Journal of Pharmaceutical Research International

33(59A): 325-333, 2021; Article no.JPRI.80154
ISSN: 2456-9119
(Past name: British Journal of Pharmaceutical Research, Past ISSN: 2231-2919, NLM ID: 101631759)

Resistance Exercise Reduces the Necessity for Hypoglycemic Agent (Humulin) in Overweight Women with Gestational Diabetes Mellitus

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Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

Article Information

DOI: 10.9734/JPRI/2021/v33i59A34276

Open Peer Review History:
This journal follows the Advanced Open Peer Review policy. Identity of the Reviewers, Editor(s) and additional Reviewers, peer review comments, different versions of the manuscript, comments of the editors, etc are available here: https://www.sdiarticle5.com/review-history/80154

Original Research Article

Received 10 October 2021
Accepted 14 December 2021
Published 16 December 2021

ABSTRACT

Background: Gestational Diabetes Mellitus (GDM) is currently treated with blood sugar monitoring, nutritional supplements, increased fatal police work, and hypoglycemic agent medical help PRN to achieve and maintain normoglycemia. Even though humulin therapy has been demonstrated to reduce low birth weight in women with GDM, using hypoglycemic drugs is likely challenging and may not address peripheral hypoglycemic agent resistance, which is a critical role in the development of GDM. Furthermore, the use of aggressive low blood sugar medication therapy may result in a twofold rise in the amount of small-for-gestational-age infants. The resistance exercise was used in overweight women with Gestational Diabetes Mellitus. Because resistance exercise increase the lean body muscle or decrease the body fat and Resistance exercise is an effective glycaemic management and cardio metabolic health strategy.
Methods: Fifteen patients with physiological condition DM were arbitrarily assigned whether it's to a group that received strength training or to a group that did not receive strength training to scale back the necessity for the hypoglycaemic agent.

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Results: Despite therapy, the number of girls who required hypoglycemic agent medical care has been the same. However, a meta-analysis with only overweight girls (pre-pregnancy BMI) revealed that the exercise cluster used to have a lower rate of hypoglycemic medication use (P<05) than that of the non-exercise receiving patients.
Conclusion: Resistance exercise coaching might facilitate to avoid hypoglycaemic agent medical aid for pregnant overweight girls with physiological state diabetes

Keywords: Gestational diabetes mellitus; insulin; exercise.

1. INTRODUCTION

Gestational diabetes is characterized as sugar sensitivity of various intensities that begins or is first detected throughout this physiological situation (GDM).The designation of sugar intolerance has affected each baby and mother. Ladies UN agency was diagnosed as GDM has thirty-fifths to the five-hundredth likelihood of repeat in future conception. Moreover, four-hundredth to an hour of girls with GDM can exhibit any deterioration of sugar metabolism, kind a pair of diabetes and vessel complications can develop at their advanced age [1-5].

Gestational diabetes mellitus (GDM) is currently treated with blood sugar monitoring, nutritional supplements, increased fatal police work, and hypoglycemic agent medical help PRN to obtain and sustain normal blood glucose levels. Even though humulin therapy was shown to reduce lower birth weight in women with GDM, using hypoglycemic agents is likely difficult and maynot address peripheral hypoglycemic agent resistance, which is a key factor in the development of Gestational diabetes mellitus. Furthermore, forceful low blood sugar drug therapy use could lead to a two-fold rise in the amount of small-for-gestational-age infants [6-9].

Pregnant women with Gestational diabetes mellitus (GDM) will benefit from exercise in ways that a hypoglycemic medication cannot. Exercise has been demonstrated to reduce peripheral hypoglycemia drug resistance more effectively than daily hypoglycemic agent injections. Cardiopulmonary exercise uses a lot of muscle clusters rhythmically and regularly for a continuous amount of fifteen to twenty minutes whereas maintaining an hour to eightieth of the most pulse rate. In distinction, with the utilization of some kind of a resistance device we tend to area unit overloading a muscle during specific fixed storage. 2 irregular studies show that aerobic coaching can lower glucose levels in Gestational diabetes mellitus (GDM) [10-19].

