II. REVIEW OF LITERATURE

A review of literature is a collective body of works done by earlier scientists and published in the form of books or in the form of articles in journals or as monographs etc. A literature review is "an important chapter in the thesis, where its purpose is to provide the background to and justification for the research undertaken" (Bruce, 1994: 217). Many literature reviews provide overviews of evidence addressing a specific, clearly defined research question. It incorporates standardized methods for identifying and reviewing the literature that should be clearly explained in the literature review, with the goal of including all relevant studies on the given topic. This helps not only in avoiding unintentional duplication but also provides valuable guidance in defining the problem, recognizing its significance, and suggesting promising data-gathering devices, appropriate research design, and sources of data. It also guides the investigator in making comparisons between the findings of his study and the findings of other related studies. The investigator reviewed as many studies as possible that are related to the different aspects of the problem based on pregnant women.

The related studies relevant to the present study entitled **"Effectiveness of Music and Meditation on Psychological Status of Pregnant Women in Lakhimpur District, Assam"** were reviewed and grouped in following heads:

2.1 Psychological status of pregnant women

2.2 Effects of various interventions on pregnant women's psychological status.

2.3 Benefits of music during pregnancy.

2.4 Benefits of meditation during pregnancy.

2.5 Discussion over the review of literatures citing various interventions, music and meditation impact.

2.1 Psychological status of pregnant women

Pregnancy brings a mix of feelings, and not all of them are good. They may feel worried, loneliness, fear etc. Worry is common, especially during a woman's first pregnancy or an unplanned one. It can be even harder if they are dealing with depression or anxiety. Pregnancy is always associated with changes in psychological functioning of pregnant women. It is usually associated with ambivalence, frequent mood changes, varying from anxiety, fatigue, exhaustion, sleepiness, depressive reactions to excitement. During pregnancy, changes include body appearance, affectivity and sexuality, whereas the position and role of women attains a new quality. Even thoughts of pregnancy can bring about

numerous worries about its course and outcome, and especially of the delivery itself, which may be so intense that they acquire a feature of phobia (which may be the reason for avoiding pregnancy). Some of the reviews were collected to support this study and discussed below.

International Reviews

Airaksinen et al. (2023) investigated the relationship between diet quality and depressive symptoms during pregnancy. Data from 1,362 pregnant females was collected during the first and third trimesters. Results showed that females with poorer quality diets displayed higher depressive symptoms, a trend that remained constant throughout pregnancy. The study suggests further investigation into the causality of these associations. Khouj *et al.* (2022) assessed 200 women obstetric information and pregnancy-related symptoms in Jeddah. The results showed a significant percentage of women experienced psychological problems, indicating a need for more support to reduce symptoms and help them adapt to pregnancy-related changes.

Adina *et al.* (2022), in their study on 'Depression and anxiety in second and third trimesters among pregnant women in Kenya', assessed the prevalence of prenatal depression and anxiety among pregnant women and identified socio-demographic and health-related risk factors. The study found Unplanned pregnancy and unhappiness are significant predictors, with women who are unhappy about their current pregnancy being twice as likely to experience depressive and anxiety symptoms. Younger maternal age is also associated with prenatal depressive symptoms, and women without a history of seeking mental health help are three times more likely to experience anxiety. However, Moulds et al. (2022) reviewed 87 studies on the relationship between repetitive negative thinking (RNT) and perinatal depression, anxiety and found an association between RNT and depression and anxiety in both pregnancy and postpartum. The pandemic also significantly affected on anxiety and depressive symptoms in pregnant women. The study found that 35.4% of respondents scored higher than 13 on the Edinburgh Postpartum Depression Scale (EPDS). The pandemic also affected social isolation, and mean scores in the Beck Depression Inventory (BDI) and Beck Anxiety Inventory (BAI) as per Durankus & Aksu (2022). They concluded that providing psychosocial support to this population during the crisis is crucial to prevent adverse events during pregnancy, affecting both the mother and the foetus.

Albayati *et al.* (2021) in their cross-sectional study involved 150 pregnant women from Najaf city to assess psychological status on fetal outcomes during COVID-19 pandemic. Results showed that 2.04% experienced medium-level perceived stress, while 52.7% experienced mild anxiety. No depression was found in the study. Most psychological status was non-distressful, with a small percentage experiencing distress. The study recommends an educational program for nurses to reduce stress and anxiety levels. In another study Yin et al. (2021) found that antenatal depression is prevalent globally, particularly in low- or lower-middle-income countries. Factors such as depression history, lack of social support, single/separated/divorced status, unplanned pregnancy, unemployment, violence experience, and smoking before or during pregnancy were significantly associated with the disorder. The study suggests that effective risk assessment strategies and prevention and intervention strategies are crucial to addressing the issue, as a significant number of pregnant women experience depression. Likewise, Gonzalez *et al.* (2021) conducted a study on 200 pregnant women to see "The psychological impact of the COVID-19 pandemic on pregnant women". Among two groups, Pandemic and Pre-Pandemic, the Pandemic group scored higher in depression, phobic anxiety, and perceived stress. Additionally, 25% of pregnant women who lost loved one's experienced insomnia, explaining 13% of the variance in the Perceived Stress Scale. The fear of contagion by COVID-19 increased the scores in the phobic anxiety dimension, affecting pregnant women's mental health. Among 308 third-trimester pregnant women in Qingdao, China, to understand the relationship between social support and anxiety during the COVID-19 pandemic. Results showed high social support levels among these women, medium risk perception, and a high risk of developing anxiety. Maternal anxiety was strongly associated with social support and risk perception (Yue et al. 2021). Age, family economic status, social support, and physical activity were associated with pregnant women's mental health (Fan et al.2021). The study suggests healthcare professionals should strengthen social support to reduce anxiety among pregnant women and psychological intervention measures are necessary to help pregnant women navigate this challenging period.

Effati-Daryani *et al.* (2020) also indicated education level, spouse's job, marital life satisfaction, and number of pregnancies were predictors of depressive symptoms among 205 women from Tabriz health centers in Iran. There was also an increase in anxiety and depression among Sri Lankan pregnant women attending antenatal clinics at Castle Street

Hospital for Women. The study recommended that educating spouses on strengthening marital life can help control worries and reduce stress, anxiety, depression and need for special support for pregnant mothers during infectious epidemics in pregnant women (Patabendige *et al.* 2020).

Happiness during pregnancy experiences had a negative and direct correlation with mental health disorders. However, fear of COVID-19 through mediating concerns of pregnancy experiences had a significant positive relationship with mental health through an indirect path. There may be a relationship between fear and anxiety of COVID-19, pregnancy experience, and mental health disorders observed among 222 women from Kamali Hospital in Alborz province assessed using five questionnaires Fear of COVID-19 Scale, the Anxiety of COVID-19 Scale, the pregnancy experiences Scales, Depression Anxiety Stress scale, and demographic checklist. The results showed that anxiety and fear directly and indirectly related to pregnancy worries were related to the mental health of pregnant women as Salehi *et al.* (2020) expressed.

Moyer *et al.* (2020), said COVID-19-related issues, fear of food shortages, increased home tension, and fear of infection were the most strongly associated with greater changes in perceived pregnancy-related anxiety. Additionally, being an essential worker or living in a location with a high number of COVID-19 cases were significant drivers of greater changes in pregnancy-related anxiety scores. These factors were significant even after controlling for age, education, and previous history of depression and anxiety. Anxiety and depression symptoms showed that the pandemic negatively affected pregnant women's mental health, leading to adverse birth outcomes (Ayaz *et al.*2020). High levels of depression, anxiety, and pregnancy-specific anxiety were linked to concerns about COVID-19 threats to the mother and baby, lack of prenatal care, relationship strain, and social isolation. Conversely, higher levels of perceived social support and physical activity were associated with lower psychological symptoms. So, healthcare professionals establish comprehensive treatment plans for vulnerable pregnant women to prevent mental trauma during infectious disease outbreaks (Lebel *et al.* 2020).

A study by Kotabagi et al. (2020) found that maternal anxiety and depression levels among pregnant women with COVID-19 were low at the end of the pandemic in the UK. The study, which involved eleven COVID-19-positive mothers, found that increased

information and reassurance through social media, healthcare professionals, and primary care likely contributed to these low levels of anxiety and depression.

Brannigan *et al*. (2020) studied on 'The role of prenatal stress as a pathway to personality disorder: longitudinal birth cohort study'. The study involved 3626 pregnant women and used logistic regression models to examine the association between maternal stress and personality disorder. Results showed that children exposed to any maternal stress during pregnancy had three times the odds of developing a personality disorder. The study also found that assessing maternal stress and well-being during pregnancy can help identify those at greatest risk and emphasizes the importance of prenatal care for good maternal mental health. Wu *et al.* (2020) found association of Prenatal Maternal Psychological Distress with Fetal Brain Growth, Metabolism, and Cortical is associated with impaired foetal brain biochemistry, hippocampal growth, and accelerated cortical folding in healthy, well-educated, and employed pregnant women. Maternal depression was also linked to decreased choline and creatine levels in the foetal brain. The findings suggest the need for routine mental health surveillance for all pregnant women and targeted interventions for those with elevated psychological distress.

A study by Pereira et al. (2020) examined the impact of tobacco consumption on maternal and neonatal health in 807 Spanish women. Results showed that tobacco consumption significantly influenced anxiety, delivery, neonatal health complications, and gestational age at birth. High anxiety levels led to more delivery complications, emphasizing the importance of quitting smoking during pregnancy to reduce these risks.

Degirmenci & Yılmaz (2020) conducted a study entitled 'The relationship between psychosocial health status and social support of pregnant women'. It involved 393 women and used the Personal Information Form, Pregnancy Psychosocial Health Assessment Scale (PPHAS), and Multidimensional Scale of Perceived Social Support (MSPSS) to collect data. The findings showed that psychosocial health and social support during pregnancy were affected by spouses' employment status and the number of children. A weak positive relationship was found between psychosocial health and social support.

Tang *et al.* (2019) involved 1220 women with less than 15 weeks gestation in Chongqing, China to assess pregnancy pressure scale, Hamilton anxiety scale, and self-rating depression scale to assess these factors. Anxiety symptoms were associated with housewife/unemployment, primiparity, stress, and low-level social support, while exercise

protected anxiety. Risk factors for prenatal depression included group-oriented personality, anxiety, lack of husband support, low-level family care, and low-level social support.

Kayla Herbell & Zauszniewski (2019) involved 82 women in their second and third trimesters to assess correlations between stress and mental health indicators, with social support mediating the relationship between pregnancy-specific stress and resourcefulness. The study recommends early screening and intervention could significantly reduce mental disorders in pregnant women, with family and societal support also crucial. DeSocio *et al.*(2018) found in "Epigenetics, maternal prenatal psychosocial stress, and infant mental health" provided a summary of the literature on epigenetic effects and infant health outcomes of maternal psychosocial stress during pregnancy. The research, spanning 2008-2018, found that maternal stress can lead to epigenetic mechanisms affecting foetal brain development and increasing the risk of emotional dysregulation and mental disorders. History of previous miscarriages increased the odds ratio of depression. Non-employed women were more likely to experience depression than employed women and students. Unplanned pregnancy and negative thought about its impact on life and work were also found to be more prevalent at University Hospital in Eastern province of Saudi Arabia: (Alqahtani *et al*.2018). Increased maternal stress was linked to factors such as gravidity, gestational age at delivery, monthly family income, prematurity, and preterm delivery (Pais & Pai, 2018) They highlight implications for nursing practice at various levels, including policy advocacy, public education, prevention, screening, intervention and offer educational materials and programs to improve maternal and infant health**.**

Maternal lifestyles during pregnancy can impact antenatal stress and anxiety in 1491 Chinese pregnant women and found increased daily phone usage, good sleep quality, not frequent cooking, and having pets negatively correlated with prenatal stress and anxiety. The results indicated that adverse lifestyles can increase stress and anxiety during pregnancy, while enjoyable activities and regular routines can decrease these risks (Hou et al.2018). However maternal prenatal distress during late gestation was linked to significant reductions in birth weight, birth length, and head circumference. Prenatal stress was also associated with altered diurnal cortisol patterns, which in turn reduced gestation length (Gilles *et al.*2018).

