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*Research Article*

# Literature Review of Complementary Therapies for the Management of Gestational Diabetes Mellitus

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**Abstract.** Gestational diabetes mellitus is a condition of hyperglycemia in pregnant women caused by insulin resistance influenced by hormones produced by the placenta, such as placental lactogen. This can have adverse effects on the condition of pregnant women, leading to preeclampsia, as well as causing macrosomia and hypoglycemia in the fetus. The prevalence of gestational diabetes mellitus has increased by 10% among pregnant women, particularly in East Asia and Southeast Asia, where it stands at 10.1% and is more commonly found in low- and middle-income populations compared to high-income populations. Previous studies have examined the management of gestational diabetes through early screening and insulin therapy to normalize blood sugar levels in the body. This article discusses the management of gestational diabetes mellitus using complementary therapy to provide a better prognosis for the well-being of the mother and fetus without replacing the primary treatment prescribed by the doctor. This article used a literature review method to conceptualize and identify literature gaps in complementary therapy for managing gestational diabetes mellitus. Based on the results of the literature review, complementary therapy administered to pregnant women with diabetes mellitus can suppress the release of cortisol, a hormone with anti-insulin, leading to hyperglycemia in pregnant women. Further research is needed to develop a holistic approach in the care of pregnant women with GDM to prevent complications for both the mother and the fetus.

**Keywords:** Gestational diabetes mellitus, complementer therapy; literatur review

## 1. Introduction

Gestational diabetes is a condition characterized by elevated insulin levels during pregnancy due to impaired ability of the body to effectively process insulin, influenced by hormones produced by the placenta [1]. Elevated insulin levels in the body during pregnancy can have negative effects on both the mother and the fetus. Preeclampsia or toxemia during pregnancy is found in some pregnant women with diabetes mellitus. This can result in eclampsia/seizures during pregnancy, which can lead to the death of both the mother and the fetus. In infants, gestational diabetes can cause macrosomia and hypoglycemia [2] [3]. In cases of macrosomia, where the fetal weight exceeds 3,500 grams, this occurs due to high insulin levels causing excessive fat accumulation in the fetal body. In cases of hypoglycemia, where the

newborn's blood sugar levels are low, this is because the fetal body has become accustomed to high insulin levels continuously received from the mother during pregnancy, which significantly decrease after birth [4]. Macrosomia can lead to cephalopelvic disproportion, a condition where the baby has difficulty being born vaginally because the fetal head cannot fit into the mother's pelvis. In cases of hypoglycemia, it can trigger hypothermia, a condition where the baby's temperature drops below 36.5 degrees Celsius, and result in an Apgar Score below the normal range [5] [3] .

Based on the results of a meta-analysis study, the prevalence of gestational diabetes has increased to over 10% of the pregnant population. Another meta-analysis review of pregnant women with gestational diabetes in East Asia and Southeast Asia found a prevalence of 10.1%, which was higher in low- and middle-income countries than in high-income countries [6].

Previous studies have discussed efforts to prevent gestational diabetes using screening methods, health education, and counselling. Previous research has emphasized early screening for gestational diabetes in pregnant women for a better prognosis. The authors of this

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study aim to provide management of gestational diabetes using complementary therapy while also providing relaxation therapy for pregnant women with gestational diabetes. The importance of non-pharmacological research for the management of gestational diabetes. This study used a literature review method to provide a theoretical foundation and identify gaps in research on complementary therapy for managing gestational diabetes [1].

## 2. Literature Review

### 2.1 Gestational Diabetes Melitus

Gestational diabetes mellitus is a condition of hyperglycemia in pregnant women. It is accompanied by risk factors such as obesity, micronutrient deficiency, advanced maternal age, and a family history of insulin resistance or diabetes. Although gestational diabetes resolves after childbirth, it has long-term adverse effects, including an increased risk of developing type 2 diabetes, cardiovascular disease in the mother, and obesity. Similarly, the infant born may be at risk of developing type 2 diabetes, cardiovascular disease, or gestational diabetes [7].