In the treatment of Gestational diabetes mellitus (GDM), resistance training is a useful addition to cardiovascular activity. Circuit-type resistance training has been shown to increase hypoglycaemic medication sensitivity, aldohexose excretion rate, and diabetes control in persons with type 2 diabetes. In men with aberrant aldohexose regulation, Muscle strength has the same effect on aldohexose sensitivity as an endurance activity.It shows that it's doable to the low glucose level in Gestational diabetes mellitus (GDM) with resistance exercise as a result of each Gestational diabetes mellitus (GDM) and sort II diabetes area unit caused by the same issue.Resistance exercise can improve capacity and postural control while also rejecting the unpleasantness which comes with the gradual anterior shift in the center of gravity. Girls may find aerobic training increasingly painful as their physiological conditions deteriorate. Female internal reproductive organ activity is not produced by exercising with the upper body or with limited mechanical stress on the trunk and should be lighter later in physiological state. Muscle-conditioning workouts are also easier to execute during late physiological conditions than cardiopulmonary exercise because females will remain relatively static during the exercise. Additionally, having a greater variety of exercise options may improve overall compliance with an exercise regimen. This study looks at the effects of loop resistance training on the requirement for hypoglycemic drugs in GDM girls who were cared for at one of two prenatal institutions in Edmonton, Alberta, Canada. Resistance exercise therapy, they projected, would minimize or eliminate the usage of hypoglycemic medicines in females with Gestational diabetes mellitus (GDM).

Women with Gestational diabetes mellitus (GDM) area unit famous to possess slashed quality of life and enhanced risk of abdominal delivery, physiological condition high blood pressure, toxemia, and kind II polygenic disorder. GDM has been linked to macrosomia (bigger than typical gestational-age neonates), baby discomfort, and type II diabetes later in life in babies. As a result, it's vital to comprehend the

impact of GDM in various parts of the world to give country-specific statistics to help drive strategy and design [20-25].

The global incidence of Gestational diabetes mellitus (GDM) ranges from 1 Chronicle to twenty-eight, depending on demographic parameters (e.g. maternal age, socioeconomic background, religion or ethnicity, or body composition), screening methods, and diagnostic criteria [25-30]. GDM can also be influenced by hereditary variables, which can have an impact on disease prevalence in communities, similar to the typical type of type II inherited condition. Once the knowledge has been adjusted, the dispersion of Gestational diabetes mellitus (GDM), such as continent and Asia, can be determined with prevalence reports being 0%-13.9% and 1.6% -17.8%, severally.

Asia is the world's biggest and more populous continent (60 percent of the earth's population), with a growing frequency of Gestational diabetes mellitus (GDM). Even though maternal overweight/obesity had typically been thought to be a risk factor for Gestational diabetes mellitus (GDM), recent research has found that the prevalence of Gestational diabetes mellitus (GDM) is considerably higher in slim people than in those with larger bodies. This is consistent with the biological process roots of adult illness hypothesis (DOHAD), which claims that poor nutrition during the first 1,000 days is linked to the later polygenic disorder. Eighteen countries make up the Japanese and South-Eastern sub regions, accounting for almost half of Asia's population and contributing about a quarter of the Asian GDP. Given Asia's rapid socioeconomic and nutritional transitions, as well as the rising prevalence of Gestational diabetes mellitus (GDM), providing an overview of the illness in Japan and Southeast Asia is critical for public health. However, in this subregion, there are no widely available and most well studies of Gestational diabetes mellitus (GDM) prevalence.

Resistance exercise is any variety of active exercise during which dynamic or static contraction is resisted by an outdoor force applied manually or automatically.

2. METHODS

2.1 Participation

This study included a total of fifteen Gestational diabetes mellitus (GDM) females, all of whom gave written consent before participating. The CANADIAN polygenic disease ASSOCIATION pointers were used to determine the diagnosis of GDM. Women between the ages of 20 and 40, with a fertilization age of 26 to 32 weeks.The following were the inclusion criteria: Nonsmokers UN agency wasn't interested in an excessively regular exercise program, maternal age between twenty and forty years, fertilization age between twenty-six and thirty-two weeks, BMI over 30kg/m^2, and maternal age between twenty and forty years.

2.2 Study Design

It is a short research article and it was a Quasi-experimental study design. It is a prospective method.

2.3 Criteria

Inclusion Criteria:

- Overweight patients with gestational diabetes mellitus.
- Abnormal humulin.
- Women are only included.
- Age between 20 to 40.
- Fertilization age of 26 to 32 weeks.

Exclusion Criteria:

- Males are excluded.
- Age below 12 and above 40.
- Fertilization age of more than 32 weeks.
- Underweight patients with gestational diabetes mellitus.
- Congenital or pathological diabetes mellitus except gestational diabetes.

2.4 Outcome Measures

The screening test may be a measurement of plasma aldohexose level one hour after a 50-g oral aldohexose load is given at any time of day (BASIC TEST) GDM SCREEN (Universal look dating for polygenic disorder Mellitus). GDM was discovered in women with R10.3 mmol/L (185 mg/dL) levels.