There was a significant difference in stress, anxiety, and depression severity across different trimesters at Tabriz health centres. Depression and stress disorders increased with

gestational age, while anxiety disorder declined slightly in the second trimester but increased again in the third (Effati-Daryani *et al.*2018). The study suggests programs to study and treat mental health issues during pregnancy to ensure the health of pregnant women and their newborns.

Fahami *et al.* (2018) conducted a study on 'The relationship between psychological wellbeing and body image in pregnant women' and it involved 320 women from Isfahan, Iran, and used questionnaires to gather data. The results showed a significant positive relationship between body image satisfaction and psychological wellbeing. The study also found that self-acceptance and personal growth can predict body image in pregnant women. The study concluded that training a positive attitude towards body image or increasing psychological wellbeing knowledge can create a positive cycle, making pregnancy more enjoyable and acceptable.

Shafaie *et al.* (2018) conducted a study on 'Association between psychological status with perceived social support in pregnant women referring to Tabriz health centers'. The study found that perceived social support significantly impacts the mental state of pregnant women in the third trimester of pregnancy. The study involved 372 Iranian women selected through a two-stage cluster sampling method at Tabriz health centers. Data were collected using the socio-demographic characteristics questionnaire, perceived social support (PRQ-85) and the short form of depression, anxiety, and stress (DASS-21). The results showed that increasing social support led to a decrease in anxiety, depression, and stress levels in pregnant women.

Fagbenro *et al.* (2018) studied on 'Influence of Stages of Pregnancy on the Psychological Well-Being of Pregnant Women in Ibadan, Nigeria'. The study involved 100 women and used a standardized questionnaire including socio-demographic factors, and psychological wellbeing scale was used to collect data. The results showed that pregnant women in the third trimester had better psychological wellbeing than those in the first and second trimesters. The study concluded that the stages of pregnancy significantly impact the psychological well-being of pregnant women.

Gravensteen *et al.* (2018) investigated the prevalence of anxiety and depression in the pregnancy following stillbirth and assessed gestational age at stillbirth and inter-pregnancy interval as individual risk factors. The study involved 901 women, including those who had experienced stillbirth, live births, or were previously nulliparous. Anxiety

and depression were more prevalent in the pregnancy following stillbirth compared to those with previous live births or nulliparous women. However, the prevalence declined after a live-born baby, and depression and anxiety increased slightly in the previous stillbirth group. The study also found no association between subsequent pregnancy timing and anxiety and depression in the third trimester.

A study by van Heyningen *et al.* (2017) examined the prevalence and predictors of antenatal anxiety disorders among low-income pregnant women in urban South Africa. The research involved 376 women from a primary clinic in Cape Town. The study found that demographic and socioeconomic characteristics, psychosocial risk factors, and psychiatric comorbidity were predictors for anxiety disorders. Factors such as mental health problems, multigravidity, food insecurity, unplanned pregnancy, pregnancy loss, and threatening life events were identified as predictors. Increased perceived social support reduced the risk of antenatal anxiety.

Hasanjanzadeh & Faramarzi (2017) in their study 'Relationship between Maternal General and Specific-Pregnancy Stress, Anxiety, and Depression Symptoms and Pregnancy Outcome'. The study analysed the relationship between stress, anxiety, and depression symptoms during pregnancy and pregnancy outcomes. The study involved 200 pregnant women from urban and rural health centres, with data collected through questionnaires like the Hospital Anxiety Depression Scale and Pregnancy Distress Questionnaire. The findings showed a negative correlation between stress, anxiety, and depression during pregnancy and neonatal outcomes. Infants of mothers with high anxiety had significantly lower weight compared to those without anxiety.

Pinto *et al.* (2017) studied on 'Maternal depression and anxiety and fetal-neonatal growth'. The study examined the impact of maternal depression and anxiety on neonatal growth outcomes and fetal-neonatal growth trajectories from the 2nd trimester of pregnancy to childbirth. The study involved 172 women who completed self-reported measures of depression and anxiety during the 2nd and 3rd trimesters of pregnancy and at childbirth. Results found that neonates of prenatally anxious mothers showed lower weight, length, and ponderal index at birth than neonates of prenatally non-anxious mothers. Moreover, foetuses-neonates of high-anxiety mothers showed a lower increase of weight from the 2nd trimester of pregnancy to childbirth than foetuses-neonates of low-anxiety mothers.

Silva *et al.* (2017) studied on "Anxiety in pregnancy: prevalence and associated factors". In this descriptive, correlational cross-sectional study, the study assessed the

anxiety levels of 209 pregnant women in a south Minas Gerais, Brazil, using the Hospital Anxiety Subscale and a socio-demographic profile. The findings revealed that occupation, previous pregnancies' complications, history of preterm birth, maternal desire, abortions, daily smoking of cigarettes, and drug use were statistically associated with anxiety during pregnancy. The study recommended the need for further research on anxiety in pregnancy.

Cunha *et al.* (2017) studied on 'Stress and Anxiety in Pregnant Women from a Screening Program for Maternal-Fetal Risks'. The study investigated the relationship between stress and anxiety in pregnant women, focusing on the screening program for maternal-fetal risks. The study involved 90 pregnant women in their first trimester of pregnancy, who were assessed using the Beck Anxiety Inventory and the Stress Symptoms Inventory for Adults. Results showed that 34.4% of the participants reported mild to severe anxiety, with half in the resistance phase of stress. Statistically significant correlations were found between anxiety and stress, but no significant correlations were found among stress, anxiety scores, and sociodemographic variables like marital status, education, and age.

Ghaffar *et al.* (2017) investigated the frequency and predictors of anxiety and depression among pregnant women in Quetta City, Pakistan. A cross-sectional survey was conducted among 750 pregnant women using the Hospital Anxiety and Depression Scale (HADS). Moderate anxiety and depression were reported among the respondents. Unemployed women were found to be more depressed during pregnancy due to lack of economic support and free time to think about their pregnancy. Women with 1-4 children were more depressed and anxious, possibly due to unplanned pregnancy or poverty.

Rasul *et al.* (2017) aimed to understand the relationship between maternal anxiety and depression and major pregnancy complications and birth outcomes. The study involved 646 women and examined factors such as age, marital status, stress, substance use, and ethnicity. Results showed that early-pregnant women with depression were more likely to report cumulative stressors in late pregnancy, such as unborn baby health concerns, financial support, housing inadequacy, and food inadequacy. Stress in late pregnancy mediated the relationship between maternal anxiety and depression and pregnancy complications like gestational diabetes, hypertension, and oedema. The study also found that history of sexual abuse, single or divorced marital status, younger maternal age, and Aboriginal ancestry had moderating effects on adverse pregnancy and birth outcomes.

Yang *et al.* (2017) in a study entitled 'Symptoms of anxiety and depression during pregnancy and their association with low birth weight in Chinese women: a nested case

control study' and it found no significant association between prenatal depression and low birth weight among Chinese women. However, individuals with prenatal depression combined with anxiety were at a higher risk of low birth weight. This association was more pronounced for preterm births, not full-term ones. The study suggested that maternal mental health during pregnancy should be given more attention and that a more effective methodological diagnosis for depression and anxiety during pregnancy is needed.

Biaggi *et al.* (2016) studied a review article on "Identifying the women at risk of antenatal anxiety and depression: A systematic review". This systematic review of 97 papers aimed to identify the main risk factors for antenatal anxiety and depression in women. The review was conducted using PubMed, PsychINFO, and the Cochrane Library. The findings revealed that the most relevant factors associated with antenatal depression or anxiety were: lack of partner or of social support; history of abuse or of domestic violence; personal history of mental illness; unplanned or unwanted pregnancy; adverse events in life and high perceived stress; present/past pregnancy complications; and pregnancy loss.

Li (2016) examined the relationship between prenatal maternal stress, resilience, and sleep quality in Chinese pregnant women. The study involved 231 women in their second trimester. A structural equation model was used to analyse the relationships, with resilience acting as a mediator. Results showed that prenatal maternal stress negatively impacted sleep quality, while resilience positively impacted sleep quality. Resilience mediated the relationship between prenatal maternal stress and sleep quality, with a 22.0% mediation effect ratio. Pregnancy-specific stress was a risk factor for disturbed sleep, while resilience was a protective factor for sleep quality. This finding could guide the development of intervention strategies to improve sleep quality in pregnant women.

Lilliecreutz *et al.* (2016) studied on 'Effect of maternal stress during pregnancy on the risk for preterm birth'. In this case–control study 340 women, including 168 who gave birth preterm and 172 who gave birth at term. Data was extracted from standardized medical records, and if a medical record contained a psychiatric diagnosis or self-reported stressor, the woman was considered to have been exposed to stress during pregnancy. Results showed that maternal stress was more common among preterm births.

Scheinost *et al.* (2016) in a study 'Prenatal stress alters amygdala functional connectivity in preterm neonates.' The study aimed to establish the effects of preterm birth and consists of 12 very preterm neonates and 25 term controls, all without prenatal stress

exposure. Prenatal stress in preterm neonates found that it significantly reduced connectivity between the amygdala and the thalamus, hypothalamus, brainstem, and insula compared to term controls. The study also found that extremely preterm neonates with prenatal stress exposure showed less connectivity between the left amygdala and the thalamus, hypothalamus, and peristriate cortex. The study's findings suggest that prenatal stress may play a role in the alterations in amygdala connectivity associated with preterm birth.

Staneva *et al.* (2015) examined the impact of maternal depression, anxiety, and perceived stress during pregnancy on preterm birth. The study involved four electronic database searches to identify studies published between 1980 and 2013. Out of 1469 articles, 39 were included in the review, which examined depression, anxiety, and perceived stress separately and combined. The results showed strong evidence that antenatal distress during pregnancy increases the likelihood of preterm birth. The study highlights the importance of understanding the link between these factors in preventing preterm birth.

Schetter & Tanner (2015) found that anxiety, depression, and stress in pregnancy can lead to adverse maternal and child outcomes. Anxiety was linked to shorter gestation and negatively impacted foetal neurodevelopment and child outcomes. Chronic strain, exposure to racism, and depressive symptoms in mothers during pregnancy were linked to lower birth weight infants, affecting infant development. These findings suggest that further investigation into these distinct risk factors and their impact on birth outcomes is warranted.

Bayrampour *et al.* (2015) aimed to identify risk factors for chronic antenatal depressive and anxiety symptoms in a longitudinal pregnancy cohort in Alberta, Canada. The study involved 3021 women with singleton pregnancies, measuring anxiety and depressive symptoms in the second and third trimesters. The results showed that less optimistic pregnant women had a four-fold increased risk of developing chronic depressive or anxiety symptoms compared to more optimistic women. Common predictors of these symptoms included high perceived stress, low social support, and a history of mental health issues. Partner tension was the exclusive predictor of anxiety symptoms, while poor physical health, unplanned pregnancy, and infertility treatments were unique predictors of chronic depressive symptoms.

National Reviews

The study by Najam *et al.* (2022) titled “COVID-19 and Anxiety in Perinatal Women" aimed to evaluate maternal anxiety during the pandemic. The research utilized the

Coronavirus Anxiety Scale and the Generalized Anxiety Disorder-7 Questionnaire to assess anxiety levels in 123 perinatal women diagnosed with COVID-19. Findings indicated high anxiety levels in both antenatal and postnatal participants, with antenatal mothers showing significantly higher anxiety levels, according to CAS. The study emphasizes the importance of accurate assessments to provide targeted counselling by healthcare workers and to improve resource allocation for supporting at-risk groups.