Risk factors for gestational diabetes include maternal age over 25 years, obesity prior to pregnancy, a history of gestational diabetes in a previous pregnancy, and a family history of diabetes mellitus. Other conditions that increase the prevalence of gestational diabetes mellitus include polycystic ovary syndrome (PCOS), ethnic and racial factors, chronic hypertension, and a sedentary lifestyle with a diet high in sugar and saturated fats [1].

The pathophysiology of gestational diabetes mellitus is caused by increased insulin resistance due to pregnancy hormones produced by the placenta, such as estrogen, progesterone, and human placental lactogen. These hormones have anti-insulin properties, which reduce sensitivity to insulin and interfere with glucose transport into cells. Under normal conditions, the mother's pancreas can produce insulin as compensation. However, in pregnant women with gestational diabetes mellitus, this response is insufficient, leading to hyperglycemia. This can result in preeclampsia, preterm labor, and metabolic risks for the baby [6].

The principle of managing gestational diabetes mellitus is to control blood glucose levels to remain within normal limits to prevent complications in both the mother and fetus. Non-pharmacological management may involve adopting a healthier lifestyle, including dietary adjustments and increased physical activity. Specifically, pregnant women with gestational diabetes are advised to follow a balanced diet that includes complex carbohydrates, protein, low simple sugars, and saturated fats. Light activities such as walking or regular prenatal exercises can help improve insulin sensitivity and lower blood sugar levels. Pharmacological management involves controlled insulin therapy. Self-monitoring of blood glucose is also highly recommended, which can be done four times a day before meals and two hours after meals. Additionally, regular prenatal check-ups are crucial for monitoring fetal growth and detecting complications early on. Communication, information, education, and psychosocial support play a vital role in ensuring compliance and the success of long-term therapy [8].

### 2.2 Complementary Therapy

Complementary therapy is a treatment used to complement conventional medical treatment to improve a patient's overall health and well-being. It is not meant to replace medical treatment but is used concurrently to support healing effects, enhance quality of life, and reduce side effects of primary treatment. In this article, complementary therapy aims to stabilize normal blood sugar levels, improve metabolic balance in pregnant women, and reduce stress [9].

Various types of complementary therapies that can be used in healthcare include nutritional therapy, acupuncture, acupressure, meditation, yoga, aromatherapy, herbal therapy, and reflexology. These are broadly categorized into biologically-based therapies, which utilize plants or natural supplements, and mind-body therapies, which include breathing exercises, meditation, and relaxation techniques. The use of these therapies in the management of gestational diabetes mellitus must be adapted to the patient's pregnancy condition, considering the safety and effectiveness in according with evidence-based practice [10].

Safe, complementary therapies for gestational diabetes include prenatal yoga, light acupressure, meditation, and progressive relaxation. Based on research findings, Prenatal yoga can help control blood glucose levels by increasing insulin sensitivity, reducing stress, and improving metabolism. Acupressure or reflexology massage can also stimulate specific nerve points directly related to pancreatic function and the hormonal system. However, the use of

herbal remedies is not recommended without medical supervision, as it may pose risks to the mother's and fetus's condition [11].

Complementary therapy positively correlates with managing gestational diabetes mellitus. It can reduce stress, worsen insulin resistance, improve sleep quality and emotional well-being in pregnant women, and lower blood glucose levels. Increased stressful can increase cortisol hormone levels, which affect glucose metabolism. Several studies have shown that complementary therapy can improve metabolic profiles by reducing insulin requirements and increasing patient compliance with overall gestational diabetes mellitus management.

## 3. Proposed Method

This study uses a literature review method, which is a systematic approach to identifying, evaluating, and synthesizing relevant research findings related to the effects of complementary therapy on the management of DMG. The main objective of this literature review is to summarize existing scientific evidence, identify research gaps, and provide a strong theoretical basis for clinical practice and further research. This literature review is narrative in scope with a descriptive-analytical approach, where the research findings under review will be critically analyzed and compared to identify patterns and conclusions [12].

