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Brisk walking and lipid profile in obese subjects

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***Abstract*---**The worldwide prevalence of obesity adults has increased dramatically in the past four decades. Obesity is also recognized as a risk factor for many other non-communicable diseases such as cardiovascular disease, various types of cancer, gallbladder diseases, respiratory problems and musculoskeletal disorders also induces type 2 diabetes mellitus. Cardiovascular disease is a leading cause of mortality and morbidity in developed and developing countries. The objectives of the study include a) To estimate the lipid profile in obese subjects, b) To compare lipid profile parameters before and after brisk walking in obese subjects. At baseline, pre-designed questionnaire was used to note down the demographic characteristics age, gender, residential address, telephone number and time spent in physical activity in hours. Anthropometric measurements included body weight, height and BMI is calculated. Fasting blood sample was collected in all the subjects to estimate the levels of Triglycerides and LDL and compared the levels TG and LDL in pre-post intervention in brisk walking group. We found significant reduction in TG an LDL levels in Brisk walking group before and after intervention. Non-pharmacological approach that is brisk walking for dyslipidemia is one of the significant approach in lowering the levels of TG and LDL thus contributing to reduction in cardiovascular morbidity and mortality.

***Keywords*---**obesity, over-weight, physical inactivity, low density lipoproteins, triglycerides.

Introduction

Obesity is a well-documented risk factor for cardiovascular disease in the general population (Rimm et al., 1995). Cardiovascular disease is a leading cause of mortality and morbidity in developed and developing countries including Malaysia (World Health Organization, 2000). In Malaysia, cardiovascular

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mortality has increased 15 folds from 1950 to 1989 and accounts for approximately 30% of total deaths among Malaysian adults (Khoo et al., 1991). Hence, cardiovascular risk factors including obesity have increasingly gained the attention of policy makers and researchers in Malaysia. The Third National Health and Morbidity Survey in 2006 has recorded an abdominal obesity in 17.4 % of the adults aged more than 18 years in Malaysia (Kee et al., 2008). Obesity is a well-documented risk factor for cardiovascular disease in the general population (Rimm et al., 1995). Cardiovascular disease is a leading cause of mortality and morbidity in developed and developing countries including Malaysia (World Health Organization, 2000). In Malaysia, cardiovascular mortality has increased 15 folds from 1950 to 1989 and accounts for approximately 30% of total deaths among Malaysian adults (Khoo et al., 1991). Hence, cardiovascular risk factors including obesity have increasingly gained the attention of policy makers and researchers in Malaysia. The Third National Health and Morbidity Survey in 2006 has recorded an abdominal obesity in 17.4 % of the adults aged more than 18 years in Malaysia (Kee et al., 2008). Obesity is a well-documented risk factor for cardiovascular disease in the general population (Rimm et al., 1995). Cardiovascular disease is a leading cause of mortality and morbidity in developed and developing countries including Malaysia (World Health Organization, 2000).

In Malaysia, cardiovascular mortality has increased 15 folds from 1950 to 1989 and accounts for approximately 30% of total deaths among Malaysian adults (Khoo et al., 1991). Hence, cardiovascular risk factors including obesity have increasingly gained the attention of policy makers and researchers in Malaysia. The Third National Health and Morbidity Survey in 2006 has recorded an abdominal obesity in 17.4 % of the adults aged more than 18 years in Malaysia (Kee et al., 2008). Obesity is a well-documented risk factor for cardiovascular disease in the general population (Rimm et al., 1995). Cardiovascular disease is a leading cause of mortality and morbidity in developed and developing countries including Malaysia (World Health Organization, 2000). In Malaysia, cardiovascular mortality has increased 15 folds from 1950 to 1989 and accounts for approximately 30% of total deaths among Malaysian adults (Khoo et al., 1991). Hence, cardiovascular risk factors including obesity have increasingly gained the attention of policy makers and researchers in Malaysia. The Third National Health and Morbidity Survey in 2006 has recorded an abdominal obesity in 17.4 % of the adults aged more than 18 years in Malaysia (Kee et al., 2008). The prevalence of overweight and obesity (BMI >25kg/m^2) continuous to increase in developing countries like India with inadequate physical activity and excess calorie consumption. Obesity is also recognized as a risk factor for many other non-communicable diseases such as cardiovascular disease, various types of cancer, gallbladder diseases, respiratory problems and musculoskeletal disorders also induces type 2 diabetes mellitus. Cardiovascular disease is a leading cause of mortality and morbidity in developed and developing countries. As such, managing a comorbidity of overweight and obesity is of considerable importance. [1-4]