Nazir *et al.* (2022) conducted a study titled "Emotional difficulties in pregnant females who tested positive for COVID-19: A cross-sectional study from South Kashmir, India," to evaluate the emotional challenges experienced by pregnant women with COVID-19. Conducted with 63 pregnant women at the Child and Maternity Hospital of GMC who tested positive for the virus, results showed heightened levels of depression, anxiety, and stress. Increased emotional difficulties were particularly noted in educated, working women, and those with a history of obstetric complications were identified as an independent risk factor for increased emotional challenges.

In a study by Bachani *et al.* (2022) focused on the prevalence of depression and anxiety among pregnant women hospitalized for childbirth and tested positive for COVID-19. It examined how sociodemographic factors, social support, obstetrical factors, and COVID-19-related concerns impact mental health. Results found heightened worries related to COVID-19 stigma, infant care support, and healthcare access, with an increase in anxiety and depression postpartum. The study highlighted the need for addressing mental health to improve perinatal care during the pandemic.

Kakaraparthi *et al.* (2022) studied ‘Anxiety, depression, worry, and stress-related perceptions among antenatal women during the COVID-19 pandemic: Single group repeated measures design’. The study explored anxiety, depression, stress, and worry levels among antenatal women during the COVID-19 pandemic compared to the pre-COVID-19 period. Using a single-group repeated measures design involving 101 antenatal women, the study revealed significantly elevated levels of anxiety, stress, and worry during the pandemic. The findings stressed the importance of providing up-to-date health information to enhance maternal attentiveness to COVID-19 risks and its impact on pregnancy outcomes.

Mahapatro *et al.* (2022) examined the association between domestic violence during pregnancy and stress and depression symptoms among women attending antenatal care

(ANC) at a tertiary care hospital in New Delhi, India. Analyzing data from 517 pregnant women, the study found that victims of domestic violence during pregnancy were significantly more likely to suffer from stress and depressive symptoms. Routine screening during pregnancy was recommended to identify and address women experiencing domestic violence and related mental health issues.

Basutkar *et al.* (2021) conducted a study on 'A Study on the Assessment of Impact of COVID-19 Pandemic on Depression: An Observational Study among the Pregnant Women' which assessed the impact on COVID-19 pandemic on psychiatric symptoms among 120 pregnant women and to compare them with non-pregnant women. Utilizing the Edinburgh Depression Scale for mental health assessment, they found notable increments in depression during the pandemic compared to pre-pandemic levels, with factors such as educational background, income, marriage duration, body mass index, and suicidal thoughts contributing to the escalation. This underscores the necessity for regular mental health evaluations and appropriate care for pregnant women during such crises.

Tikka *et al.* (2021) investigated the prevalence and determinants of anxiety among pregnant women during the pandemic. Utilizing the Generalized Anxiety Disorder-7 scale and a specialized scale for COVID-19 related antenatal anxiety, the study found that 11.1% experienced moderate or severe anxiety. Factors such as high-risk perception of COVID-19, more significant antenatal COVID-19 anxiety, and less social support were linked to higher general anxiety levels, while factors like being further along in pregnancy, having lower education, living in semi-urban areas, and lower social support were associated with increased antenatal COVID-19 anxiety. The conclusion suggests that while not extremely high, the anxiety rates in pregnant women are significant enough to require dedicated interventions.

In a study by Nath *et al.* (2021), the incidence of hypertension during pregnancy among attendees of antenatal clinics in Bengaluru was analysed. Out of 783 women in the study, 13.9% were hypertensive. Factors like working outside, obesity, older maternal age, low socioeconomic status, anxiety, and depression were linked to higher risks of hypertension in pregnancy. Identifying these risk factors is crucial for preventing hypertensive complications in expectant mothers.

A study conducted in rural Haryana, India, by Jha *et al.* (2021) examined the prevalence of common mental disorders (CMDs) among pregnant women. The study's

findings were based on a population-based investigation. Pregnant women with gestational ages between 25 and 34 weeks participated in a community-based cross-sectional study that was carried out in 28 rural Haryana villages. The findings showed that among pregnant women, the frequency of CMDs was 15.3%. None of the obstetric or sociodemographic variables were found to relate to CMDs during pregnancy. Pregnant women in the rural area had a significant frequency of CMDs, particularly anxiety. The study suggested that mental health treatments be integrated with regular prenatal care at the primary health care level in India.

Anandhi *et al.* (2021) conducted a study on depression, anxiety, and stress among perinatal mothers in a tertiary hospital. The study involved 150 COVID-positive and 150 COVID-negative mothers, and used DASS-21 to assess their levels. The results showed high self-reported depression, anxiety, and stress levels among all pregnant mothers, with stress levels being lesser. The study highlights the significant psychological impact of the COVID pandemic on all pregnant mothers, emphasizing the need for early assessment and management of maternal mental health.

Jelly *et al.* (2021) studied on the psychological impact of the COVID-19 pandemic on pregnant women in Uttarakhand, India, found that most had minimal psychological impact and anxiety-related symptoms. Factors such as gestational age, occupation, religion, residence, method of conception, history of abortion, and awareness of COVID-19 were associated with higher psychological impact among pregnant mothers. Factors such as parity, education level, occupation, monthly income, religion, marital and family support, history of mental illness, method of conception, and awareness of COVID-19 were associated with anxiety levels among pregnant mothers.

Kalra *et al.* (2021) examined the prevalence and determinants of antenatal common mental disorders (CMDs) among women in India. The review found that risk factors included negative reactions from husbands or in-laws to dowry, difficult relationships, lack of support, and pressure to have a male child. Protective factors included education, employment, supportive husbands, and recreational opportunities during pregnancy. The study highlights the urgent need for local policies and programs for mental health promotion during pregnancy and early intervention.

Britto *et al.* (2020) carried out a study on 'A study on relationship between depression, anxiety and stress of pregnant women' that aimed determine the relationship

between depression, anxiety and stress of pregnant women. The study was conducted in Hospitals, Obstetrics and Gynecology department, Pellamedu, Coimbatore, 60 pregnant women in their three different trimesters viz. 3 months, 6 months, and 9 months in the age range of 23-30 years were selected by purposive sampling. Findings revealed that there was a positive and close relationship between depression, anxiety, and stress among pregnant women in different trimesters.

Dahiya *et al.* (2020) study focused on early detection of possible depression in pregnant women that may lead to decrease in incidence of depression and adverse outcomes of pregnancy. Edinburgh postnatal depression scale was used to diagnose possible depression. The study reported higher prevalence of possible antenatal depression in literate women, female with age of marriage more than 18 years, and women who wanted the present pregnancy. This may be due to awareness of the possible changes and outcomes of the pregnancy and added responsibility. The results also showed higher chances of possible antenatal depression in women who had history of alcoholism in spouse.

Shidhaye *et al.* (2020) examined the impact of COVID-19 on mental health in pregnant women. It found that increased risk perception, reduced social support, domestic violence, disruption of antenatal care, and economic consequences of mitigation strategies can lead to adverse mental health outcomes. The study recommends evidence-based interventions for perinatal depression and stepped, collaborative care using non-specialist health workers to improve access to mental health services.

Singh *et al.* (2020) studied 'Significance of stress assessment: cross sectional study of 1000 pregnant women from India' and the study focused on the association of perceived stress among pregnant women on maternal and foetal outcome. It was an observational cross-sectional study on 1000 pregnant women. The study found no statistical difference in maternal stress levels with different modes of delivery or neonatal outcomes with the third trimester PPS stress score. The findings suggested that adequate counselling is crucial to reduce maternal stress during pregnancy and delivery, and stress assessment should be an integral part of antenatal care.

Dere *et al.* (2019) conducted a study named "Antenatal preparedness for motherhood and its association with antenatal anxiety and depression in first-time pregnant women from India." The study involved 100 women and used the Pregnancy Experiences Scale-Brief Version to assess their rating of uplifts and hassles related to pregnancy. Results showed

that sociodemographic factors like low socioeconomic status, lower education, employment, advanced gestation, and risk factors like antenatal complications can negatively impact the pregnancy experience. Pregnancy-specific anxiety significantly impairs birth preparedness.

Johnson *et al.* (2019) studied 'Fear of Childbirth among Pregnant Women Availing Antenatal Services in a Maternity Hospital in Rural Karnataka'. The study found that 45.4% of pregnant women in rural Karnataka experienced fear of childbirth. The common fears included not feeling confident, fear of labor pains, and fear of cesarean section. Teenage pregnancy, nulliparity, primigravida status, and having no living child were significantly associated with fear. The study suggests that improving maternal and fetal outcomes requires providing information and reassurance to mothers, as there is a need for better maternal and fetal outcomes.

According to a study by Viswasam *et al.* (2019), 3% of pregnant women experience anxiety disorders, such as posttraumatic stress disorder and obsessive-compulsive disorder (OCD). Roughly 13% to 39% of pregnant women reported having OCD at some point during the second trimester. Compared to the general population, pregnant women had greater rates of OCD and panic disorder (PD). It is important to diagnose and treat these diseases as soon as possible, as the study indicates that pregnancy may be a special risk factor for their occurrence or worsening.

Raghavan & Kirubamani (2019) assessed depression, anxiety, and stress among 18 to 40 years old low risk pregnant women in a tertiary care hospital. The study revealed that lower-income and non-literate women were more vulnerable to these concerns. Women who had no formal education or completed high school were more likely to suffer from depression, anxiety, and tension. Anxiety and tension were more prevalent throughout the second and third trimesters. Women who received inadequate support from partners and parents were more likely to develop prenatal and postnatal depression. The study stressed the importance of significant intervention and community-led efforts to enhance maternal health.

Sheeba *et al.* (2019) conducted a study on 'Prenatal Depression and its associated Risk Factors among Pregnant Women in Bangalore: A Hospital Based Prevalence Study'. The study included 280 pregnant women and used the Edinburgh Postnatal Depression Scale (EPDS) to screen for prenatal depression. Results showed a high prevalence of prenatal depression among pregnant women, with domestic violence being a five-fold

higher risk. Pregnancy-related anxiety and a recent history of catastrophic events were positive predictors of prenatal depression.

In Bangalore, Southern India, 380 pregnant women were included in a 2019 study by Nath *et al.* to determine the prevalence and contributing factors of pregnancy-related anxiety. The Pregnancy-related thoughts (PRT) scale was employed in the study as an anxiety screening tool. 195 (55.7%) of the 380 women experienced anxiety related to pregnancy. The high incidence was closely linked to depression, limited social support, and a lower socioeconomic position. The study recommends that future research should concentrate on community-based studies to evaluate the prevalence of anxiety in a wider population of pregnant women.

A study by Johnson *et al.* (2018) examined the screening of mental health disorders among pregnant women in Bengaluru City. The study, which involved 208 mothers in the third trimester, found that 5.8% of pregnant women screened positive for antepartum mental morbidities, while 3.8% screened positive for depression. 15.4% showed depressive symptoms. The study highlights the importance of including mental health screening and treatment as part of routine antenatal care, as poor relationships and desire for a male child are predictors of these disorders.

Priya *et al.* (2018) studied "Depression, anxiety, and stress among pregnant women in East Delhi" which aimed to fill the knowledge gap about mental health issues faced by antenatal females. The study found that 25.5% of pregnant women experienced depression, 63% experienced anxiety, and 23% experienced stress. Pregnant women face increased biological vulnerability due to hormonal maladjustment, psychological vulnerability due to apprehension for motherhood, and social vulnerability due to the added demands of family support.

