

## EVALUATION OF LIPID PROFILE AND BIOCHEMICAL MARKERS FOLLOWING WEIGHT LOSS IN OBESE INDIVIDUALS IN TURKISH SOCIETY

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### ABSTRACT

**Background:** Obesity is a chronic and metabolic disease whose prevalence is rapidly increasing worldwide. Obese individuals are likely to be prone to dyslipidemia. It is reported that in these individuals, hypertriglycemia involving lipoprotein abnormalities, low HDL and increased LDL cholesterol levels are common due to lipid deposition. **Methods:** This study aims to demonstrate how the lipid profile and cardiometabolic values changes in basal (pre-weight loss) and follow up (6 months) under the weight loss program for obese people in Turkish society. The study was conducted with follow up of patients who applied to Endocrine and Metabolism Diseases polyclinics of two health centers in the city of Eski ehir between August 2010 and January 2012. The study began with 657 patients who accepted to be included in the study out of 954 obese patients who applied to the health center. It was completed by reaching 503 patients (F/M= 358/145) in the six month follow up. Age of patients included in the study varied between 18-65 and body mass index (BMI) was 30 kilogram/square meter (kg/m<sup>2</sup>). The patients included in the study were examined by their Fasting Lipid Levels (Total Cholesterol, LDL, Cholesterol, HDL Cholesterol and Triglyceride), Fasting Blood Glucose (FBG), Liver Enzymes, Uric Acid Levels, BUN, Creatinine, Hemogram (hemoglobin, hematocrit, leukocyte, PLT) and TSH. The patients were applied weight loss purpose diet and training and the same parameters were reviewed again after six months. **Results:** We can say that weight loss reduces dyslipidemia. **Conclusions:** Prevalence of adult obesity in Turkey is correlated with BMI and may be associated with a considerable increase in Cardio Vascular Disease (CVD) risk factors. At the highest BMI levels, CVD risk factors often emerge in the earliest decade of adulthood and affect women more often than men.

**Key words:** BMI, CVD risk factor, lipit profiles and weight loss.

### INTRODUCTION

Prevalence of obesity is rapidly rising (1). To reverse the obesity epidemic, efforts should be made to incorporate intensive weight loss programs into medical practice (2). The primary aim of this study was to change the behavior for achieving a mean weight loss of 5-10% of initial body weight

over 6 months in obese adults (3,4). Obesity is a well established risk factor for CVD, hyperlipidemia, diabetes mellitus and metabolic syndrome (1-4). As the degree of obesity increases, accompanying diseases and their degrees increase (5). Moreover, degree of obesity is associated with risk of early death. An

increase in visceral fat accounts for many of the metabolic abnormalities (3,4). The prevalence of obesity and overweight in Turkey is rising (6). The excessive consumption of high-calorie foods and sucrose-enriched beverages associated with sedentary lifestyle are the main factors contributing to prevalence of obesity (7).

While many past epidemic studies report increased total cholesterol, LDL cholesterol and triglyceride levels and decreased HDL cholesterol level with increased BMI (8,9), some recent research suggests no significant correlation between increased BMI and total cholesterol (10). This urged to focus on studies on pre- and post- lipid profiles of obese people included in weight loss programs.

Studies which monitor obese people while losing weight generally have 6 month, 12 month and 18 month control follow ups (11). Due to challenges in monitoring patients and collecting data, however, we planned our study in pre-weight loss and 6 month follow up.

## 2. Materials and Methods

### 2.1. Study Participants

The study began with 657 patients who accepted to be included in the study out of 954 obese patients who applied to Endocrine and Metabolism Diseases policlinics of two hospitals in the city of Eski ehir between August 2010 and February 2014 and it was concluded by reaching 503 patients (F/M= 358/145) in the six month follow up.

The patients included in the study were measured in their length, weight, waist circumference and hip circumference and were examined by their Fasting Lipid Levels (Total Cholesterol, LDL, Cholesterol, HDL Cholesterol and Triglyceride), Fasting Blood Glucose (FBG), Liver Enzymes, Uric Acid Levels, BUN, Creatinine, Hemogram (hemoglobin, hematocrit, leukocyte, PLT) and TSH.

The subjects were provided with an education about diet and increased physical activity (12,13). The variables measured included; height and weight to calculate BMI (14), Waist to hip ratios were measured at the beginning, and after 6 months. Pregnancy was exclusion criteria for the study. A total of 503 individuals with BMI 30 completed the 6 month program of the study. Subjects were visited once every 2 weeks or a month during 6 months. Thus, their weight loss and changes in their nutrition behavior were recorded.

Lifestyle counseling was delivered by a dietitian. The main goal was to achieve a mean loss of 5-10% of the baseline weight (8, 11). They were prescribed diet lists reducing 500-700 cal. Intake from the energy they were supposed to take per day (15). The participants were also recommended to change their lifestyle activity such as, walking rather than riding, using stairs rather than elevators, and avoiding sedentary activities. Increased physical activity (PA) was recommended for 3-5 times a week, 30-45 minutes each time depending on the gender and BMI (16). It varied from controlled individualized exercise programs to informal group sessions behavior therapy and dietary changes. The subjects were provided with an educational prospectus about diet and increased physical activity.

