



# Effect of Areobic Exercise on Fat Deposition during Pregnancy

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## ABSTRACT

**Background/aim:**Regular exercise during pregnancy is a great way of helping the body to cope with pregnancy and prepare for giving birth. It's one of the most effective ways of managing weight, especially if combined with a healthy diet. This can in turn lower risk of giving birth to a large baby. The aim of this study was to determine the effect of aerobic exercise on weight gain and fat deposition during pregnancy.

**Material and methods:** Sixty healthy pregnant, their ages range from 20 to 30 years old enrolled in the study were randomly assigned into 2 groups: control, and study. Leptin hormone concentration was measured for all participants pre- and post-treatment period.

**Results:** There was a significant difference between the two groups in the leptin hormone concentrations after treatment. But there was no significant difference between the two groups regarding the leptin hormone concentrations before treatment.

**Conclusion:** We suggest additional exercise is a necessary adjunct to diet regimen to decrease weight gain and fat deposition during pregnancy.

**Key Words:** diet regimen, exercise, leptin hormone, pregnancy.

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## INTRODUCTION

Pregnancy is the period from conception to birth, where the ovum is fertilized and implanted in the deciduas. Whereas labor is the journey of the fetus and placenta (after birth) from the uterus to the vagina to the outside world [1].

In humans, the duration of pregnancy averages forty weeks. Traditionally, pregnancy duration is counted from the woman last menstrual period, which adds roughly two weeks to gestational age [2].

Obesity represents a state of excess storage of body fat . The term overweight is defined as an excess body weight for height. Men have a body fat percentage of 15-20% while, women have approximately 25-30%. Because differences in weight among individuals are only partly

due to variations in body fat , body weight is a limited, though easily obtained ,index of obesity [3].

Irisin travels throughout the body in the blood, and alters fat cells , body fat is stored inside fat cells. Most of these fat cells are called white fat cells, and their function is to store fat. Brown fat cells don't store fat, they burn fat. If the goal is to lose weight, the person wants to increase the number of brown fat cells and to decrease white fat cells [4].

Exercise training resulted in reduced fat mass will lower leptin concentrations ,exercise training –induced reductions in leptin levels have been attributed to alterations in energy balance ,improvements in insulin sensitivity, alterations in lipid metabolism [5].

Exercise involve any bodily movement produced by

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skeletal muscles that expands energy, are measured by calories ranging continuously from low to high ,Exercise is p

hysical activity that is planned, structured, repetitive,and purposive in that sense that improvement or maintenance of one or more components of physical fitness an objective [6].

Regular exercise during pregnancy is a great way of helping the body to cope with pregnancy and prepare for giving birth. It's one of the most effective ways of managing weight, especially if this is combined with a healthy diet. This can in turn lower the risk of giving birth to a large baby [7].

Physical activity is important for long-term regulation of body weight, partly because it increases the resting metabolic rate Weight reduction after physical exercise is correlated with reductions in plasma leptin concentrations [8].

Exercise can help promote weight loss, but it seems to work best when combined with a lower calorie eating plan. If people don't curb their calories, however, they likely need to exercise for long periods of time—or at a high intensity—to lose weight [9].

## MATERIALS AND METHODS

Sixty healthy pregnant between 20 and 30 years of age were selected from Boulak Abo Alala Hospital, out patient clinic of gynecology and obstetrics and were enrolled in the study. Subjects with any abnormal medical condition/ disease, who are cigarette smokers or their BMI > 30 kg/m<sup>2</sup>were excluded from the study. Written informed consent was obtained from each subject. Age, weight, height and body mass index of the subjects were recorded. The study was designed as a prospective randomised clinical trial.

Patients were randomized into 2 groups, each group consisting of 30 subjects. In group 1 was the control group and followed a diet regimen and group 2 was the study group and followed a diet regimen in addition to program of aerobic exercise in form of treadmill walking exercise for 30 minutes three sessions per week for 12 weeks .

### Electronic Treadmill:

American motion, Fitness 86 ,HP:1 AC , Speed range :0-16 K.G /H .and 6 Programes. it was used to perform exercise for subject in the study group.

Leptin hormone concentration was measured for each participants before and after 12 weeks.

### Statistics

A statistical package program was used to evaluate the data obtained from the study. Descriptive statistical methods (mean, and standard deviation) were used in the evaluation of research data as well as the Kolmogorov–Smirnov distribution test for examining normal distribution. In comparing quantitative data, the unpaired samples t-test was used in intergroup comparison of parameters. The Paired samples t-test was used for intragroup comparisons. The results were calculated at the 95% confidence interval, P < 0.05 significance level and P < 0.01 advanced significance level.

## RESULTS

No study participant left the research project for any reason. No side effects or complications were observed during the treatment. Baseline characteristics of the patients are shown in Table 1. The average age was 22±1.07years in the study group and 21.6±1.57years in the control group. The average height was 1.61±0.106cm in the study group and 1.56±0.06cm in the control group. The average weight was 50.8±4.49kg in the study group and 49.4±3.62kg in the control group. The average boby mass index was 30±0.50Kg /m<sup>2</sup>in the study group and 30±0.67Kg /m<sup>2</sup> in the control group.

No statistically significant difference was found between the 2groups in terms of age, height, weight, and boby mass index (P > 0.05).

The increase in the leptin hormone concentrations for the control group at the end of the treatment was statistically significant in comparison to baseline leptin hormone concentrations (P < 0.05), as shown in Table 2.

The decrease in the leptin hormone concentrations for the study group at the end of the treatment was statistically significant in comparison to baseline leptin hormone concentrations (P < 0.05), as shown in Table 2.