According to Jha *et al.'s* (2018) systematic analysis of 23 research, common mental disorders (CMDs) in pregnant women ranged between 1% and 37%. Depression was more prevalent with rates ranging from 1% to 30%. The prevalence of generalized anxiety disorder (GAD) was reported to range between 1% and 26%. CMDs were linked to poorer socioeconomic position, intimate partner violence, previous CMD episodes, family mental disease history, and unmarried status. The study additionally revealed that CMDs influenced child health outcomes.

A study by Nath *et al.* (2017) examined the impact of prenatal exposure to maternal cortisol and psychological distress on infant development in Bengaluru, India. The study involved 2612 pregnant women and used questionnaires to collect data on socio-demographic characteristics, obstetric, medical, and psychiatric past histories. Results showed that maternal psychological distress during pregnancy negatively impacts offspring's growth and development. The study recommended evidence-based interventions, such as stress reduction programs, to reduce maternal anxiety and depression during pregnancy.

Madhavanprabhakaran *et al.* (2015) conducted a study on pregnancy anxiety and its associated factors among Indian pregnant women aged 18-35. The study used the State Trait Anxiety Inventory (STAI) and Pregnancy-Specific Anxiety Inventory (PSAI) to collect data. The study found that the highest prevalence of pregnancy-specific anxiety was reported during the third trimester, with all pregnant women rating high levels of third trimester childbirth anxiety. Nulliparous pregnant women reported higher levels of PSA than parous pregnant women. Young age, nulliparous status, and nuclear family nature were identified as common risk factors.

Bhat *et al.* (2015) conducted a study on 'Sociodemographic factors: A major predictor of anxiety and depression among pregnant women'. The study found that socio-demographic factors, such as gestational age, educational qualification, and monthly income, were significant predictors of anxiety and depression among pregnant women. The study involved 47 participants and used the Hopkins Anxiety Checklist and CES-D to assess anxiety and depression. Results showed high anxiety and depression in women under 30 years old, especially those with gestational age under 3 months. Age and income were also found to be negatively and significantly related to anxiety and depression.

2.2 Effects of various intervention on pregnant women's psychological status

Pregnancy can come with an onslaught of emotions. They may feel happy, sad, excited, and worried all in the span of a few minutes along with sleep disturbances feeling stressed and even anxious in the midst of all the positives. Different interventions like yoga, meditation, cognitive behaviour therapy, counselling, mindfulness meditation, music and so on has proved to have benefits on pregnant women. Here some literatures given depicted which supported this study.

International reviews

A study of 318 pregnant women by Ekrem *et al.* (2023) found that perceived stress, social support, psychological resilience, and healthcare practices all had a favourable impact on their healthcare practices. The impact of stress on healthcare practices was detrimental. The study recommends doing extensive descriptive and intervention studies to investigate the impact of social support on healthy lifestyle behaviours in pregnant women from various cultures. This emphasizes the significance of knowing the link between stress, social support, and healthcare practices in pregnant women.

Permatananda *et al.* (2023) investigated the impact of yoga on the anxiety levels of third-trimester pregnant women in Bali. The research involved 44 women, with yoga as the independent variable and 3rd trimester pregnant women as the dependent variable. The state anxiety inventory questionnaire was used as the instrument. The results showed a significant decrease in anxiety levels between the yoga and TAU groups. The yoga group experienced a mean decrease of 3.91, while the TAU group experienced a decrease of 1.73. The study suggests yoga could be a potential alternative method for reducing anxiety in pregnant women.

Astuti *et al.* (2023) assessed how Prenatal Gentle Yoga affected pregnant women's fear of childbirth. Cross-sectional case-control research of 130 first-time expecting women showed that education level, number of ultrasounds, and participation in Prenatal Gentle Yoga sessions all had a significant impact on fear. Participants who attended eight hours or more of classes reported less fear than those who did not. Participation in Prenatal Gentle Yoga was closely associated with delivery fear, implying that it can reduce worry.

Hindun & Franciska (2023) conducted a study entitled 'Effect of yoga practice in reducing blood pressure, platelet blood count, and proteinuria in pregnant women with mild preeclampsia' and the study aimed to investigate the impact of yoga practice on reducing blood pressure, platelet count, and proteinuria in pregnant women with mild preeclampsia. The study involved forty women who agreed to practice 30 minutes of yoga weekly for a month. The results showed that yoga exercise significantly decreased systolic and diastolic blood pressure in these women during the upper 20 weeks of gestation.

A study by Puertas-Gonzalez *et al.* (2022) aimed to test the effectiveness of online cognitive behavioural therapy as a psychological vaccine against stress in pregnant women during the COVID-19 pandemic in Spain. The study involved 207 pregnant women divided

into three groups: Online Cognitive Behavioural Therapy (o-CBT), Online Psychological Support (o-PS), and Usual Care (UC). The results showed that o-CBT participants had lower rates of pregnancy-specific stress, perceived stress, anxiety, depression, and obsessions-compulsions symptoms. This suggests the importance of implementing such interventions during pregnancy, especially during periods of major stress, such as during a pandemic.

Butt *et al.* (2022) studied 'Comparison of Depression, Anxiety and Stress with Quality of Life among Pregnant Women' and investigated the correlation and prediction of depression, anxiety, stress, and quality of life among 106 pregnant women in a local setup. Co relational analysis revealed that depression, anxiety, and stress were significantly negatively related to the quality of life. Moreover, regression analysis found that depression inversely predicted quality of life. Study has significant implications for couple counselling and marital therapy to increase the psychological health of females and to protect new-born babies and pregnant mothers from the effects of psychological distress.

According to Islami & Hardjanti's (2022) findings, hypnosis can reduce anxiety levels in high-risk pregnant women. The study included pregnant women who were considered high risk by the Poedji Rochyati scoring and had anxiety according to the HARS questionnaire. The intervention was administered in three 40-50-minute sessions spread out over a week. Following the final session, all pregnant women's anxiety scores decreased. The study concluded that hypnosis can aid pregnant women who are at high risk of developing anxiety during the Covid-19 epidemic.

Amouzandeh *et al.* (2022) determined the effectiveness of prenatal training in modulating anxiety sensitivity and anxiety control perception in stress-prone pregnant women. Quasi-experimental research was done on 125 participants using the convenience sample approach, with 40 randomly selected and divided into two groups. Each participant completed the pregnant anxiety, anxiety control perception, and anxiety sensitivity questionnaires before and after training. During the training, eight 120-minute sessions were held to teach experimental procedures and healthy lifestyles. The results revealed that psychological training during pregnancy, such as relaxation and healthy lifestyle, decreases pregnancy anxiety, perceived stress, and boosts anxiety control perception in pregnant women.

Mahmoud *et al.* (2022) investigated the effect of cognitive behavioural therapy on stress and anxiety levels in pregnant women who had experienced a previous pregnancy loss. Data were collected using Taylor's Manifest Anxiety Scale, and the Levenstein Stress Perception Questionnaire. The study indicated that CBT lowered stress levels in the intervention group after CBT compared to the control group, indicating that there were no statistically significant variations between pre and post routine of care. Cognitive behavioural therapy can be used to help pregnant women who have previously lost a pregnancy reduce worry and stress.

Putri *et al.* (2022) conducted a study on 'An Analysis of Prenatal Yoga for Pregnant Women at Eka Sri Wahyuni Clinic' to use knowing how much big influence of prenatal yoga on complaint physical as well as feeling not comfortable for mom second and third trimester of pregnancy. The result showed average score complaint physique from mothers pregnant before doing prenatal yoga. The found that is prenatal yoga can be one reason decline complaint physique of pregnant women entering the second and third trimesters.

A study by Dafroyati *et al.* (2022) examined the impact of cognitive behavioral therapy (CBT) on the anxiety levels of pregnant women during the COVID-19 pandemic. The study involved 80 respondents, including 40 intervention and 40 control groups. The intervention group received CBT therapy for 10 sessions per hour. The results showed a significant decrease in maternal anxiety levels after the CBT intervention, indicating that CBT can effectively reduce the anxiety of pregnant women during the pandemic.

Yuliani & Andarwulan (2022) determined the effect of prenatal yoga on the length of the second stage of labour at Mitra Sehat Mandiri Clinic. In this quasi-experimental primigravida method in the third trimester with a sample of 30 pregnant women who were divided into two groups, namely 15 maternity mothers who attended prenatal yoga and 15 who did not participate in prenatal yoga. The conclusion is that there is an effect of third trimester yoga exercise on the length of the second stage of labor in mothers. Mothers who practice prenatal yoga before delivery will be better prepared to face labor, focus their thoughts, and provide inner peace.

Herniyatun *et al.* (2022) determined the effect of prenatal yoga on the anxiety level of pregnant women in the third trimester during the Covid-19 pandemic. This study used Pre-Experimental Design with One Group Pre-test and Post-test Design. The sample in this study was 576 pregnant women. The results showed that there is a difference in the level of

anxiety before and after the intervention in the form of prenatal yoga. Prenatal yoga reduces anxiety levels in pregnant women in the third trimester during the Covid-19 pandemic.

Zakaria & Astuti (2022) studied 'Utilizing Go-Yoga Smartphone Application to Prevent Preeclampsia in Pregnant Women' to determine the differences in the implementation of the Go-Yoga smartphone application and the role of the family in pregnant women in the III trimester on blood pressure and albumin levels. The study involved 60 women in the third trimester, divided into three groups: those who practiced yoga with books, those who used the app with their families, and those who used it with their families. The results showed that the third group had the highest average blood pressure, and those who used the app with their families had lower blood pressure. Additionally, the study found that using the Go-Yoga app with family members may prevent hypertension during pregnancy.

Tuxunjiang *et al.* (2022) conducted a study on the relationship between pregnancy stress and prenatal anxiety in pregnant women in Urumqi, Xinjiang. The study involved 750 women and used the Bootstrap mediation test and Amos to establish a structural equation model. Results showed a significant correlation between pregnancy stress, mental resilience, and prenatal anxiety, with mental resilience playing a partial mediating role. The study recommends that pregnant women exercise their mental resilience to reduce prenatal anxiety and promote physical and mental health.

Soleha & Rahmadania (2022) studied 'The effectiveness of yoga relaxation techniques to reduce the anxiety level of pregnant mothers primigravida trimester III'. The study examined the effectiveness of yoga relaxation techniques in overcoming anxiety in third-trimester primigravida pregnant women. The study used a quasi-experimental design with a pre-test and post-test, with 40 respondents from 28-36 weeks gestational age. The standard Hamilton Anxiety Rating Scale (HARS) questionnaire was used. Results showed that yoga relaxation techniques reduced severe anxiety levels to mild levels, and anxiety levels decreased by 2.67 times in pregnant women.

Kuswati *et al*. (2022) examined the effect of pregnant yoga on reducing back pain in pregnant women in the second and third trimesters. In this quasi-experiment with (Pre-test and post- test without control group design) 30 pregnant women in the second and third trimesters were taken by purposive sampling technique. The results showed that back pain before doing yoga during pregnancy, most of the respondents experienced back pain while

after being given yoga, most of the pregnant women improved their condition. There is an effect of yoga on reducing back pain in pregnant women in the second and third trimesters.

Siregar *et al.* (2022) conducted a study on 'The Effect of Self Hypnosis on the Reduction of Anxiety of Pregnant Women in Trimester III Practice Midwife Anni Rizkiah' and investigated the impact of self-hypnosis on the anxiety of pregnant women in the third trimester at Midwife Anni Rizkiah's practice. The study involved 15 pregnant women and found that self-hypnosis significantly reduced anxiety in the third trimester. The study revealed that there is an effect of self-hypnosis on the anxiety of pregnant women in the third trimester. The researchers suggested that midwives should implement policies related to self-hypnosis for every pregnant woman who visits the practice, as it has been shown to reduce anxiety.

