

## **PREGNANT IN A PANDEMIC**

**Stress techniques for a healthy pregnancy during a pandemic**

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## **SAMMANFATTNING**

År 2019 drabbades världen av det nya Coronaviruset; SARS-CoV-2 som är det virus som orsakar sjukdomen COVID-19. Viruset har orsakat en internationell pandemi. Studier visar att gravida som insjuknar i COVID-19 under senare delen av graviditeten löper risk att föda prematurt. En pandemin kan ha påverkan på gravida kvinnors fysiska och psykiska hälsa. En viktig egenskap hos barnmorskan är att kunna bedöma, stödja och planera vården för gravida. Syftet med denna studie var att identifiera metoder som kan användas under en pandemi för att minska stress hos kvinnor under graviditeten och tiden efter barnets födelse. En litteraturöversikt genomfördes för att kartlägga befintlig kunskap inom området. I resultatet inkluderades 16 artiklar efter att ha genomgått en kvalitetsanalys. Resultatet togs fram genom en integrerad analys, vilket tydliggjorde faktorer som både ökade och minskade upplevd stress hos gravida under pandemin. Dessa faktorer var: oro angående hälsa, bristfälligt stöd, brist av fysisk aktivitet och sömn, ekonomisk oro, sociodemografiska faktorer, samt skyddande faktorer. Metoder som visade sig minska stress hos gravida kvinnor var tillgång till information och icke-farmakologiska behandlingar. Resultatet påvisade att upplevd stress hos gravida kvinnor under en pandemi kan minska genom ett ökat stöd, användning av metoder såsom mindfulness och fysiskt aktivitet, samt tillgång till information. Genom att aktivt arbeta med att förebygga psykisk ohälsa kan barnmorskor vara ett bra stöd för gravida kvinnor under en pandemi.

**Nyckelord:** Faktorer, Graviditet, Metoder, Pandemi, Stress

## **ABSTRACT**

In 2019, the world was introduced to a new Coronavirus; SARS-CoV-2 which is the virus that causes the disease COVID-19. The virus has created an international pandemic. Studies show that pregnant women who fall ill with COVID-19 during the latter parts of pregnancy are at risk of premature birth. A pandemic can have an impact on pregnant women's physical and mental health. Important characteristics of the midwife are to be able to assess, support and plan the care of pregnant women. The aim of this study was to identify methods to reduce stress for women during pregnancy and after childbirth. A literary review was conducted in order to identify current knowledge about stress in pregnancy during a pandemic. The result included 16 articles that were critically analyzed. The result was extracted through an integrated analysis, which presented factors that both increased and decreased perceived stress amongst pregnant women. These factors included: worries about health, lack of support, lack of physical activity and sleep, financial concerns, sociodemographic factors and protective factors. Methods found to reduce stress in pregnant women included having access to information and using non-pharmacological treatments. The result revealed that the perceived stress in pregnant women during a pandemic can be reduced by increasing support, using methods such as mindfulness, being physically active and having access to information. By actively working to prevent mental illness midwives can be a good support for pregnant women during a pandemic.

**Keywords:** Factors, Methods, Pandemic, Pregnancy, Stress

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## INTRODUCTION

At the end of 2019 information about a new virus started to circulate. The coronavirus quickly spread around the world, and in March 2020 the World Health Organization [WHO] officially declared the outbreak a global pandemic (WHO, 2020). As a consequence of this, the Swedish Public Health Authority published recommendations and guidelines to slow the spread of disease, which affected our whole society (Folkhälsomyndigheten, [FHM], 2021). Within maternal care units and for expecting parents, the question about susceptibility to infection of pregnant women and the effects of the infection on the fetus, have since the outbreak began been the main focus of attention. Worldwide various studies have been conducted regarding COVID-19, but there is still much that is unknown regarding the virus' effect on pregnancy.

New studies show that pregnant women are at a greater risk to fall ill with COVID-19, which during the latter part of pregnancy entails a higher risk of premature birth. Respiratory tract infections during the last stage of pregnancy can also be physically wearing and implicates risks for expecting women (FHM, 2020a). According to WHO (2021a) there have been over 119 000 000 confirmed cases of COVID-19 globally, including more than 2 600 000 deaths, as of March 2021 (Figure 1.1). Information regarding how many pregnant women have been affected worldwide is still limited. In the United States, according to the Centers for Disease Control and Prevention (2020) the total outcome among pregnant women with COVID-19 was as of December 2020 over 7000. In Sweden 0,6% of all deliveries between March 19<sup>th</sup> and December 2<sup>nd</sup> in 2020 were of women who had a COVID-19 diagnosis as shown by Graviditetsregistret (2020). Although it should be noted that the indications for testing have varied between different countries, maternity clinics and have differed a great deal over time.

### Global Situation

**119,960,700**

confirmed cases

**2,656,822**

deaths

Source: World Health Organization  
Data may be incomplete for the current day or week.

Note. Figure 1.1. Confirmed cases and deaths related to COVID-19 as of 16 March, 2021 (WHO, 2021b).

A meta-analysis conducted by Yan et.al (2020), which included a total of 23 studies, indicated that the pandemic has had a significant impact on the mental health among pregnant and postpartum women (Yan et al., 2020). Physiological stress causes the autonomic nervous system to constantly stimulate the sympathetic nervous system, resulting in the brain and body modifying to the critical adaptations of stress. The release of cortisol, adrenalin and noradrenalin into the bloodstream impacts bodily functions such as metabolism, psychological and immunological functions. The nervous

system cannot distinguish between an actual physical threat or worrying thoughts, and therefore the body responds the same way regardless of the cause (Vårdguiden 1177, 2020). Long-term or severe stress is thereby a common risk factor for mental illnesses (Notaras & Buuse, 2020). During pregnancy it is considered normal to perceive higher levels of stress because of several associated factors, such as state anxiety or pregnancy-specific stress. In addition to this there are also enhancing factors that can increase the perceived stress for pregnant women, for example social relationships, environmental conditions, physical health and psychological status. Studies show that the weight of long-term stress and the following behavioral changes can have negative outcomes for pregnant women (Kashanian et al., 2019).

## **BACKGROUND**

### **Pandemic**

WHO (2011) defines a pandemic as “an epidemic occurring worldwide, or over a very wide area, crossing international boundaries and usually affecting a large number of people”. This definition does not include the severity or virology of the disease, and could be interpreted as to occur each year when seasonal outbreaks of infections cross international borders and affect a large number of people. Even so, these seasonal epidemics are not classified as pandemics - an actual pandemic occurs when a simultaneous transmission takes place worldwide (WHO, 2011). According to FHM (2020b) a pandemic implies a wide spread of a new type of virus that is likely to affect large parts of our society.

### **History of pregnancy during pandemics**

#### Influenza

Throughout history pregnant women have been disproportionately affected by influenza pandemics. In 1918 during the Spanish flu almost half of pregnant women diagnosed with influenza also contracted pneumonia (Mosby et al., 2011). Out of these women approximately half died, resulting in an overall case-mortality rate of around 25 percent. In 1957 when the Asian flu pandemic transpired, half of the deaths amongst women of reproductive age were amongst pregnant women. Even though previous influenza pandemics have been established as a great threat to pregnant women (Mosby et al., 2011), the seasonal influenza also presents a risk and the general recommendation for all pregnant women is to be vaccinated from week 16 (FHM, 2020c). Vaccinations are considered safe and reduce both neonatal and maternal morbidity, while the antiviral drugs given to hospitalized patients have shown moderate evidence for its effectiveness in pregnant women. In general pregnant women are more often hospitalized and admitted to intensive care due to influenza compared to the rest of the population. It is also reported as a cause of increased risk of preterm birth and neonatal death. The risk of complications associated with the seasonal influenza virus are especially predominant during the third trimester (Meijer et al., 2015).

#### Swine flu

In 2009 the first influenza pandemic in 40 years emerged, the H1N1 virus also known as



the swine flu. The virus spread rapidly and severe illness in pregnant women were reported (Mosby et al., 2011). Pregnant women acquiring the H1N1 virus had a significantly increased risk of complications that could lead to intensive care and death in comparison to non-pregnant women of the same age. The chance of requiring hospital care was estimated to be approximately four times higher in pregnant women compared to the general population. The most common serious complications in pregnancy were of severe lower respiratory tract infection, especially in the second and third trimester. Preexisting conditions in pregnant women such as smoking, asthma, obesity and/or diabetes constituted particularly increased risk factors for influenza related complications. Minority ethnic groups were also recognized as being at increased risk. The elevated risk was thought to be associated with the physiological changes in the immune system, the cardiovascular system and the respiratory system that occurs during pregnancy. Changes in the immune system, reduced lung capacity and the increased cardiac output are believed to contribute to an immunosuppressed state and an increased risk of cardiopulmonary compromise (Mosby et al., 2011). The impact of the H1N1 infection on the fetuses of women who developed critical illness because of the virus were according to studies significant – it has been reported a drastically increased risk of unfavorable pregnancy outcomes such as miscarriage, three times greater risk for preterm birth and five times greater risk for stillbirth and early neonatal death. The unfortunate outcomes are however more likely to be because of the virus effect on the mother, causing hypoxia, sepsis, hypotension and fever, rather than direct contact between virus and fetus (Ponnampalan et al., 2011).

### **Psychological well-being**

Well-being is described as the state of being happy, healthy and prosperous (Merriam-Webster's Collegiate Dictionary, n.d) and can be classified into five different categories: mental/psychological, physical, social, intellectual and societal (Davis, 2019). WHO (2019) defines psychological well-being as the state in which an individual realizes their own potential, can cope with the normal stresses of life, can work productively and fruitfully and make a contribution to the community. According to Ghorbani-Marghmaleki et al. (2019) factors that contribute to a healthy psychological well-being are self-acceptance, having an accurate perception of reality, thriving in the face of adversity, having and pursuing interests, maintaining healthy emotional relationships, having optimism, having determination and having an independent sense of self that is not reliant upon others for self-identity or happiness. Psychological well-being is an essential component in promoting good mental health. It plays an important role in ensuring dynamism and efficiency in a community and is correlated to positive health-related quality of life (Ghorbani-Marghmaleki et. al, 2019).

