ORIGINAL ARTICLE

Comparative Analysis of Role of Vitamin E and Iron Supplementation for Weight Loss in Young Adult Obese Females with Controlled Diet of 1500 Calories

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ABSTRACT

Background: Obesity has become a major health issue in the world over past two decades. . This leads us to the need of immense exploration of life style modification options, dietary supplementation and weight loss friendly elements.
Aim: Our study aims to highlight the comparative analysis of independent supplementation of vitamin E and iron to young adult females for their weight loss regime.
Methods: 90 young adult non pregnant females of age between 25-39 years with BMI ranging between 30-34.9 (obese) were asked to take a fixed 1500 calorie diet for two months. They were divided into three groups with no supplement group, vitamin E group and iron group. Body mass index(BMI), LDL levels and prevalence of fatty liver was assessed among all individuals.
Results: vitamin E and iron supplementation reduced BMI in their respective groups. Vitamin e and iron supplementation also reduce the prevalence of fatty liver among groups. Vitamin E reduces serum LDL levels.
Conclusion: vitamin E and iron supplementation helps in weight loss.
Keywords: obesity, vitamin E, iron, weight loss

INTRODUCTION

Obesity has become a major health issue in the world over past two decades. Sedentary lifestyle, type a personalities, excessive consumption of junk food, easy access to quick meal resources and exaggerated use of technology has added fuel to the fire[1]. Obesity is one of the leading causes of myocardial infarction and diabetes. In Pakistan, the rise in prevalence of obesity among young population, especially female strata has been documented[2]. Prevalence is highest among women aged 35-54 years (42.8%) and high among those aged 15-24 years (12.4%)[2]. The percentage is much higher as compared to the male population[2]. This leads us to the need of immense exploration of life style modification options, dietary supplementation and weight loss friendly elements.

Recently the role of vitamin E and iron has appeared as a matter of debate for weight loss. It has been found in various studies that vitamin E helps in fat metabolism subsequently leading to weight loss[3]. Vitamin E is an important anti oxidant. It offers protection against the oxidative stress generated by excess of fats in the body. Low iron is indicative of low energy in the body. Low energy leads to burning of comparatively fewer calories. Hence iron is an important metabolism booster and it is assumed to be crucial for the normal energy homeostasis of the body. Role of iron has been highlighted as a booster for weight loss in recent research work[4].

Recommended caloric intake of female body is 2000 calories a day[5]. For most of the population, a caloric deficit of 500 calories leads to weight loss[5]. A caloric intake of 1500 calories a day thus produces a baseline caloric deficit for female body. Hence for weight loss, caloric intake should be 1500 calories or less in a day in females.

Our study highlights the comparative analysis of independent supplementation of vitamin E and iron to young adult females for their weight loss regime.

METHODOLOGY

90 young adult non pregnant females of age between 25-39 years with BMI ranging between 30-34.9 (obese) were included in the study. Balloting method was used for sampling. The study was carried out with consent from participants at a nutrition and fitness clinic in Lahore.
Inclusion criteria: BMI in obesity range (30-34.9)

LDL levels greater than 130 mg/dL
Fatty liver on ultrasound
Exclusion Criteria: Co morbid diseases, iron intolerance, pregnancy, addiction to abusive drugs, use of any sort of medication, Hb not less than 10g/dL and greater than 14g/dL, cholecystectomy.
Groups
Group 1: Control Group: 30 young adult females with consumption of fixed 1500 calorie diet plan for 2 months without any supplements.
Group 2: Vitamin E group: 30 young adult females with consumption of fixed 1500 calorie diet plan and daily intake of 400 IU of vitamin E[6].
Group 3: Iron Group: 30 young adult females with consumption of fixed 1500 calorie diet plan and daily intake of iron supplementation (Fer Fer sachet one daily)[7].
Parameters
Body Mass Index: BMI of each female was calculated on Day 1 and Day 60. It is calculated as kg/m^2 (kg shows weight in kilograms and m^2 shows square of height in metres).
Low Density Lipoproteins levels: LDL levels were calculated from serum on Day 1 and Day 60
Prevalence of Fatty Liver: Prevalence of fatty liver in each group was assessed on day 1 and day 60.
Statistical Analysis: Statistical analysis was done by graph pad prism version 6.0. One way and Two way annova was applied to assess difference between the means. P value of less than 0.05 was considered statistically significant.

