The Effect of Sedentary Life Style on "Good" and "Bad" Cholesterols in Young Adults

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Abstract: The aim of present study was to evaluate the sedentary life style on blood cholesterol in all population with different obese and slim body mass indexes over 8-weeks period time. Nineteen physically inactive women [(obese =9, BMI ≥ 30, age 22.6 ± 1.5) and slim =10, BMI ≤ 20, age 21.9 ±1.2)] volunteered to partake in this investigation. Pre-intervention assessments (before 8-weeks) were included age (yr) height (cm), weight (kg), BMI (kg/m²) and cholesterol components (HDL-C and LDL-C) (mg/dl).The post –intervention assessments were involved all primarily measurements expect age and height. Analysis showed that initiate LDLcholesterol was significantly differ in obese and slim groups (O: 106.01±0.11 Vs S: 101.1±0.20) (P= 0.37) and it equally remained significantly different (O: 110.78±0.77 Vs S: 99.4±0.50) (P= 0.19) within groups after post-intervention measurement. HDLcholesterol at pre-intervention assessment dramatically was different between obese and slim participants (O: 45.33±0.30 Vs S: 58.9±0.00) (P= 0.39) but this differences was not statistically significant at post –intervention evaluation (O: 45.33±0.30 Vs 44.56±0.50 and S: 58.9±0.00 Vs 60.1±0.03) (P= 0.86) yet obese subjects had an HDL-C below normal range in comparison an optimal HDL-C range in slim participants. These findings point out once again that obesity can increase the risk of developing various health problems and keeping the weight off can be a beneficial lifestyle modification through a level appropriate combined with reducing the number of calories at each day in a comprehensive program of health promotion.

Key words: Sedentary Lifestyle • Lipid Profiles • Cardiovascular Diseases • Lifestyle Modification

INTRODUCTION

A sedentary lifestyle is a kind of lifestyle without physical activity. Sedentary behavior literary is associated with nocuous health outcomes [1] that can contribute in many preventable diseases (heart disease, hypertension, diabetes) in which have become epidemic worldwide [2, 3]. Consequently, there is a considerable economic burden ($) and/or £) due to physical inactivity across the globe [4].

In sedentary routine the style of living has been defined by a daily energy expenditure less than 1.5 metabolic equivalent tasks (≤1.5 METs) [5] which does not meet the goal standard physical activity recommendation that stated to promulgate public health all adults aged 18 to 65 years need moderate-intensity (3–6 METs) cardiorespiratory activity for a minimum of 30 min on five days each week [6]. Sedentary individuals in fact, whether they are obese or slim do not have an energy balance in their daily way of lives in which can adversely influence on their general health [7] as the stability of body composition depends on reaching a steady-state where the amount of energy ingested are equal to the amount of energy expended [8]. Consequently, the prolonged persistence of energy imbalance between energy intake and energy expenditure, in sedentary style of lives alters blood cholesterol concentrations and balance of blood lipids (i.e. HDL, LDL, etc.) [9, 10]. World Health Organization’s (WHO) (2002) in this respect has been reported that the lack of physical activity increases ‘bad’ LDL cholesterol and decreases ‘good’ HDL cholesterol [11]. Low level of high density lipoprotein cholesterol (HDL-C) accelerates the development of atherosclerosis because impaired reverse excess cholesterol transport to the liver for elimination process develops lipid levels in blood vessels. Thus a healthy level of HDL cholesterol (HDL-C) can be a protection against heart diseases [12]. Subsequently,
Low density lipoprotein cholesterol (LDL-C) carries cholesterol from liver to the cells that need and if high level of LDL cholesterol (LDL-C) is being transferred to the cells to use, it can build up in the artery walls [13] leading to plaque, a thick and hard deposit that can clog arteries and make them less flexible whereby atherosclerosis can takes place and if a clot forms and blocks a narrowed artery, heart attack or stroke can result. Peripheral artery disease is another condition that can develop when plaque buildup narrows an artery supplying blood to the legs [14].

MATERIAL AND METHODS

Subjects: Nineteen physically inactive women [(obese =9, BMI ≥ 30, age 22.6 ± 1.5) and slim =10, BMI ≤ 20, age 21.9 ±1.2] volunteered to partake in this investigation. Participants provided written informed consent to engage in the research, which was approved by local committee of ethics. Participants were free from cardiovascular as well as muscular diseases and were not taking any medication. All subjects were requested to maintain their sedentary routine of life and not to contribute in any sport during the time of study period (8 -weeks).

Anthropometric Measurements: The height, in centimeter (cm) was measured using a standard stadiometer (vertical height board) (Seca, Stadiometer Scales Ltd). A calibrated electronic weighing scale (Seca model, Digital Scales) was used to assess body weight in kilogram (kg). The body mass index (BMI) or Quetelet index was determined by dividing the body weight (in kilograms) by the height (in meters) squared (BMI = weight/height²). Anthropometric measurements were made in controlled environment exercise physiology laboratories.

Blood Sampling: Participant were asked not to eat for 10-12 hours the night before cholesterol test. Following that 10 ml of fasted blood samples were taken for LDL, HDL serums and immediately centrifuged at 1500 rpm for 30 min at 4°C within 2 h. Serum sample from each study participant after that was stored at -20°C frozen environment until analysis (pre and post measurements).

Cholesterol components (HDL-C and LDL-C) in milligram per deciliter (mg/dl) were estimated by a homogeneous assay (HDL & LDL, Plus and Roche Diagnostics, Japan) on the Hitachi 911 analyzer. The same technician performed blood cholesterol (HDL-C & LDL-C) test before and after 8 weeks.