### 2.2. Clinical and Anthropometric Evaluation.

BMI was calculated by dividing weight by square of height ( $\text{kg}/\text{m}^2$ ). Body weight was measured to the nearest 0.1 kg with an electronic scale, and height was measured to the nearest 0.1 cm with a meter. Waist circumference was measured midway between the lowest rib and the iliac crest; hip circumference was measured at the widest part of the hip region in the standing position, and the waist-to-hip ratio was calculated based on these measurements.

### 2.3. Biochemical Analyses.

Biochemical analyses were performed on blood samples collected after an overnight fast (>12 hrs) Total cholesterol, LDL cholesterol, HDL cholesterol and Triglycerid), Fasting Blood Glucose (FBG), Liver Enzymes, Uric acid levels, BUN, Creatinine, Hemogram (hemoglobiline, hematocrit, leucocyte, PLT) ve TSH were measured .

### 2.4. Statistical Analyses

All data were analyzed using SPSS version 21.0. Quantitative variables were expressed as mean±SD. Statistical analyses were performed using repeated measure ANOVA and dependent t-test. The chi-square test was used for comparisons of qualitative data. P value less than 0.05 was considered statistically insignificant.

**Table 1: Anthropometric and demographic characteristics of the patients at baseline**

Patient characteristics N= 503, F358/M145	X±SEM (range)
Age (years)	37.9±10.3 (19-64)
Famele	71.2%
Male	28.8%
Married	75.3%

**Table 2: Evaluation of clinical characteristics of the participants of the study (baseline and 6 months)**

	Baseline	6 months	P value
Weight (kg)	101.0±17.2	93.4±17.2	0.001
BMI (weight/height <sup>2</sup> )	37.3±6.1	34.5±6.0	0.001
Waist to hip ratio	0.9±0.8	0.9±6.7	0.852
Fasting glucose (mg/dL)	97.7±17.5	94.3±20.0	0.001
Cholesterol (mg/dL)	209.3±35.5	199.5±32.0	0.001
Triglyceride (mg/dL)	166.6±95.6	152.9±75.8	0.001
LDL (mg/dL)	125.9±32.0	121.5±34.9	0.001
HDL (mg/dL)	45.7±11.4	47.3±8.6	0.001
BUN	17.3±6.9	16.6±6.2	0.001
Creatinine	0.6±0.2	0.6±0.2	0.001
Uric acid	4.6±1.4	4.5±1.2	0.001
ALT	26.0±17.5	24.0±14.3	0.001
Hemoglobin	13.6±1.6	13.6±1.4	0.363
Hematocrit	40.0±4.7	40.4±5.3	0.190
Leukocyte	7.4±1.9	7.4±1.7	0.018
PLT	261.5±56.2	259.2±55.5	0.570
TSH	2.2±1.2	2.1±1.1	0.001

### Results

It is shown in Table 1 that 71.2% of the participants were women and that 75.3% of them were married. The initial mean weight and BMI averages of the participants were

101.0±17.2 kg and 37.3±6.1 kg/m<sup>2</sup>, respectively . Mean weight and BMI loss in these subjects were 7.52±0.0 kg and 2.8±0.02 kg/m<sup>2</sup>, respectively. Table 2 shows initial mean weight and BMIs of the participants and the values after 6 months. Table 2 demon-

strates that the participants lost weight by 5% to 10% compared to basal. While there was statistically significant decrease in participants' total cholesterol, LDL cholesterol, triglyceride, fasting blood glucose, liver enzymes, uric acid, BUN and TSH values, statistically significant increase was observed in HDL cholesterol levels compared to basal (Table 2) ( $p < 0.001$ ).

## DISCUSSION

Obesity is a major risk factor for metabolic deregulation, leading to diabetes, hypertension, hyperlipidemia and cardiovascular diseases (17). The most commonly encountered dyslipidemia in obese individuals is characterized by a cluster of interrelated plasma lipid and lipoprotein abnormalities including hypertriglyceridemia, low HDL cholesterol values and increased small dense LDL cholesterol particles (18).

In studies on Turkish society, both genetic factors and lower HDL cholesterol levels provide a risky lipid profile (18,19). This constitutes a higher risk for Turkish society compared to other communities in terms of metabolic syndrome and coronary artery disease. Our study found obesity increased with prevailing sedentary lifestyle and consumption of high calorie food and the lipid profile was negatively affected by increased obesity. Results of studies on the lipid profile in obese people in our country show similarities to those of neighbour countries (6). This can be construed in a way that communities living in the same geography exhibit similar characteristics due to similar lifestyles.

The first line therapy is change of lifestyle in treatment of dyslipidemia along with obesity (20,21). Here, the concept of treatment covers diminishing daily calorie intake, limiting saturated fat intake, engaging in more physical activity and motivation (change of behavior) (3,7,8). In our study, the patients were given necessary nutrition information,

training for physical activity and behavioral change for six months. This training resulted in significant weight loss and improved lipid profile in our patients. Weight loss not only recovers medical health of individuals, but also induces mental health and good mood (22).

## CONCLUSIONS

Improvement was achieved in biochemical markers, especially in lipid profiles as a result of weight loss in obese people. Patients taken to work; By losing weight, low blood sugar, cholesterol, triglycerides, LDL value, increased HDL value, contributing positively to health. The ratio of the hip ratio has been shown for both the waist and the hip measurements. Our study shows that dietary modification and lifestyle changes in obese patients can be one of the effective ways to lose weight. Improvement of biochemical parameters related to weight loss of obese patients. There is a need for reducing obesity across the world or developing new treatment strategies for prevention.

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**Source of Support:** Nil

**Conflict of Interest:** None Declared