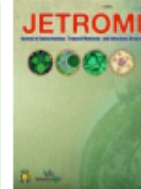




JETROMI

Journal of Endocrinology, Tropical Medicine, and Infectious Disease



The Effect of Lifestyle Modification on Lipid Profile and Body Weight in Obese Subject

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Abstract

Background. The lifestyle modification (LSM) programs program addresses diet, exercise, stress management, and nutritional depletion using cognitive-behavioral approaches to improve the causes of chronic disease. The purpose of the study is to evaluate the effect before and after three months of LSM on lipid profile and body weight parameters of obese subjects

Method. The participants of age 25-50 years recruited through personal contact consisted of 20 obese subjects who appeared to engage in diet and regular exercise (get at least 150 minutes of exercise a week). The types of physical exercise aerobic (walking, swimming, jogging) were included in the study. The anthropometric measurements and blood sample was taken before and after three months of LSM. Height (m) is measured using a wall-mounted height bar and body weight (kg) is measured using a scale and its value is used in BMI calculations. The serum of profile lipid was determined by enzymatic colorimetric method and sd-LDL examination was performed indirectly in which the ratio of LDL /Apolipoprotein B.

Result. After 3 months of LSM, there was a significant decrease in serum LDL, ApoB, BMI, WC, and FPG ($p < 0.05$) in the obese subject. However, no significant difference was observed in TG, HDL, sd-LDL, PPG, and HbA1C ($p > 0.05$).

Conclusion. Lifestyle modification of obese subjects for three months can decrease parameters of body weight and profiles lipids, which means it can prevent cardiovascular diseases.

Keywords: Body Weight, Lipid Profile, Lifestyle Modification

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Abstrak

Latar belakang. Program modifikasi gaya hidup (MGH) terhadap diet, olahraga, manajemen stres dan perbaikan gizi digunakan dengan pendekatan perilaku kognitif dalam upaya untuk mencegah penyebab penyakit kronis. Tujuan penelitian adalah mengevaluasi efek sebelum dan sesudah tiga bulan MGH terhadap profil lipid dan parameter berat badan dari subjek yang obesitas.

Metode. Peserta berusia antara 25-50 tahun yang direkrut melalui kontak pribadi terdiri dari: 20 subjek obesitas yang melakukan diet dan olahraga teratur (berolahraga setidaknya 150 menit seminggu). Jenis latihan olahraga/fisik adalah aerobik (berjalan, berenang, jogging) termasuk dalam penelitian ini. Pengukuran antropometri dan sampel darah diambil sebelum dan sesudah tiga bulan MGH. Tinggi (m) diukur menggunakan pengukur tinggi badan yang dipasang di dinding dan berat badan (kg) diukur menggunakan skala/alat digital dan nilainya digunakan dalam perhitungan indeks masa tubuh (IMT). Serum lipid profil ditentukan dengan metode kolorimetrik enzimatis dan pemeriksaan sd-LDL dilakukan secara tidak langsung dengan mengukur rasio LDL/apolipoprotein B.

Hasil. Setelah MGH selama 3 bulan, ada penurunan yang signifikan terhadap serum LDL, ApoB, IMT, LP, dan GDP ($p < 0,05$) pada subjek yang obesitas. Namun, tidak ada perbedaan yang signifikan terhadap TG, HDL, sd-LDL, PPG, dan HbA1C ($p > 0,05$).

Kesimpulan. Modifikasi gaya hidup selama tiga bulan dapat menurunkan parameter berat badan dan profil lipid, yang berarti dapat mencegah penyakit kardiovaskular.