RESULTS

Body mass index: Significant reduction in body mass index was seen control, Vitamin E and iron treated group. All the groups had shown significant reduction in body mass index on day 60 as compared to day 1. Analysis among various experimental groups showed that iron supplementation(24±4.5) had significantly reduced BMI as compared to control group(28±2.5) and vitamin E(28±3) treated group. However the reduction in BMI caused by vitamin E(28±3) was not significant as compared to control group(28±2.5).
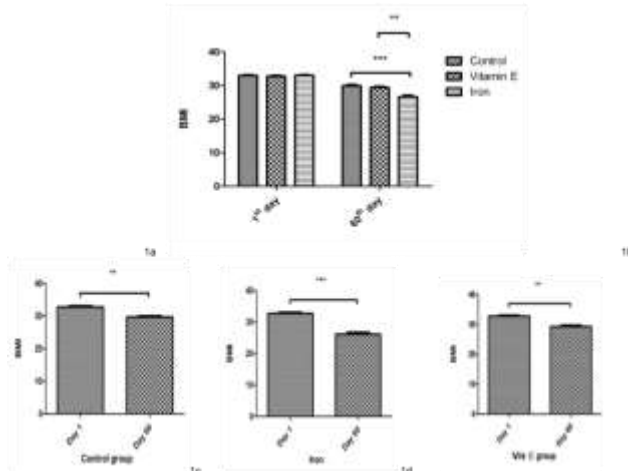
Figure 1: Body mass index of all groups on day 1 and day 60. P value of <0.05 was considered significant. ** shows P value < 0.01 significantly difference. *** shows significant difference with P value < 0.001.

Serum LDL levels: Significant difference was seen in LDL levels of patients on day 60 who received Vitamin E supplementation as compared to day 1. There was no significant difference in serum LDL levels of patients who had taken only 1500 calorie diet with no supplements or those who had taken iron supplementation.
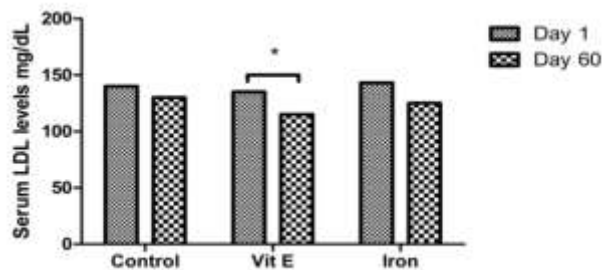

Figure 2: serum LDL levels of all groups on day 60 as compared to day 1. * shows P < 0.05, significant difference between day 1 and day 60 in vitamin E group.

Prevalence of fatty liver: The prevalence of fatty liver significantly decreased among vitamin E(100% vs 65%) and iron(100% vs 70%) treated groups. However no significant decrease in prevalence was seen in control group(100%vs 80%).
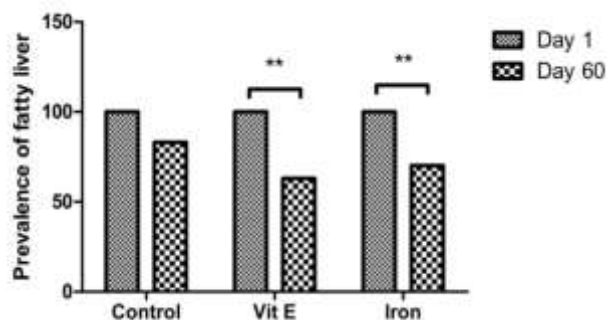

Figure 3: Prevalence of fatty liver on Day 60 in the three groups as compared to 100% prevalence on day 1. ** shows P < 0.01 , significant difference between the groups.

DISCUSSION

Exploration of elements beneficial against obesity can help ameliorate the prevalence of obesity especially among females in Pakistan. The aim of our study was to scrutinize the role of two important dietary supplements like vitamin E and iron. Dietary modification is the basic step in this regard. A caloric intake with deficit of 500 calories was designed for all females[5]. Their body mass index was between 30 and 34.9 which is considered as obese[8]. Females showing signs of fatty liver on ultrasound scan were included in the study. Moreover those females were included who had relatively higher LDL levels. We did not include pregnant females due to differential estrogen levels as compared to non pregnant females[9]. Females with co morbidities like cancer, diabetes and hypertension were also excluded as it could change the interpretation of our results. Females were asked for iron intolerance before engaging them into the studies. Anemic females were excluded as iron supplementation could only rectify their Hb levels. Similarly females who had undergone cholecystectomy in the past were excluded from the study[10]. Weight loss in elderly might be critical hence elderly females were not engaged in the study.

According to our results controlled diet, vitamin E and iron had significantly reduced the BMI of females in a two month span. Intake of 1500 calories has been reported to reduce BMI previously as well[11]. Vitamin E has been shown to reduce BMI in obese patients with non alcoholic fatty liver disease[12]. Moreover iron absorption is inversely related to BMI which means more iron stores help to reduce the chances of increase in BMI[13]. Our study has however added to this by comparing the effects of vitamin E and iron and it was seen that iron is significantly better in reducing BMI as compared to vitamin E and calorie deficit diet only. Research in recent years has highlighted that Vitamin E supplementation reduces LDL levels and incidence of fatty liver disease in non alcoholic individuals[6]. Few researchers also proposed same for iron as well however some theories suggest that excess iron may lead to fat deposition in liver due to altered metabolism[14]. Our study however establishes that vitamin E supplementation reduces serum LDL levels during the process of weight loss while iron supplementation had no significant effect on serum LDL levels. In our study the both vitamin E and iron helped to reduce the prevalence of fatty liver among experimental groups.

CONCLUSION

Scrutinization of elements beneficial against obesity can help to reduce the prevalence of metabolic syndromes especially among females in Pakistan. Based on our study, it can be concluded that both vitamin E and iron supplementation can help in the process of weight loss. Their comparative molecular and cellular role can be a way forward for future research.

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