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Effects of Exercise in Gestational Diabetes Mellitus

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Running Title: Effects of exercise in gestational diabetes mellitus.

Abstract: ***Gestational Diabetes Mellitus is one of the most common complications during pregnancy. Gestational Diabetes Mellitus us defined as "glucose intolerance or hyperglycemia with onset or first recognition during pregnancy" that usually revolves after birth. Gestational Diabetes Mellitus typically revolves after birth. However, there have may have been studies detailing the significantly increased risk of developing type II diabetes mellitus after having gestational diabetes mellitus, particularly in the first 5 year of postpartum. An increased risk of type II diabetes mellitus after pregnancy ranging from 17% to 63% within 15 years. Conclusion: The reviewed articles by the author concluded that the resistance band training exercise is effective in gestational diabetes mellitus.***

Keywords: pregnant women, gestational diabetes mellitus, exercises, 25 to 35 years of age

1. Introduction

Gestational Diabetes Mellitus is one of the most common complications during pregnancy. It has both short term and long term adverse effects of the health of mothers and foetuses. Maintain adequate blood glucose during pregnancy reduces morbidity of both mother and baby. Gestational Diabetes Mellitus is defined as "glucose intolerance or hyperglycemia with onset or first recognition during pregnancy" that usually revolves after birth. Rates of GDM are increasing globally, and upto one third of pregnancies now thought to be affected. The incidence of GDM is likely to increase in parallel with increasing rates of maternal obesity. It affect 4 - 7.5% of all pregnancies and is increasing.

For Mother: gestational diabetes mellitus is related to higher rates of caesarean section, gestational diabetes mellitus in subsequent pregnancies. gestational diabetes mellitus typically revolves after birth. However, there have may have detailing the been studies significantly increased risk of developing type II diabetes mellitus after having gestational diabetes mellitus, particularly in the first 5 year of postpartum.

For Baby: macrosomia, fetal hyperglycemia and hyperinsulinemia, preterm delivery, intensive neonatal care, high neonatal body fat percentage, clinical neonatal hypoglycaemia.

Several Risk Factors Include: advanced maternal age, ethnicity, high pre - pregnancy BMI, family history of diabetes, multigravid women, excessive weight gain during pregnancy, smoking, polycystic ovarian syndrome, impaired beta cell function and insulin sensitivity.

Incidence of gestational diabetes mellitus (GDM) varies globally from 2% to 14%. These cases in India are also increasing and emerging as a major public health problem.

The prevalence of GDM among urban population of India has been reported as 16% and 17.8% respectively.

The exact pathophysiology of gestational diabetes mellitus is unknown. One main aspect of the underlying pathology is insulin resistance, where the body's cells fails to respond to the hormone insulin in the usual way. Several pregnancy hormones are thought to disrupt the usual action of insulin as it binds to its receptor, most probably by interfering with cell signalling pathways.

Insulin is the primary hormone produced in the beta cells of the islets of langerhans in the pancreas. Insulin is key in the regulation of the body's blood glucose level. Insulin stimulates cells in the skeletal muscle and fat tissue to absorb glucose from the blood stream. GDM may represent transient 'unmasking' of pre - existing latent metabolic disturbances.

2. Factors

Presence of insulin antagonist such as human placental lactogen or chorionic somatomammotropin and cortisol; these promotes lipolysis and decrease glucose use.

Another factor in increased insulin requirements during pregnancy is the production of insulinase by the placenta. Various genetic defects of the beta cells, insulin action, decrease of the exocrine pancreas, endocrinopathies, drugs, chemical agents, infections, immune disorders and genetic syndromes.

Exercise has been proved to be a beneficial therapeutic tool during pregnancy. Exercise has a powerful potential to assist with blood glucose control. Records as early as 17th and 18th centuries have shown encouragement of exercises during pregnancy as it was thought to ensure good health and prevent miscarriage. In the late 18th century maternal physical activity was thought to help encourage an easier labour and reduce the baby size, also advantageous during delivery. In 1990's found that women who had exercised during pregnancy had babies with a significant lower birth weight than those who had Articles in English, full text articles. Decreased their physical activity during their

pregnancy. In 1991 investigated the use of exercise in women with GDM.

Exercise was now deemed to be safe and advantageous for glucose control for women with GDM exercise reduces the vast effects of hyperglycemia on the women, foetus and child.

Exercises during pregnancy can decrease lower back pain, other physiological studies have reported as to improve cardiovascular functions such as fitness, blood pressure and peripheral oedema. The resistance band training exercise is more effective in the people with gestational diabetes mellitus.

3. Methodology

Study Design:
The systematic review was conducted based on PRISMA guidelines.

Selection Criteria

Inclusion Criteria:
- Patient with gestational diabetes mellitus.
- Pregnant women.
- 25 to 35 years of age.
- Articles are Meta analysis, systematic review, books, randomized controlled clinical trials.

Exclusion Criteria:
- Pregnant women without diabetes mellitus
- Articles with other languages.
- Articles with other interventions.

Search Strategy:
- With the help of various healthcare databases, searched upon inclusion criteria.
- The databases are pubmed, researchgate, google scholar.
- The used keywords for searching like, effects of exercise in pregnant women with diabetes mellitus.

Screening
As displayed (PRISMA flow diagram). A total of 44 studies were potentially identifies by the author. Studies published in English language on effect, effectiveness included in the review. Excluded articles is 39. Full text article eligible for reading is 44 and the were excluded which does not satisfy the inclusion criteria and not had appropriate data and the articles finally included in the study is 5.

