency use authorization (EUA) by the Food and Drug Administration (FDA) in December 2020 (Shimabukuro et al., 2021). Administered as a two-dose series, 3 weeks apart for Pfizer–BioNTech and 1 month apart for Moderna, the BNT162b2 and mRNA-1273 vaccines were recommended for use by the Advisory Committee on Immunization Practices (ACIP) but excluded pregnant women in the preauthorization clinical trials and provided limited human data regarding safety during pregnancy at the time of authorization. Since pregnant women with COVID-19 are at increased risk for severe illness, ICU admission, mechanical ventilation and death when compared with non-pregnant persons (Acker et. al., 2021), as well as adverse pregnancy outcomes, such as preterm birth, the CDC, ACIP, the American College of Obstetricians and Gynecologists (ACOG), and the American Academy of Pediatrics have established that COVID-19 vaccines need not be postponed during pregnancy (Shimabukuro et al., 2021). Specifically, the CDC recommends that women who are either pregnant, breastfeeding, or plan on becoming pregnant receive a Pfizer or Moderna COVID-19 vaccine, yet counsel patients to consult with their healthcare provider in making a final determination to receive the vaccine (CDC, 2021). Centers for Disease Control and Prevention claim that none of the COVID-19 vaccines contain live virus, and that evidence in favor of the safety and effectiveness of the vaccine for pregnant women is growing, suggesting that the benefits outweigh the potential risks (CDC, 2021). Similarly, ACOG recommends all eligible individuals over the age of 12, including pregnant and lactating women receive a COVID-19 vaccine or vaccine series (ACOG, 2021). As a result of the increased risk of adverse pregnancy and birth outcomes for those diagnosed with COVID-19 while pregnant, and a greater severity of illness compared to non-pregnant persons many countries have begun to vaccinate pregnant women,

especially if they are at risk of being exposed (Ciapponi et al., 2021). In their rapid review, Ciapponi et al. (2021) reported finding no evidence of safety concerns regarding the COVID-19 vaccines that the COVAX MIWG selected for review in August 2020, their components, or platforms used in other vaccines during pregnancy. In a study consisting of 3958 participants who identified as pregnant and were enrolled in the v-safe registry, 827 had a completed pregnancy, out of which 115 (13.9%) were pregnancy losses and 712 (86.1%) were live births. No neonatal deaths were reported, and adverse neonatal outcomes included pre-term birth (9.4%) and small for gestational age (3.2%) (Shimabukuro et al., 2021). Prabhu et al. (2021) revealed transplacental immunity in a study conducted at a single academic center. Out of 122 participants all except for one showed detectable IgG antibodies in cord blood samples by week four after receiving one dose of the COVID-19 vaccine. The lone couplet that was negative for antibody transfer was 10 weeks post vaccine dose one and six weeks post dose two (Prabhu et al., 2021).

Rottenstreich et al. (2021) reinforce Prabhu et al. (2021) in support of transplacental immunity to SARS-CoV-2 following maternal vaccination. In a study of 20 couplets conducted at the Hadassah-Hebrew University Medical Center in Jerusalem, both mothers and infants were positive for anti-spike protein (S) - and anti-receptor binding domain (RBD) - specific IgG. Further, anti-S and anti-RBD-specific IgG levels in maternal blood were positively correlated to their respective concentrations in cord blood. These results led to the conclusion that COVID-19 vaccines administered antenatally produced sufficient maternal immune response and transplacental immunity transfer (Rottenstreich et al., 2021).

Kachikis et al. (2021) conducted a large prospective cohort study comparing vaccine reactions and perceptions in pregnant and lactating individuals to individuals of similar age and fertility intentions who were neither pregnant nor lactating and discovered that the

vaccines were well tolerated among women who were pregnant, lactating, or planning pregnancy. Day one reactions were reported to be similar among both groups and coincided with previously reported findings. However, both groups reported increased reactions after receiving the second dose of BNT162b2 and mRNA-1273 vaccines (Kachikis et al., 2021). Wainstock et al. (2021) retrospective cohort study on the association between prenatal Pfizer-BioNTech COVID-19 vaccination, pregnancy course and outcomes determined that prenatal maternal COVID-19 vaccine has no adverse effects on pregnancy course and outcomes. Findings indicated that the two dose vaccination series was associated with longer gestation and increased birthweight compared to single dose, however, this may be due to the fact that women may have delivered prior to receiving the second dose (Wainstock et al., 2021).

Background

Consequently, the COVID-19 pandemic necessitated lifestyle changes and brought about new societal protocols such as mandatory wearing of masks in public and social distancing. Rationale for these measures stems from the fact that reducing the risk of infection from respiratory droplets can be achieved through distance from the infectious source as well as containment of respiratory secretions and guarding mucous membranes (Acker et al., 2021). Further, the risk of infection through aerosol transmission can be reduced through the wearing of personal protective equipment (PPE) and remodeling ventilation. Hand hygiene serves as the primary method of prevention by indirect contact. Internationally, healthcare systems have implemented fundamental changes to their protocols and method of operations. Hospitals and clinics reorganized patient appointments to decrease the number of patients in waiting rooms, began placing visual reminders for patients to not sit side by side in a waiting room, reduced the amount of furniture in their waiting rooms, and limited group activities (Acker et al., 2021).

From a triage perspective, patients are screened upon arrival and prior to their appointment at a healthcare facility. Globally, the World Health Organization (WHO) reports that there have been 628,346,704 confirmed cases of COVID-19 with 6,573,968 resulting in death. In the United States, according to the Center for Disease Control (CDC), there have been 97,604,763 total cases of COVID-19 with 1,068,667 resulting in death. Narrowed down to the state of Georgia, the Georgia Department of Public Health (DPH) has reported a total of 2,252,117 total cases, 33,802 confirmed deaths, 128,742 hospitalizations, 17,087 ICU admissions, 672,615 antigen positive cases, and 6,894 probable deaths.

One of the major concerns that has arisen out of this pandemic is its effect on the mental health of millions of people worldwide (Perzow et al., 2021). Of specific concern is the mental health of segments of the population considered to be at a higher risk or more vulnerable to changes in mental health status. For pregnant women, considered to be a vulnerable population, mental health effects can be compounded (Harrison et al, 2021). Pregnancy is a stressful period due to its unique physiological and psychological changes. Koyucu and Karaca (2021) found that pregnant women are at an increased risk for experiencing mental health issues such as anxiety and depression and present three reasons why pregnant women might be stressed during the COVID-19 pandemic:

1. Fear of contracting the infection
2. Fear of passing on the infection to their baby
3. Potential side effects on the fetus of antiseptics commonly used during the pandemic

Salehi et al. (2020) suggest that COVID-19 be considered as an influential factor in the mental health of pregnant women due to the observed increase in anxiety amongst pregnant women for their baby as well as their own health. Sharifi-Heris et al. (2021) note that pregnant women are in

the high-risk category for traumatic mental health effects during a pandemic since both the physiological as well as psychological changes combined with the motherhood transition led to an increase in stress and anxiety.

Concerningly, the increase in prenatal anxiety, depression, and stress might result in poor birth outcomes including miscarriage, preterm birth, low birth weight, and fetal death (Hocaoglu et al., 2020). Koyucu and Karaca (2021) report that the frequency of obstetric complications during labor and delivery in women diagnosed with mental illness is higher than that in the general population while external stressors place them at risk for prenatal and postnatal complications such as preeclampsia and gestational diabetes (Sharifi-Heris et al., 2021).