Moderate weight loss has been demonstrated to decrease the health risks and medical problems in 90% of obese patients. This is attributed to improvements of

their heart function, blood pressure, glucose tolerance and lipid profiles. It has been well accepted that an effective strategy to ameliorate obesity and lower the health-related risks is through participation in physical activity (NHLBI Obesity Education Initiative, 2000). Regular physical activity has been shown to induce physiological and psychological benefits including an improved lipid profiles, enhanced insulin sensitivity, lowered blood pressure and an increased energy expenditure which has the potential to lower body fat and body mass. Hence, participation in regular physical activity should be an integral component of weight loss therapy and weight maintenance. Reducing cardiovascular risk is even more important, given that circulatory disease is the leading cause of death. Therefore, managing dyslipidaemia must be one of the first-line interventions, as lipid profiles are strong risk factors for cardiovascular disease. [4-8]

Dyslipidaemia is commonly treated with pharmacological agents, however a need for alternative non-pharmacological intervention has become increasingly apparent as several safety concerns regarding the long-term use of pharmacological agents surfaced. Along with this respect, there have been studies pertaining to the effects of lifestyle modifications including exercise and/or diet. Some of them showed significant lipid lowering effects of exercise in over-weight/obese middle-aged women. In this study, we evaluated non-pharmacological intervention that is Brisk Walking and its impact on lipid profile in Obese Subjects with Dyslipidaemia. Brisk walking requires no special skills or facilities, has little injury risk, and is effective. As such, it is a feasible, safe, and effective exercise modality for overweight and obese women. However, limited number of studies have investigated the effects of brisk walking in our population. Hence, we have taken up this study to evaluate lipid profile in these subjects before and after brisk walking.[8-12]

Objectives of the study

The objectives of the study include a) To estimate the lipid profile parameters Triglycerides and LDL cholesterol levels in obese subjects, b) To compare lipid profile parameters triglycerides and LDL cholesterol levels before and after brisk walking in obese subjects.

Materials and Methods

Source of data

The study on “Brisk Walking and Lipid Profile in Obese Subjects” was conducted at Dept. of Biochemistry, RIMS, Raipur from January 2021 to July 2021. A written informed consent was obtained from each participant and their parents. The study protocol was approved Institutional Ethical Committee. In this study, we included 60 obese subjects aged 18 years to 40 years. We randomly divided these subjects into two groups with 30 subjects in each group, one as control group without any physical intervention with their daily routine and the other as brisk walk group.

Inclusion criteria

We included obese subjects both males and females in the age group of 18-40 years with BMI ranging from 25-40 kg/m^2 were included.

Exclusion criteria

We excluded the obese subjects with Diabetes, PCOD, hypothyroidism, h/o smoking and alcohol consumption, known cases of dyslipidaemia.

Data collection and analysis

At baseline, pre-designed questionnaire was used to note down the demographic characteristics age, gender, residential address, telephone number and time spent in physical activity in hours. Anthropometric measurements included body weight, height and BMI was calculated. 5 mL fasting blood sample was taken from all the participants in red stoppered tube and was subjected to centrifugation to separate the serum. Serum was used for the estimation of lipid profile parameters in fully automated biochemistry analyser.

All the subjects participated in the study were given instruction for Brisk Walk 30 minutes a day, 5 days a week for 3 months. After one month fasting blood sample was collected in the plain serum tube for the analysis of lipid profile parameters which include total cholesterol, HDL cholesterol, LDL cholesterol and Triglycerides (TG). All the values obtained before and after brisk walking period were compared using students unpaired t test. P value <0.05 is considered statistically significant.