In another study by Maharani *et al.* (2022) examined the correlation between prenatal yoga participation intensity and anxiety levels in third trimester pregnant women in Kartasura district. The study involved 42 women who participated in prenatal yoga and underwent prenatal check-ups. The results showed that 22 women who did not participate experienced severe anxiety, while the majority of the 20 who participated in prenatal yoga experienced mild anxiety. The study concluded that there is a relationship between prenatal yoga intensity and anxiety levels in third trimester pregnant women.

Golshani *et al.* (2021) examined the impact of cognitive behavioural therapy (CBT) on perceived stress, anxiety, depression, and quality of life in pregnant women with a history of primary infertility. The study involved 56 women, with the intervention group receiving group CBT after the 14th week of pregnancy, and the control group receiving routine care. The results showed that the counselling group had significantly lower perceived stress and anxiety scores than the control group four weeks after intervention. The study concluded that CBT-based counselling effectively reduces stress and anxiety, improving quality of life.

Sanaeinasab *et al.* (2021) conducted a randomized controlled trial to assess the efficacy of a spiritually-integrated cognitive-behavioural educational group intervention for reducing stress, anxiety, depression, and blood pressure during pregnancy and improving delivery outcomes. The intervention consisted of four 90-minute group sessions over 8 weeks, using a spiritually-integrated cognitive-behavioural approach to help participants

cope with pregnancy stress. The study found significant differences in systolic and diastolic blood pressure between groups at the 3-month follow-up, favouring the intervention group.

Amouzande & Heris (2020) conducted a study on the impact of prenatal training on anxiety sensitivity and control perception in stress-prone pregnant women. The study involved 125 volunteers, divided into experimental and control groups. The experimental group received stress management training and healthy lifestyle techniques for eight sessions. Results showed that stress management training combined with healthy lifestyle techniques increased anxiety control perception, decreased perceived stress, and reduced pregnancy anxiety. However, the training sessions did not positively affect anxiety sensitivity.

Akmese, & Guneri (2020) evaluated the effectiveness of a group-based prenatal yoga program on perceived stress in pregnant women. The study found that yoga was acceptable to stressed pregnant women and significantly decreased their stress perception. The women were able to express the physical and mental effects of yoga on stress management.

Hassan *et al.* (2020) investigated the effect of cognitive behavioural therapy on anxiety, stress, depression, and coping pattern among pregnant women with preeclampsia. The study found a statistically significant difference in scores of depressions, anxiety, and stress pre and post the cognitive behavioural therapy among the intervention group. Conversely, in the control group, there was no statistical difference in scores of depressions, anxiety, and stress pre and post routine care. Cognitive-behavioural therapy can be used as a treatment option for reducing pregnancy-specific anxiety, stress, and depression in preeclamptic women and improving coping patterns among high-risk pregnant women.

Abazarnejad *et al.* (2019) conducted a study on the effectiveness of psycho-educational counselling on anxiety in pregnant women with preeclampsia. The study involved 44 women, divided into two groups: control and intervention. The anxiety levels were measured using the Spielberger State-Trait Anxiety Inventory (STAI) before and after the counselling sessions. The intervention group showed a significant reduction in anxiety levels, while the control group experienced a slight increase. The results suggest that psycho-educational counselling can significantly reduce anxiety levels in pregnant women with preeclampsia.

Novelia *et al.* (2018) conducted a study on the effects of yoga relaxation on anxiety levels among pregnant women at the third trimester. The study used a quasi-experimental design and involved 30 pregnant women. The Hamilton Anxiety Rating Scale (HARS) was used to measure anxiety levels. The results showed a significant difference in anxiety levels before and after the intervention in the experimental group and between the experimental and control groups. Yoga relaxation was found to significantly reduce anxiety levels among pregnant women at the third trimester.

Jannah *et al.* (2017) and Beevi et al. (2016) conducted studies on hypnosis and its effects on anxiety levels in primigravida mothers. Jannah et al. found that hypno-anxiety significantly reduced anxiety levels in the intervention group after four weeks of therapy.

Beevi *et al*. (2016) also found that hypnosis intervention helped reduce physical and psychological symptoms during pregnancy. The experimental group experienced a reduction in psychological symptoms, such as stress, anxiety, and depressive symptoms, while the control group experienced increased stress, anxiety, and depressive symptoms. Both studies suggest that hypno-anxiety could be an alternative therapy for reducing anxiety in pregnant women.

A study by Parsa *et al.* (2016) investigated the effectiveness of counselling in reducing anxiety among nulliparous pregnant women. The study included 110 women from Iran, divided into two groups: experimental and control. The experimental group received four weekly sessions of group counselling about mother-infant attachment behaviours, while the control group received routine care. The experimental group experienced a significant decrease in state and trait anxiety levels, with a significant difference in mean scores. The results suggested that prenatal counselling is effective in reducing anxiety levels among pregnant women.

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Rameshkumar *et al.'s* (2023) pilot study evaluated the impact of intravenous iron sucrose on oxidative stress and antioxidant status in pregnant women with iron deficiency anaemia (IDA). The study involved 20 women with moderate IDA and collected blood samples before and after treatment. The results showed that intravenous iron sucrose infusion was associated with increased lipid peroxidation in antenatal women with IDA, suggesting the need for antioxidant treatment during iron infusions. The study suggests that

antioxidant treatment during iron infusions could potentially reduce oxidative stress in pregnant women with IDA.

Shidhaye *et al*. (2022) conducted a pilot randomized controlled trial on the effectiveness of a yoga-based intervention for maternal mental health and immune function during the COVID-19 crisis in a rural Indian community. The study involved participants attending weekly group yoga sessions for 12 weeks and practicing yoga at home. The results provided evidence for the intervention's feasibility, acceptability, and preliminary efficacy, paving the way for an explanatory randomized controlled trial to assess its efficacy and cost-effectiveness.

Francis *et al.* (2022) examined the impact of pica practice on pregnant women's nutritional status, stress, and anxiety. The study, conducted in Chennai, India, found that pica practice, not just ingestion of edible substances, led to anaemia, increased stress, and anxiety. The study revealed that one-fourth of pregnant women practice pica, and many also consume non-edible harmful substances. The study highlighted the detrimental effects of pica on women's nutritional wellbeing and stress levels.

Raghuveer *et al.* (2020) evaluated the effectiveness of a brief psychological intervention delivered by a nurse for mild to moderate depression in pregnant women in India. The study involved 816 women with mild to moderately severe depression, randomly assigned to trial intervention and treatment-as-usual (TAU) groups. This study holds promise to cast light on the course and outcome of depression during pregnancy in different parts of India. It is envisaged to help in developing a sound screening and referral-based protocol for obstetric settings.

Yadav & Yadav (2019) aimed to determine the impact of a Combined Interventional Approach (CIA) on achieving full antenatal care (ANC) among pregnant women in District Dehradun. The approach included multiple interventions, such as a control room, mobile application, community participation, alternative referral transport, and community sensitization for high-risk pregnancy. If proven effective, this approach could strengthen ANC services without additional costs, improving ANC coverage and improving pregnancy outcomes and maternal and neonatal health, especially in low-resource countries like India.

Another study by Bhutekar & Shirsath (2017) investigated the effects of vipassana on stress and anxiety among pregnant women. The study involved 50 pregnant women from a dhamma Ajanta vipassana centre in Aurangabad, using a perceived stress scale and state

trait anxiety inventory for data collection. Results showed significant differences in stress and anxiety levels between pre-test and post-test, suggesting that vipassana meditation can positively affect stress and anxiety levels among pregnant women.

Kumar *et al.* (2016) also studied 'To Study the Effect of Integrated Yoga Practices on Stress during Pregnancy' and the study was to assess the effect of yogic package on level of stress during pregnancy in 20 primigravida aged 20-30 years. They performed 45 minutes of yoga, including physical posture, breathing, mantra chanting, and relaxation techniques. Results showed yogic intervention significantly decreased the level of stress in the post test as compared to pre-test. The findings suggested that yoga is well indicated for pregnant women and decrease the level of stress during pregnancy.

Karimi *et al.* (2016) conducted a study on the effectiveness of Teasdale's cognitive therapy on anxiety reduction during pregnancy. A total of 80 pregnant women were interviewed and completed a Spielberger questionnaire. 24 people with intermediate and high state and trait anxiety scores were selected, and 12 participants were trained to control anxiety and fear of childbirth using Teasdale cognitive method. The findings showed that both state and trait anxiety were significantly decreased in the experimental group, indicating that Teasdale's cognitive therapy is effective in reducing anxiety during labour.

2.3 Benefits of Music during pregnancy

It is proven that music has a role in brain development before birth. Listening to music during pregnancy will not only have a soothing and uplifting effect on the pregnant woman, but also a positive influence on the unborn baby. Around 16─18 weeks of pregnancy, the little one hears its very first sound. By 24 weeks, the little ears start to develop rapidly and babies have been shown to turn their heads in response to voices and noise in the last few months of pregnancy, an unborn baby can recognize her mother's voice, her native language, word patterns and rhymes. In the third trimester, the baby will be able to hear the music that we play. Classical music, gentle sounds like lullabies, nice melodies that inspire happiness all are designed to be soothing. Present study exposed some selected pregnant women to music therapy for assessing her psychological status. However previous literatures give postpartum benefits, infant development and pregnancy outcomes provide benefits to pregnant women and newborns, thus justifying its importance in this field.

International reviews

Estrella *et al.* (2023) investigated the effects of virtual reality and music therapy on anxiety levels, maternal and foetal physiological indicators, labour, and delivery outcomes in 343 full-term pregnant women. The study consisted of three groups: music therapy intervention, virtual reality intervention, and control group. The intervention was administered during a non-stress test in the third trimester and birth. When compared to the control group, the music therapy and virtual reality groups had lower levels of anxiety, as well as lower systolic and diastolic blood pressure and maternal heart rates. The control group also had more unreliable foetal heart rate tracings. The study shows that music and virtual reality can be utilized as nonpharmacologic therapies to alleviate anxiety and improve mother and foetal physiology parameters, and improve labour and birth outcomes.

Baltacı *et al.* (2023) compared the effects of nulliparous pregnant women listening to lullabies and self-selected music on reducing the anxiety and antenatal stress. This was a randomized controlled study. Lullaby group (LG) (n = 40) listened to the lullaby chosen by the researcher, mixed music group (MG) (n = 40) listened to self-selected music and control group (CG) (n = 40) received general care. Post-test anxiety and stress levels was lower in two intervention groups versus CG. Post-test anxiety was lower in the MG versus LG; however, post-test stress levels were similar. Pregnant women listening to self-selected music at home is more effective in reducing anxiety.

In another study by Baltacı *et al.* (2023) also compared the effects of listening to lullabies and self-selected music in reducing distress and increasing maternal attachment in pregnant women. 120 pregnant women were recruited, and the participants were allocated to one of three groups, with 40 women in each. For 30 minutes every day for two weeks, the lullaby group (LG) only listened to lullaby records at home, and the multi-music group (MG) listened to self-selected music from different records; the control group (CG) did not listen to any music. Results showed that for pregnant women, listening to self-selected music was more effective in reducing distress, whereas listening to lullabies selected by the researcher was more effective in increasing attachment.

Soylu *et al.* (2022) studied a randomized controlled clinical trial study which assessed music's effect on foetal well-being, anxiety levels, and vital signs of pregnant women during the non-stress test. The sample comprised of 74 (37 music and 37 control group) pregnant women. The study determined that music affects vital sign values, foetal

movements, reduced the state and trait anxiety levels of pregnant women during the non-stress test procedure.