In addition to coping with the mental health challenges of pregnancy during a pandemic, pregnant women and their birth partners have experienced logistical modifications to maternity care brought about to combat the COVID-19 virus. Osborne et al., 2021 mention that labor and delivery is one of the few medical procedures that cannot be delayed. With hospitals having to revise protocols and procedures, fathers, doulas, and other birth support persons were restricted from accompanying the laboring women through the birthing process. Also included in the hospital restriction guidelines was the temporary separation of infected women from their newborn. However, due to emerging CDC evidence revealing a low rate of viral transmission between infected mother and newborn, the WHO and the American Academy of Pediatrics revised the restrictions and recommend placing the newborn in the room with the mother. To prevent the transmission of the virus between the mother and newborn, the WHO and American Academy of Pediatrics have suggested an infected mother practice hand hygiene and utilize a face mask. Length of hospital stay post-partum is an additional adjustment healthcare facilities made during the early stages of the COVID-19 pandemic. Pariente et al. (2020) mention that at

the onset of the pandemic, healthy mothers and newborns experienced a shorter hospital stay in an effort to avoid contamination with SARS-CoV-2. Mothers were also staying in their assigned hospital room rather than ambulating around the unit which limited their opportunity to become mobile post-partum. Once discharged from the hospital, Boekhorst et al. (2021), Gonzalez-Garcia et al. (2021), and Perzow (2021) all report that the social isolation induced by the lockdown led to a decline in outside family support for the post-partum mother. Resultingly, the lack of post-partum social support revealed a negative impact on the mental health of the mother, including increased depression, stress, and anxiety. Difficulty in prevention of disease transmission while in the hospital has also been presented. Breslin et al. (2020) and Liu et al. (2020) report finding pregnant women presenting to the hospital for delivery and testing positive for COVID-19 despite being asymptomatic. The Breslin et al. (2020) study occurred in New York City and discovered that many of the pregnant women who tested positive for COVID-19 in the city were asymptomatic. Liu et al. (2020) detailed results of a study of 15 cases of pregnant women with COVID-19 two of whom were asymptomatic. Recommendations were therefore given to conduct universal testing of all pregnant women presenting to the labor and delivery unit of a hospital.

Regarding antenatal care, Muhaidat et al. (2020) discovered a decline in pregnant women receiving healthcare during their pregnancy. Results from the Muhaidat et al. (2020) study revealed that only 4% of participants lacked antenatal care prior to the lockdown period of the pandemic, but as much as 59.5% lacked antenatal care during the lockdown. Karavadra et al. (2020) report that antenatal care transitioned to the virtual platform during the lockdown period. Moyer et al. (2020) echo Karavadra et al. (2020) through a study that revealed 25.8% of women ceased in-person antenatal care after the onset of the COVID-19 pandemic. In the same study,

Moyer et al. (2020) inform that 15.2% of participants utilized a video visit for prenatal care and 31.8% utilized a phone visit. When in-person antenatal care was provided, restrictions dictated that the pregnant woman attend the appointment alone (Cullen et al., 2021). Because the pregnant woman was alone, birth partners unfortunately missed pivotal routine antenatal appointments such as ultrasounds, gender reveals, and hearing the baby's heartbeat.

Because of the changes and modifications to maternity care, Acker et al. (2021) recommends beginning patient education regarding transmission and signs and symptoms of COVID-19 at the inaugural antepartum visit and continue educating throughout pregnancy and postpartum. Included in the patient education is the instruction for the patient to notify the provider of the development of respiratory symptoms or exposure. Identified by Karavadra et al. (2020) as a commonality among study participants, birthing partners not being allowed during labor induced a sense of worry for pregnant women. Shayganfard et al. (2020) discovered that increased health anxiety resulted in pregnant women postponing or canceling their routine health care appointments, thereby establishing a connection between mental health and health behavior changes. Currently, pregnant women are encouraged to identify a primary support person to stay with them during their hospital admission and to also have an alternate support person available in the event that the primary support person screen or test positive for COVID-19 or become exposed to the virus (Acker et al., 2021). Upon admission to the antepartum unit, patients are screened and tested for SARS-CoV-2 with repeat screening occurring in the labor and delivery unit and post-partum unit. As stated earlier, COVID-19 positive patients are encouraged to wear a surgical mask while in the presence of others, including their newborn, throughout their hospitalization, and to perform hand hygiene prior to contact with their infant.

Due to the impact the COVID-19 pandemic has had on pregnant women, a literature review focused on how the COVID-19 pandemic has affected the mental health of the pregnant population and resulting health behavior changes was determined to be valuable. The primary rationale for conducting this integrative review is the fact that preliminary research has revealed that the COVID-19 pandemic has yielded an increase in psychological distress among expectant mothers (Cameron et al., 2020). In a mixed-methods study, Farewell et al. (2020) reported that the prevalence of prenatal and postpartum depression is estimated at 12% and 17%, respectively. Exposure to environmental factors, such as natural disasters, have the potential to amplify perinatal mood disorders that can result in intergenerational impacts on child health and development outcomes. A second rationale for research and study of this topic is the gap in literature regarding the mental health implications related to perinatal mental health during COVID-19 (Koyucu & Karaca, 2021; Overbeck et al., 2021; Sharifi-Heris et al., 2021). Gonzalez-Garcia et al. (2021) have similar support of research and study on the impact of COVID-19 on the mental health of pregnant women by reporting that in “normal” times 1 in 5 women develops an anxiety disorder during the perinatal period, and that meta-analysis has indicated that the prevalence of postpartum PTSD is 3.1%. This highlights that the containment and other health measures of the pandemic have compounded the tiring, trying, and painful stage of life that pregnancy, labor, and childbirth is with women having to deal with restricted social dialog, greater isolation, and less family support. Arising out of the reports from the literature, the discovered gap in the literature, and the novelty of the SARS-CoV-2 virus, a literature review on the impact of the COVID-19 pandemic on the mental health of pregnant women and resulting health behavior changes was undertaken.

Method

This integrative review was conducted through a search of the literature on the Kennesaw State University library website, CINAHL database and the reference lists of articles obtained through these two sources. The literature search was conducted intermittently from January 2021 until April 2022. Aforementioned databases were searched for published, peer-reviewed research studies that were either qualitative or quantitative. Given the recent emergence of the topic, the time frame was self-limited to articles published from April 2020 through April 2022. Keywords searched included “COVID-19”, “pregnancy”, and “pregnant women”. MeSH search terms included “COVID-19 and pregnancy” and “COVID-19 and pregnant women”. Criteria for inclusion were articles located that were relevant to the topic of the literature review, qualitative, quantitative, or mixed-methods studies, and published in a scientific, medical, or nursing journal from April 2020 – April 2022. Criteria for exclusion were articles located that did not specifically address the impact of COVID-19 on the mental health of pregnant women and their health behaviors or were strictly opinion pieces regarding the impact of COVID-19 on the mental health of pregnant women and their health behaviors. Additional exclusion criteria were articles that addressed the mental health of pregnant women and their health behaviors but did not include both pre and post COVID-19 data. A PRISMA flow diagram detailing the literature search is included as Appendix A.