The following inclusion criteria were used in selecting articles for review: (1) articles in Indonesian or English, (2) articles published in the last 10 years, (3) publications in the form of scientific journals that have undergone peer review, (4) articles discussing complementary therapy for pregnant women with GDM, and (5) articles containing data on the effects of therapy on blood glucose levels or the psychological condition of mothers. Meanwhile, exclusion criteria include articles that only discuss type 1 or 2 diabetes, animal studies, articles without full access, and non-scientific publications such as opinions, blogs, and newsletters.

The research was conducted online using reliable scientific databases such as PubMed, ScienceDirect, Google Scholar, and ProQuest. The keywords used in the search included: "gestational diabetes mellitus," "complementary therapy," "yoga in pregnancy," "acupressure," "herbal treatment," and "blood glucose control in pregnancy." The search used Boolean operators (AND, OR) to effectively combine keywords. Each article found will be selected through title identification, abstract review, and full-text evaluation relevant to the research focus.

The selected articles were then analyzed using data extraction techniques, whereby vital information such as the name of the researcher, year of publication, study design, sample size, type of complementary therapy, measurement results (e.g., blood glucose levels), and conclusions was recorded in a synthesis table. Next, thematic analysis was carried out to group the findings based on the type of therapy (e.g., yoga, meditation, herbs), type of effect (physical or psychological), and effectiveness results. The results of this analysis were used to compile a systematic narrative regarding the contribution of complimentary therapy in the management of DMG [13].

To ensure validity, only articles from reputable journals that have undergone peer review were used. In addition, two independent reviewers were involved to evaluate the suitability of articles and prevent selection bias. However, limitations remain, such as differences in study design between articles, small sample sizes, and the lack of specific studies discussing DMG with a complementary therapy approach in local populations. Therefore, the results of this literature review are more descriptive of trends and the potential for intervention rather than definitive evidence.

## 4. Results and Discussion

The following are the results of a literature review related to complimentary therapy for gestational diabetes management:

**Table 1.** Literature Review of Complimentary Therapy for the Treatment of Gestational Diabetes Mellitus

| No | Jenis Terapi Komplementer | Kategori Terapi | Jenis Pengaruh | Hasil Efektivitas | Referensi |
|---|---|---|---|---|---|
| 1 | Prenatal yoga | Relaxation | Physical & Psychological | Lowers fasting and postprandial blood glucose levels, reduces | Lučovnik, *et.al,* 2021 [14] |

| | | | | | |
|---|---|---|---|---|---|
| | | | | stress, improves sleep quality | |
| 2 | Mindfulness meditation | Relaxation/mental | Psychological | Reduces anxiety and stress, improves diet adherence and glycemic control | DiNardo *et al.,* 2021 [15] |
| 3 | Acupuncture | Traditional | Physical | Increases insulin sensitivity; several studies have shown a decrease in blood glucose levels | Hajbaghery ,*et.al,* 2021 [16] |
| 4 | Herbs (e.g., cinnamon) | Phytotherapy | Physical | Potential to lower blood glucose, dose- and duration-dependent effects | Kumar, *et.al, 2023.* [17] |
| 5 | Aromatherapy (lavender, peppermint) | Relaxation/senses | Psychological | Reduces stress and promotes relaxation | Ştefănescu *et al.,* 2023 [18] |
| 6 | Music therapy | Sensory/emotional | Psychological | Helps regulate emotions and sleep quality in pregnant women | Sastra & Reni, 2022 [19] |
| 7 | Prenatal massage | Manual/relaxation | Physical & Psychological | Reduces muscle tension, improves circulation, reduces stress | Wintika, 2021 [20] |
| 8 | Traditional-based diets (e.g., Ayurveda, TCM) | Holistic nutrition | Physical | Helps control glucose in accordance with dietary patterns | Kumar, *et.al,* 2023 [17] |
| 9 | Spiritual therapy (prayer, zikir, spiritual counseling) | Mental/Spiritual | Psychological | Reduces stress, brings inner peace | Husnati, *et.al.2020* [21] |
| 10 | Prenatal exercise | Physical | Physical | Helps metabolize glucose, safely and effectively when taken regularly. | Shawahna, *et.al,* 2021 [22] |

Based on the literature review results, complementary therapies such as prenatal yoga and light pregnancy exercises can help increase insulin sensitivity and lower blood glucose levels naturally. Prenatal yoga movements include gentle body movements accompanied by relaxation through deep breathing. This helps increase the mother's flexibility and strength, improve blood circulation and boost the metabolic system. Psychologically, prenatal yoga can help calm the sympathetic nervous system, thereby reducing cortisol levels and improving emotional balance. Lower cortisol levels can prevent spikes in blood sugar levels. Another positive effect is improved sleep quality for pregnant women, enabling them to relax, focus, and maintain discipline in managing their diet and adopting a healthy lifestyle.