### **A midwife's role and competence in managing the psychological well-being of pregnant women**

During pregnancy, biological and chemical changes have an effect on the body of women. Ghorbani-Marghmaleki et al. (2019) explains that the physiological effects due to changes in hormones can make women physically and mentally vulnerable. Such effects can lead to disorders such as anxiety and depression (Alhusen et al., 2016). According to the Swedish Midwives Association (Svenska Barnmorskeförbundet [SBF], 2019) a midwife is expected to uphold a certain level of competence, which

includes an understanding about the mental health of pregnant women. The association has written a competence protocol in order to specify the unique competencies of midwives as well as to uphold ethical principles. Some of these competencies include:

- Meeting the mental, physical and emotional needs of patients seeking health care, regardless of their circumstances.
- Supporting the patient's self - esteem, dignity, integrity and autonomy through dialogue as a tool to create trust, security, participation and equality.
- Compiling a history and status as a basis for identifying risk factors and assessing a plan for individual care needs.
- To be able to assess and provide support and plan for care in the event of mental illness.

The ability to uphold these competencies as a midwife allows for the best possible care to be given. A midwife's role in antenatal care is to provide information regarding lifestyle factors, such as alcohol, drugs, tobacco, nutrition and physical activity, as well as identify and assess risk factors that can affect a pregnancy. During the first visits, a midwife will ask about previous medical history, which includes details of medical and mental illness in addition to possible medications. If a woman has, or has had, a history of a psychological illness the midwife is to send a referral to a psychiatrist or psychologist for further assessment and care planning. It is the midwife's role to have an understanding of the patient's physical health, family situation and capability of taking care of a child. It is during this assessment that a midwife can plan and prepare support for the mother that is suffering from a mental illness or disorder ([www.psykatristöd.se](http://www.psykatristöd.se)).

### **Treatment for psychological disorders**

Anxiety and depressive disorders are common among the general adult population which causes morbidity and is associated with increased medical utilization and lost productivity (Duane-Porter et al., 2016). Depression accounts as one of the leading mental health disorders in the world, affecting more than 264 million people while anxiety affects 284 million people worldwide (WHO, 2017). Treatment for psychological disorders can include medical, behavioral and non-traditional therapies. Selective serotonin reuptake inhibitors (SSRI) and serotonin-norepinephrine reuptake inhibitors (SNRI) are common medications used to treat both long-term depressive and anxiety disorders, while benzodiazepines are recommended for shorter periods of anxiety (Ballinger, 2000). Behavioral therapies, such as cognitive behavioral therapy [CBT], are seen as a source of treatment in parallel to medication or non-traditional therapies which have been proven to reduce stress and anxiety (Gonzalez-Valero et al., 2019). Non-traditional therapies such as yoga and mindfulness meditation have become an option for those wanting to choose non-pharmacological treatments. Yoga combines physical postures, breath control, and meditation while mindfulness meditation requires calming the mind with the goal of achieving a state of “detached observation” (Saeed et al., 2019).

### **Anxiety and depression during pregnancy**

During pregnancy and the perinatal period extra attention and care is required regarding mental health and illness, since pregnancy and the first year postpartum involves big changes for every parent (Rubertsson, 2018). This time is distinguished by extensive

challenges, and risk factors for not being able to cope with these challenges during this period include previous anxiety or depression, other form of previous or ongoing mental illness, lack of social support, relationship problems, isolation due to cultural and/or language barriers, stress due to economic and social difficulties, and traumatic life changes. Although mental illness has become more common, few seek help according to Rubertsson (2018). Estimates regarding the frequency of perinatal anxiety varies, with rates of 15 to 21 percent according to international studies (Folliard et al., 2020). Pregnant women with signs of anxiety and depression are recommended treatment and interventions (Rubertsson, 2018). Although anxiety during pregnancy shares characteristics with general anxiety, anxiety during the perinatal period is considered a unique condition. This is because what initiates anxiety during pregnancy, which is grounded in biological, psychological, and socio-environmental factors. The consequences of this can be significant for both mother and child according to Folliard et al. (2020). To measure symptoms of depression after delivery the Edinburgh Postnatal Depression Scale [EPDS] is used at maternal clinics and within child health care, but it can also be used during other periods in life if a mother is exhibiting signs of depression (Rikshandboken i Barnhälsovård, 2020). The EPDS-scale does not evaluate sleep, fatigue or appetite. This is to make the instrument better suited for the perinatal period and not getting outcomes with too many false positives. Treatment and follow-up of depressive symptoms among pregnant or postpartum women is assessed individually by the professional team working with her, it can involve motivational interviewing, CBT or interpersonal therapy. In more severe cases psychotherapy and/or medical treatment may be necessary (Rubertsson, 2018).

### **Outcomes of labor for stressful pregnancies**

Pregnancy as well as labor and delivery can be impacted due to stress. Stress in pregnancy has been linked to neuroendocrine alterations, dysregulation of cortisol and oxytocin, preterm delivery, low APGAR scores, low birth weight and reduced fetal growth (Cook, 2018). Post-traumatic stress [PTSD], which has been seen in women as a result of the pandemic, can have a major effect on both mother and child. This is due to the consistent challenges the COVID-19 pandemic brings, and thereby inciting the chronic psychological stress which can induce PTSD (Liang et al., 2020). Women who suffer from PTSD also have a high risk for developing other psychological comorbidities such as anxiety and depression (Cook, 2018). Untreated depression in perinatal mothers can lead to poor maternal health, inadequate prenatal care, and postnatal depression (Kajdy et. al, 2020). If perinatal depression were to lead to postnatal depression it can disrupt maternal-infant bonding. This disruption can have a negative impact on the child with an increased risk of delayed cognitive and language development, lower IQ and an increased prevalence of psychiatric and emotional problems (Kajdy et al., 2020).

Stress is an emotional response to psychological and physiological processes in the human body (Alehagen, 2018). A certain amount of stress hormones are required for giving birth, such as adrenaline and cortisol. Cortisol is produced in the fetus adrenal glands and in the placenta days prior to delivery, it raises glucose levels in the bloodstream, prevents degradation of proteins and maintains blood pressure. In relation to this, if a woman has high levels of cortisol earlier in the pregnancy it implies a risk of premature labor (Lindgren & Wiklund, 2018). While adrenaline is released by both

positive and negative mental activity, cortisol is at elevated levels an indicator for negative mental activity like fear, stress and lack of control. These factors contribute to a prolonged duration of the birth process (Alehagen, 2018). In a research conducted by Huntley et al. (2020), 538 COVID-19 positive women from three different countries were studied and experienced a 20 percent preterm birth rate and a 84.7 percent cesarean delivery rate. One in three of the women had a comorbid condition. This high percentage rate comes as a result from women going into labor and enduring the physical and psychological stresses of COVID-19. There was no direct correlation with COVID-19 and increased risk of maternal or fetal deaths according to this study. Regarding heightened rates of cesarean delivery, the pooled portions sub-analysis of cesarean delivery rates by country represented in this systematic review were 42.9 percent from Italy, 44.4 percent from the United States, and 92.2 percent from China. It is noteworthy that at least three articles from China cite COVID-19 infection as an indication for cesarean delivery (Huntley et al., 2020).

### **Mental health of pregnant women during the COVID-19 pandemic**

The implications of the effects of the COVID-19 disease have impacted people socially, economically and physically. As a result, pandemic related stress factors have increased among many different groups, one of which are pregnant women (Almeida, et al., 2020). Almeida et al. (2020) explain that one in seven perinatal women expressed increased anxiety, depression and stress, during the pandemic with the risks being even higher for those who have high-risk pregnancies. Those women most at risk for experiencing increased stress and mental health problems are women that have a pre-existing psychological diagnosis (i.e., depression or anxiety) prior to the COVID-19 outbreak. Berthelot et al. (2020) states that women that have pre-existing conditions reported higher rates of post-traumatic stress disorder and dissociation. Other risks include women younger in age, advanced pregnancies (third trimester), women residing in areas with a high number of infections, being an essential worker, having lower education and lower household income (Shidaye et al., 2020). Due to increased risk these pregnant women needed more contact and medical care from their healthcare providers.

### **Problem formulation**

The pandemic has made an impact on the world in a way that most were not prepared for. Unexpected changes in people's way of life have created new stress factors for many pregnant women. Stress during pregnancy can be profound, not only for the mother but the unborn child as well. Finding effective and creative ways to manage stress and prevent anxiety and depression is key in promoting a healthy pregnancy during a pandemic.

### **AIM**

The purpose of this study was to find methods to reduce stress for pregnant and postnatal women that can be used during a pandemic.

- What factors are correlated with stress in pregnancy during a pandemic?

- Which methods are effective to help women alleviate stress while being pregnant during a pandemic?

## **METHOD**

### **Design**

The chosen design was a literature review. By undertaking a critical and detailed literature review, researchers can condense the context of existing knowledge. Primary sources whose results answered to the aim of this literature review were collected, examined, analyzed and compiled into a clear result as recommended by Polit and Beck (2021). The purpose of all research is to answer questions or solve problems with the aid of disciplined methods. Nursing research is designed to increase the evidence concerning issues within the profession, including education, administration and information. The goal of research is to develop and expand knowledge, and the compiled knowledge extracted from a literature review can be applied in practice. This makes the method useful in the nursing field (Polit & Beck, 2021).

### **Selection**

Articles were collected through the databases Public Medline [PubMed], Cumulative Index to Nursing and Allied Health Literature [CINAHL], and Psychology Information [PsycINFO]. PubMed primarily contains scientific literature regarding medicine and nursing, CINAHL is a nursing database, and PsycINFO contains literature and reports about psychology, behavioral science and sociology (Polit & Beck, 2021). Both quantitative and qualitative studies were included in this study. The decision to include both types of research methods enhances the validity of the conclusions. Qualitative studies were chosen on the basis of its reliability and transferability. Reliability refers to the accuracy and consistency of the information obtained in a study while transferability is the extent in which the findings can be transferred to other settings as an aspect of the study's trustworthiness. Quantitative studies were chosen based on its generalizability which is used to assess the extent in which findings can be applied to people and settings beyond those used in the study (Polit & Beck, 2021). A total number of sixteen articles were included, twelve quantitative articles and four qualitative articles. Search plans and decisions about limitations have been documented in order to guarantee reproducibility as recommended by Polit and Beck (2021).