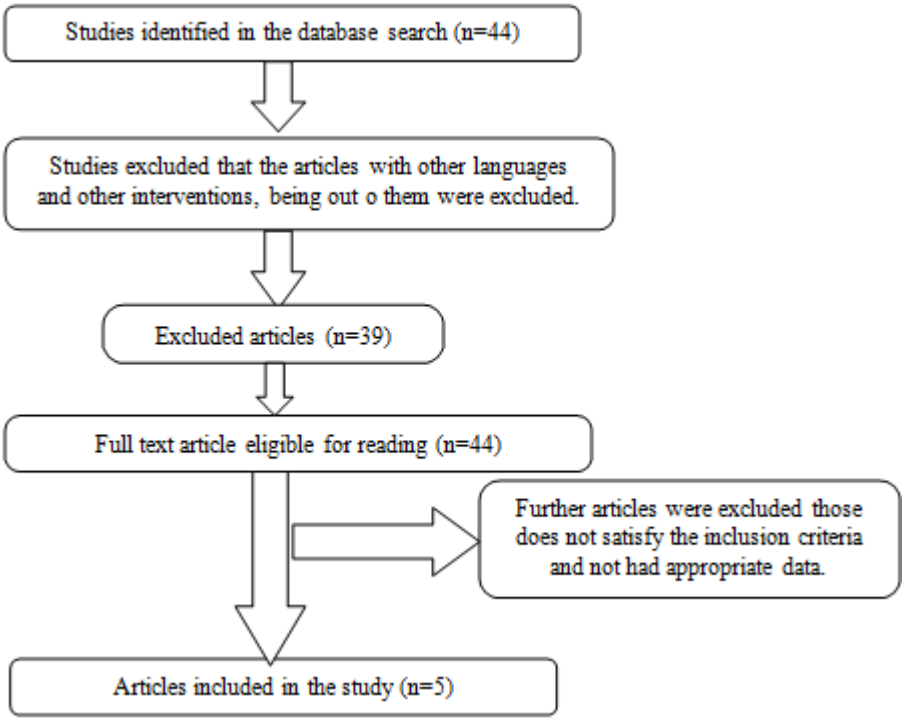

Figure 1: PRISMA flow diagram

4. Result

A total of 44 articles were found in the above mentioned database. Out of which 39 were excluded based on duplication, not having proper data, unable to access and not relevant to the study 44 were fully eligible for reading out of which 5 articles met the inclusion criteria. By reviewing the article in the study, the following results were obtained.

5. Review of Literature

Table 1

S. NO	Author	Year	Title	Study Design	Total No of Subjects	Study Description	Result
1	Emily Shepherd et al	2017	Combined diet and exercise interventions for preventing gestational diabetes mellitus	Systematic Review	n=23	The evidence was assessed as moderate to very low quality	Moderate - quality evidence suggests reduced risk of GDM with combined diet and exercise intervention during gestational diabetes mellitus
2	Fatemeh Nasiri - Amiri et al	2019	The effect of exercise on prevention of gestational diabetes in obese and overweight pregnant women	Systematic Review	n= 1441	The incidence of GDM was 24% lower in the intervention group than the control group	Intensity and duration of exercise in preventing GDM
3	Wai - Kit Ming et al	2018	The effect of exercise during pregnancy on gestational diabetes mellitus in normal - weight women	Meta - Analysis		The primary outcome was the occurrence of GDM and the secondary outcome includes gestational weight gain, gestational age at birth, birth weight and the odds of caesarean section	Exercise during pregnancy can obstensily decrease the occurrence of GDM without reducing gestational age at delivery and increasing the odds of caesarean section.
4	Carrie Nobles et al	2015	Effect of an exercise intervention on gestational diabetes mellitus	Randomized controlled trial	n=251	The intervention had no effect on birth outcomes	Pregnant women with increased risk for GDM.
5	Jose Alberto Laredo - Aguilera et al	2020	Physical Activity Programs during Pregnancy are Effective for the Control of Gestational Diabetes Mellitus			Pregnant women with gestational diabetes mellitus should exercise for at least 20 - 50 min a minimum of 2 times a week with at a least moderate intensity	Aerobic, resistance exercise or a combination of both are effective. Resistance exercise is analyzed, where the duration of the training increases as the pregnancy progresses.

6. Discussion

This review was clinically and scientifically applicable for both clinicians and researchers with patients involved in the gestational diabetes mellitus, improving the effects of exercise in gestational diabetes mellitus. No language and other than English language were reviewed. Only small number of studies have been included based on search criteria. On detailed study selection, some articles were excluded, as few studies were not focused on specific outcome.

Joes Alberto Lagerdo - Augilera view on the effects of exercise. Aerobic type of exercise and the resistance band training is the combination of both exercises is effective.

The most of the authors were reviewed that the effects of the combination of the particular type of the exercises and the combination of diets also. The effects of exercises with the combination of the diet can be more effective.

7. Conclusion

The articles reviewed that the effects of exercise in gestational diabetes mellitus is effective. The resistance band training exercise for gestational women is effective.

8. Declaration of Conflicting

The authors declared no potentials conflicts of interest with respect to the research, authorship, and publication of this article.

Prior publication – nil
Support – nil
Conflicts of interest – nil
Permissions – nil

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