Data Analysis

An integrative review is conducted through examining evidence for the purpose of revealing complex concepts related to health care problems of importance to the nursing profession (Whittemore & Knafli, 2005). Further, an integrative review provides a holistic understanding of the subject matter and enhances evidence based practice initiatives. However,

there must be specific and systematic methods utilized during the integrative review process to reduce the risk of error. Therefore, strategies recommended by Whitemore and Knafl (2005) were utilized as the foundation for the completion of this integrative review. Specifically employed were the five stages of review, known as *problem identification, literature search, data evaluation, data analysis, and presentation*. Elements of data analysis from Whitemore and Knafl (2005) were consulted to inform how best to analyze and present data. Particular elements of data analysis employed during this integrative review were noting patterns and themes, clustering, making contrasts and comparisons, discerning common and unusual patterns, subsuming particulars into general, and finding intervening factors. Applying this approach, details of the eight studies selected for data analysis are discussed.

Gonzalez-Garcia et al. (2021) conducted a study analyzing the concept of the anxiety associated with the COVID-19 pandemic potentially compounding mood disorders that are routinely experienced by new and expecting mothers. In consideration of the effects that the COVID-19 pandemic could have on the affect of pregnant and postpartum women, the authors studied both the coping strategies and protective factors of the mothers. Quarantine along with the other health measures enforced by the COVID-19 pandemic, particularly social limitations, increased isolation, and decreased family support are suggestions for the escalation in mood disorders seen in this population. Five hypotheses were examined:

1. Low level of social support during the pandemic would be associated with increased concerns for the baby during pregnancy.
2. Greater degree of concern about the baby during quarantine would be associated with higher antenatal levels of anxiety and depression symptoms.

3. The prevalence of anxiety and traumatic symptoms would be higher during the quarantine period than outside the quarantine period.
4. Quarantine measures would impact emotional soothing as a regulatory strategy.
5. The crisis would challenge points of view and trigger posttraumatic growth, which would prompt a positive reevaluation of situations and influence emotional regulation strategies.

This study was comprised of 90 pregnant women who were in their second or third trimester during France's first lockdown period (April 06 – May 11, 2020). All of the participants completed questionnaires during pregnancy (T1), but only 26 (40.6%) completed the questionnaires one month postpartum (T2). Questionnaires completed by participants at T1 included the Spielberger Trait Anxiety Inventory (STAI), the Edinburgh Postnatal Depression Scale (EPDS), and the Multidimensional Scale of Perceived Social Support (MSPSS).

Questionnaires completed at T2 included the City Birth Trauma Scale (CBTS), the Interpersonal Emotional Regulation Questionnaire (IERQ), and the Posttraumatic Growth Inventory (PGI).

Results for hypothesis number one confirmed that the level of worry about the baby generated by COVID-19 was significantly and negatively associated with the degree of perceived social support. Results for hypothesis number two revealed a significant difference between depression scores at T1 versus T2 with the scoring guide indicating possible depression in 9 participants.

These results validated the authors second hypothesis as there was a significant positive correlation between the concern for the baby on one hand and the mother's symptoms of anxiety and depression on the other. Results for hypothesis number three indicated that the prevalence of postpartum PTSD amongst study participants was around 3% with one of the 26 participants meeting criteria for PTSD at T2. Results for hypothesis three also revealed that the mean prenatal anxiety symptom score during the COVID-19 pandemic appeared to be higher than in a control

population in the literature prior to the pandemic ($M=42.77$, $SD=12.06$. Scale 20-80: (very high >65), high (56–65), medium (46–55), low (36–45) or very low (<35)). Regarding hypothesis number four, the authors unexpectedly discovered that soothing ability was not considerably connected to worrying about COVID-19. Results for hypothesis number five revealed that posttraumatic growth was not significantly correlated with any of the interpersonal emotion regulation subscales. Results of this study indicate that the potential impact of COVID-19 needs to be taken into consideration when assessing possible psychological disorders in perinatal women.

Moyer et al. (2020) sought to explore the impact of the COVID-19 pandemic on pregnant women's anxiety and to identify factors that most strongly contribute to increased changes in anxiety. The authors conducted a cross-sectional study whereby 2,740 participants from 47 states completed a survey consisting of a modified pregnancy-related anxiety scale (PRAS) to reflect perceptions of pregnancy anxiety prior to COVID-19 versus during COVID-19. Responses from participants revealed that due to the pandemic 25.8% ($N=706$) ceased in-person visits, 15.2% ($N=415$) utilized video visits, and 31.8% ($N=817$) utilized phone visits for prenatal care. Further, the number of participants planning a hospital birth decreased from 2641 (96.4%) to 2400 (87.7%). Categories of stress reported by the participants included food supply (59.2% $N=1622$), job or household income loss (63.7%, $N=1745$), loss of childcare (56.3%, $N=1543$), conflict between household members (37.5% $N=1028$), and being infected with COVID-19 (93%, $N=2556$). Of note is that 41.4% ($N=1133$) of participants or their family members were healthcare workers and 45.5% ($N=1246$) were employed in essential services. Also of note is the fact that 35.9% ($N=982$) of the participants had previously diagnosed depression, anxiety, or other mental health issue. Through multivariate analysis, the authors were able to observe that

participants who expressed a greater agreement with COVID-19 related stressors experienced more significant changes from pre to post COVID-19 pregnancy related anxiety. Moyer et al. (2020) agree with Gonzalez-Garcia et al. (2021) in expressing that the rapidly changing context and high degree of uncertainty surrounding childbirth during the pandemic serves to increase the anxiety amongst this population during a time when stress is already heightened. Anxiety was measured multiple ways. First, the authors utilized a 10-point visual analog scale (VAS) to assess anxiety about being pregnant during the COVID-19 pandemic. On this VAS, 1 indicated not being anxious at all and 10 indicated being extremely anxious. The authors then utilized a second VAS to assess anxiety about childbirth during the COVID-19 pandemic in addition to the modified version of the PRAS. Instructions for the PRAS included recalling emotions prior to the pandemic and then answering the same questions based on current emotions during the pandemic. It was the difference between these two scores that the authors used as their outcome variable. Factors that were significantly associated with greater changes in PRAS scores included being in the 3rd trimester, history of or recent diagnosis of depression or anxiety, ceasing in-person prenatal care, and change of delivery location away from the hospital. Alternatively, factors associated with smaller changes in PRAS scores included higher maternal age, higher education, being married, and planning a home birth. Mean PRAS scores for perceptions pre-COVID were 20.6% but were 23.9% during the pandemic. Anxiety scores revealed that the participants were more anxious about childbirth during the pandemic (mean 7.6 on scale of 1-10) than about being pregnant during the pandemic (mean 6.5 on scale of 1-10). Comparing the anxiety scores against the study's outcome measure led the authors to the conclusion that greater anxiety regarding pregnancy and childbirth was significantly associated with greater changes in PRAS scores. Given the fact that COVID-19 related issues (ex. becoming infected with the virus,

ceasing in-person prenatal care, and delivering outside the hospital), food insecurity, and tension in the home were the issues most strongly associated with greater changes in pregnancy related anxiety, the authors concluded that the pandemic is having a weighty impact on pregnancy related anxiety. Additionally, two important factors regarding pregnancy related anxiety have been exhibited through this study and magnified by the COVID-19 pandemic:

1. Real or anticipated threat to pregnancy or its outcomes
2. Low perceived control

This was the first American study to examine both COVID-19 related anxiety together with pregnancy-related anxiety and highlights to providers the importance of recognizing that pregnant women's anxiety surrounding COVID-19 is likely to carry over and be expressed as pregnancy-related anxiety.