Kata Kunci: Berat Badan, Profil Lipid, Modifikasi Gaya Hidup

Received 19 March 2022 | Revised 14 April 2022 | Accepted 23 June 2022

1 Introduction

Lipids are small hydrophobic molecules that perform many important roles; they act as structural elements in biological membranes, they store energy and they serve as signaling molecules in cellular response pathways.[1] Although lipids are very important, abnormal levels contribute to the development of atherosclerosis. Lipid abnormalities can be accessed through a lipid profile panel which is a blood test panel that serves as an early broad medical screening tool for lipid disorders such as cholesterol and triglycerides. Many metabolic risk factors such as atherogenic dyslipidemia, increased blood pressure and blood glucose, atherogenic dyslipidemia, and increase in triglyceride (TG), apolipoprotein-B (Apo-B), Small dense low-density lipoprotein (sd-LDL), and decreased high-density lipoprotein (HDL) can be prothrombotic and proinflammatory states.[2]

Lifestyle modification programs (LSM) address the poor lifestyle choices that are the root cause of chronic disease. The LMP program addresses diet, exercise, stress management, and nutritional depletion using

cognitive-behavioral approaches to improve the causes of chronic disease. Exercise is any movement that the body works at an intensity greater than the usual level of daily activity. This is done for a variety of reasons including strengthening the muscles and cardiovascular system. It also improves mental health, helps prevent depression, helps promote or maintain positive self-esteem, and can improve body image, which has also been found to be linked to higher levels of self-esteem.[3] Frequent and regular exercise helps prevent diseases such as heart disease, type 2 diabetes, and obesity. Increased exercise, especially continuous aerobic exercise has been considered one of the best non-pharmacological strategies for preventing and treating cardiovascular disease. [4] Exercise induces an acute increase in post hepatic lipoprotein lipase which in turn leads to enhanced triglyceride clearance and decreases plasma clearance of high-density lipoprotein (HDL) constituents.[5] Lipoprotein lipase activity is the major enzyme involved in the catabolism of plasma triglyceride and is increased in the skeletal muscle and adipose tissue as well as in the plasma of people engaged in exercise compared to those not engaged in exercise. This study aimed to determine the effect of LSM on the parameter of body weight and serum lipids profile level of the obese subject.

2 Method

The inclusion of participants aged 25-40 years recruited through personal contact consisted of 20 obese subjects who appeared to engage in diet and regular exercise (get at least 150 minutes of exercise a week). The types of physical exercise aerobic (walking, swimming, jogging) were included in the study. Exclusion criteria include: those with a history of high blood pressure, coronary heart disease, individuals on a fat-free diet, pregnant women and nursing mothers, and those taking lipid-suppressing drugs. The anthropometric measurements and blood sample was taken before and after three months of the LSM. Height (m) is measured using a wall-mounted height bar and body weight (kg) is measured using a digital bathroom scale and its value is used in BMI calculations. Blood pressure (systolic and diastolic) is measured using a mercury sphygmomanometer. After an overnight fast of about 10-12 hours, about 5 ml of blood is collected aseptically with a venous puncture of all subjects between 8-10 am. The sample is left to clump and centrifuge to get the serum stored at -20°C. Serum total cholesterol (TC) was determined by the enzymatic colorimetric method and estimation of TG, HDL, and determination of LDL.[6] the sd-LDL examination was performed indirectly in which the ratio of LDL cholesterol /Apolipoprotein B.

Statistical analysis

Data were presented as mean \pm SD. The normality assumption of data was evaluated and confirmed using Shapiro-Wilk in each group. Differences within group were tested using a dependent sample t-test.

However, the abnormal data were tested using the Mann-Whitney U test and Wilcoxon test. Two-sided p-values of <0.05 were considered as statistically significant. The data were analyzed using SPSS software

3 Results

After 3 months of LSM, there was a significant decrease in serum LDL, ApoB, BMI, WC, FPG, and DBP ($p < 0.05$) in obese. However, no significant difference was observed in TG, HDL, sdLDL, PPG, and HbA1C ($p > 0.05$) [Table].

Table 1 The Parameters of Profil Lipid before and after lifestyle modification for 3 months.