Statistical Analysis: Variables were compared between pre and post assessments using Statistical Package for the Social Sciences (SPSS) (version 18; SPSS Inc., Chicago, IL USA). Descriptive Statistics were used to determine mean and standard division (SD) and independent student t –test with an alpha level set at .05 (P < 0.05) was used to compare adherence.

RESULTS

As it can be seen from Table 1, the subjects were not different in age (22.6 ± 1.5 Vs 21.9 ±1.2 yr) and also height (159.1± 1.5 Vs 162.7±6.6 cm) P>0.05 however they were significantly divergent in BMI (kg/m²) and weight(kg) P<0.05 before and after intervention programme. Among non-identical subjects 67% of obese women and 40% of slim women had an HDL cholesterol (HDL-C) below normal range (35 -60 mg/dl) at the beginning of measurements and 22% of obese people remained to have an HDL cholesterol under normal range after 2 months post –measurements. However, there was not observed any discrepancy in LDL cholesterol (LDL-C) level among obese and slim women. Further, according to the Table 1, pre – assessments showed that LDL cholesterol (LDL-C) was significantly differ in obese and slim groups (O: 106.01±0.11Vs S: 101.1±0.20) (P= 0.37) P<0.05 and it equally remained significantly different (O: 110.78±0.77 Vs S: 99.4±0.50) (P= 0.19) P<0.05 within groups after post-intervention assessments according to the Figure 1. Table 1 also displays significant differences in HDL cholesterol (HDL-C) at pre-intervention assessment between obese and slim participants (O: 45.33±0.30 Vs S: 58.9±0.00) (P= 0.39) P<0.05 but this differences was not statistically significant at post –intervention evaluation (O: 45.33±0.30 Vs 44.56±0.50 and S: 58.9±0.00 Vs 60.1±0.03) (P= 0.86) P>0.05 according to the Figure 2.
**Table 1: Changes in variables in subjects’ pre and post assessments (X ± SD)**

<table>
<thead>
<tr>
<th>Variables</th>
<th>Obese</th>
<th>Slim</th>
</tr>
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<tbody>
<tr>
<td>Age (years)</td>
<td>22.6 ± 1.5</td>
<td>21.9 ± 1.2</td>
</tr>
<tr>
<td>Height (cm)</td>
<td>159.1 ± 1.5</td>
<td>162.7 ± 6.6</td>
</tr>
<tr>
<td>Weight (kg)</td>
<td>78.1 ±10.9</td>
<td>46.5 ± 5.7</td>
</tr>
<tr>
<td>BMI (kg/m²)</td>
<td>30.9 ± 3.3</td>
<td>30.3 ±3.2</td>
</tr>
<tr>
<td>LDL(mg/dl)</td>
<td>106.01±0.11</td>
<td>110.78±0.77</td>
</tr>
<tr>
<td>HDL(mg/dl)</td>
<td>45.33±0.30</td>
<td>44.56±0.50</td>
</tr>
</tbody>
</table>

Significantly different from the respective ‘Pre’ value p < 0.05

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**Fig 1:** Change in LDL serum before and after 8 weeks between slim and obese groups

**Fig 2:** Change in HDL serum before and after 8 weeks between slim and obese groups

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**DISCUSSION**

The results of a present study showed sedentary life-style inversely influenced on LDL cholesterol (LDL-C or ‘bad cholesterol’) in obese subjects in which increased their LDL-C levels by 1.5% whiles slim subjects experienced a decrease in their LDL-C levels by 1% with independent changes in weight as well as body mass index (BMI). Increasing low-density lipoprotein (LDL) can fuse together with other fatty substances in blood and reform an obstruction in the arteries that in turn leads to reduced blood flow, which can stimulus serious coronary heart disease (CHD) [17]. Hence reducing the LDL cholesterol (LDL-C) levels can lower the incidence of CHD significantly even by up to one third (1/3) [18]. Furthermore, the study follow-up showed being obese and being sedentary can all result in lower HDL cholesterol (HDL-C or ‘good cholesterol’) than being slim over time. Alternatively, it has been shown that for every 1 milligram HDL-C per 1 deciliter (mg/dL) of blood, the risk for developing cardiovascular disease (CAD) decreases by 2% to 3% [12]. Framingham from early years reported,
risk for CAD increased sharply as HDL levels dropped progressively below 40 mg/dL [19]. Therefore, bringing up HDL cholesterol levels leads to an effective cardioprotective strategy against cardiovascular disease such as atherosclerosis [20]. These findings point out once again that obesity can increase the risk of developing various health problems and losing weight and keeping the weight off can be a beneficial lifestyle modification to control the cholesterol levels. To control body weight the energy balance framework is very good technique [21]. The energy balance term indicates that daily energy intake needs to be equal with daily energy expenditure [22]. This can be achieved through physical activity to a level appropriate combined with reducing the number of calories at each day in a comprehensive program of health promotion [23]. This is why, the most recent American College of Sports Medicine (ACSM) Position Stand of quantity and quality of physical activity guidelines recommends that “most adults engage in moderate-intensity cardiorespiratory exercise training for ≥30 minutes per day on ≥5 days each week for a total of ≥150 minutes per week, vigorous-intensity cardiorespiratory exercise training for ≥20 minutes per day on ≥3 days each week (≥75 minutes per week), or a combination of moderate- and vigorous-intensity exercise to achieve a total energy expenditure of ≥500 to 1000 MET per minutes per week” [24]. Lifestyle modification thus in this study specifies as a mean of public health strategies to monitor and/or treatment of cardiovascular diseases related to the lipid profiles in part in obese individuals.

ACKNOWLEDGEMENT

While this study was not funded by any organizations, the author would like to thank all the participants who took part in this research.

REFERENCES