Overbeck et al. (2021) provided insight regarding the mental health of pregnant women in Denmark during COVID-19 through assessing symptoms of anxiety and depression. This assessment was completed by analyzing data from two cohorts of pregnant women. One group, named the COVID-19 cohort (N=330) was recruited from April 08 – May 06, 2020, completed questionnaires, and was compared to a control cohort from 2016 (N=1428). Both groups were recruited by general practitioners in Capital Region and Region Zealand during their first prenatal consultation. In both groups, mental health was assessed using the Major Depression Inventory (MDI) and the Anxiety Symptoms Scale (ASS). There was no difference observed between the two cohorts regarding depressive symptoms, however, anxiety symptoms were observed to be slightly worse in the COVID-19 cohort (mean difference = 1.4 points) with the greatest difference occurring during the first trimester (adjusted mean = 4 points). In contrast to the Gonzalez-Garcia et al. (2021) and Moyer et al. (2020) studies, the Danish National Health

Services regarded preventive antenatal services as high priority, and did not pause prenatal services during lockdown, although some general practitioners and midwives reorganized some of the appointments to be video consultations. Another contrast is that unlike with the Moyer et al. (2020) study, none of the participants in this study had a previous diagnosis of anxiety or depression. The authors noted higher levels of general anxiety and avoidance behavior but lower social phobia amongst the COVID-19 cohort, and no significant difference for the other items.

Perzow et al. (2021) assessed the changes in anxiety and depression symptoms prior to and during the COVID-19 pandemic among pregnant and post - partum women through a longitudinal study. Participant population was comprised of a group of 135 women (26% Latina, 55% non-Hispanic White, 11% Black; 39% low-income) found to have elevated levels of depressive symptoms. Median age was 31.81 years and those originally recruited were 25 weeks gestational age (GA) or less, 18–45 years old, English speaking, and carrying a singleton. Participants completed questionnaires during early pregnancy, prior to COVID-19, and during COVID-19. The Edinburgh Postnatal Depression Scale (EPDS) and State Trait Anxiety Inventory (STAI) short form were among the questionnaires completed by the participants. Loneliness was measured in the COVID-19 assessment using an 8-item version of the UCLA Loneliness Scale, and Income-to-Needs Ratio (INR) was calculated by dividing the total reported household income by the poverty threshold corresponding to the number of persons living in the household at the time of assessment. Stressors such as job loss, inability to work from home, and exposure to COVID-19 for self and/or family were evaluated. Recruitment arose from current participants in the Care Project, a randomized control trial of interpersonal psychotherapy for distraught pregnant women. The authors continue the theme introduced by Gonzalez-Garcia et al. (2021) and Moyer et al. (2020) by mentioning that exposure to uncontrollable stressors,

including the COVID-19 pandemic intensifies maternal mental health struggles. This study arose out of a need to evaluate the effect of the pandemic on mental health and to classify risk and protective factors. The authors hypothesized that the following factors would contribute to a greater increase in depression and anxiety symptoms pre-pandemic to during the pandemic:

1. Greater loneliness
2. Greater socio-economic risk
3. Greater COVID-19 specific adversity

Review of the data revealed a distinct break between adversity scores 2 and 3, therefore participants were separated into the lower adversity group (score 0-2, n=94) and higher adversity group (score 3+, n=41). Results revealed that depression symptoms were markedly higher during COVID-19 and early pregnancy compared to pre-COVID-19. Similarly, anxiety symptoms were higher during COVID-19 compared to pre-COVID-19 and early pregnancy. Greater loneliness was found to be linked with increased depression symptoms during COVID-19, and greater COVID-19 adversity found to be attributed to an increase in internalizing symptoms during COVID-19. Additionally, greater loneliness was associated with both elevated depressive and anxiety symptoms at all three timepoints, and income-to-needs ratio was discovered to be the strongest predictor of symptoms during early pregnancy. Participants in the lower INR group reported higher depression and anxiety symptoms during early pregnancy and during the COVID-19 pandemic compared to pre-pandemic assessment. With the higher INR group, symptoms of depression and anxiety were greater during COVID-19 compared to early pregnancy. While the low INR group reported elevated anxiety and depression scores compared to the higher INR group, the two groups did not differ significantly prior to or during the

COVID-19 pandemic. Specifically regarding the COVID-19 adversity data, symptoms of depression and anxiety were higher during the pandemic compared to pre-pandemic for the low adversity group, but not during early pregnancy. For the high adversity group, depression symptoms were higher compared to the low adversity group during the pandemic, but not prior. Based on ACOG screening guidelines, the following percentages of women were found to be above the cutoff of 10 on the EPDS:

35% of during pregnancy, 15.5% prior to the COVID-19 pandemic, 33.3% during the pandemic.

The authors longitudinal analysis suggests that the COVID-19 pandemic resulted in an increase in internalizing symptoms among diverse pregnant and postpartum women with interpersonal and contextual factors exacerbating the risk and impact of the pandemic on women's mental health.

Similar to Perzow et al. (2021), Boekhorst et al. (2021) conducted a longitudinal prospective cohort study. Recruitment for the Boekhorst et al. (2021) study, also called the Brabant Study, began in 2019 and continued into the pandemic. Eligible participants included Dutch pregnant women over 18 years of age attending their first antenatal visit before 14 weeks gestation. Participants completed online questionnaires during all three trimesters of pregnancy and 8 to 10 weeks postpartum. Up until March 01, 2020, 401 women completed questionnaires during pregnancy (trimester 1: N = 393; trimester 2: N = 350; trimester 3: N = 350), of whom 250 also completed postpartum assessments. From March 01, 2020, to May 14, 2020, 268 women filled out at least one questionnaire during pregnancy (trimester 1: N=265; trimester 2: N=203; trimester 3: N=110), and 59 completed a postpartum assessment, providing the authors with a total of 669 questionnaires to analyze. Unfortunately, the study period ended before all the women had completed assessment in the third trimester of pregnancy or postpartum. However,

during pregnancy 436 completed all questionnaires, 131 completed two questionnaires and 102 completed one questionnaire. Location was significant in that Brabant, the Netherlands, is considered one of the European epicenters of the COVID-19 pandemic. Depression symptoms were measured using the 10-item Edinburgh Postnatal Depression Scale (EPDS) with a score >12 identifying women at risk for high levels of postpartum depression. The 10-item adapted version of the Tilburg Pregnancy Distress Scale (TPDS-NA) was used to assess pregnancy worries surrounding fetal health, childbirth, and delivery. A mixed model analysis was conducted and results revealed that the primary effect of the pandemic was not an important indicator of depressive symptoms throughout pregnancy for the EPDS model. However, results revealed a slight increase in depressive symptoms from trimester 1 to trimester 3, but the effect of time was not shown to be a significant factor. Seven percent of the pre-pandemic and 8.5% of the pandemic group had a score higher than 12 on the EPDS at 8–10 weeks postpartum, which is suggestive of high levels of postpartum depression symptoms. Of note though is that placement in the pandemic group was not correlated with high levels of postpartum depression symptoms. In contrast, the TPDS-NA model revealed that the pandemic did have a primary effect on pregnancy-specific stress symptoms with the effect of time on stress during pregnancy being significant and decreasing over time. For example, there was a significant difference in stress scores between trimester 3 and trimester 1, but not between trimester 3 and trimester 2. Interestingly, the authors did not observe an increase in depression symptoms during pregnancy nor an increase in the occurrence of high levels of postpartum depression symptoms during the pandemic.