### **Inclusion and exclusion criteria**

In this literature review original research published within the last 10 years was included to be able to guarantee that the material was up to date. In all databases the language was limited to English and Swedish - the languages the researchers mastered, and English being the most commonly used language within science. Articles had to be ethically approved to be included. In CINAHL Complete and PsycINFO the filter for peer reviewed material was applied. Polit and Beck (2021) defines peer reviewing as research material that has been critiqued and undergone improvements after being reviewed by referees that has focused on the content and method. There is no filter for peer reviewed material in PubMed, but the scientific articles collected from this database were manually searched for having been peer reviewed by the researchers. The data included in this literature review are from articles regarding pregnant and postnatal women that have been affected directly or indirectly by the COVID-19 pandemic, and

articles dealing with treatment options that could be applied during a pandemic. Articles from around the world have been included in the result, but limited to high- and upper-middle-income countries. This limitation was made to facilitate a comparison between the studies. Data concerning healthcare professionals' experiences regarding caring for pregnant women during the pandemic have been excluded. Articles that focused on severe mental illness in pregnant individuals were also excluded from this study.

## **Data collection**

### Database search

The database searches began in January 2021 and the following data collection occurred during February 2021. The researchers performed the searches using the scientific databases CINAHL Complete, PsycINFO and PubMed since these databases publish scientific articles regarding nursing, medicine and psychology. All three databases have subject thesauruses. PubMed uses Medical Subject Headings [MeSH], which are the official terms that represent biomedical concepts where predetermined index words fall under each term. CINAHL Complete applies CINAHL Headings, and PsycINFO uses Index Terms – both operating in the same way as MeSH terms (Polit & Beck, 2021). During the data collection Boolean operators were used across all databases. The three most commonly used Boolean operators are “AND”, “OR” and “NOT”. “AND” was used to restrict the search by making the software retrieve articles only containing the combining terms. “OR” was used to expand the search. The Boolean operator “NOT” was used to narrow the search, these searches did not however result in any findings appropriate for this study. To broaden the search further the truncation symbol asterisk [\*] was used when searching Free Text for example, by applying the asterisk at the end of a search term the word would be searched with all its suffixes (Polit & Beck, 2021).

The aim of the study was indicative for the search terms. To isolate the correct terms to begin the search in PubMed the researchers used Swedish MeSH (Karolinska Institute, n.d). Then, to identify terms, a mapping search was initially done in PubMed with the keywords “pregnancy”, “COVID-19 OR coronavirus” and “women’s health”. Mapping is a function that allows searches for topics using keywords, instead of having to enter a term that is a subject heading in the database. The software translates the term entered into the most probable subject heading. In addition to this the software will also conduct a search in the text fields of articles, such as the title and abstract, for the searched term (Polit & Beck, 2021). Based on the main subject headings of the articles produced from the mapping, the search terms were chosen. Searches for the articles included in the result were made between 4<sup>th</sup> of February and 16<sup>th</sup> of February, with search terms such as “Pregnancy”, “Coronavirus”, “Stress”, and “Treatment”.

The first selection of data was made from reading titles of the articles that the search resulted in. Abstracts of all articles with titles that were associated with the aim and problem formulations of this literature review were then read. If the abstract did not



match the aim or problem formulations the article was removed. All articles with abstracts that did match were read in their entirety and then quality reviewed. If any uncertainties arose about if an article should be included or not, the issue was discussed. In total six different searches were made, these are presented in Appendix I. Sixteen articles were chosen for this literature review, which made it possible to answer the study's aim. The articles included in the result are marked with an asterisk [\*] in the reference list.

### Manual search

Polit & Beck (2021) describe different ways of conducting searches for research evidence. Besides using bibliographic databases another method is the ancestry approach, which involves using references from relevant studies to discover additional material on the same topic. By studying the reference lists of relevant research evidence an additional four articles were found.

### **Data analysis**

#### Quality analysis

After the selection of articles a quality review was performed where the quality of each article was graded. If research is seriously flawed a study cannot provide useful evidence. When drawing conclusions from a study's results, it is essential to consider whether researchers have taken appropriate steps to collect data that reflects reality (Polit & Beck, 2021). To critically examine problem formulations, ethical aspects, methods and results from the selected articles the Sophiahemmet Högskola template for reviewing articles was applied (Appendix III). The examination of articles was done individually to minimize the impact of opinions. The results of the quality reviews were then compared and differences were discussed. Both quantitative and qualitative articles were graded based on context, data collection, sample, hypotheses, method of analysis and more. The quality analysis was executed from different aspects depending on the method used in the study. When an agreement was reached the quality of each article was calculated and given a grade of "very good quality", "good quality", or "low quality" (Caldwell et al., 2011). The results of the articles that answered to the aim of this literature review and met the quality review standards were compiled, analyzed and discussed. No data of "low quality" was included.

#### Integrated analysis

The result of this literary review is based on sixteen articles. To examine the individual results an integrated analysis of the material was conducted in three steps, according to Kristenssons (2014) model. An integrated analysis compiles the results of the articles, and by placing them in relation to each other a clear picture is created. This makes the results easier to understand and evaluate (Kristensson, 2014).

In the first step the material was thoroughly studied and read several times to gain an in-depth understanding of the content, this was done individually. The text was studied with the aim of finding patterns and themes describing specific data that answered to the aim of this literature review – meaningful units (Kristensson, 2014). To be able to find underlying meaning and themes in text the material has to be examined with an open mind and read carefully multiple times (Polit & Beck, 2021). In the next step the findings were discussed to distinguish overall similarities and/or differences, and from this categories were created. Under each category similar content from different articles

that answered to the subject was included. To be able to sort the meaningful units in the raw data a color coding system was used where each color represented a different category. The last step of the analysis was to compile findings from all articles under the different categories.

### **Ethical consideration**

By only considering research material that has been peer-reviewed and ethically approved all ethical considerations can be maintained. By including only this type of data risks of obtaining relevant literature that has not been through the peer-review process is reduced, and therefore giving the data validity. All literature included must meet the inclusion and exclusion criteria as to not create bias within the research. All work cited is ensured to be referenced correctly as to decrease the risk of plagiarism (Polit & Beck, 2021).

Ethical considerations within the included research were of importance as to ensure good evidence that also protected human rights. Articles that did not follow the code of ethics were excluded from the results. A code of ethics is important within research in order to avoid conflicts of interest and guide the researchers conduct in the research of humans and treatment of animals (Polit & Beck, 2021). Three ethical conduct principles in research are articulated in the Belmont Report (United States Health and Human Services, 1978), which is a standard for research ethics in the United States. The three broad principles for protecting study participants are beneficence, respect for human dignity and justice. The beneficence principle enforces a duty upon the researchers to maximize the benefits of the research but avoid, prevent or minimize harm to its participants. This principle includes the right to freedom from harm and discomfort as well as the right to protection from exploitation. The second principle, respect for human dignity, includes the right to self-determination and the right to full disclosure. This principle describes the participants' right to participate voluntarily as well as ask questions, refuse information or withdraw from the study. In order to make informed decisions regarding participation, it is the researchers responsibility to give all persons involved detailed information regarding the study along with information about the rights to refuse participation. The third principle is justice, which includes participants' rights to fair treatment and privacy. Fair treatment includes equitable distribution of benefits that are based on a study's requirements and not a group or persons vulnerability, respect for beliefs and lifestyles and treating people that decline participation in a nonprejudicial manner. A researcher also has the responsibility to respect a participant's privacy by not being more intrusive than need be and collecting personal data in strict confidence (United States Health and Human Services, 1978).

### **RESULTS**

A total of sixteen scientific articles were included in this research. The articles chosen in this study came from China (1), Canada (2), Germany (1), Iran (1), Netherlands (1), Sweden (1), Taiwan (1), United Kingdom (2) and the United States of America (5). Two major themes derived from the article selection (Table 1). The first main theme is *Factors correlated with stress* with the sub-themes: *Worries about health during the pandemic, mental health, Lack of support, Lack of physical activity and loss of sleep,*



*Employment, economy, and socio-demographic vulnerabilities, and Protective factors.* The second main theme is *Methods to reduce stress* with the sub-themes: *Information* and *Treatments*.

Main theme	Sub-theme
Factors correlated with stress	<ul style="list-style-type: none"> <li>- Worries about health during the pandemic</li> <li>- Lack of support</li> <li>- Lack of physical activity and loss of sleep</li> <li>- Employment, economy and socio-demographic vulnerabilities</li> <li>- Protective factors</li> </ul>
Methods to reduce stress	<ul style="list-style-type: none"> <li>- Information</li> <li>- Treatments</li> </ul>

Table 1: Main theme and Sub-theme

### **Factors correlated with stress**

#### Worries about health during the pandemic

In countries profoundly affected by the coronavirus, concerns about mental and physical health during pregnancy and the adverse effects on the unborn child were of great concern. In a study by Lebel et al. (2020), pregnant women proved to have an increased risk for clinical depression due to a perceived threat to one's own life, harm to their baby and not receiving the care needed. This level of concern was also shared in a study by Khoury et al. (2021) where 73 percent of participants indicated a negative overall effect in their lives due to the pandemic. This was induced by increased levels of anxiety and depression endorsed by concerns of something being wrong with the child, their partner being present or not while giving birth and giving birth itself. Elevated depression was a result of increased risk of infection, social isolation and relationship difficulties.

Rhodes et al. (2020) completed a study where 436 women revealed their greatest concerns during the pandemic. Sixty percent of women expressed that their mental and physical health was of great concern while 47 percent were concerned that their heightened levels of stress would transfer to their baby in the womb and adversely affect its development. Those closest to their delivery dates were particularly anxious about contracting COVID-19 in the hospital while giving birth. Two-thirds of women who participated in the survey stated that staying safe from contracting the virus while giving birth was worrying them more than normal while over half of the participants were worried about staying safe during antenatal appointments. Postnatal women expressed concerns about the potential impact on their baby if they contracted COVID-19 themselves. Such concerns included the ability to breastfeed as well as who would look after their baby (Rhodes et al., 2020). Of those women participating in studies reviewing maternal mental health during the pandemic, only a small percentage reported positive cases of COVID-19. One-third thought that they may have contracted the virus but went undiagnosed (Preiss et al., 2020).

Contradicting results regarding pregnancy complications and increased rates of depression and/or anxiety were found. In a COVID-19 related study by Farell et al. (2020), women with pregnancy complications did not score higher in anxiety and depression scales than those women without complications. Contrary to those results, a similar study of 1873 women revealed that pregnancy complications were reported to be significantly associated with increased anxiety (Jhiang et al., 2020).