The leptin hormone concentrations increase in the control group at the end of the treatment was significantly than in the study group (P < 0.05), as shown in Table 2.

**Table 1. Baseline characteristics of the subjects.**

Characteristics	control (n = 30)	study (n = 30)	P
Age (years, mean ± SD)	21.6±1.57	22±1.07	0.115
Weight (kg, mean ± SD)	49.4±3.62	50.8±4.49	0.453
Height (cm, mean ± SD)	1.56±0.06	1.61±0.106	0.214
Body mass index (Kg/m <sup>2</sup> )	30±0.67	30±0.50	0.484

Data are presented as mean ± SD or number of patients.

**Table 2. Leptin hormone concentration.**

Leptin hormone	control (n = 30)	study (n = 30)	P
Baseline	58.39±7.64	51.13±14.81	0.185
At the end of the treatment	66.15±9.03	50.42±14.77	0.01*

Data are presented as mean ± SD. \*P < 0.05.

## DISCUSSION

Regular exercise during pregnancy incurs little risk and physical health [10]. In accordance with research findings, guidelines published by the American college of obstetricians and gynecologists (ACOG), as well as other national organizations such as the society of obstetricians and Gynecologists of canada (SOGC), endorse exercise for pregnant women. Specifically, the ACOG Committee opinion on exercise during pregnancy published in 2002 recommends that, barring medical or obstetric contraindications, pregnant women have to be encouraged to engage in 30 or more minutes of moderate exercise daily, or at least on most days of the week [11].

The results of the present study are supported by that of et al., 2008, who suggested that Exercise in pregnancy could

prevent and limit adverse maternal and fetal morbidities and provide a long-term benefit through reduction of maternal weight gain during pregnancy, and improvement in cardiovascular fitness. Pregnancy emerges as a unique time for behavior modification [12].

The results of the current study are in agree with the study of Haakstad et al., 2011 who found that Regular participation in aerobic exercise can contribute to significantly reduce weight gain during pregnancy [13].

Aerobic exercise has a lot of benefits such as decrease the resting heart rate and resting blood pressure , the heart becomes stronger as a result of exercise , so it can pump more blood through the body with every beat and continue working at maximum level, if needed , with less strain. The resting heart rate of those who exercise is slower because less effort is needed to pump blood [14].

Benefits of aerobic exercise are explained by Farid et al., 2005 who stated that aerobic exercise produces training effect, improve the ventilatory functions and increase the capacity to utilize oxygen in several ways . It tones the muscles all over the body, improving the general circulation , lowering blood pressure and reducing the work load on the heart . It strengths the muscles of respiration and tends to reduce the resistance to air flow , ultimately facilitating the rapid flow of air in and out of the lungs [15].

Published investigations concluded that individuals with improved levels of fitness are capable of managing stress more effectively than those who are less fit, the data suggest an inverse relationship: higher physical fitness is associated with lower levels of stress [16].

Maintaining a regular exercise routine throughout your pregnancy can help you stay healthy and feel your best. Regular exercise during pregnancy can improve your posture and decrease some common discomforts such as backaches and fatigue. There is evidence that physical activity may prevent gestational diabetes (diabetes that develops during pregnancy), relieve stress, and build more stamina needed for labor and delivery[17].

Exercise is recommended for women during pregnancy to promote comfort , maintain good muscle tone , promote a positive body image , be aware of good body mechanics and prepare the pregnancy woman for childbirth. Exercise also, aid in preventing and decreasing certain common pregnancy discomfort such as backache, leg cramps, swollen legs and varicose veins. In addition, increasing joint mobility as well as, improving maternal and fetal circulation, positively affect bowel function, assist in weight management and increase psychological wellbeing and self-esteem. Furthermore having a healthy body during pregnancy helps to ensure a speedy recovery after birth. Therefore, pregnancy should not be a state of confinement , and pregnant women with uncomplicated pregnancies should be encouraged to continue and engage in physical activities [2] The results of the present study are in agree with Stephanie et al ., 2012 who reported that a prenatal nutrition and exercise program, regardless of exercise intensity, reduced excessive GWG and decreased weight retention at 2 mopp in women of normal weight before pregnancy[18].

Results of the present study agreed with that of Doran et al., 2011 who stated that there is considerable evidence

that exercise that exercise during healthy pregnancy has positive effects on the mother and fetus furthermore, there is some evidence that suggests positive effects on the child . Women therefore, should be encouraged to initiate or continue exercise during a healthy pregnancy further research is required to assess the short and long term effects of weight management on maternal and infant health , the psychosocial benefit of exercise during pregnancy , and the effect of exercise during pregnancy on the neurodevelopment of children [19].

Results of this study agreed with that of Harms., 2014 who stated that Walking is a primal human activity and perfect for pregnancy. Most modern birthing centers allow mothers to walk in the hours — if not even the moments — leading up to delivery. When you use your arms during walking, you can build upper body strength and flexibility. Walking at a fast pace is a heart-healthy exercise. Thirty minutes a day, three to five times a week is a healthy walking schedule. If you're not already an exercise walker, you can work up to that level, starting with 10 minutes a day [20].

In conclusion, using the treadmill program in form of walking exercise improve the maternal outcomes can be considered as beneficial non- invasive intervention to help pregnant women to favorably respond to the pregnancy changes and be well , prepared and confident about their forthcoming birth compared to women who remained sedentary. it also declined the pain during labor , decreased the duration of second stage of labor, increased the number of normal deliveries ,improved leptin hormone concentrations and decrease fat deposition.

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