Mei et al. (2021) conducted a cross-sectional study of pregnant women to analyze depression, anxiety, and stress levels in a Novel Coronavirus-Pregnancy Cohort (NCP) and a

Healthy Baby Cohort (HBC). NCP (531 participants) was developed during the COVID-19 pandemic and conducted in March and April 2020 while the HBC (2352 participants) was established in 2012 and was conducted from 2017-2018. Both groups used the 7 item Generalized Anxiety Disorder version 7 (GAD-7) for anxiety assessment and the 10 item Perceived Stress Scale (PSS) for stress analysis. The 10 item Center for Epidemiologic Study Depression Scale (CES-D) and the 9 item Patient Health Questionnaire version 9 (PHQ-9) were used to evaluate depression in the HBC and NCP groups, respectively. Maternal pre-pregnancy overweight and obesity rates were higher in NCP than in HBC, resulting in overweight and obesity at 18.64% and 6.81%, respectively in the NCP group and 13.95% and 3.39% in the HBC group. Significant differences in depression and stress were found between participants in the two studies, but no significant difference was found for anxiety between the two groups. Specifically, depression rates were much higher in participants from NCP than those from HBC, especially moderate-to-severe depression (10.36% vs. 0.55%). Regarding stress, participants in HBC reported a higher rate than NCP (69.39% vs. 60.45%). Similar trends in depression, anxiety, and stress scores were observed between the two groups. However, there were no significant differences in depression, anxiety, or stress rates noted among the three trimesters in either group. Vaginal bleeding during pregnancy was discovered to be associated with higher maternal depression, anxiety, and stress risks. Through this study, the authors discovered that pregnant women with pre-pregnancy obesity and high educational levels showed lower risks for depression, anxiety, and stress than those with normal weight and low educational levels. Results also revealed that the COVID-19 pandemic was correlated with higher depression but lower stress risks in pregnant women.

Pariante et al. (2020) analyzed the incidence of increased risk for post-partum depression in women delivering during the COVID-19 pandemic compared to the incidence of increased risk for post-partum depression among women delivering before the COVID-19 pandemic via a cross-sectional cohort study. Recruitment and data collection occurred during the COVID-19 strict isolation period (March 18 - April 29, 2020), with women who delivered between November 2016 - April 2017 serving as the comparison group. Participants included 223 women who delivered during the COVID-19 strict isolation period, and 123 women who delivered before the COVID 19 pandemic. Both groups delivered at Soroka University Medical Center (SUMC) and were approached by the research team on day two post-partum for invitation to participate. In addition to completing the EPDS during hospitalization in the maternity unit, participants completed questionnaires regarding socioeconomic status, obstetrical history, and current pregnancy. Results revealed that women delivering during the COVID-19 pandemic showed a lower risk of having a high (≥ 10) EPDS score than women delivering before the COVID-19 pandemic (16.7% vs 31.3%). Similarly, women delivering during the COVID-19 pandemic showed lower risk of having a very high (≥ 13) EPDS score than women delivering before the COVID-19 pandemic (6.8% vs 15.2%). Rates of positive suicidal ideations (accounted for in question number 10 on the EPDS questionnaire) were comparable between the groups (0.5% vs 0.9%). These results led the authors to the conclusion that delivering during the COVID-19 pandemic was independently associated with lower risk for possible maternal depression according to both EPDS score ≥ 10 and EPDS score ≥ 13 .

Puertas-Gonzalez et al. (2021) examined the psychological health of pregnant women during the COVID-19 pandemic through investigating psychopathological symptomatology and stress. The psychopathological symptoms and stress of a group of women who were pregnant

during the pandemic were compared with those of a group of women who were pregnant prior to COVID-19, and the factors that could potentially influence the differences found between both groups were calculated. Participants included 100 women in the Pre-Pandemic Group (PPG) and 100 women in the Pandemic Group (PG) with the PPG participants having been enrolled in the Gestastress study prior to the current study. Pregnant women who were over the age of 18, in their second or third trimester of pregnancy, and capable of reading and writing in Spanish were eligible for inclusion, but those being actively treated with psychopharmaceuticals were ineligible. Overall, the PG presented with more psychopathological symptoms than the PPG, especially regarding depression and phobic anxiety. Interestingly, it was discovered that insomnia combined with the recent loss of a loved one increased the scores on the depression dimension of the Symptom Checklist-90-Revised (SCL-90-R), and that fear of contracting the virus resulted in an 11% increase in the phobic anxiety scores of the SCL-90-R.

Authors concluded that insomnia, recent loss of a loved one, and the fear of being infected with the COVID-19 virus were found to be predictive indicators of the participants psychopathological symptomology. Particularly, the fear of being infected with the COVID-19 virus was found to increase phobic anxiety levels in the PG group. Results also revealed higher levels of perceived stress among the PG, potentially due to uncertainty, high infection rate, high mortality rate, and fear of contracting the disease.

Common themes that emerged through analyzing the data of the forementioned studies are:

1. Pregnancy and post-partum unique period of vulnerability and heightened emotions
2. Changes in prenatal care
3. Anxiety of uncertainty

4. Fear of infection
5. Social isolation
6. Lack of support
7. Mental health challenges in pregnancy associated with birth defects
8. Overflow of information on social media contributing to anxiety and subsequent behavior

Distribution of the themes contained in each article that emerged from the data analysis are displayed in Table 1.

Table 1 – Emerging Themes

Article	Vulnerability	Care Changes	Uncertainty/ Fear of Infection	Social Isolation	Support	Baby's Health	Social Media Info.	Job
Boekhorst et al. (2021)	✓		✓	✓		✓		
Gonazlez-Garcia et al. (2021)			✓	✓	✓	✓		
Moyer et al. (2020)		✓	✓	✓	✓	✓		✓
Mei et al. (2021)				✓	✓			✓
Overbeck et al. (2021)		✓	✓	✓		✓	✓	
Pariente et al. (2020)			✓	✓	✓		✓	
Perzow et al. (2021)	✓		✓	✓	✓	✓		✓
Puertas-Gonzalez et al. (2021)	✓		✓	✓		✓	✓	

Discussion

Extracted themes from analyzing the data provide valuable insight into the effects that the COVID-19 pandemic has had on the mental health of pregnant women. Across each of the eight articles analyzed, results revealed that being pregnant during the pandemic was shown to produce increased levels of anxiety, stress, and depression. Contributing factors included social isolation, fear of the unknown, concern for the baby, disruption in care, lack of control, and drastic lifestyle changes. Alleviating factors included strong social support, delivery of healthy baby, low risk of contamination with the virus, and lack of exposure to media. Detailed discussions of each article analyzed are given in the remaining paragraphs of this section.

Gonzalez-Garcia et al. (2021) discovered that social support serves as a defense against postpartum anxiety. Results obtained confirmed the authors hypothesized connection between concern for the baby due to COVID-19 and symptoms of anxiety and depression. Further, prevalence of postpartum PTSD amongst the participants was similar to that observed in the control sample and therefore was not considered an influential factor. In contrast, however, the authors observed a higher level of antenatal anxiety amongst the study participants compared to the control sample, but this was not shown to have either a protective or harmful influence on the occurrence of PTSD. Regarding the emotional regulation hypothesis, changes in the scores were minimal and shown to be non-significant leading the authors to conclude that the participants had no difficulty with emotional regulation. The authors instruct that this study should be considered exploratory and results interpreted cautiously. This is primarily due to the sample size associated with the Spearman's correlations.