Catalgol & Ceber Turfan (2022) conducted a randomized controlled trial on the impact of music therapy on maternal, foetal, and neonatal outcomes. The randomized controlled trial's sample size was 100 primipara women (50 intervention and 50 control). Women in their 36th, 37th, and 38th weeks of pregnancy had the Nonstress Test. During the test, the intervention group was given music, while the control group received standard care. The results revealed that the use of music considerably reduced anxiety. The intervention group had substantially higher findings for acceleration, mean number of fetal movements, and reactivity. There was no significant difference between the groups in terms of State Anxiety Inventory scores after labour or neonatal findings. Music therapy for pregnant women was demonstrated to reduce mother anxiety and improve Nonstress Test results.

Perkovic *et al.* (2021) investigated the relationship between music therapy and mental health during pregnancy. Several studies have shown that listening to music has a therapeutic impact on the health of both mother and child. Listening to music throughout pregnancy improves mood and reduces symptoms of postpartum depression. Scientific research demonstrates the impact of music therapy on pregnant women's stress and anxiety levels, as well as calmer children and stronger emotional bonds. GIM treatment, or music-induced imagination, has also been shown to improve psychological resilience.

Perkovic *et al.* (2021) aimed to prove the impact of educating pregnant women and listening to classical music on the experience of childbirth pains and the occurrence of psychological symptoms during puerperium. A prospective randomized controlled trial (n=198) was conducted. The experimental group of pregnant women was educated during pregnancy and listened to classical music the rest of the pregnancy, while the control group received the usual care. Results demonstrated the impact of midwifery education and listening to classical music on the perception of childbirth pain and mental health in the puerperium. The experimental group rated childbirth pain significantly lower compared to the control group and had significantly fewer psychological symptoms 6 weeks after delivery. Six weeks following delivery, the experimental group reported much less psychological problems and evaluated pain during labour significantly lower than the control group.

Weingarten *et al.* (2021) aimed to evaluate the impact of music on anxiety in women undergoing caesarean delivery. Out of 1296 studies, 15 met the inclusion criteria, with

613 women in the music group having lower intraoperative anxiety levels than the controls. Music exposure was associated with lower anxiety levels, even when the caesarean delivery was unscheduled and the music was selected by the patient or the study team. The effect of music on preoperative and postoperative anxiety varied depending on the anxiety assessment tool used. In conclusion, music is associated with decreased intraoperative anxiety in patients undergoing caesarean delivery.

Shimada *et al.* (2021) investigated in the literature the studies on the benefits of music therapy interventions among pregnant women in the prenatal, delivery and postpartum periods. In total, 146 articles were identified, and only 23 studies were included in this systematic review. The articles found indicate among their results relaxation, decreased levels of anxiety, psychosocial stress, and depression, decreased pain, increase in the maternal bond, improvement in the quality of sleep, control of the fetal heart rate and maternal blood pressure, and decreased intake of drugs in the postoperative period. Music therapy during the prenatal, delivery and postpartum periods can provide benefits to pregnant women and newborns, thus justifying its importance in this field.

Wulff *et al.* (2021) examined the effects of a prenatal music and singing intervention on maternal well-being and mother-infant bonding. Using visual analogue scales and questionnaires, the study evaluated 172 pregnant women's depression symptoms, self-efficacy, maternal well-being, and mother-infant attachment. The outcomes demonstrated the beneficial effects of both therapies on bonding, stress, and emotional state. When compared to the music group, the singing group had a greater decrease in cortisol and an increase in valence. The therapies had a strong positive impact on self-efficacy and perceived connectedness to the unborn child in the long run. Depressive symptoms and the mother-infant attachment questionnaire, however, did not show any significant impacts. According to the study, therapies including singing and music during pregnancy may be a useful way to lift pregnant mothers' spirits.

Hinesley *et al.* (2020) investigated the impact of a musical intervention on maternal/ fetal attachment, psychiatric symptoms, and perceived stress in two centres. Forty-four pregnant women participated and were assigned to a lullaby intervention or control group. No significant differences were found in maternal/ fetal attachment between control and intervention groups, there were within-group differences in both groups from baseline to follow-up. Exposure to a lullaby intervention was not statistically associated with maternal/ fetal attachment, mental health, and perceived stress in this pilot study.

Erkun Dolker & Basar (2019) determined the effect of music that was listened to by pregnant women during the non-stress test (NST) on the test result and maternal anxiety. The study utilized a non-randomized controlled trial design. The pregnant women in the experimental group listened to music during the NST (20 min). results showed that music effectively reduces pregnant women's deceleration numbers and increases their acceleration numbers and reactive NST rates. The use of music during NSTs can be recommended.

Garcia-Gonzalez *et al.* (2018) investigated the effect of music therapy on maternal anxiety, before and after a non-stress test (NST), and the effect of maternal anxiety on the birthing process and birth size. 409 nulliparous women coming for routine prenatal care were randomized in the third trimester to receive either music therapy (n = 204) or no music therapy (n = 205) during an NST. Results showed that the pregnant women from the music group presented lower levels of state-trait anxiety than the control group in relation to the variables of birth process, and higher birth weight and chest circumference in the new-born. Music therapy intervention during pregnancy could reduce elevated state-trait anxiety levels during the third trimester.

A study by Toker & Komurcu (2017) evaluated the impact of Turkish classical music on prenatal anxiety and satisfaction in pregnant women with pre-eclampsia. The study involved 70 women, divided into experimental and control groups. The experimental group received 30 minutes of Turkish classical music therapy daily for 7 days, while the control group received routine care and 30 minutes of bed rest daily. The results showed that music therapy increased satisfaction with nursing care, decreased blood pressure, positively impacted fetal movement counts, and minimalized foetal heart rate. However, it did not seem to affect anxiety levels as participants relaxed while listening to music.

Corbijn van Willenswaard *et al.* (2017) assessed the effectiveness of music-based interventions in reducing levels of stress or anxiety among pregnant women. Results showed that music interventions significantly reduced levels of maternal anxiety. There was no significant effect on general stress. Additional research is warranted focusing on rigour of assessment, intensity of interventions delivered and methodological limitations.

Persico *et al.* (2017) studied on 'Maternal singing of lullabies during pregnancy and after birth: Effects on mother-infant bonding and on new-borns' behaviour. Concurrent Cohort Study' and the study's aim was to investigate the effects of mothers singing lullabies on bonding, new-borns' behaviour, and maternal stress. Eighty-three (singing cohort) and

85 (concurrent cohort) women were recruited at antenatal classes at 24 weeks and followed up to 3 months after birth. Results revealed that mothers singing lullabies could improve maternal-infant bonding. It could also have positive effects on neonatal behaviour and maternal stress.

Liu *et al.* (2016) found that listening to music at home can improve sleep quality in Taiwanese pregnant women. The participants self-regulated listening and received prenatal care similar to the control group for two weeks. Results showed significant improvements in sleep quality, stress, and anxiety in the music listening group. Lullabies were the most frequently used genre, followed by classical and crystal baby music. This supports the idea that 2-week music listening interventions can reduce stress and anxiety in sleep-disturbed pregnant women.

Oh *et al.* (2016) investigated how music intervention affected testing duration, fetal heart rate pattern, and mother anxiety during non-stress tests (NST) used for prenatal foetal screening. A control group and an experimental group were randomly allocated to sixty pregnant women. The experimental group's fetal heart rate had a lower baseline and more frequent accelerations, no significant changes in systolic blood pressure or pulse rate, and considerably lower state anxiety levels. For reactive NST, there were no discernible variations in either fetal movement or testing duration.

Chang *et al.* (2015) investigated the effects of music listening on maternal-fetal bonding and psychosocial stress during pregnancy. 296 pregnant women in their second or third trimester were split into an experimental group and a control group for the study. While the control group got standard prenatal care, the experimental group also received music therapy. Psychosocial stress, specifically associated with altering family dynamics, caring for a newborn, and identifying as a mother, was substantially reduced in the experimental group. Nonetheless, there were no appreciable variations in the two groups' perceptions of stress or their attachment to their foetuses.

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Asha & Yuvaraj (2022) studied ‘Effects of music stimulation on pregnancy’ and investigated the effects of music stimulation on pregnancy, concentrating on psychophysiological issues. The study focuses on music-related bonding, prenatal sound stimulation, educational impacts, and brain development in pregnant women. It implies that music therapy can overcome psychophysiological systems and promote general well-being.

Music has been utilized for millennia to promote peace and relaxation, making it a well-studied and extensively used intervention for reducing stress and improving client well-being in a variety of clinical settings. The study emphasizes the effectiveness of music therapy in resolving a variety of psychological disorders.

Sujatashamkuwar *et al.* (2022) investigated the 'Effect of Classical Music on Fetus'. The paper supports five primary objectives based on evidence-based research: music therapeutic modulation of pre- and perinatal stress, anxiety, and depression; mental and physical birth planning related to music, including cognitive change, emotional regulation, physical exercise, maintenance of relaxation and discomfort, and social inclusion; music-related bonding and self-efficacy; and prenatal sound enhancement. Raga Chikitsa, Vedic chanting, Garbha Sanskara (Learning in the Womb), Time Theory of Ragas (combining ancient Ayurvedic concepts), and Cakra activation (a music and breathing technique employing ragas) are examples of traditional therapeutic tools. Clinical outcomes are investigated to see how they affect biological, physiological, psychological, chronobiological, and spiritual variables.

A study by Jyoti *et al.* (2022) examined the impact of music therapy on anxiety among antenatal mothers with pregnancy-induced hypertension (PIH). The research involved 60 participants, with 30 experimental and 30 controls. The results showed that music therapy significantly reduced anxiety scores in the experimental group, indicating its effectiveness in reducing anxiety levels among pregnant women. The study also found no significant association between anxiety levels and age, parity, or gestation period. The findings suggest that music therapy can effectively reduce anxiety in pregnant women with PIH.

Upadhyay (2021) studied ‘Music Therapy, Garbh and Healthy Neurological Development’ and it explored the relationship between music therapy, Garbh, and healthy neurological development. They discuss the therapeutic qualities of music therapy, including non-lyrical Vena-based instrumental interventions using Indian Classical Music Ragas. Listening to healing music has numerous effects on Garbh, making it an essential element of Garbh Sanskar. The study also discusses Vena music and its effect on Gharbh, and reviews studies examining the neurological correlates of music during pregnancy.

Patki *et al.* (2020) evaluated the effect of music therapy on blood cortisol levels in pregnant women conceived using in vitro fertilization (IVF) technology. 30 pregnant ladies

conceived by IVF with a gestation of more than 20 weeks were chosen. They were treated to the trial after being sensitized with three sessions of music therapy with a 20-minute audio tape of vintage Hindi cinema songs. Blood cortisol levels were measured before and after a 30-minute music therapy session with the identical audio track in the morning. The findings demonstrated that music therapy may be utilized as a valuable supplement to the basic algorithm to reduce stress and its associated pathophysiological consequences, such as elevated cortisol levels in pregnant women with greater stress levels due to circumstances connected with IVF conception. Pregnant women's serum cortisol levels decreased significantly after music therapy. They continued music therapy throughout the antenatal period after 24 weeks of gestation and successfully delivered viable babies.

The impact of music therapy on the Hamilton Anxiety Score in pregnant women was demonstrated by Kumari & Acharya (2018) and the study comprised one hundred pregnant women with pre-hypertension who were in the third trimester of their pregnancy. apiece of the two groups—the research and the control—had fifty participants apiece. The research group's subjects were required to attend music therapy sessions for a continuous three months, either daily or at least six times a week. Before and after music therapy sessions, data were gathered. Three months of music therapy resulted in a statistically non-significant effect on the Hamilton Anxiety Score in the Control group, compared to a considerably lower mean value in the Study group. According to the study's findings, music therapy is an effective treatment for anxiety.