#### Lack of support

As a consequence of mandatory lockdowns and social distancing, changes in prenatal routines and access to healthcare were affected. A majority of women reported changes in prenatal care due to the pandemic (Khoury et al., 2021; Lebel et al., 2020; Preis et al., 2020). Trouble accessing healthcare services such as psychological counseling, prenatal classes, chiropractic services and massage therapy were profoundly reported (Lebel et al., 2020; Khoury et al., 2020). Concern and disappointment in receiving self-perceived suboptimal care resulted in many worrying about the aspects of care they may be missing (Rhodes et al., 2020). A majority of women were not allowed to bring a support person for in person visits (Khoury et al., 2020). Changes in prenatal care due to the pandemic resulted in a change in birth plans. These changes included locations of birth, changes in supportive persons and childcare arrangements (Lebel et al., 2020).

Lack of social support was a seemingly distressing factor for pregnant women during the pandemic (Rhodes et al., 2020). Increased anxiety and stress prevalent to current disruption, future uncertainty and fear of contracting COVID-19 were intensified due to the perceived reduced level of social support. Prenatal/postnatal groups and visitations with friends and family were reported as missed opportunities to share experiences and learn from others. Increased use of digital pregnancy and parenting resources and online support groups and classes became comforts in the absence of physical support (Rhodes et al., 2020). Missed social experiences due to social isolation were shown to have the largest effects on anxiety and depression in pregnant women during the pandemic (Lebel et al., 2020).

#### Lack of physical activity and loss of sleep

Disruption in routine was found to be a profound factor in the changes in physical health. According to Rhodes et al. (2020) physical health was one of the highest rated concerns for pregnant and postnatal women. Respondents reported most were getting far less exercise than normal and many were reluctant to go outside due to fear of contracting the virus. Women living in urban areas found this to be particularly true due to lockdown and social distancing regulations. One consequence of this being limitations to access to healthy foods, which in turn lead to eating more foods high in fat, sugar, and salt (Rhodes et al., 2020). Those who reported changes in their physical activity routine, during the pandemic, demonstrated significantly higher depression scores in comparison to their counterparts that were able to maintain an exercise routine (Gildner et al., 2020). Gildner et al. (2020) found that changes in exercise routine generally resulted in less physical activity. In the United States, certain demographic groups had higher odds of stopping physical activity according to Whitaker et al. (2020). These groups included: hispanic women, women with high income, nulliparous women, those in the first or second trimester or who did not know their due date, women who were overweight or obese pre-pregnancy, those with pregnancy complications, lost their source of income, or those with reported stronger social

connections. Those with lower odds of stopping physical activity included part-time or unemployed women and multiparous women (Whitaker et al., 2020).

Difficulties and changes in sleep pattern during the pandemic were identified in two studies by Whitaker et al. (2020) and Khoury et al. (2021). Khoury et al. (2021) found that forty percent of women reported subthreshold insomnia while twenty percent reported clinical insomnia. Factors that contributed to these sleep problems were risk of COVID-19 infection, financial difficulties and relationship difficulties. Demographics for women with increased odds of sleep deprivation include middle income groups, women working part-time, women who resided in rural areas, those with pregnancy complications and those that lost their income due to the pandemic (Whitaker et al., 2020).

#### Employment, economy and socio-demographic vulnerabilities

The vastly changing economy due to the pandemic left many without jobs, a reliable income or housing. As a result, some faced the choice of changing their standards of living causing additional stress factors. Thayer and Gildner (2020) found that women concerned about their financial situation were more than twice as likely to have clinical depression. These effects were independent of other common predictors of depression in pregnancy such as household income. Worries about finances during the pandemic were reported by forty percent of the women included in the study. Living with parents, due to financial related stress was also associated with higher levels of depression (Thayer & Gildner, 2020). Although financial stressors proved to be a risk factor for clinical depression, loss of employment was not directly correlated with elevated levels of depression (Lebel et al., 2020). A large number of pregnant women reported a loss of income due to the pandemic according to Gildner et al. (2020). Vulnerable demographic groups, such as those with Hispanic, Latin or Spanish origins, who reported a high-risk pregnancy or reported experiencing COVID-19 related financial stress, displayed significantly higher levels of depression. Factors related to these stresses were changes in exercise routine and living in metropolitan areas. This is due to the cost of living in metropolitan areas and the restricted time outside due to social distancing regulations (Gildner et al., 2020).

Certain demographic and ethnic groups proved to be more vulnerable to the stresses related to the pandemic. Previous history of abuse within the home, having a low-income status and being a woman and a minority are vulnerable socio-demographic factors that are related to higher levels of stress (Preis et al., 2020). Chronic illness and high-risk pregnancies were proven to be predictors of medical vulnerability. The vulnerabilities were common risk factors used to measure preparedness stress (feeling unprepared to give birth during the pandemic) and perinatal infection stress (stress related to fears of perinatal COVID-19 infection) in pregnant women. Other contributing factors were lack of marital status or a cohabiting relationship and previous pregnancy loss. Gestational age, fertility treatment, or use of psychiatric medication did not prove to be vulnerable to increased risks of stress (Preis et al., 2020).

Social status, education and placement of housing were key factors in the comparison of risk factors and stress. Pregnant women in both high- and low-income demographics that experienced financial stress due to the pandemic were shown to have an increased risk of depression (Thayer & Gildner, 2020). Education also played a significant role in

reported levels of anxiety and depression. University educated women were verified to have significantly lower anxiety and depression in comparison to women with little to no college or university education (Farrell et al., 2020). Pregnant women that lived in a rural area and multiparous had more stress in comparison to primiparous women that lived in urban areas (Jiang et al., 2020).

#### Protective factors

Several studies showed that physical activity, access to outdoor space and healthy behaviors was associated with lower scores regarding depression, stress and anxiety (Lebel et al., 2020; Gildner et al., 2020; Preis et al., 2020). Engaging in healthy prenatal behaviors such as a good diet, taking vitamins, exercise and getting enough sleep were linked with lower odds of stress (Preis et al., 2020). Better self-rated health was also associated with significantly lower likelihood of depression (Thayer & Gildner, 2020). The probability of elevated general anxiety and pregnancy related anxiety were lower if participants reported more physical activity, and women who reported exercise changes during the pandemic exhibited significantly higher depression scores compared to those who reported no changes (Lebel et al., 2020; Gildner et al., 2020). In the study by Preis et al. (2020) results indicated that having access to outdoor space was associated with lower odds of feeling unprepared for birth/postpartum due to the pandemic, and concerns related to infection to oneself or the fetus. A large majority of pregnant women reported having access to outdoor space “whenever I want” or “sometimes”, versus “rarely”. Findings from the study by Gildner et al. (2020) showed that pregnant women living in urban areas of all sizes were more likely to report changes in exercise routine compared to women living in non-metro areas. Exercise changes generally meant less physical activity as a result of the pandemic. Living in more rural areas implied the feeling of safety when going outside for walks or other forms of physical activity, given the lower population density and less perceived risk of viral exposure.

Women with higher household income and who were more highly educated exhibited significantly lower anxiety, stress and depression scores (Preis et al., 2020; Gildner et al., 2020; Farrell et al., 2020; Jiang et al., 2021). Education was significantly associated with anxiety and depression scores, with women who were educated at a college level scoring poorer than university educated women (Farrell et al., 2020). According to Jiang et al. (2021) pregnant women who were employed and had completed higher education showed a negative association for experiencing at least one form of the mental health disorders assessed – stress, anxiety and depression. Older age was also shown to be protective against high levels of stress (Preis et al., 2020). The odds of clinically elevated depression and anxiety symptoms were lower if pregnant women had better perceived social support from partners and support in general (Lebel et al., 2020). Women with closer social connections additionally had higher odds of reporting improvements in diet and had lower odds of reporting loss of sleep during the pandemic (Preis et al., 2020). According to one study higher levels of social support acted as a protective factor for the women who considered the impact of COVID-19 to be more negative (Khoury et al., 2021). The ability to access antenatal care information was also found to be associated with a significantly lower risk of perceived stress, anxiety and depression (Jiang, 2021).

## **Methods to reduce stress**

### **Information**

Several articles concluded that women who had access to antenatal care information had a lower risk of perceived stress, anxiety and depression (Farrell et al., 2020; Jiang et al., 2021; Rhodes et al., 2020). The articles addressed different ways of accessing information. One way to obtain information was from apps. According to the study by Rhodes et al. (2020) pregnant women conveyed concern and disappointment regarding the antenatal care they might be missing out on. Because of the reduced support from health care professionals a majority of women in this study reported finding an app developed by the national health service in the United Kingdom helpful during this period, and several stated they used the app more frequently since the pandemic began. Women felt that they got help from the app with getting access to reliable information, bonding with their baby, help with their mental, emotional and physical health, and also help with their relationships (Rhodes et al., 2020). A different approach of getting information was from the media - this included televised media, social media, hospital hotlines and text message services. Different media proved to be effective in different ways. Access to antenatal care information through hospitals' social media was significantly associated with a lower risk of several health disorders - perceived stress, anxiety and depression. Obtaining antenatal information via hospital hotlines or a text message service was found to only lower the risk of anxiety, but not have any significant impact on stress or depression. Results also showed that pregnant women who primarily received advice and information regarding their pregnancy through friends and family members were associated with a higher risk of depression (Farrell et al., 2020; Jiang et al., 2021).

Numerous women also worried about the risk of contracting COVID-19 while visiting hospitals and how they would stay safe at antenatal appointments (Rhodes et al., 2020). According to Khoury et al. (2021) women in their study reported that antenatal appointments and services had not been cancelled because of the pandemic, but that they rather had phone or video appointments instead of meetings in-person. However, this could not account for missing out on parent groups, and the missed opportunities to share experiences and learn from other pregnant women and partners. Many reported an increased usage of digital pregnancy and parenting resources, such as online support groups and classes, as a way of education and exchanging information (Rhodes et al., 2020).

### **Treatments**

Several studies examined online-based programs for therapy, which included mindfulness and CBT (Goetz et al., 2020; Heller et al., 2020; Krusche et al., 2018). Mindfulness based interventions accessible online showed to have an impact on perceived stress and anxiety amongst pregnant women. Krusche et al. (2018) evaluated the results of a four-week intervention where 185 participants were randomised to an online mindfulness course or a control group. Those who completed the course had a significant improvement in general stress in comparison to the control group. These women also reported greater improvements in mood, reduced depression, pregnancy-related stress and labor worry. The authors however point out that these findings can't be guaranteed to be isolated effects of the intervention, and not be due to

other factors. In a pilot study by Goetz et al. (2020) the effect of a brief mindfulness intervention online in high-risk pregnant women also showed the positive impact mindfulness had on anxiety. Despite the fact that the intervention was brief and only lasted one week, participants showed a significant reduction in pregnancy-related anxiety levels, but no substantial effects on reducing perceived depression could be seen.