Moyer et al. (2020) analysis leads to the suggestion that factors independent of pregnancy appear to be the force behind the changes in pregnancy – specific anxiety. This study builds upon

previous research that established pregnancy related anxiety as distinct from general anxiety or depression and is therefore manifested in more detrimental maternal or child outcomes. Further, it demonstrates two important contributors to pregnancy-related anxiety: 1) real or anticipated threat to pregnancy or its outcomes 2) low perceived control. Moyer et al. (2020) findings are found to be consistent with the literature that women who experienced their pregnancies as potentially threatened by the pandemic showed greater changes in pregnancy-related anxiety, and that women who experienced a disruption in their anticipated pregnancy and delivery experience showed greater changes in pregnancy-related anxiety. These findings contribute to a line of research documenting the effects of disaster, trauma, and life stressors during pregnancy on maternal mental health, confirming the detrimental impact of COVID-19 and its psychosocial ramifications. Included in the detrimental impacts of COVID-19 are heightened interfamilial tension and sociodemographic hardship on increasing pregnancy-related anxiety. The retrospective format allowed the participants to serve as their own control sample rather than comparison to another study and therefore makes this study unique.

Overbeck et al. (2021) proved to be a rather insightful study with the lone statistically significant difference between the two groups being pregnancy history. Zero statistical significance was observed regarding MDI scores between the two groups, but the ASS score was observed to be slightly higher in the COVID-19 cohort. However, what is most revealing in this study is the authors' explanations for the recorded mild impact of the COVID-19 pandemic on the mental health of pregnant women in Denmark. Reasons cited by Overbeck et al. (2021) for the mild impact of the pandemic on the mental health of Danish pregnant women include the lack of a curfew in Denmark, stores remaining open, freedom in moving about in society, and healthcare facilities not being overwhelmed with patients. Additionally, in Denmark the COVID-

19 virus might not have had a major impact on mental health due to the fact that the health threat was quickly discovered to be low. Rather, any impact on mental health is seen to stem more from the societal and economic consequences of the pandemic lockdown.

Perzow et al. (2021) longitudinal study of racially and ethnically diverse women during the prenatal and postpartum periods exposed the fact that symptoms of depression and anxiety were elevated following the onset of the COVID-19 pandemic compared to pre-pandemic findings. Of particular interest is that an increase in symptoms was compounded in women reporting more loneliness and COVID-19 specific adversity. Data revealed that depression symptoms rose from before to during the COVID-19 pandemic and were as high as symptom levels seen during early pregnancy. This suggests that the COVID-19 pandemic shifts symptom trajectories, as evidenced by a resurgence of depressive symptoms equivalent to levels experienced during early pregnancy and the increase of anxiety symptoms to a level higher than previously experienced amongst the participants. Results also suggest that uncontrollable stress and unpredictability surrounding the pandemic presented a risk for depression and anxiety among pregnant and postpartum women regardless of INR.

Results from the Boekhorst et al. (2021) study led to the conclusion that in spite of the fact that other studies have discovered an association between prenatal symptoms of anxiety and postpartum depression symptoms, the presence of COVID-19-related worries and anxiety during pregnancy could be unrelated to postpartum depression. In fact, Boekhorst et al. (2021) purport that after childbirth has occurred COVID-19-related anxiety decreases, especially if the newborn is healthy. However, study generalizations were limited by participant demographics, small sample size, and design not allowing for assessment of change in symptoms of depression and

stress from the prenatal to postnatal period, nor a comparison in this change between the pandemic and pre-pandemic group.

In the Mei et al. (2021) study, the authors propose several reasons for the interesting findings of the anxiety rate in NCP bearing no statistical difference compared to HBC, and the stress rate for NCP being lower than HBC:

1. Participants in the study were not infected with coronavirus, and most families had no infected members.
2. During the COVID-19 outbreak, participants had at least one companion, most of whom was their husband, which may have led them to feeling more at ease.
3. During the pandemic, participants did not need to work, therefore reducing work-related stress.

Results led Mei et al. (2021) to the conclusion that the pandemic as well as pre-pregnancy weight status and educational level impacted the degree of depression experienced by the pregnant population. Additionally, the authors suggest that the higher depression rate during COVID-19 could be attributed to the sudden change in lifestyle following lock-down policies.

In the Pariente et al. (2020) study, the authors propose the following as rationale for the negative association between delivery during the strict isolation period of the COVID-19 pandemic and maternal depression observed in the study:

1. The circumstances of being quarantined with family provided the expectant mothers with greater support. Quarantine also resulted in shorter hospital stays for the new mothers, which the authors presume to be associated with a lower risk of post-partum depression.

2. Lack of exposure to serious COVID-19 cases in the region where the study was conducted.
3. Participants not having to confront day to day realities of society due to quarantine.
4. Previous reports that many disaster victims do not develop short or long-term psychopathology.
5. Quarantine allowing for the increase of post-partum bonding and partnership satisfaction serving as a buffer to post-partum symptoms of anxiety.

Additionally, the authors discovered a significant difference in the marital status between the two populations (90.6% COVID-19 group vs 79.1% pre-COVID-19 group), which they determined could be contributory to the lower prevalence of depression among women who delivered during the COVID-19 pandemic.

Results from the Puertas-Gonzalez et al. (2021) study are consistent with similar studies in showing that pandemics serve as a precursor to the psychopathological symptoms experienced by pregnant women. The authors suggest that the drastic change in life instituted by the quarantine was a major contributing factor to the increase in the participants stress levels along with the media's continual broadcast regarding the severity and lethality of the virus. Constant media inundation was also attributed to the increase in the participants depression symptoms and psychological dysphoria.

Conclusions

As evidenced by the emerging themes of the data analyzation and discussion above, COVID-19 has had a profound and noticeable effect on the mental health of pregnant women. In some instances, the anxiety and stress brought about by the pandemic have led pregnant women to making changes in their health behaviors. Some of the changes include moving the birth of the

baby from a hospital to the home setting, avoidance behavior, ceasing in-person visits, and utilizing telehealth for prenatal care. What can be observed is that in places, such as Denmark, where there were not strict mandates and lockdowns instituted and when the pregnant woman had strong familial and partner support, the impacts of the pandemic on the pregnant woman's mental health were not as severe as in places where strict mandates and isolation were imposed. Thus, it can be concluded that the true cause of the mental health impact on pregnant women should be more accurately attributed to the societal, economic and media response to the pandemic than to the virus itself.

Implications for Nursing

Nurses are at the forefront of responses to COVID-19 and are the largest group of healthcare professionals (Choi et al., 2020). There are approximately 20 million nursing professionals throughout the world with America representing four million of the total number. Individuals who claim the title of Registered Nurse are responsible for their own physical and mental wellbeing as well as the physical and mental health of the patients cared for and the other health professionals on the same team. Trauma-informed care, a structure that takes into account the consequences previous trauma can have on current decisions, attitudes and coping ability is reported to be helpful in reducing retraumatization during health care appointments (Hall et al., 2021). Emerging evidence suggests the SARS-CoV-2 virus is disproportionately affecting pregnant women (Hall et al., 2021), specifically due to the stress of birth preparations during a pandemic and concern over becoming infected. This stress can increase the pregnant population's risk for moderate or severe anxiety above and beyond sociodemographic, obstetric, and other health factors. Therefore, training in the principles of trauma-informed care (TIC) is recommended for nurses to enhance practice and patient care. Further support for nurses being