2.5 Glucose Tolerance Test

The oral aldohexose tolerance test, which analyses the abstinence plasma aldohexose level and hence the plasma aldohexose levels after one and a half hours following a 75-gm

aldohexose load, was the next diagnostic technique. GDM was diagnosed if two of the following three values were reached or surpassed: abstinence (R5.3 mmol/L, 95 mg/dL); one hour (R10.6 mmol/L, 191 mg/dL); and two hours (R 8.9 mmol/L, 160 mg/dL).

- Exercises enclosed,
- Plie´s (I.E., Squats with Outturned Knees),
- Press,
- Knee Extension,
- Hamstring Curl,
- Bench Press,
- changed Lateral Pull Down,
- sitting Row.

2.6 Intervention

For each GDM, a seven-week resisted exercise program was implemented. Eight exercises can be done in a circuit-style pattern with short rests in between.

2.7 Training Program

The subjects were chosen using a practical sampling strategy. A straightforward sampling procedure was used to pick 15 people who fit the inclusion and exclusion criteria. The study was explained to the subjects in detail, and signed informed consent was obtained from those who met the requirements. Subjects took part in the Pre-test and Post-test evaluations. The circuit training program consisted of three sessions each week, each lasting no more than ten minutes. Throughout the activity, subjects were asked to maintain track of their heart rate to which is why it does not surpass 140 beats per minute for 10 minutes.

- Exercises enclosed,
- Plie´s (I.E., Squats with Outturned Knees),
- press,
- Knee Extension,
- Hamstring Curl,
- Bench Press,
- changed Lateral Pull Down,
- sitting Row,
- skeletal muscle PressPlie´s (I.E., Squats with Outturned Knees),

The head is in a neutral state, not wanting to go down or up to an excessive degree. The chest is proudly front. The back isn't rounded forward, and there isn't an excessive amount of anterior girdle tilt (over the arch of the lower back). The knees trail behind the second and third toes. By corporal punishment a full range of motion, squatting to a depth where the hip crease is below the knees offers the best effects. They were instructed to hold their position for four seconds and then return to their original position. This practice should not be repeated if you don't want to tumble down.

Fig. 1. exercise program 1 skeletal muscle PressPlie´s (I.E., Squats with Outturned Knees)

Fig. 2. Exercise program 2 Active knee resisted exercise

- Sit on a chair. Plant your feet on the ground, hip-width apart.
- Straighten your back.
- Extend your right knee to elevate your right leg.
- Return to the beginning position.
- Start with 2 sets of ten to twelve reps. Repeat with the left leg.

2.7 Statistical Analysis

The statistical analyses were performed using the paired t-test. The statistical significance of pre and post-t-test values of the Oral glucose tolerance test (OGTT) was determined using the paired t-test. The mean difference is 10.96, standard deviation is 1.11, the paired t test value is 38.2 and the unpaired t test value is 2.15.