Two different studies looked at online CBT. In the first study a randomized controlled trial was conducted where the intervention group underwent a five-week CBT course online, while the control group did not receive a specific intervention but could use other concurrent treatments (Heller et al., 2020). The authors describe that symptoms of depression did decrease significantly amongst pregnant women when looking at effects of the online based intervention, although this had also occurred in the control group during the same period. The change was more pronounced in the intervention group but the differences between the groups were small and in conclusion not statistically significant. In the second study by Forsell et al. (2017) online based CBT had a significant effect on depression symptoms in prenatal women. It was discovered that online therapy proved to have a positive effect for women who experienced depression during pregnancy - this was due to the CBT being more structured and controlled, which increased treatment fidelity in comparison to traditional CBT where therapists can deviate from the manuals of treatment or protocols without noticing. The fact that the online CBT specifically targeted prenatal and perinatal women increased the participants' satisfaction and participation (Forsell et al., 2017).

Despite the fact that internet-based therapy has the benefit of being easily accessible, studies demonstrated the challenge of getting women to complete the courses (Goetz et al., 2020; Heller et al., 2020; Krusche et al., 2018). The shortest intervention had the highest completion rate of almost 60 percent (Goetz et al., 2020). Heller et al. (2020) reported that only about half of the participants in the intervention group completed the course. In the study by Krusche et al. (2018) 107 women were included in the intervention group, but only 22 completed the entire course. There were no differences in baseline mood between those who completed the course and those who did not, but those who did complete the course were older, stated more partner support and had greater prior experience of similar activities such as yoga - suggesting they had been more familiar with the general concept of the course, and also had more support during their pregnancy (Krusche et al., 2018).

A few studies evaluated treatment methods which involved participants physically attending meetings. These treatment methods could however be adapted to work under the restrictions of a pandemic (Davis et al., 2015; Pan et al., 2019; Zemestani & Fazeli Nikoo, 2020). Studies that evaluated mindfulness treatments where participants attended group meetings showed that the interventions had a significant impact on stress, anxiety and depression. The treatment also had a long-term effect (Pan et al., 2019; Zemestani & Fazeli Nikoo, 2020). When examining the effect of mindfulness based CBT, results showed that the treatment increased cognitive reappraisal and decreased expressive suppression strategies compared to the control group. Mindfulness based CBT also had a significant impact on psychological well-being from pre to post treatment that continued through follow-up (Zemestani & Fazeli Nikoo, 2020). In a randomized controlled trial by Pan et al. (2019) where participants during mid-pregnancy underwent

a series of eight three hour classes held once a week, and one day of seven hours silent meditation, results showed a significant decline in self-reported stress and depression in the intervention group compared to the control group. The mindfulness skills obtained during the intervention had long-term effects on participants, who maintained a low level of stress and depression at least to three months postpartum. One study looked at yoga as treatment for depression and anxiety in pregnant women by randomly assigning women into either an intervention group, an eight-week yoga class, or a control group (Davis et al., 2015). Participants in both groups got instructions that there were no restrictions regarding seeking care for mental illness outside of the study and were asked to report any non-study treatment received. Results showed prenatal yoga only significantly outperformed the control group on reduction of negative affect over time. Evidence regarding the impact of yoga on depression and anxiety symptoms was mixed - participants in both groups reported lower symptom severity of depression and anxiety at the end of the intervention, but no evidence of greater decline in depression or anxiety for the yoga class participants was established. The rate of completion for all treatments taking place in person were higher in comparison to the online options, from around 70 percent (Pan et al., 2019) to almost 90 percent (Daves et al., 2015) of women completing the interventions.

## DISCUSSION

### Discussion of results

The aim of this study was to find methods to reduce stress for pregnant and postnatal women that can be used during a pandemic. This was followed up by the supportive aim questions: *What factors are correlated with stress in pregnancy during a pandemic*, and *Which methods are effective to help women alleviate stress while being pregnant during a pandemic?* The results of this study revealed the impact of stress in prenatal and perinatal women during a pandemic, more specifically the pandemic due to the new Corona virus SARS-CoV-2. Adverse factors such as concerns for physical and mental health, lack of support, lack of physical activity and sleep, economy, and social demographic adversities proved to have a profound negative effect on women's mental health. While protective factors such as having a healthy support system, access to physical activity and maintaining a healthy diet were proven to reduce the likelihood of stress, anxiety and depression. Methods such as providing adequate information and having access to therapies such as mindfulness, meditation and yoga were also proven to be effective.

#### Physical activity

A factor strongly correlated with elevated levels of stress, anxiety and depression while being pregnant during the pandemic was lack of physical activity. Several studies reported a decrease in physical activity during the pandemic in comparison to before (Rhodes et al., 2020; Gildner et al., 2020; Whitaker et al., 2020). This is consistent with previous studies showing that moderate-intensity physical activity in healthy pregnant women does not only significantly reduce the risk of depression, but also the occurrence of excessive gestational weight gain and gestational diabetes mellitus (Dipietro et al., 2019; Kołomańska et al., 2019). It is however not possible to isolate the pandemic as the only factor causing pregnant women to become less physically active –

the difference could for example have been caused due to the different stages in pregnancy. Women transitioning from the second to third trimester may have stopped being physically active to the same extent due to the discomfort of pregnancy progression, rather than because of the pandemic. Participation in physical activity tends to decline in the third trimester of pregnancy compared to the other trimesters (Nascimento, 2015).

The decline in physical activity largely depends on social distancing and isolation policies, which also have been reported in non-pregnant populations (Tison et al., 2020). This could directly prevent pregnant women's ability to participate in physical activity with business closing and recommendations to stay at home, especially in urban areas where there is limited space for outdoor physical activity. This has resulted in gyms, recreational centers and parks closing, which interrupts normal exercise routines. To encourage physical activity during the pandemic across all demographics and living conditions fitness providers could work with pregnant women to find simple exercise routines that can be done safely from home without specialized equipment and do not require much space. Davenport et al. (2020) suggests that to support maternal physical and mental health household chores, walks, gardening, and online fitness classes may be suitable alternatives to normal exercise routines. The pandemic's restrictions also had an impact on pregnant women's access to healthy foods, in combination with a lower level of physical activity (Rhodes et al., 2020), this may have a long-term impact on mothers and their babies. A bad diet and low activity level could result in an increased risk associated with excessive gestational weight gain (Ren et al., 2018).

The fact that women with higher income and high social support were more likely to not be as physically active as before, according to the study by Whitaker et al. (2020), was surprising. Previous studies have shown that people with high socio-economic status to a greater extent continue to be physically active, even during the pandemic. In a study by Wu et al. (2020) when observing how the public have been experiencing psychological distress during the pandemic, it turned out that those with higher education and income tend to exercise more to improve their physical health. Another study suggests that during the pandemic, it was more likely that women were to be physically active and exercise (Colley et al., 2020). A strong association was also seen between exercise and socio-economic status, and those with a bachelor degree or higher were more likely to report physical activity compared to those with lower education. A possible reason for Whitaker's et al. (2020) findings may be that women with higher incomes are more likely to exercise in a gym, and with many gyms closing or recommendations to not visit the gym may have led to a reduction in physical activity. It could also be due to the fact that women with higher incomes and employment may to a greater extent have had the option to work from home, which led to a reduction in transportation and thus everyday activity declined. Also, pregnant women who declared having part-time employment were more likely to report less changes in physical activity during the pandemic, compared to pregnant women with full-time employment (Whitaker et al., 2020). It is possible that women working part-time may have had different types of employment that did not permit them to work remotely.

Simple and accessible methods to enable physical activity for all pregnant women, regardless of economic status at housing, are needed. As is today, women with higher-income have access to more resources and may find it easier to find new forms



of exercise as the pandemic continues – like purchasing home gym equipment or exercise videos, allowing them to be active even if they live in urban areas and cannot easily exercise outside. This could mean that lower-income pregnant women living in densely populated areas with deficient infrastructure, like green space to enable safe outdoor exercise, may be more significantly affected by pandemic restrictions. Previous research has looked at factors that contribute to physical activity in women and how effective different easily accessible methods are (Ainscough et al., 2020; O'Brian et al., 2014; Sosa et al., 2021). Findings suggest that when determining where providers should intervene in supportive self-management factors that influence women's engagement in physical activity, demographic and situational factors are the primary aspects which determine physical activity levels (Sosa et al., 2021). In a systematic review by O'Brian et al. (2014) different methods of managing interventions to improve health in pregnant women was studied. The most effective intervention was video-supported lifestyle interventions in pregnancy, which resulted in significant increases regarding self-reported physical activity, healthy eating behaviors, nutritional knowledge and discussions about these topics between patients and caregivers. Internet-based support turned out to have very high dropout rates and mainly reached women with higher education that already led a healthy lifestyle (O'Brian et al., 2014), results which are in line with the findings of this literary review. The effect of smartphone apps to improve exercise and nutrition in pregnant women have also yielded promising results according to previous research, having an impact on pregnant women's diet, physical activity, and motivation to engage in exercise (Ainscough et al., 2020).

### Support

This literature review shows that lack of support is a key factor increasing the risk of stress, anxiety and depression amongst pregnant women during the pandemic (Khoury et al., 2020; Lebel et al., 2020; Preis et al., 2020; Rhodes et al., 2020). New restrictions have entailed many changes regarding maternity care and planning around childbirth, from not being able to bring a support person to appointments to changing the location of giving birth. Davis-Floyd et al. (2020) reports, in a study that took place in the United States, how pregnant women had to choose between their partner or a support person such as a doula attending the birth. This since only one person is allowed to accompany them in many hospitals, causing stress and anxiety. As a result women often changed birth plans, some choosing home birth to be able to have more than one support person present. However, the majority of pregnant women hiring doulas were well educated with higher-income, making this an issue for a particular group. It could also be an option for doulas to support women virtually during labor.

In line with this review previous studies show that pregnant women and new parents are finding the support from healthcare services insufficient (Vazquez-Vazquez et al., 2020). This is most likely one of the reasons why pregnant women have chosen alternate ways of obtaining information and support, for example via online support groups and forums. Expecting parents have the right to acquire adequate information from healthcare professionals based on their individual needs, have the opportunity to discuss their worries and be met with respect. These are basic conditions that enable pregnancy to become a good experience for both women and their partners (Svensk Förening för Obstetrik och Gynnekologi, 2016). During the pandemic it has however been hard for

midwives and healthcare providers to give clear information regarding pregnancy and COVID-19 since much is still unknown, which has made it difficult to provide the answers expecting parents want. In this situation midwives need to be prepared to treat the anxiety that the lack of information can cause, which would include a greater effort regarding the mental, physical and emotional needs of pregnant women. Accessing trustworthy information has become a main concern when healthcare professionals have been unable to provide clear information. As the study by Jiang et al. (2021) indicated, pregnant women who primarily obtained information from friends and family members were associated with a higher risk of depression. This may be explained by the fact that women experiencing depression might be more likely to turn to someone they know for help, or that they are met with greater concern from friends or family members. This suggests that there is a need for involving family members in antenatal health education and actively spreading information about maternal health.