trained in TIC is provided by Brooks et al. (2020) who inform that a mental health pandemic is the consequence of the quarantine of the COVID-19 pandemic. Choi et al. (2020) advise that pregnant women are a population of special concern regarding the consequential mental health pandemic. TIC follows four key assumptions and six guiding principles and is best accomplished through the assessment of and assistance with the pregnant patient's psychosocial concerns (SAMHSA, 2014). Clinicians expressing sensitivity through realizing and normalizing survivor experiences of past trauma, recognizing survivors' behaviors as coping mechanisms, responding by creating a safer environment, and seeking to avoid retraumatization are the four key assumptions of TIC. Safety, trustworthiness, collaboration, peer support, empowerment, and cultural sensitivity are the six guiding principles. Using relationship-based care to foster reciprocal social connections among patients, families, and staff is one of TIC's main goals with the intended outcome of creating a buffer to mitigate stress, promote resilience, and improve health outcomes. Choi et al. (2020) recommend the implementation of TIC in perinatal care and Hall et al. (2021) suggest that TIC can be practiced with all pregnant women similarly to the application of universal precautions. Sperlich et al. (2017) proposed a framework for the adoption of TIC in the maternity care setting and highlighted the need for further education about TIC in this area. Screening is the starting point of the framework and is followed by the implementation of referrals to interdisciplinary programs such as *Minding the Baby*, *Compassionate Minds*, *Seeking Safety*, and *Parents Under Pressure*. The reward of nurses receiving training in TIC is the increased ability to provide emotional support to patients and the decrease in provider burnout (Hall et al., 2021). In order for this to be accomplished, nursing leaders need to ensure that their staff receive the support and protection needed to provide TIC (Choi et al., 2020). Additionally, nurses need to advocate for a comprehensive public health

response to COVID-19 including the resultant mental health implications. Through preparing for a potential second pandemic of mental distress related to COVID-19, the nursing profession can improve resilience in our mental health organizations and communities.

Limitations

Through the integrative review process, certain limitations of the studies incorporated in the data analysis were noted. Boekhorst et al. (2021), Pariente et al. (2020), and Puertas-Gonzalez et al. (2021) all mention time as a limitation of the respective studies. Specific time limitations include the inability to assess for changes in depression and stress symptoms from prenatal to postnatal period or between the pandemic and pre-pandemic groups, lack of detection of post-event non-traumatic stressors, seasonality effects of the recruitment windows, and psychological evaluation instruments only assessing psychological state of the last month. Limited generalizability due to demographic and geographic discrepancies, small sample size, social desirability bias, drop out rates, self-reporting of data weakening the objectivity and reliability of results, and recall bias due to reliance on retrospective assessment of pregnancy – related anxiety prior to COVID-19 pandemic are other study limitations. Methodological limitations included recruitment through different means for the two groups and the utilizing of single-item variables in the regression models. Another limitation of note is that the correlational nature of the data prohibits the making of causal conclusions regarding the effect of the pandemic on mental health.

Recommendations for Further Research

In consideration of the novelty of the COVID-19 pandemic, recommendations for future research have arisen out of the integrative review process. First, future studies assessing the mental health of pregnant women during later outbreaks of COVID-19 should be conducted and

compared to results published during data collection of the initial outbreak of the COVID-19 pandemic. Additionally, future studies of longitudinal design that assess the effects of COVID-19 on depression and stress symptoms of pregnant women as well as those that evaluate the father's psychological state should be conducted.

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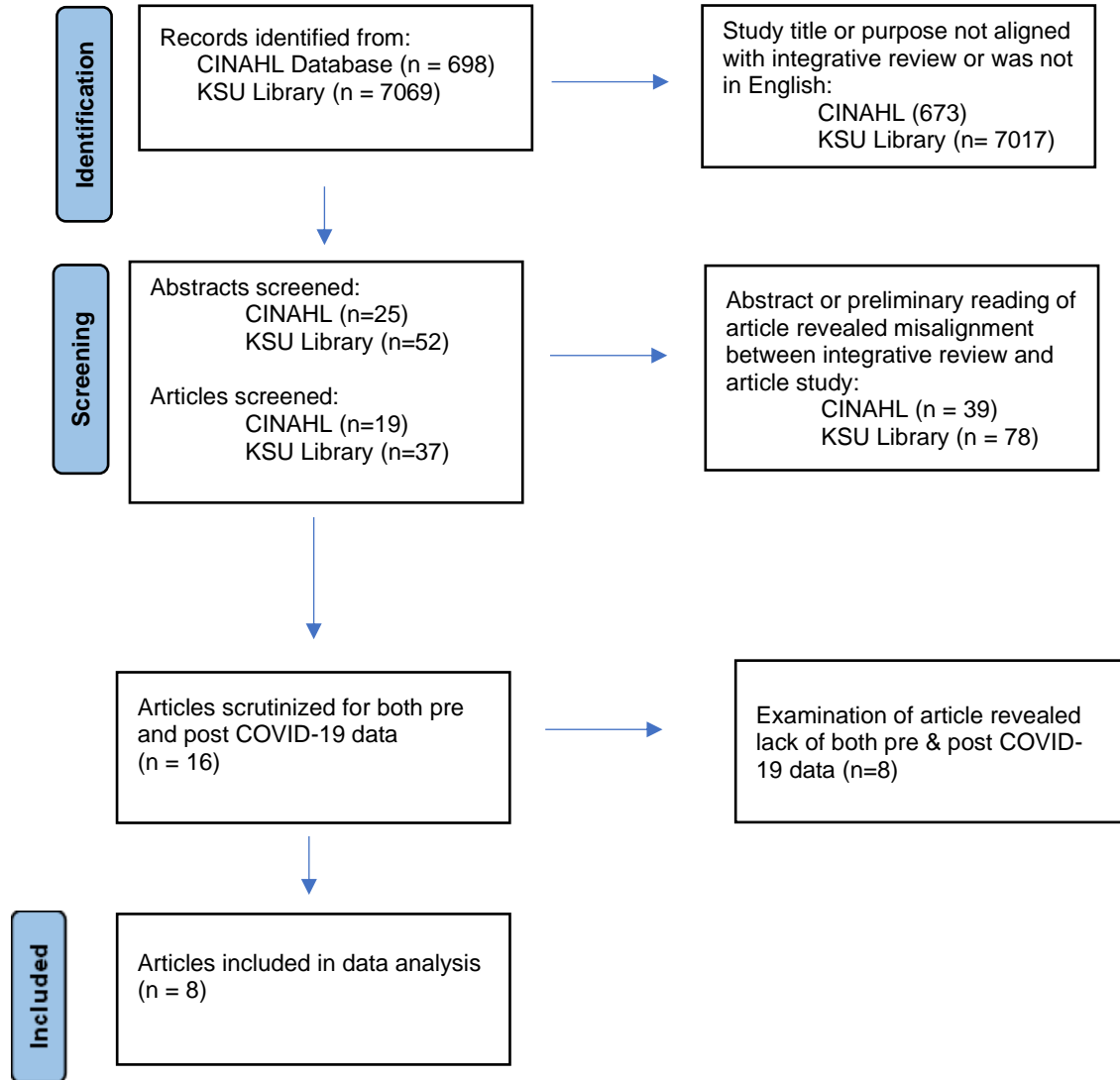
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Appendix A