2.8 Data Presentation

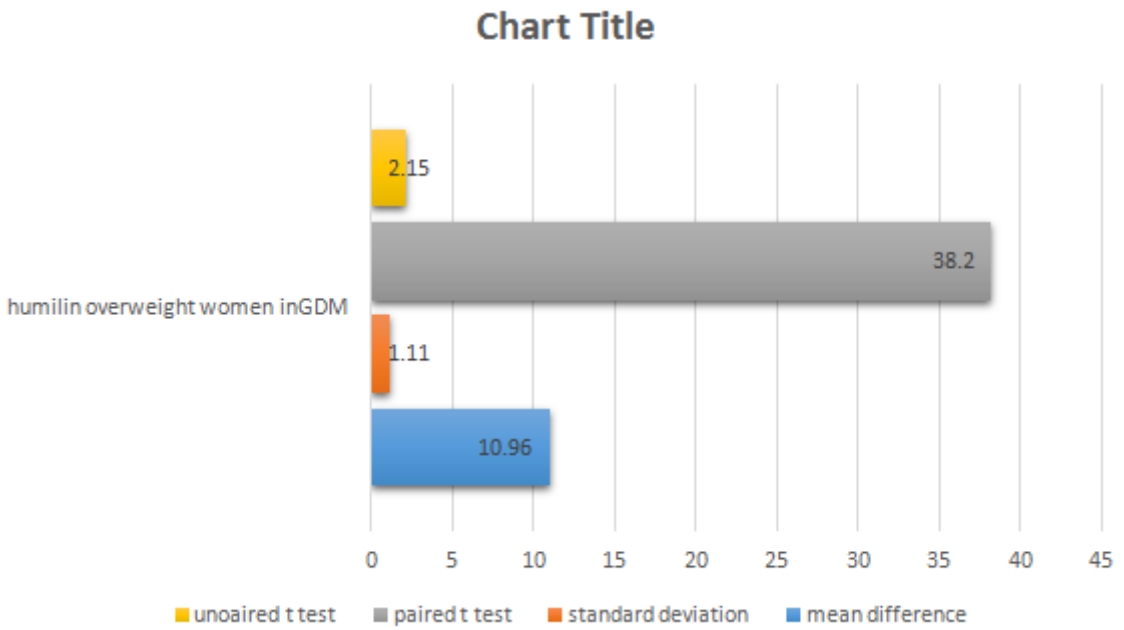

Fig. 3. Data presentation (values of mean difference, standard deviation, paired and unpaired t values)

Table 1. Data presentation (values of mean difference, standard deviation, paired and unpaired t values)

Data values	Oral Glucose Tolerance Test (OGTT)
Mean Difference	10.96
Standard Deviation	1.11
The Paired 't' Test	38.2
Table Value	2.15

3. RESULTS

Eighteen ladies were recruited. Thanks to pregnancy-induced high blood pressure, the physicians of 2 ladies suggested against the exercise program. 2 ladies in World Health Organizations that were haphazardly designated to strength training were unable to participate in the program. Due to lack of time, one patient was born from the study. The study was completed by fifteen women. The non-exercising group seemed to have a greater mean pre-pregnancy body mass (weight) than the exercising group, but there was no significant difference in pre-pregnancy BMI. The remaining ladies were diagnosed with a 75-g oral aldohexose tolerance test. Women who did not exercise had considerably higher fast and 1-hour readings than those who did. In terms of the 2-hour activity, however, there have been no major variations across teams. The training group conducted two to three bouts of resistance exercise per week on average.

They are included in oral glucose tolerance test (OGTT). The significance of pre and post test value are based on OGTT. The mean difference value is 10.96, and the standard deviation value is 1.11. then assessed the paired t test . the paired t test value is 38.2 . find unpaired t test value for finding the significance. The unpaired t test value is 2.15. The calculated't' values were more than the table value 2.05 for 5% level of significance.

Apart from strolling, the non-exercising participants described very little activity. As a result, there was no significant difference in the number of females who received hypoglycemic agent therapy between the two populations. At intervals during the exercise cluster, half-hour of the girls|ladies who trained two to three times per week were provided hypoglycemic agent treatment; sixty-seven of these females who exercised zero to one were prescribed hypoglycemic agent therapy. nine times per week, a hypoglycemic agent medical aid was prescribed. When compared to the others, the number of hypoglycemic agents described was much lower in the exercise receiving group. The delay between the primary clinic appointment and the start of insulin medication was considerably longer in the exercise cluster than in the other groups.

There were no significant differences between the other and exercise receiving teams in terms of age at delivery, cesarian delivery rate, or birth weight. The training cluster had a considerably lower incidence of hypoglycemic drug use, according to a subgroup study that looked exclusively at women with a pre-pregnancy BMI of >25 kg/m2. Eight out of ten women in the research experiment were prescribed hypoglycemic medications, whereas only three out of ten individuals in the training groups were given insulin.In terms of glucose monitoring at home, there were no changes between the therapy groups. When all post-meal readings were combined, the exercise cluster had demonstrably lower glucoselevels than the others. Four ladies on 2 teams failed to keep proper records of their glucose levels.

4. DISCUSSION

According to the findings, strength exercise may hardly reduce the frequency of girls given endocrine for treating persistent high blood sugar in our population sample. It took about fifty-five percent of the time to find a twenty-five percent difference in endocrine demand. To show that the impact exhibited (12.5 percent) was significant, fifteen individuals would be required.Even though this study was unable to demonstrate a big variation in the major outcome, the evaluations of secondary variables reveal that resistance training has a beneficial effect, which is practiced with our hypothesis. Strength training used to have a significant influence on glycemic control, with girls in the exercise group being prescribed significantly less endocrine and having a significantly longer stage to endocrine use than women who did not participate in the research. Resistance exercise

hasa bigger influence on overweight females with GDM, according to the findings of Dye.