Mindfulness meditation is a form of meditation that involves being fully aware of the present moment. This helps pregnant women to be more sensitive to their body's signals, including stimuli, hunger, fullness, or stress. Mindfulness meditation can also reduce sympathetic nervous system activity, which influences the decrease in cortisol and adrenaline levels, leading to increased blood glucose levels. This positively impacts the body's metabolic balance, helping to regulate blood glucose levels more optimally.

Acupuncture is a method of relaxing the body by inserting fine needles into specific points to balance energy. This affects blood circulation and improves pancreatic function to produce insulin. It also suppresses the secretion of cortisol, which can trigger insulin resistance.

Natural herbs such as cinnamon have been shown to lower blood sugar levels due to the release of the active compound cinnamaldehyde, which helps improve insulin sensitivity. However, further research is needed to determine the safe dosage for pregnant women. Excessive consumption of cinnamon can cause liver damage if not closely monitored.

Aromatherapy using essential oils from plants can create a relaxing and refreshing mental effect. This can reduce stress levels by suppressing the stimulation of the hormone cortisol. In addition, aromatherapy can also improve the quality of sleep for pregnant women, improving their well-being so that their metabolism can function better and avoid stress.

The music therapy referred to here uses slow tempos, such as classical or instrumental music, to create a relaxed atmosphere and help pregnant women control their emotions. This helps regulate stress levels in mothers so that they are better maintained, allowing blood sugar levels to be metabolized normally and preventing hyperglycemia.

Prenatal massage reduces muscle tension, improves blood circulation, and increases physical comfort. It triggers the release of endorphins and serotonin, which can increase feelings of pleasure and happiness, and suppresses the release of cortisol and adrenaline, which can cause stress. Massage can also support stable glucose metabolism.

A traditional diet emphasizes natural, balanced eating patterns tailored to the body's needs. This diet avoids processed foods and added sugars, thereby helping to control blood glucose levels. Collaboration with a nutritionist is essential to meet nutritional needs during pregnancy, especially for patients with gestational diabetes mellitus.

Spiritual therapy is also vital to maintain the mental and emotional condition of pregnant women so that they remain calm and relaxed and are not easily triggered by stress, which can increase cortisol hormones in the body and cause a spike in blood sugar levels.

## 5. Conclusions

Therefore, complementary therapies have an essential role to play in supporting the management of gestational diabetes with a holistic approach, both physically and psychologically. Therapies such as yoga, prenatal exercise, and acupuncture have been shown to help lower blood glucose levels by increasing insulin sensitivity, improving metabolism, and reducing insulin resistance. These physical therapies reinforce the effectiveness of medical treatment and provide a relatively safe natural alternative for pregnant women [23].

From a psychological perspective, therapies such as mindfulness meditation, music therapy, aromatherapy, and spiritual therapy help stabilize pregnant women's emotional state, which plays a significant role in maintaining stable blood glucose levels. Stress management, anxiety reduction, and improved sleep quality through these therapies can lower stress hormone levels such as cortisol, indirectly reducing blood sugar spike risk. These psychological therapies also encourage pregnant women to adhere more closely to healthy lifestyle guidelines [24].

Overall, the appropriate, safe, and evidence-based use of complementary therapy can effectively complement the management of DMG. The combination of conventional medical approaches and complementary therapies will provide more optimal results if carried out in an integrated manner, monitored by health workers, and tailored to the individual needs of pregnant women. This shows the importance of a holistic approach in the care of pregnant women with GDM to prevent complications for both the mother and the fetus [25].

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