PRISMA flow Diagram



Appendix B

Author, Date	Aim	Study Design/ Methods	Major Findings	Limitations	Questionnaires Utilized
Boekhorst, M. G. B. M., Muskens, L., Hulsbosch, L. P., Van Deun, K., Bergink, V., Pop, V. J. M., & van den Heuvel, M. I. (2021)	Comparing perinatal symptoms of depression & stress before & during the pandemic.	Longitudinal prospective cohort Brabant Study of 669 Dutch women 01/07/2019 – 05/14/2020	Pregnancy-specific stress increased significantly during the pandemic, but depression during pregnancy and postpartum did not.	<ol style="list-style-type: none"> 1. Limited generalizability due to: <ol style="list-style-type: none"> i) Narrow sample population ii) Higher level of education among participants than general Dutch female population iii) Higher rate of marriage/partnership among participants than general Dutch population 2. Study design not conducive to assessing change in symptoms from pre to postnatal nor from pre-pandemic to pandemic 3. Smaller pandemic group sample size compared to pre-pandemic group 	Edinburgh (Postnatal) Depression Scale (EPDS) Tilburg Pregnancy Distress Scale (TPDS-NA)
Gonzalez-Garcia, V., Exertier, M., & Denis, A. (2021).	Identify & understand factors that impact concern regarding COVID-19 for perinatal women and subsequent coping strategies.	Longitudinal study of 90 participants comparing women in 2 nd or 3 rd trimester during lockdown in France (04/06-05/11 2020) to control sample of those who gave birth outside lockdown period. Participants completed surveys at 2 separate timepoints: 1 – during pregnancy 2 – 1 month postpartum	Observed difference in the prevalence of anxiety but not postpartum PTSD between study population and control sample.	<ol style="list-style-type: none"> 1. Social desirability bias 2. Participants not recruited from population with postpartum PTSD diagnosis 3. Drop-out rate between T1 & T2 4. Time frame between T1 & T2 too short 5. Weakened objectivity & reliability of results due to self-reported data 	Spielberger Trait Anxiety Inventory (STAI)* Edinburgh Postnatal Depression Scale (EPDS)* Multidimensional Scale of Perceived Social Support (MSPSS)* City Birth Trauma Scale (CBTS)** Interpersonal Emotional Regulation Questionnaire (IERQ)** Posttraumatic Growth Inventory (PGI)**
Mei, H., Li, N., Li, J., Zhang, D., Cao, Z., Zhou, Y., Cao, J., & Zhou, A. (2021)	Evaluate depression, anxiety, and stress symptoms in pregnant women before and during COVID-19 pandemic with an	Cross-sectional analysis of pregnant women’s depression, anxiety, and stress levels in the Novel Coronavirus-	Significant difference in depression rates between the HBC & NCP as well as the COVID-19 pandemic being correlated with higher	<ol style="list-style-type: none"> 1. Comparison capability reduction due to NCP data gathered during perinatal periods versus 20–28-week gestation for HBC data 	Center for Epidemiologic Study Depression Scale (CES-D) Patient Health Questionnaire version 9 (PHQ-9)

	analysis of risk factors.	Pregnancy Cohort study (NCP) and the Healthy Baby Cohort study (HBC). NCP conducted during COVID-19 pandemic and HBC prior to the pandemic.	depression but lower stress risks in pregnant women.	<ol style="list-style-type: none"> 2. Utilization of different scales in evaluating depression between the NCP & HBC studies 3. Significant differences in certain participant demographics 	Generalized Anxiety Disorder version 7 (GAD-7) Perceived Stress Scale (PSS)
Moyer, C. A., Compton, S. D., Kaselitz, E., & Muzik, M. (2020)	Exploration of the impact of COVID-19 on pregnant women's anxiety & the identification of factors associated with changes in the level of anxiety.	TA cross-sectional anonymous online survey conducted 04/03/2020 – 04/24/2020 reflecting participants perception of pregnancy anxiety pre-COVID & then during COVID-19.	COVID-19 pandemic deeply affecting pregnant women's mental health with factors independent of pregnancy responsible for changes regarding pregnancy specific anxiety.	<ol style="list-style-type: none"> 1. Reliance on participants retrospective recall of symptoms 2. Convenience sample bias 	10-point visual analog scale (VAS) x2 Pregnancy Related Anxiety Scale (PRAS)
Overbeck, G., Rasmussen, I. S., Siersma, V., Andersen, J. H., Kragstrup, J., Wilson, P., Hauskov Graungaard, A., & Ertmann, R. K. (2021)	Provide insight into the mental well-being of Danish pregnant women during COVID-19.	Cohort study comparing women recruited from Danish general practice from 04/08/2020 – 05/06/2020 with control group from 2016.	Participants of the lockdown cohort showed a modest elevation in anxiety compared to control group, but no difference observed regarding depression symptoms between the 2 groups.	<ol style="list-style-type: none"> 1. Convenience sampling of the lockdown cohort 2. Small sample size of lockdown cohort 3. Lack of follow-up and reminders with lockdown cohort 	Major Depression Inventory (MDI) Anxiety Symptom Scale (ASS).
Pariante, G., Wissotzky Broder, O., Sheiner, E., Lanxner Battat, T., Mazor, E., Yaniv Salem, S., Kosef, T., & Wainstock, T. (2020)	Assess the risk for post-partum depression among women delivering during the COVID-19 pandemic as compared to the risk among women delivering before the COVID-19 pandemic.	Cohort study of women delivering singletons at Soroka University Medical Center 03/18/2020 – 04/29/2020 compared to women delivering prior to COVID-19 at same location.	Women delivering during the COVID-19 pandemic showed lower risk of scoring high or very high on the EPDS compared to pre-COVID-19.	<ol style="list-style-type: none"> 1. Context of natural disaster leading to individuals who display and experience symptoms but do not meet diagnostic criteria 2. Timeframe of study not sufficient for allowing depression to manifest itself 3. Effect of seasonality due to recruitment for the 2 groups occurring in different seasons 4. EPDS not exclusively reflecting risk for PPD 	Edinburgh Postnatal Depression Scale (EPDS)

<p>Perzow, S. E. D., Hennessey, E.-M. P., Hoffman, M. C., Grote, N. K., Davis, E. P., & Hankin, B. L. (2021)</p>	<p>Examined change in internalizing symptoms from before COVID-19 to during COVID-19 longitudinally & moderation by risk factors.</p>	<p>Longitudinal self-report questionnaire completed 04/13/2020 – 05/22/2020</p>	<p>Both depression and anxiety symptoms were higher during COVID-19 than pre-COVID-19 and reflected results obtained during 1st trimester of pregnancy.</p>	<p>1. Longitudinal study design prohibiting causal conclusions</p>	<p>Edinburgh Postnatal Depression Scale (EPDS) State Trait Anxiety Inventory (STAI) UCLA Loneliness Scale Income-to-Needs Ratio (INR) NIH Coronavirus Health Impact Survey – Adult Self-Report Baseline Short Form</p>
<p>Puertas-Gonzalez, J. A., Mariño-Narvaez, C., Peralta-Ramirez, M. I., & Romero-Gonzalez, B. (2021)</p>	<p>Examine the psychological effects caused by the COVID-19 pandemic on pregnant women, as well as the factors influencing those effects.</p>	<p>Cross-sectional study of 200 pregnant women – divided into 100 pandemic group (PG) & 100 pre-pandemic group (PPG)</p>	<p>PG displayed more psychopathological symptoms than the PPG, specifically greater levels of depression, phobic anxiety, and stress with insomnia discovered to be a factor in the increase of depression & stress.</p>	<p>1. Evaluation tools limited to assessing psychological state of the past month 2. Psychological state of the father not included 3. Variation in recruitment of the 2 groups 4. Evaluation of PG occurring during COVID-19 masking influence of lockdown outside of pandemic</p>	<p>Symptom Checklist-90-Revised (SCL-90-R) Perceived Stress Scale (PSS) Prenatal Distress Questionnaire (PDQ) Athens Insomnia Scale (AIS)</p>

KEY: * Completed during prenatal period ** Completed during postnatal period