Sharma *et al.* (2016) investigated 'A Quasi experimental study to assess the effectiveness of music therapy on stress and blood pressure among antenatal mothers with Pregnancy Induced Hypertension at selected hospitals of Punjab'. This study employed a quantitative quasi-experimental research design and approach. The sample was obtained using a non-probability purposive sampling approach with a sample size of 50. For two consecutive days, the experimental group received 20 minutes of music therapy in the morning and evening for the expectant woman with PIH. After two days of music intervention, the experimental group experienced a significant decrease in stress and blood pressure. At the 0.05 level of significance, blood pressure has a significant relationship with the demographic variable education and occupation.

Sundar *et al.'s* (2016) study investigated the influence of Indian classical music on mental conditions. A 27-year-old pregnant lady suffering from serious depression was cured with receptive music therapy that included Indian classical music. The Raga was selected

based on her tridoshic research and the Time Theory of Ragas. After 20 sessions, the woman's depressive symptoms improved and she exhibited progressive improvement on the Carroll Rating Scale for depressive. According to the study, music therapy employing Indian classical music, which incorporates Time Theory of Ragas and Ayurvedic principles, can be a safe and effective treatment for those suffering from depression.

Nayak *et al.* (2014) investigated the efficacy of music therapy on anxiety levels and pain perception in primipara mothers during the first stage of labour in selected Odisha hospitals. The study examined the amount of anxiety and pain perception in primipara mothers during the first stage of labour following music therapy. A total of 30 primipara mothers were purposefully selected. The findings demonstrated that music therapy might be highly effective in reducing anxiety and pain perception in primipara mothers during the early stage of birth. There was a positive and significant association between primipara mothers' anxiety levels and pain perception scores during the first stage of labour. This indicates that lowering anxiety levels could decrease primipara mothers' experience of pain during the early stage of birth. Mothers who received music therapy during labour reported much lower levels of anxiety and discomfort. As a result, it is hypothesized that music therapy would be extremely beneficial in reducing anxiety and pain perception in primipara mothers during the early stage of labour.

2.4 Benefits of Meditation during pregnancy

Meditation is the practice of clearing a mind using a combination of physical and mental techniques. It can take many different forms and can have many different purposes. Some types of meditation are religious, while others are designed to help that to adapt to challenges or relax. But most types of meditation share the same benefits. Almost all types of repetitive, anxious thoughts that can cause stress and anxiety. Focusing mind on something specific is an important element in clearing our mind. The present study collected literatures which proved pregnancy specific benefits from meditation. The discussions are given below.

International reviews

A study by Yilmaz Esencan & Rathfisch (2023) examined the impact of yoga and meditation practices during pregnancy and labour on the birth process. The study involved 90 pregnant women, divided into two groups: 30 in an intervention group and 60 in a control group. The intervention group practiced yoga and meditation for 60 minutes twice a

week for 10 weeks, and also during labour. Results showed that the intervention group had higher vaginal delivery rates, lower labour intervention rates, lower pain measurement scores, and higher CBSEI scores than the control group. However, the intervention group's State trait anxiety inventory scores increased significantly post-intervention. The study concluded that yoga and meditation are effective methods for reducing pain and fear perception, increasing self-efficacy, and vaginal delivery rates during labour.

Green *et al.* (2022) investigated pregnant women's satisfaction with Calm, a meditation mobile app, as well as their preferences for pregnancy-specific material. The study included a national cross-sectional survey of Calm subscribers who were presently or recently pregnant and used the app during their pregnancy. The findings revealed that, while the app reduced sleep, anxiety, and stress, pregnant women preferred pregnancy-specific information. The study proposes that future meditation app studies incorporate pregnancy-specific information and assess the app's practicality and usefulness in improving pregnant women's sleep and mental health.

Nasrollahi *et al.* (2022) conducted a study on the effectiveness of mindfulness-based stress reduction on depression, anxiety, and stress in women with early pregnancy loss in southeast Iran. The study involved 106 women and involved eight counselling sessions, including mindful thinking, mindful body scan, meditation, mindful yoga, and breathing exercises. The results showed a significant reduction in anxiety in the intervention group after counselling. The study concluded that mindfulness training programs can reduce anxiety, depression, and stress in women with bleeding leading to pregnancy termination in the first trimester.

Li *et al.* (2022) did a meta-analysis of 1,612 randomized controlled trials to determine the efficacy of mindfulness meditation on pregnant depression. The experimental group had less symptoms of depression during pregnancy than the control group, demonstrating that mindfulness meditation can successfully ameliorate negative emotions while also preventing, controlling, and lowering the incidence of depression during pregnancy. Mindfulness-based cognitive therapy (MBCT) had the greatest effect on depression during pregnancy, with the most effective intervention lasting less than four weeks.

Papini *et al.* (2022) investigated self-compassion and body image in pregnancy and postpartum, with an emphasis on the effectiveness of a three-week self-compassion meditation intervention. The study involved 71 people from a health coaching program,

with 35 randomly allocated to a three-week SC meditation intervention and 36 to a waitlist control condition. When compared to the control group, the intervention group had considerably lower levels of body shame and dissatisfaction, as well as higher levels of body appreciation and self-compassion.

Abera *et al.* (2022) performed a comprehensive review and meta-analysis of relaxation therapies for pregnant women, which included yoga therapy, music therapy, progressive muscle relaxation (PMR), guided imagery/deep breathing exercises, mindfulness, and hypnosis. The findings revealed that stress reduction relaxation intervention restores normal homeostasis in pregnancy, improves biological and psychological well-being, and hence improves pregnancy and delivery outcomes.

Jensen *et al.* (2021) explored whether women with recurrent pregnancy loss (RPL) who participated in a 7-week meditation and mindfulness intervention in addition to conventional supportive care reported less stress than those who received only standard supportive care. After 7 weeks, both the intervention and control groups reported a substantial reduction in perceived stress. At the 12-month follow-up, both groups exhibited a substantial reduction in felt stress relative to the baseline. This randomized controlled study shows that a 7-week daily meditation and mindfulness program combined with group sessions decreases perceived stress in women with RPL more effectively than usual supportive care.

Huberty *et al.* (2021) studied the mental health, perceptions, and meditation habits of pregnant women during COVID-19. They surveyed meditation mobile app subscribers and found that pregnant women were more concerned about COVID-19 and taking more precautionary measures. Pregnant women reported weaker pre-COVID-19 meditation habits but larger increases in strength during the pandemic. The study indicates the importance of understanding and addressing mental health concerns during the pandemic.

Smith *et al.* (2021) investigated the impact of a consumer-based mobile meditation application (app) on wellness in outpatient obstetrics and gynaecology patients during the coronavirus disease 2019 (COVID-19) pandemic. Women were randomly allocated to either the intervention group, who were given a mobile meditation app for 30 days, or the control group, who got normal care. The main outcome was self-reported felt stress.

Secondary outcomes were self-reported sadness, anxiety, sleep disruption, and satisfaction with the meditation app. A sample size of 80 individuals (40 in each group) was determined to have 84% power to detect a 3-point difference in the primary outcome. Outpatient obstetrics and gynaecology patients who used the recommended consumer-based mobile meditation app during the COVID-19 pandemic reported significantly lower levels of felt stress, sadness, anxiety, and sleep disturbance than those who received conventional treatment.

Hartiningsih *et al.* (2020) conducted a study on the effectiveness of Uvik Wiwitan relaxation application in decreasing anxiety in primipara pregnant women in Bandung, Indonesia. The study involved 68 hospitalized high-risk pregnant women who were divided into two groups: intervention and control. The intervention group underwent guided UsikWiwitan relaxation for 12 weeks, while the control group acted as controls. The results showed a significant decrease in anxiety scores after the intervention group's exercises in the third trimester.

Goetz *et al.* (2020) explored the clinical effectiveness of a 1-week electronic mindfulness-based intervention on prenatal depression and anxiety in hospitalized high-risk pregnant women. The participants were given access to an eMBI app, which included mindful breathing exercises, body scans, psychoeducation, loving-kindness meditation, and skills to strengthen positive attitudes. The study found that the prevalence of depression and anxiety among these women was high. After completing the mindfulness course, participants showed a significant reduction in mean state anxiety levels. Participants who completed more than 50% of the course showed lower scores in PRAQ-R in the second assessment.

Traylor *et al.* (2020) reviewed literature on nonpharmacologic modalities for stress relief in pregnancy and examined the interplay between psychiatric diagnoses and stressors. They found that mindfulness meditation and biofeedback showed effectiveness in improving mental health, such as depressive symptoms and anxiety among pregnant women. Exercise, including yoga, improved both depressive symptoms and birth outcomes. Expressive writing was successfully applied postpartum and in response to pregnancy challenges.

Sacristan-Martin *et al.* (2019) assessed the efficacy of an adapted Mindfulness-Based Childbirth and Parenting (MBCP) program that includes compassion training for pregnant women in primary care (PC) settings in the Spanish National Health System to decrease perinatal depression. Mindfulness-Based Childbirth and Parenting (MBCP) program was carried out including mindful meditation, body scan, awareness of breathing meditation, visualize meditation, loving kindness, sitting meditation and so on. Perinatal depression is a significant health problem. Perinatal depression is a significant health problem. An effective and low-cost childbirth education program that incorporates mindfulness and compassion practices may be a beneficial preventive complementary healthcare modality for expectant women and their partners.

Pan *et al.* (2019) carried out a randomized control experiment to assess the impact of a mindfulness-based birthing and parenting program on mental health throughout pregnancy and early motherhood. The study included 74 women aged 13 to 28 weeks who were separated into two groups: the intervention group, which got weekly 3-hour sessions and a 7-hour silent meditation session, and the control group, who received no intervention. The results revealed substantial variations in stress and depression levels between the two groups, with the intervention group performing better at three months postpartum. The program successfully decreased postpartum self-perceived stress and sadness, implying long-term benefits for women during pregnancy and after childbirth.

Salmanzadeh *et al.* (2018) investigated the influence of Benson's relaxation on pre-operative anxiety in nulliparous women undergoing cesarean sections. The study included 60 women who were chosen by purposive selection and divided into two groups: intervention (30) and control (30). The intervention group got Benson's relaxation twice, for 15 minutes each and at 2-hour intervals, whereas the control group received standard therapy treatment with no relaxation intervention. The results revealed no significant difference in anxiety levels prior to the intervention, but the intervention group's anxiety level was much lower thereafter. The study reveals that Benson relaxation can reduce pre-cesarean anxiety in nulliparous women, indicating a possibility for future research.

Fiskin & Sahin (2018) used Diaphragmatic breathing exercises for pregnant women with gestational diabetes to help prenatal attachment and reduce depression, anxiety, and stress. Outcome measures included the Depression Anxiety Stress Scale (DASS), and Prenatal Attachment Inventory (PAI). The results of the study indicate that diaphragmatic

breathing exercises appear to provide positive effects on psychological state and may increase levels of maternal-fetal attachment.

Yuksel *et al.* (2017) found that breathing exercises with deep inhalation and exhalation in pregnant women effectively reduce the perception of labour pain and shorten the duration of the second stage of delivery. Therefore, it was recommended breathing exercises as an effective modality for labour pain management and shortening the duration of labour.

Shi & MacBeth (2017) reviewed a study that analysed 18 studies on the efficacy of mindfulness-based interventions (MBI) in decreasing prenatal anxiety and depression. The investigations comprised 17 cohorts and included mindfulness methods such as meditation, breathing, body scanning, and deep relaxation. The results demonstrated considerable depression decreases before and after therapy but no significant improvements when compared to a control group. Some studies revealed that MBIs were linked to enhanced mindfulness. The research presents preliminary evidence for the usefulness of MBIs in lowering prenatal anxiety, but ambiguous data on perinatal depression symptoms. The report recommends more rigorous trials of MBIs throughout the perinatal period.