This large survey research found that thin women had the same rate of GDM whether or not they practiced in their physiological state.Obese women who trained regularly throughout their physiological condition, on the other hand, showed reduced rates of GDM than non-exercising women. Avery and Walker's findings also revealed that cardiopulmonary exercise had a greater effect on overweight women with GDM than on women of healthy weight, meaning that training is especially useful in the treatment of Gestational diabetes mellitus in obese women. According to the findings, the mechanism of GDM differs in normal-weight and overweight women. GDM could be a group of disorders that include hypoglycemic drug resistance and beta-cell dysfunction, all of which have a part to perform. GDM in slim females could be caused by a testing phase defect that isn't addressed by exercise, whereas GDM in overweight women could be caused by a beta-cell defect that isn't corrected by exercise.

Physical exercise coaching will most likely have an effect via increasing peripheral internal secretion resistance. The largest protective effect of exercise in the bar of type two DM occurs among heavy persons, UN agencies are more likely to have their internal secretion resistance, according to evidence. Fitness training, it goes to reason, would be more advantageous to obese women with GDM. Cardiopulmonary exercise has been utilized as a treatment for GDM in the past, with unquestionably beneficial effects. According to Peterson, females who trained three times a week had lower abstinence and postprandial glucose levels than those who were merely given a diet. The impact of this cardiopulmonary activity on maternal body composition, however, was not found to be significant.Obese girls with gestational diabetes mellitus who did not object to diet medical care were assigned randomly to either an internal secretion cluster or an exterior secretion cluster, according to Bung et al.

There were no significant differences in weekly sugar levels measurements across the teams, implying that cardiopulmonary exercise is just as beneficial as a hypoglycemic medication in the management of GDM. Another study that looked into the benefits of resistance exercise training on GDM females does not appear to exist. In an earlier study, resistance exercise coaching was found to be effective in regulating dominant blood sugar in persons with type 2 diabetes. Circuit-style resistance training increased the aldohexose disposal rate by 48% in previously undisciplined type 2 diabetic men, according to Ishii et al. These subjects received five training programs per week for four to six weeks. Males and females with type 2 diabetes who took part in a three-month circuit resistance educational program reported significant improvements in their hemoglobin program A1C and blood sugar levels tested at home.

Surprisingly, one person's use of anti-diabetic medication was terminated due to hypoglycemia. Furthermore, males with poor aldohexose tolerance who completed a 20-week resistance-training programhave been discovered to have restored aldohexose tolerance, allowing them to be classed as non-diabetic. In our cohort of an individual with GDM, resistance exercise coaching lowered the number of hormones required; however, beginning an exercise program early in pregnancy may be even more beneficial. Indeed, the impact of cardiopulmonary exercise on according to Jovanovich-Peterson, ladies with Gestational diabetes mellitus did not show up until the 4th week of training. Patients in the nutrition-exercise group were given a prescription of hypoglycemic medication for an average of three months in the gift trial. When they went to the primary clinic visit, it had been seven weeks. Including at-risk females in an exercise program early in their physiological state may help to avoid Gestational diabetes mellitus or, at the very bare minimum, reduce necessity hypoglycemic medication.

Girls under this cluster trained an average of two times per week, rather than the recommended three times per week. Compliance with cardiac exercise regimens ranged from 90 percent to 100 percent for supervised regimens and 75 percent to 100 percent for home-based programs in previous studies with women with GDM. The exercise cluster's lower endocrine demand, and hence the current trial's pattern of decreased endocrine demand with increased exercise frequency, shows that if compliance had been 100%, many ladies might be avoided endocrine medication.

5. CONCLUSION

Resistance exercise appears to be more helpful in reducing the requirement for Humulin in

gestational diabetes in obese women, according to the findings. The alternative resistance exercise that lessens the metabolic activities may reduce the insulin resistance in the body and impact insulin sensitivity.

In the end, with attention to the positive effect of resistance exercise on Gestational Diabetes, as a significant problem for adult pregnant women that cause high-risk pregnancy, the recommended regular exercise as a helpful means in this group of patients. Further study can be done with more samples, different populations, and with other pregnancy disorders like Hypertension, Pre-eclampsia, etc.

As a consequence of the findings, the alternative hypothesis is accepted, and the research can be concluded that there is a substantial difference in lowering the need for humulin in obese-gestational diabetes mellitus patients while enhancing functional improvement and strength in the postpartum period.

Here, accept the alternative hypothesis which states that, there was a significant difference in effects obtained by the treatment technique in overweight women with GDM.

CONSENT

Written informed consent was obtained from the parents of the students.

ETHICAL APPROVAL

As per standards, the ethical approval was collected and preserved by the authors.

ACKNOWLEDGEMENT

My sincere thanks to the Chairperson of the Ethical Committee, Secretary, and the members for their guidance and support.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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Peer-review history:
The peer review history for this paper can be accessed here:
https://www.sdiarticle5.com/review-history/80154