Statistical analysis

The collected data were entered in the excel sheet. Mean and SD were calculated. Lipid profile parameters before and after brisk walk in obese subjects were compared using students un paired t test. A p value of <0.05 was considered statistically significant.

Results

In our study, we included a total of 60 obese adults aged between 18-40 years. These subjects were randomly divided into control group on their daily routine without non-pharmacological intervention and brisk walking group on brisk walking for 30 minutes weekly 5 days for three months.

Table 1: Shows Demographic Characteristics in both the study groups

Parameters	Control group	Brisk walking group	P value
Age	37.46 ± 4.43	41.43 ± 4.82	NS
Height	158.46 ± 5.24	159.4 ± 6.24	NS
Weight	74.34 ± 8.32	76.36 ± 7.78	NS
Body fat	23.42 ± 3.89	24.6 ± 4.66	NS
Triglyceride in mg/dL	218.42 ± 34.89	198.42 ± 46.89	NS
LDL in mg/dL	128.34 ± 14.67	132.98 ± 12.432	NS

Table 2: Shows comparison of TG and LDL levels before after brisk walking in brisk walking group			
Parameters	Pre-intervention	Post-intervention	P value
Triglyceride in mg/dL	198.42 ± 46.89	158.42 ± 26.89	HS
LDL in mg/dL	132.98 ± 12.432	90.98 ± 10.72	HS

Discussion

In our study, we evaluated 60 obese subjects randomly divided into control group (n=30) and brisk walking group (n=30), no intervention for control group they were on routine regular activities and the brisk walking group were on brisk walking intervention for 3 months with 30 minutes of brisk walking for 6 days a week. We evaluated lipid profile parameters TG and LDL levels in these subjects. In Brisk walking group lipid profile parameters were evaluated after 3 months of brisk walking. We found highly significant reduction in TG and LDL levels in brisk walking group, pre-and post intervention.

Physical inactivity is a state of concern as it leads to major health problems like obesity, hypertension and various metabolic disorders. Exercise is recommended as a therapeutic lifestyle change as it leads to various health benefits. It is also known to bring about changes in lipid parameters. Exercise is a subset of physical activity defined as "planned, structured, and repetitive bodily movement done to improve or maintain one or more components of physical fitness." Physical activity is an important determinant of energy expenditure and regular exercise is essential for weight control and weight loss. The awareness about complications of obesity and the significance of exercise in reduction of cholesterol levels are becoming popular amongst people that are obvious with increase in the number of people walking for health, moving towards gyms and various physical activities.[12-16]

The subjects in our study were hypertriglyceridemia (TG≥150 mg/dl) and have higher TG levels than subjects in other studies mentioned earlier. Therefore, it is possible that substantial reductions in TG levels in our study derived from the high baseline TG concentrations. As such, the result of our study confirms a notion that the effect of exercise on serum TG levels may be dependent on baseline TG concentrations and this effect is augmented when subjects' initial TG levels are high. The elevated levels of TG are associated with an increase in small dense LDL particles (sdLDL), which is the main risk factor in the development and progression of atherosclerosis and CVD. Circulating sdLDL particles are very susceptible to multiple atherogenic modifications in blood plasma, including desilylation, glycation, and oxidation, that make them even more atherogenic. Modified sdLDL is a major trigger of inflammatory processes that accompany CVD. Twelve weeks of exercise in the NW reduced the participants' TG levels to the upper limit of normal. Several physiological mechanisms can be considered to explain the exercise-induced and intensity-independent changes in LDL-c. Exercise-induced changes in LDL-c may be due to dilution as a result of an increase in plasma volume, a decrease in body weight or a change in body fat distribution, an upregulated expression of hepatic LDL receptors, an increased cholesterol transfer from apoA-containing particles (LDL-c, very-low-density

lipoprotein) to HDL particles and the use of cholesterol for cellular metabolism and repair due to muscle damage immediately after intense exercise. [17-18]

Conclusion

Non-pharmacological approach that is brisk walking for dyslipidemia is one of the significant approach in lowering the levels of TG and LDL thus contributing to reduction in cardiovascular morbidity and mortality.

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