Prior studies have demonstrated how stressful events like natural disasters and epidemics strongly impact the severity of stress and mental health outcomes (Brooks et al., 2017; Kucharska, 2017). Brooks et al. (2017) describes how women experienced changes in their relationships with others due to social distancing during the previous SARS-outbreak in 2002, which caused strains on the relationship with spouses due to decreased contact and sleeping separately because of fear of infection. The result of this literature review implies that, in the context of stressful life events such as a pandemic, social support can act as a barrier against mental health problems. Social distancing is a necessary measure to prevent COVID-19 from spreading, but can also result in harmful psychological outcomes. To avoid this, actions need to be taken to maintain social connections and support, since the ability to manage emotions and psychiatric symptoms can help ease the adverse consequences of isolation (Hwang et al., 2020). Interventions regarding social support are highly adaptable and can be targeted through several different interventions for pregnant women. Campaigns regarding mental health aimed at encouraging communication via modern technology during physical isolation could be beneficial. The support from others with similar experiences can be helpful to ease stress in general, and social media is a significant source of support for pregnant women. To encourage virtual support groups aimed at pregnant women to support each other may therefore be valuable.

#### Treatment and methods during a pandemic

Due to restrictions and lock downs it was important to research effective treatments to reduce stress in pregnancy which could also be applied in a pandemic. The study's results showed that having access to information was an important factor in relieving stress in pregnant women (Farrell et al., 2020; Jiang et al., 2021; Rhodes et al., 2020). The results also revealed that due to restrictions, appointments were no longer being accepted in person but rather over digital media which allowed for gaps of information which could be seen as discomforting for mothers (Justman et al., 2020). In order to close these gaps, the results revealed that use of social media and web-based applications increased during the pandemic (Jiang et al., 2021). The benefits of using this type of technology can be found in a study by Smith et al. (2020). The study revealed that women that use social media for support and information during pregnancy were able to better connect with other new mothers and discuss topics that they may not feel comfortable sharing with their family and friends or others in face-to-face settings. This level of support allowed for the women to benefit from online spaces

while also remaining anonymous thereby using the internet to skillfully navigate information as well as avoid anxiety (Smith et al., 2020; Prescott & Mackie, 2017).

Cognitive behavior therapies are known to be used in anxiety and depression treatments. Due to the pandemic, access to these types of healthcare services were not easily available as a face-to face method. As shown in the results, the use of internet-based treatments was seen as a positive replacement (Forsell et al., 2017; Goetz et al., 2020; Heller et al., 2020; Krusche et al., 2018). However, some studies included in the result could not guarantee that the positive outcomes experienced by participants solely were because of the interventions. This could be because the studies did not demand the participants in either control or intervention group to refrain from other services, which would have been unethical. Other psychological treatments could have been started before the interventions and continued after starting, and thereby have had an impact on the results. Nevertheless, the benefits of online therapies can be supported in a study by Heber et al. (2017) which found that on a large scale, web and computer- based interventions have the potential to be effective to reduce stress and mental health problems. A major threat to public health is a result of the substantial economic costs of stress and stress related disorders. Giving effective and scalable solutions allow for the accommodation of the demand for stress management (Heber et al., 2017). This could be applicable to the increase of mental health disorders in pregnancy during a pandemic.

The role of a midwife involves being competent in acknowledging psychological disorders and helping manage the psychological well-being of mothers (SBF, 2019). To be able to help mothers during a pandemic, healthcare workers need to find creative ways to access and help their patients. The results found that the use of digital media outlets allowed for mothers to find therapies for mindfulness, meditation, yoga and social support but did not directly address how CBT could be used during the pandemic. In certain countries, the use of telemedicine for psychiatric services was thrust to the forefront once the pandemic began (Betancourt et al., 2020). Telemedicine is defined as the provision of healthcare services using technology to exchange information for the diagnosis, treatment, and prevention of disease. As the results showed, many women felt a lack of support and felt that they had little access to psychological services (Betancourt et al., 2020; Lebel et al., 2020; Khoury et al., 2020). By using and having access to these types of telemedicine services, the competencies of midwives would not be limited, thereby helping reduce stress in pregnant women.

The results show that while some methods were proven to be effective specifically for the pandemic, other methods such as physical activity and mindfulness, were shown to be a general way of reducing stress during pregnancy. These results were interesting as they could be applied as general methods to reduce stress but also be modified to specifically reduce stress due to the pandemic. The results revealed that use of mindfulness, meditation and yoga are exercises that could be practiced at home, in a lockdown or using distancing measures. The benefits of these methods could also be seen in a study which reviewed the adverse effects of psychological stress during pregnancy (Traylor et al., 2020). The study found that the use of non-pharmacological methods (i.e meditation, mindfulness, yoga and physical activity) provided women with a safe and effective choice of preference which gave autonomy and improved participation. Traylor et al. (2020) also claims that the benefits of having the interventions readily available to women from all backgrounds, closes the gap on racial

and socio-demographic vulnerabilities. By applying these non-pharmacological methods to reduce stress during pregnancy, birthing outcomes could also be improved (Traylor et al., 2020).

The results showed that treatments such as mindfulness and yoga were proven to be effective methods of handling stress during pregnancy (Zemestani & Fazeli Nikoo, 2020; Davis et al., 2015). The effects of these treatments for chronic anxiety and depression can also result in improving labor outcomes. This can be found in a study by Jahdi et al. (2017), yoga was investigated for its effects on maternal labor pain and delivery outcomes. The study found that women that performed yoga for one hour, at least three times a week, reported lower pain intensity in the second and third stages of labor and had a decreased frequency of labor induction. In addition, the women had a lower percentage of delivery by cesarean section and a shorter duration in the second and third stages of labor (Jahdi et al., 2017). Research regarding mindfetalness, a mindfulness-based program where pregnant women are encouraged to monitor character, strength and frequency in their fetus movements for 15 minutes each day, have also shown a lower frequency of cesarean section amongst women who were listed at clinics that provided information about mindfetalness (Akselsson et al., 2020). Psychological anxieties in pregnant women such as fear of birth and concerns for mental and physical health can be eased through the use of mindfulness meditation. Mindfulness training addressing these types of fears allow for women to reduce the use of opioid pain medication and in turn reduce the length of labor and minimize the risk of postpartum depression (Duncan et al., 2017). Mindfulness meditation is also found to reduce the number of unwanted obstetric interventions due to mothers feeling prepared and having reduced stress levels during labor (Duncan et al., 2017). It is important to recognize that these treatments, which can be performed during a pandemic, are shown to have positive binary effects for women during pregnancy.

## **Discussion of methods**

### Design

To answer the aim of this study a literary review was chosen as the design. The review has been carried out in a way that enables the reader to follow the process step by step, which increases the transferability of the study (Polit & Beck, 2021). A weakness regarding literary reviews in general is the selection of articles that makes up the result, as it can be both selective and limited. This could contribute to flawed conclusions, unlike a systematic review where all research regarding a subject is compiled and presented according to Polit and Beck (2021). Criticism has also been aimed at the fact that researchers access literature before collecting their data when conducting a literary review. By doing so prior studies could influence the researchers perception of the issue at hand (Polit & Beck, 2021). However, to get the most comprehensive picture of the phenomenon, within the given timeframe, conducting a literature review was the best available option. It is also possible that the results from a literature review can be transferred into practical suggestions for improving clinical work, which makes the design suitable for the field of nursing research. Had a qualitative approach been taken towards the subject, like conducting an interview study, the outcome of this study would have been quite different. By analyzing qualitative material which is subjective and narrating, the understanding for the individual experience can be enhanced (Polit & Beck, 2021). This would have affected the study in such a way that the aim would have

had to be altered to fit a qualitative design. Methods to treat stress and factors correlating with stress would not have been possible to examine if a qualitative design had been applied.

### Selection and data collection

To compile the result three different databases were used, all focusing on research regarding nursing, medicine and psychology – this to narrow down the searches to relevant areas within the aim. The use of several databases also reduces the risk of missing out on significant data (Polit & Beck, 2021). Initially, only articles dealing with the pandemic were to be used in the result. However, this had to be relinquished as there turned out to be little range in the articles fulfilling the criteria. Therefore it was decided that articles addressing methods that can be applied under the pandemics restrictions also were to be included. This contributes to a broader result in this study. Included articles with methods such as yoga, mindfulness and CBT were specifically reviewed due to its general applicability of use during a pandemic. The number of articles that emerged from the different searches varied in size but generally generated many results which facilitated the possibility of using articles of good and very good quality. This meant the validity and reliability of this literary review could be strengthened, ensuring that the data used only measured what it intended to measure and were as reliable as possible (Kristensson, 2014). Data from several different countries are included in this review but limited to high- and upper-middle-income countries. To compare women's experiences at an international level is difficult, as several different factors come into play – for example the structure of maternity and healthcare, and different distributions of resources between institutions. Even though these country's financial situations are similar, there are also differences, which affect the availability of healthcare. Due to this, the comparison between the countries included may be skewed (Sveriges Kommuner och Landsting [SKL], 2018).

The articles that were found through manual search affect the possibilities of replicating this literature review since these choices were subjective. This could be considered a weakness regarding the selection process as the reliability may have been adversely affected (Forsberg & Wengström, 2016). This literature review did also exclude grey literature – i.e. research with limited distribution like unpublished reports. This may have contributed to a skewed depiction in the result since there is a tendency for published research to overrepresent significant findings, and grey literature that is never submitted often reports negative findings. However, the restriction was made to only include peer-reviewed articles, a significant screening process for findings worthy of consideration as evidence (Polit & Beck, 2021). A literature review should compile current research, and therefore the limitation of ten years was set – even so, the majority of data included had been published within the last year. To include only the most current research in the field increased the credibility of this literary review. By clearly reporting on how selected articles were searched the validity of a study is strengthened, the database searches are therefore reported in Appendix I (Forsberg & Wengström, 2016; Polit & Beck 2021).