Lever Taylor *et al.* (2016) presented a systematic review and meta-analysis of the effectiveness of mindfulness-based interventions for reducing depression, anxiety, and stress and improving mindfulness skills in the perinatal period. seventeen studies of mindfulness-based interventions in the perinatal period were identified, including controlled trials (n = 9) and pre-post uncontrolled studies (n = 8). The interventions offered traditional mindfulness-based cognitive therapy or mindfulness-based stress reduction programs. Pre- to post-analyses showed significant reductions in depression, anxiety, and stress and significant increases in mindfulness skills post-intervention, each with small to medium effect sizes. However, between-group analyses failed to find any significant post-intervention benefits for depression, anxiety, or stress of mindfulness-based interventions in comparison to control conditions.

Chan (2014) conducted a study on how prenatal meditation influences infant behaviours and explored the effects of prenatal meditation on these aspects. 64 pregnant Chinese women were recruited for intervention and 59 were for control. Cord blood cortisol level of babies was higher in the intervention group ($p < 0.01$) indicates positive health status of the new-borns verifies that prenatal meditation can influence fetal health. Carey Infant Temperament Questionnaire showed that the infants of intervention group have better

temperament ($p < 0.05$) at fifth month reflects the importance of prenatal meditation in relation to child health. The study concluded the positive effects of prenatal meditation on infant behaviours and recommends that pregnancy care providers should provide prenatal meditation to pregnant women.

National reviews

Mehta *et al.* (2023) investigated in the impact of antenatal meditation and yoga on maternal and fetal outcomes in low-risk primigravida women. The study involved 60 women, divided into two groups: an intervention group, who underwent 30 minutes of meditation and yoga sessions twice a week until delivery, and an intervention group, which did not. Results showed that thirteen women went post-dated as compared to 3 in the interventional group which was statistically significant ($p=0.0003$). APGAR scores of neonates in the interventional group showed a highly significant improvement with as compared to the control group. Cord blood cortisol levels were higher than 10 ng/ml in 16 women in the control group compared to 7 in the group who performed yoga and meditation.

Shirodkar *et al.* (2022) conducted a study comparing the effectiveness of guided imagery and diaphragmatic breathing exercises on anxiety and stress in the third trimester of pregnancy. The study involved 50 pregnant women, with 25 in each group. The outcome measures included blood pressure, heart rate, respiratory rate, the Beck inventory anxiety scale, and perceived stress score scale. Results showed significant differences between the two groups. Both diaphragmatic breathing exercise and guided imagery significantly reduced physiological parameters like blood pressure, heart rate, and respiratory rate. However, there was a significant difference in effective management of anxiety and stress in the diaphragmatic breathing exercise group compared to the guided imagery group.

Rali & Wale (2022) assessed the overall health effect of pregnant women's progressive muscle relaxation, a non-pharmacological approach. The study demonstrated a significant difference between women's general health in experimental groups in the field of physical, psychological, and social components. The data mostly confirmed the hypothesis of the study regarding the effect of relaxation on the overall health of pregnant women. It is therefore proposed, because of its effectiveness, lack of bad effects, especially during pregnancy, or cost-efficacy, that pregnant women use the medication.

Khound *et al.* (2020) examined the impact of moderate physical activity and meditation on maternal and fetal health. The study involved 642 pregnant women who walked for 30 minutes daily and meditated for 15 minutes daily for at least 5 days per week. Results showed a significant decrease in the risk of Pregnancy Induced Hypertension, back pain, painful legs, and constipation in women who engaged in moderate physical activity and meditation. Meditation also reduced stress, anxiety, and the risk of preterm and low birth weight babies. The study concluded that combining moderate physical activity with meditation can reduce the risk of low-birth weight babies in pregnant women.

Sreedevi (2017) evaluated the effectiveness of a relaxation programme on 400 women with pregnancy-induced hypertension. The program, administered through audio CDs, involved deep breathing, progressive muscle relaxation, and guided imagery for four weeks. The results showed that the relaxation programme significantly relieved stress, helped adapt effective coping strategies, and improved pregnancy outcomes among these women.

Muthukrishnan *et al.* (2016) investigated the effects of mindfulness meditation on the perceived stress levels and autonomic function tests of pregnant Indian women. The study included 74 women, separated into two groups: those who practised mindfulness meditation and those who did not. The mindfulness meditation group had significantly lower stress ratings, a lower blood pressure response to cold pressor tests, and a higher heart rate variability. This implies that mindfulness meditation might effectively control the sympathetic nervous system, hence lowering daily stress in pregnant women. The results suggested that mindfulness meditation improves parasympathetic functions in pregnant women and is a powerful modulator of the sympathetic nervous system during pregnancy.

2.5 Discussion over the review of literatures citing various interventions, music, and meditation impact.

Pregnancy is a transformative and exciting time in a woman's life, but it can also be a challenging experience that takes a toll on her psychological well-being. Research has shown that women's psychological status during pregnancy can have a significant impact on their health and the health of their unborn child. One of the most common psychological experiences during pregnancy is mood swings. Hormonal changes and physical discomfort can contribute to fluctuations in mood, leaving some women feeling irritable, weepy, or anxious. These symptoms are usually mild and pass quickly, but in some cases, they can

become more severe and lead to depression or anxiety. Depression and anxiety during pregnancy are not uncommon, affecting up to 20% of women. These conditions can be caused by a range of factors, including hormonal changes, stress, a history of mental illness, and social support. Women who experience depression or anxiety during pregnancy are at a higher risk of developing postpartum depression and anxiety after giving birth, which can have long-term effects on their well-being. Stress is another significant factor that can impact a woman's psychological status during pregnancy. High levels of stress can lead to adverse outcomes, including preterm labour, low birth weight, and developmental delays in children. Common stressors during pregnancy include financial worries, relationship issues, and concerns about the health of the baby. On the other hand, some women experience positive emotions during pregnancy, such as joy, excitement, and a sense of connection with their growing baby. These feelings can contribute to a positive outlook and help women cope with the physical and emotional challenges of pregnancy. Overall, it is essential to recognize that women's psychological status during pregnancy is complex and can vary widely. Healthcare professionals need to provide support and resources to help women manage any psychological symptoms they may experience during this time. This can include counselling, support groups, and other interventions that can improve mental health outcomes for both mother and child. In conclusion, pregnancy is a transformative experience that can have a significant impact on a woman's psychological well-being. Healthcare professionals must pay attention to the psychological status of women during pregnancy and provide appropriate support to help them manage any symptoms they may experience. By doing so, we can ensure that women have a positive pregnancy experience and that their children have the best possible start in life.

Psychological therapies, such as cognitive-behavioural therapy (CBT) and interpersonal therapy (IPT), have been shown to be effective in reducing symptoms of depression and anxiety in pregnant women. CBT is a short-term therapy that focuses on identifying and changing negative thoughts and behaviours, while IPT is a longer-term therapy that focuses on improving communication and problem-solving skills. Both therapies can help women identify and manage negative thoughts and emotions, improve coping skills, and build a support network.

Mindfulness-based interventions, such as mindfulness-based stress reduction (MBSR) and mindfulness-based cognitive therapy (MBCT), have also been shown to be effective in reducing symptoms of anxiety and depression in pregnant women. These

interventions involve teaching women mindfulness techniques, such as breathing exercises and meditation, to help them stay present and focused in the moment and manage stress and negative emotions. Research has shown that mindfulness-based interventions can reduce symptoms of anxiety and depression, improve well-being, and enhance coping skills during pregnancy.

Physical exercise is another intervention that has been shown to be effective in improving the psychological status of pregnant women. Regular exercise during pregnancy has been linked to reduced symptoms of anxiety and depression, improved mood, and better sleep quality. Exercise can also help women manage physical discomforts associated with pregnancy, such as back pain and fatigue. Moderate-intensity exercise, such as brisk walking, swimming, or cycling, is recommended for pregnant mothers and can be done safely throughout pregnancy.

Social support is also an essential factor in improving the psychological status of pregnant women. Women who have a strong support network, such as a partner, family, or friends, are less likely to experience symptoms of depression and anxiety during pregnancy. Support groups and peer-to-peer interventions have been shown to be effective in improving social support and reducing psychological symptoms in pregnant women. These interventions can provide women with a safe and supportive environment to discuss their experiences and concerns and connect with others who are going through similar experiences.

It is important to note that not all interventions will work for all women. Factors such as personal preferences, cultural background, and individual circumstances may influence the effectiveness of different interventions. Healthcare professionals should work with pregnant women to identify the most appropriate interventions for their needs and provide ongoing support and guidance throughout pregnancy.

It can be concluded that there are a variety of interventions that can be effective in improving the psychological status of pregnant women. Psychological therapies, mindfulness-based interventions, exercise, and social support have all been shown to be effective in reducing symptoms of anxiety and depression and improving mood and well-being during pregnancy. Healthcare professionals should consider these interventions when working with pregnant women to support their mental health and well-being. By providing

effective interventions and support, we can ensure that pregnant women have a positive pregnancy experience and that their children have the best possible start in life.

2.5.a Music on Pregnancy psychological status

Music therapy is a complementary approach to healthcare that uses music to promote healing and well-being. It has been shown to have a positive impact on psychological well-being among pregnant women and has gained popularity as a safe and effective intervention. National and international reviews have explored the impact of music therapy on the psychological status of pregnant women and found it to be an effective intervention. Music significantly lowers the levels of anxiety and depression and improves overall mental health.

The benefits of music therapy on psychological well-being during pregnancy are believed to be due to its ability to reduce stress levels and promote relaxation. Music has been shown to have a calming effect on the body and can help to reduce feelings of stress and anxiety. It can also promote relaxation and improve mood, which can have a positive impact on psychological well-being.

It is important to note that music therapy is not a replacement for medical treatment or therapy, but rather a complementary approach to improving psychological well-being. Healthcare professionals should work with pregnant women to identify the most appropriate interventions for their needs and provide ongoing support and guidance throughout pregnancy. Women who are interested in music therapy should consult with a qualified music therapist and discuss the potential benefits and risks of the intervention.

Music therapy has been shown to have a positive impact on the psychological status of pregnant women. National and international reviews have found that music therapy reduces symptoms of anxiety and depression and improves overall mental health during pregnancy. Healthcare professionals should consider music therapy as a complementary approach to improving psychological well-being among pregnant women. By providing effective interventions and support, we can ensure that pregnant women have a positive pregnancy experience and that their children have the best possible start in life.

2.5.b Meditation on pregnancy psychological status

Meditation is a mind-body practice that has been shown to have a positive impact on psychological well-being. It involves focusing one's attention on a particular object or

activity, such as the breath or a mantra, and becoming aware of one's thoughts and emotions without judgment. Meditation has gained popularity as a complementary and alternative approach to healthcare and has been increasingly used among pregnant women.

Mindfulness-based interventions, including meditation, reduced symptoms of depression and anxiety among pregnant women. This involved a combination of meditation, gentle yoga, and group discussions, and this significantly lowered the levels of depression and anxiety compared to the control group. Meditation is also effective in reducing symptoms of anxiety and depression and improving overall mental health. Meditation has been shown to reduce stress hormone cortisol levels and increase feel-good hormone serotonin levels. This can help to reduce feelings of stress and anxiety and improve overall well-being.

It is important to note that meditation is not a replacement for medical treatment or therapy, but rather a complementary approach to improving psychological well-being. Healthcare professionals should work with pregnant women to identify the most appropriate interventions for their needs and provide ongoing support and guidance throughout pregnancy. Women who are new to meditation should consult with a qualified meditation teacher and start with shorter, simpler practices before moving on to more advanced techniques. Healthcare professionals should consider meditation as a complementary approach to improving psychological well-being among pregnant women. By providing effective interventions and support, we can ensure that pregnant women have a positive pregnancy experience and that their children have the best possible start in life.

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