Parameter	LSM (n=20)			P
	Before	After	95% CI	
BMI (Kg/m ²)	32.0±4.1	30.9±4.1	0.7-1.3	0.001**
WC (cm)	98.6±16.1	89.9± 7.5	2.3-15.2	0.011**
FPG (mg/dl)	83.4±10.5	91.7±20.6	0.2-16.3	0.044*
PPG (mg/dl)	114.8±3.4	112.3±37.7	14.8-19.8	0.766
HbA1c	5.6±1.1	5.5±0.6	0.2-0.5	0.437
LDL (mg/dl)	139.7±30.5	129.4±29.8	1.8-18.7	0.019**
HDL (mg/dl)	46.3±8.4	45.3±10.0	3.4-5.5	0.633
TG (mg/dl)	147.5±50.4	151.5±71.4	31.5-23.4	0.761
Apo-B (mg/dl)	104.7±17.2	100.2±19.0	0.1-8.7	0.045*
sdLDL (mg/dl)	1.3±0	1.7±1.9	1.3-0.5	0.363

BMI: body mass index; WC: waist circumference; FPG: fasting plasma glucose; PPG: postprandial glucose; LDL: low-density lipoprotein, HDL: high-density lipoprotein, TG: triglyceride; *: <0.05; **: <0.01

4 Discussion

Physical inactivity represents a significant risk factor for coronary heart disease (CHA).[7] Young people are even less likely to meet recommended standards, with fewer than 20% of adolescents performing the recommended 60 minutes or more of daily physical activity.[8] Compared with those who are very physically active, the risk of CHD in sedentary individuals is 150% to 240% higher.[9] Only about 25% of all Americans engage in the minimum standards from the Centers for Disease Control and Prevention and the Physical Activity Guidelines for Americans 2018 guidance of at least 150 minutes per week of moderate-intensity aerobic exercise or at least 75 minutes of vigorous exercise and muscle-strengthening activities at least 2 days per week.[10] The greatest benefit in terms of reduction of risk of CHD appears to

come to those engaging in even a modest amount of physical activity compared to the most physically inactive. Physical activity is a significant risk factor for CHD.[11] The LSM program is recommended as the first line of treatment for chronic diseases by many medical communities and organizations such as the Centers for Disease Control, the National Institutes of Health, the American Heart Association, and the American Diabetes Association.[12] The LSM programs are an important and underutilized first line of treatment. They improve lifestyle choices, risk factors, and some of the biomarkers associated with chronic disease. Biomarkers such as low-density lipoprotein (LDL), high-density lipoprotein (HDL), triglycerides (TG), visceral adipose tissue (VAT), C-reactive protein (CRP), HbA1C, C-peptide, C-reactive protein, glucose, bone density, AST and ALT, which are leading indicators of the state of disease and the development of diabetes and hypertension. The medical knowledge states that proper diet, exercise, and achieving a healthy weight will not increase glucose, blood pressure, cholesterol, metabolic function, and reduce inflammation.

In this study, there was a significant decrease before and after three months of LSM in the serum LDL, ApoB, BMI, WC, FPG, and DBP ($p < 0.05$) in obese. However, no significant difference was observed in TG, HDL, sdLDL, PPG, and HbA1C ($p > 0.05$). The literature supports the use of LSM

programs for the treatment of many chronic diseases. According to Lerman et al, of the National Cholesterol Education Program, and the American Heart Association, LMP including diet and exercise are recommended as first-line treatments to treat insulin resistance and metabolic syndrome.[14] Therapeutic lifestyle modification change programs effectively reduce the risk of cancer,[15] cardiovascular disease (CVD), prevent progression to type 2 diabetes mellitus (T2DM), reverse insulin resistance,[16] lower liver fat,[17] and overcome metabolic syndrome.[18] The Diabetes Prevention Program (DPP) has shown that intensive lifestyle interventions focused on lifestyle changes and weight loss can successfully prevent or delay the onset of type 2 diabetes and metabolic syndrome in overweight or obese adults with pre-diabetes.[19]

5 Conclusion

Lifestyle modification for three months can improve parameters of body weight and profiles lipids, which means can prevent cardiovascular disease.

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