This study has created a perception and an understanding for the research previously conducted, primarily by reviewing quantitative studies. This means that women's personal stories and experiences that could have emerged in qualitative studies are largely missing in this literature review (Polit & Beck, 2021). Nevertheless, to be able to

answer the problem formulation regarding which methods are useful to alleviate stress, a quantitative approach had to be taken. One advantage of mainly relying on quantitative research is that the number of individuals included in these studies are greater, and the possibilities for generalization of this study's result are therefore improved.

### Data analysis

The chosen method of quality analysis was utilized and documented by using Sophiahemmet Högskola's systematic quality control template (Appendix III). The quality analysis took into account the types of research methods that were used in each article, qualitative, quantitative or mixed method. Analysis of both qualitative and quantitative methods were challenging though each type of study must be analyzed differently. By using a point system, strengths and weaknesses in the articles were discovered and, in that, given a quality analysis score of low to high quality. In order to give structure in analyzing the content of each article a integrative data analysis model by Kristenssons (2014) was applied. By using this analytic approach, large quantities of data could be converted into smaller, manageable segments. Using this type of analysis system helped in the organization and interpretation of the articles in order to better detect important categories, themes and relationships in the resulting data (Polit & Beck, 2021). However, according to Friberg (2017), literature reviews that are based on this model of analysis are not free from self-interpretations due to patterns being identified and the comparison of data. It is important to address the fact that there is a risk that preexisting knowledge and experiences may have affected the interpretation of the data. As an attempt to avoid this, different angles of approach to the information has been discussed openly during the writing process. By having a good interpretation of data, a study is able to remain valid and withhold good quality analysis (Polit & Beck, 2021). The study's credibility is strengthened due to the fact that the articles were read separately in order to gain self-insight. After a consensus discussion, broad categories were identified which were then represented in colored cluster codes which connected ideas conceptually. Polit and Beck (2021) state that when extracting data it is best to record information in a systematic way. By using a coding system the key variables in quantitative data and themes in qualitative data were easier to analyze and identify.

Most of the study methods of included articles in the result were of a quantitative design where data was quantified through different questionnaires. The benefits of including these types of studies allowed for a larger number of people to be included, which helped increase the quality of those studies. However, this also implicated some limitations such as the small sample size of studies, as well as high loss to follow-up. By analyzing the numeric data and relationships, a phenomena between the studies was realized, increasing the reliability of the collected data (Polit & Beck, 2021). By assessing the studies reliability the literature review gained strength. Qualitative studies that were analyzed were mostly used in a mixed methods research study, thereby combining not only qualitative data but also quantitative data. By finding themes as part of the analysis process, it allowed a collection of data to be distinguished between ideas that bring meaning to an experience as a whole (Polit & Beck, 2021).

### Ethical considerations

Research ethics were considered in all parts of the working process, including but not limited to data collection, method, and the handling of results. In order to maximize the

scientific worth of this study, included articles were reviewed in order to meet the requirements of ethical considerations as described within the articles by an ethics committee. Approved research by ethical committees was also confirmed on the website of the publishing medical journal. Because this study included information from already documented and ethically reviewed data, approval by an ethics committee was not needed.

When performing a literature review it is important to include material that is relevant to the study's aim and is not chosen with bias. A bias is an influence that produces a distortion or error which can threaten a study's validity and trustworthiness (Polit & Beck, 2021). In order to eliminate and reduce bias in this study, it was pertinent to retain a strategic approach of data analysis and the handling of results. This was represented by first performing a quality analysis for all articles included in the result, and afterwards an integrated analysis was conducted. The recurrence of potential inclusion bias could be seen during the analysis of results due to the fact there were no articles that directly correlated effective methods to reduce stress in pregnancy during the COVID-19 pandemic. Due to this it was important that included data remained relevant to the study's aim without inflicting error by selecting articles that were chosen out of bias.

## **Conclusion**

This literary review has revealed the impact of stress among women during pregnancy and after childbirth during a pandemic. Profound factors such as concerns about health, lack of support, lack of physical activity, loss of sleep, financial stressors, and social demographic vulnerabilities proved to have a negative impact on women. Factors that can protect from increased stress include having social support, being physically active and practicing mindfulness. Effective methods such as having access to information and access to online health services also proved to have beneficial factors on women's mental health. By effectively addressing these factors and providing access to treatments, midwives can uphold their roles in their profession and reduce the amount of stress in women that can be seen during a pandemic.

## **Clinical implications**

The result of this literature review can be applied by all healthcare professionals that pregnant women may encounter in today's society. Preventing stress, anxiety and depression is essential for a healthy pregnancy in general, but even more vital during a pandemic. Counseling regarding mental health and lifestyle choices is a significant part of the midwifery profession, ensuring that pregnant women in need of advice have the means to maintain a healthy and safe pregnancy. To be able to assist correctly, midwives and other healthcare professionals have to be informed about what pandemic-related factors that can affect pregnant women and methods that can be used to facilitate good mental health. This literature review can contribute with an increased knowledge of which risk and protective factors there are. Further research and evaluations need to be done concerning the effectiveness and efforts regarding virtual maternity care during the pandemic, as well as the long-term effects of having been pregnant during the pandemic.

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## Appendix I

Date	Database	Word Search	Total # Articles	Abstract	Fulltext	Included Articles
4/2	PsycINFO	((MM "Pregnancy" OR MM "Adolescent Pregnancy" OR MM "Pregnancy Outcomes" OR MM "Primipara") AND (MM "Coronavirus" OR MM "COVID-19" OR MM "Middle East Respiratory Syndrome" OR MM "Severe Acute Respiratory Syndrome")) OR (MM "COVID-19")	13	6	5	2
4/2	PubMed	((pregnancy[MeSH Terms]) AND (coronavirus[MeSH Terms])) AND (mental health[MeSH Terms])	25	11	9	2
5/2	PubMed	((pregnancy) AND (coronavirus)) AND (stress)	85	8	5	2
12/2	PubMed	((pregnancy[Title/Abstract]) AND (covid-19[Title/Abstract]) AND (physical activity[Title/Abstract]))	14	8	3	2
14/2	PubMed	((pregnancy) AND (Covid*)) AND (anxiety) AND (treatment)	65	8	3	2
16/2	CINAHL Complete	(MH "Mindfulness") AND (MH "Pregnancy") AND "patient education"	3	1	1	1
	Manual Search				7	5
	<b>Total</b>			51	34	16

## Appendix II

Author, Year, Origin of Country	Title	Aim	Method	Participants (dropout rate)	Results	Type/ Quality
Davis et al. 2015 USA	A randomized controlled trial of yoga for pregnant women with symptoms of depression and anxiety	The aim of this study is to examine the feasibility and preliminary outcomes of a yoga intervention among pregnant women with symptoms of depression and anxiety.	A randomized control trial with 1:1 ratio groups. Intervention group was a 8 week yoga class and the control group receives treatment as usual.	n = 46 (6)	Yoga was associated with high levels of credibility and satisfaction as an intervention for depression and anxiety during pregnancy. Participants in both conditions reported significant improvement over time.	RCT  Good quality  26 points
Forsell et al. 2017 Sweden	Internet delivered cognitive behavior therapy for antenatal depression: A randomised controlled trial.	To test the efficacy of a pregnancy adapted version of an existing 10-week ICBT-program for depression as well as assessing acceptability and adherence	A randomized control trial in which the intervention group received internet based cognitive-behavioral therapy and the control group received treatment as usual (TAU),	n = 42	Women in the intervention group showed lower levels of depression in comparison to those women that received treatment as usual. Those women in the intervention group showed higher levels of treatment fidelity.	RCT  Good quality  27 points

Farrell et al. 2020 Qatar	The impact of the COVID-19 pandemic on the perinatal mental health of women.	The aim is to study the impact of the COVID-19 pandemic and related restrictions on perinatal mental health among women in Qatar.	Cross-sectional survey from June-July, 2020. The survey was available in English and Swedish. The survey was comprised of relevant demographic data and the Patient Health Questionnaire Anxiety-Depression Scale.	n = 288	Women with pregnancy complications did not score higher. More than a third of the women scored with 5 or more on Depression and Anxiety scales in relation to low self-reported pre-existing mental health problems.	Qualitative  Very good quality  33 points
Gildner et al. 2020 USA	Exercise routine change is associated with prenatal depression scores during the COVID-19 pandemic among pregnant women across the United States	The aim was to explore whether reported exercise routine change was associated with depression score, and the likelihood of changes in exercise routine differed in living areas.	Online survey	n = 1856	Exercise changes meant higher depression scores compared to those reporting no changes. Individuals in metro areas were more likely to report changes compared to women living in non-metro areas.	IE  Very good quality  30 points

Goetz et al. 2020 Germany	Effects of a Brief Electronic Mindfulness-Based Intervention on Relieving Prenatal Depression and Anxiety in Hospitalized High-Risk Pregnant Women: Exploratory Pilot Study	The aim of this study is to explore the clinical effectiveness of a 1-week electronic course of mindfulness on prenatal depression and anxiety in hospitalized, high-risk pregnant women.	A pilot study was conducted in 1:1 ratio groups in which half of the women who screened for depression in the third trimester received 45 minute mindfulness sessions via an app for eight weeks. While the control group received normal prenatal care.	n = 68 (1)	A reduction in anxiety was reduced after 1 week of using the eMBI in the hospital. No significant changes in the EPDS scores were found after completing the intervention.	RCT Pilot study  Good quality  23 points
Heller et al. 2020 Netherlands	The Effectiveness of a Guided Internet-Based Tool for the Treatment of Depression and Anxiety in Pregnancy (MamaKits Online): Randomized Controlled Trial	This study aimed to examine the effectiveness of a guided internet intervention (MamaKits online) for pregnant women with moderate to severe symptoms of anxiety or depression	A randomised control trial that included women with moderate to severe symptoms of anxiety or depression. Participants were randomized Mama kits online and in addition to normal treatments (intervention) or treatment as usual (control). Outcomes based on web-based self-reports.	n = 159	Both groups showed a substantial decrease in affective symptoms over time but the intervention group decreased more than that in the control group. Negative perinatal child outcomes did not differ between the 2 groups.	RCT  Very good quality  31 points

Jiang et al. 2021 China	Maternal Mental Health Status and Approaches for Accessing Antenatal Care Information During the COVID-19 Epidemic in China: Cross-Sectional Study	This study aimed to evaluate the mental health status of pregnant women during the COVID-19 epidemics, explore the approaches used by them to access antenatal health care information, and determine their associations with maternal mental health status	A web-based cross sectional study was used to gather demographic characteristics of Chinese pregnant women and evaluate their COVID-19 self-protection behaviors, knowledge of antenatal COVID-19–related care, mental health status, and channels of obtaining antenatal care information.	n = 1873	89.1% of the women had a higher level of stress due to covid-19. Access to antenatal care information via the hospitals' official social media app was found to be associated with a significantly lower risk of perceived stress and anxiety.	Qualitative study  Good quality  26 points
Khoury et al. 2021 Canada	COVID-19 and mental health during pregnancy: The importance of cognitive appraisal and social support	The aim of this study was to describe the prevalence of mental health difficulties among pregnant women during covid-19 pandemic, determine which related experiences impacted their mental health and evaluate whether cognitive appraisal of COVID-19 and social support act as independent or interactive protective factors, to buffer against adverse mental health outcomes.	An online survey was completed from June to July, 2020	n = 303	Participants (72.3%) experienced a negative impact and higher levels of anxiety and depression due to the impact of covid-19. Reports in changes to their birth plans, anxiety about birth defects, as well as partners being present for delivery were important factors to increased anxiety.	Qualitative study  Good quality  27 points

Krusche et al. 2018 United Kingdom	Mindfulness for pregnancy: A randomised controlled study of online mindfulness during pregnancy	The aim was to evaluate the potential of an online mindfulness course for expectant mothers.	A randomised study with a control group. Participants were randomly allocated to take the online mindfulness course immediately or to wait until after their baby was born, with the aim of a 1:1 ratio.	n = 107 (59)	The course was beneficial for those who completed it, but levels of drop out from the course were very high.	RCT  Good quality  28 points
Lebel et al. 2020 Canada	Elevated depression and anxiety symptoms among pregnant individuals during the COVID-19 pandemic.	To assess symptoms of anxiety and depression among pregnant individuals during the current COVID-19 pandemic and determined factors that are associated with psychological distress.	Online survey	n = 2225 (238)	Increased perceived social support and increased physical activity were associated with reduced symptoms, and thus may be possible targets for intervention	IE  Good quality  27 points
Pan et al. 2019 Taiwan	Assessing the effectiveness of mindfulness-based programs on mental health during pregnancy and early motherhood - a randomized control trial	The purpose of this study is to assess the efficacy of Mindfulness- Based Interventions on the long-term psychological health of women during pregnancy and into early motherhood.	A randomized, controlled trial was conducted to measure the effects of the mindfulness-based childbirth and parenting (MBCP) program (intervention group) compared to the hospital's routine childbirth education (comparison group)	n = 74	After an 8 week study, the intervention group reported significantly lower levels of stress and depression in the second trimester than their comparison group peers.	RCT  Very good quality  29 points

Preis et al. 2020 USA	Vulnerability and resilience to pandemic-related stress among U.S. Women pregnant at the start of the COVID-19 pandemic.	To investigate factors predictive of pandemic-related pregnancy stress	Online questionnaire	n = 4451	Access to outdoor space, older age, and engagement in healthy behaviors were protective against stress	IE  Very good quality  29 points
Rhodes et al. 2020 United Kingdom	Experiences, Attitudes, and Needs of Users of a Pregnancy and Parenting App (Baby Buddy) During the COVID-19 Pandemic: Mixed Methods Study.	Gain insights into attitudes and experiences of expectant and recent parents during the COVID-19 pandemic, investigate whether the app is meeting users' needs during this time, identify ways to revise the content of the app to better support its users now and in future.	A mixed methods study design combining a web-based survey with semi structured telephone interviews among app users in the United Kingdom was applied.	Survey: n = 244 expectant, n = 192 recent parents.  Interviews: n = 13 pregnant, n = 19 recent parents.	Lockdown limits women's ability to exercise & restricting their access to healthy foods. Amongst pregnant women 20,5 % said the app helped with emotional and mental health, 10,7 % with physical help.	Qualitative  Very good quality  33 points
Thayer & Gildner 2020 USA	COVID-19-related financial stress associated with higher likelihood of depression among pregnant women living in the United States	To investigate the impacts of COVID-19-associated financial stress on maternal depression in pregnancy	Data came from an online survey.	n = 2099	Financial stress caused by the COVID-19 pandemic is associated with more than two times the likelihood of depression during pregnancy	IE  Good quality  25 points



Whitaker et al.  2021  USA	Variations in health behaviors among pregnant women during the COVID-19 pandemic	To examine changes in lifestyle behaviors early in the COVID-19 pandemic among pregnant women.	A cross-sectional internet-based survey	n = 706	17%-28% reported adverse changes in one or more of behaviors. Results indicated that about 1/3 were getting less sleep during the pandemic	IE  Good quality  28 points
Zemestani & Fazeli Nikoo  2020  Iran	Effectiveness of mindfulness-based cognitive therapy for comorbid depression and anxiety in pregnancy: a randomized controlled trial	To extend the effectiveness of the MBCT in order to contribute to the dissemination of evidence-based approaches for the treatment of depression and anxiety in pregnant women.	Randomized controlled trial design using the Consolidated Standards of Reporting Trials (CONSORT) guidelines. A pre-test, post-test, and a 1-month follow-up session.	n = 38	MBCT reduces the depressive and anxiety symptoms compared with the control group.	RCT  Good quality  28 points

Källa matris: Willman, Stoltz & Bahtsevani (2006, sid 84). *Evidensbaserad omvårdnad: En bro mellan forskning och klinisk verksamhet*. Lund: Studentlitteratur.

### **Modifierat bedömningsunderlag för att klassificera och kvalitetsbedöma varje enskild vetenskaplig artikel utifrån Caldwell et al, 2011.**

Klassificering utifrån Polit & Beck 2016/2017 (kryssa i rutan).

#### **Kvantitativa studier**

- ☐ Randomiserad kontrollerad studie/Randomised controlled trial (RCT)/experimentell studie; är prospektiv och innebär att den innehåller en intervention och jämförelse mellan en kontrollgrupp och en eller flera experimentgrupper där fördelningen av deltagarna mellan grupperna har gjorts slumpmässigt (randomiserat).
- ☐ Klinisk kontrollerad studie/Clinical controlled trial (CCT)/kvasi-experimentell studie med kontrollgrupp; är prospektiv och innebär att den innehåller en intervention och jämförelse mellan kontrollgrupp och en eller flera experimentgrupper.
- ☐ Kvasi-experimentell studie (KE) utan kontrollgrupp; är prospektiv och innehåller en intervention.
- ☐ Prospektiv icke-experimentell studie/kohortstudie (P); innehåller ingen intervention, jämförelser görs över tid
- ☐ Icke-experimentell studie/korrelationsstudie/observationsstudie/tvärsnittsstudie (IE); innehåller ingen intervention, samband studeras.
- ☐ Retrospektiv studie/fall-kontroll studie; jämförelser mellan fall och kontroller (R).

#### **Kvalitativ studie**

- ☐ Kvalitativ studie (K) är vanligen en undersökning där avsikten är att studera fenomen eller tolka mening, upplevelser och erfarenheter utifrån de utforskades perspektiv. Avsikten kan också vara att utveckla begrepp och begreppsmässiga strukturer (teorier och modeller).

Polit, D.F., & Beck, C.T. (2016/2017). Nursing research: Generating and assessing evidence for nursing practice. (10th ed.). Philadelphia: Wolters Kluwer Health/Lippincott Williams & Wilkins.

Frågor för kvalitetsbedömning	Beskriv kortfattat egen bedömning	Poäng Nej=0, Delvis=1 och Ja=2
1. Återspeglar titeln studiens innehåll? (Kvantitativ- och Kvalitativ studie)		
2. Har författarna publicerat något inom samma eller närliggande område? (Kvantitativ- och Kvalitativ studie)		
3. Sammanfattar abstractet de viktigaste delarna? (Kvantitativ- och Kvalitativ studie)		
4. Är <u>rationalen</u> /problemformuleringen för studien tydligt beskriven? (Kvantitativ- och Kvalitativ studie)		
5. Är litteraturen i bakgrunden tillräcklig och uppdaterad (vilka år) inom forskningsområdet? (Kvantitativ- och Kvalitativ studie)		
6. Är syftet för studien tydligt förklarad? (Kvantitativ- och Kvalitativ studie)		
7. Identifieras och diskuteras alla etiska frågor tillräckligt? (Kvantitativ- och Kvalitativ studie)		
8. Är metoden identifierad och tillräckligt beskriven? (Kvantitativ- och Kvalitativ studie)		
9. Är designen tydligt beskriven, motiverad samt lämplig? (Kvantitativ studie) Är bakgrunden, designen tydligt beskriven, motiverad och lämplig? (Kvalitativ studie)		

10. Är det en hypotes tydligt formulerad? Är huvudvariablerna tydligt beskrivna? (Kvantitativ studie) Är de centrala begreppen tydligt beskrivna? (Kvalitativ studie)		
11. Är kontexten för studien beskrivet? (kvantitativ studie) Är kontexten för studien beskriven? (Kvalitativ studie)		
12. Är urvalet adekvat beskrivet och representativt för populationen? (Kvantitativ studie) Är urvalet av deltagare och datainsamlingsmetoden adekvat beskrivet? (Kvalitativ studie)		
13. Är metoden för datainsamling valid och reliabel? (Kvantitativ studie) Är metoden för datainsamlingen granskningsbar och trovärdig? (Kvalitativ studie)		
14. Är metoden för dataanalys valid och reliabel? (Kvantitativ studie) Är metoden för dataanalys trovärdig och tillförlitlig? (Kvalitativ studie)		
15. Är resultaten presenterade på ett lämpligt och tydligt sätt? (Kvantitativ- och Kvalitativ studie)		
16. Är diskussionen tillräcklig. Diskuteras resultaten i förhållande till tidigare forskning inom området, diskuteras studiens styrkor och svagheter, är diskussionen "objektiv"?		

17. Är konklusionen tillräcklig. Baseras konklusionen (uteslutande) på studiens resultat?		
18. Är resultaten generaliserbara? (Kvantitativ studie) Är resultaten överförbara? (Kvalitativ studie)		
<b>Totalt (max 36 poäng)</b>		

(Caldwell K, Henshaw L, Taylor G. Developing a framework for critiquing health research: An early evaluation. Nurse Education Today 31 (2011) e1-e7.

### Cut off värde för kvalitet

Mycket god kvalitet, 29-36 poäng

God kvalitet, 20-28 poäng

Låg kvalitet, <20 poäng