Original Article

Estimation and correlation of stress and cholesterol levels in college teachers and housewives of Hyderabad-Pakistan

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Abstract

Objective: To evaluate environmental, psychological and physiological stresses in college teachers and housewives, and to correlate with their serum total cholesterol, HDL cholesterol, and LDL cholesterol, and triglyceride levels.

Methods: This cohort study was performed at the Institute of Biochemistry, University of Sindh, Jamshoro, Pakistan during 2003-2005. Eighty females from middle socioeconomic groups, college teachers (40) and housewives (40) aged between 25-45 years participated in this study and subjects were selected from Hyderabad and its adjoining areas. Environmental, psychological and physiological stress levels were measured with Likert scale. Total cholesterol, LDL cholesterol and HDL cholesterol were measured by CHOD-PAP method and triglyceride levels were measured by GPO method.

Results: Housewives had high levels of total cholesterol, LDL cholesterol and triglyceride but low levels of HDL cholesterol were found in college teachers. Environmental, psychological and physiological stresses were significantly higher in housewives as compared to college teachers.

Conclusion: Housewives were under more stress than college teachers. High levels of total cholesterol, LDL cholesterol and triglyceride but low levels of HDL cholesterol were found in housewives compared to college teachers (JPMA 58:15;2008).

Introduction

Stress is a set of neurological and physiological reactions that serve as an adaptive function for the environmental, social, and cultural values and structures within which the individual acts upon.1 There are several studies over the past 15 years documenting the impact of acute mental stress on blood lipid concentrations.2,3 Emotional stress has long been thought to be associated with coronary artery disease and has a risk factor for the development of atherosclerosis (thickening and hardening of arteries).4 Coronary heart disease is a leading cause of death in western societies and an elevated serum cholesterol level is well established as a key risk factor for cardiovascular morbidity and mortality.5 Mental stress has been reported to induce silent myocardial ischemia in patients with coronary artery disease.5 Few studies have examined the relationship of cholesterol and serum lipids to psychiatric disorders.6 Depression is also associated with higher cholesterol levels.5,6

Level of LDL-cholesterol higher than 130 mg/dl is associated with increased health risks. High-density lipoprotein (HDL) contains less cholesterol and more protein. Higher HDL-cholesterol levels are associated with reduced risk for coronary heart disease. It means that HDL cholesterol in blood is better than LDL.7

Triglycerides, stored in adipose tissues as glycerol, fatty acids and monoglycerides are reconverted as triglycerides by the liver.8 Dietary intake of 90% and 95% of the fat stored in tissues are triglycerides.9 Increased levels may be present in atherosclerosis, hypothyroidism, liver disease, pancreatitis, myocardial infarction, metabolic disorders, toxemia, and nephrotic syndrome.8 Decreased levels may be present in chronic obstructive pulmonary disease, brain infarction, hyperthyroidism, malnutrition, and...
malabsorption. Short periods of psychological stress can cause the body to take longer to remove heart-damaging fats from the bloodstream. Stress causes triglycerides to stay in the bloodstream longer. If a person has a high-fat snack or meal during a time of stress, that fat is going to be circulating in the blood for a longer period of time, it may be more likely to be deposited in the arteries where it can contribute to heart disease.

The present research work was carried out to find the correlation of stress and blood cholesterol levels in college teachers and housewives.

**Methods**

The study was performed at the Institute of Biochemistry, University of Sindh, Jamshoro, Pakistan during the years 2003 to 2005. The Ethical Committee of Institute of Biochemistry, University of Sindh, Jamshoro approved the study. An informed consent was taken from all the participants.

For the calculation and variations of different stress, a questionnaire measuring the environmental, psychological and physiological aspects of stress was designed. The method of scoring was based on five-point likert scale. The questionnaire was for 40 filled college teachers and 40 housewives of the same area. Age group of both the classes ranged between 25 to 45 years and both belonged to middle socioeconomic status. In order to see the effect of different nutrients on stress, a separate questionnaire was used. This questionnaire was filled in for each individual in both the groups, in which age, height, weight, marital status, socioeconomic status and diet patterns were recorded.

Anthropometric measurements were conducted using the standard methods. Weight with minimum clothing was recorded to the nearest 0.1 kg, using a portable digital scale (Tanita model 1597; Tanita, Tokyo, Japan). For height, the subject stood straight for measurement to the nearest 1 mm. The body mass index (BMI) was also calculated (kg/m²).

Blood samples were collected in the morning by disposable syringes through vein puncture and a maximum of 5 ml blood was taken. The samples were immediately transferred, which took one hour after collection. All blood samples were analyzed using 'Merck - Micro lab 200' instrument, Germany.

Total cholesterol levels were measured by CHOD-PAP method, Diagnostica Merck (1.14830.0001). HDL-cholesterol levels were measured by CHOD-PAP method, Diagnostica Merck (1.14210.0001). LDL-cholesterol levels were measured by CHOD-PAP method, Diagnostica Merck (1.14992.0001), and triglyceride levels were measured by GPO method, Diagnostica Merck (1.17130.0001). Data were expressed as mean ± standard deviation (SD). Means of two groups were compared by using student's t-test or analysis of variance. The results were considered statistically significant was the p-value was less than 0.001. Data in this study was analyzed by the Statistical Package for Social Sciences version 12.0 (SPSS Inc, Chicago, IL, USA).

**Results**

Demographic and professional characteristics of responding college teachers and housewives are given in Table 1. The college teachers less than 30 years were 10%, 75% were 30 to 40 years and 15% was above 40 years of age. Similarly 10% of housewives were < 30 years, 76.9% were 30-40 years and 13.1% females of this group were above 40 years of age. The mean body mass index (BMI) in kg/m² of college teachers 23.1±1.4, while the mean BMI of housewives was 24.2±2.1 There was no female with BMI greater than 30.0.

Results of the statistical analysis in Table 2 have revealed main differences between the three types of stresses i.e. environmental stress (t=4.7), psychological stress (t=7.2) and physiological stress (t=4.8) with the probability of 0.001.

Table 3 shows the comparison of serum lipid levels in college teachers and housewives.

<table>
<thead>
<tr>
<th>Variables</th>
<th>College Teachers</th>
<th>Housewives</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number</td>
<td>n = 40</td>
<td>n = 40</td>
</tr>
<tr>
<td>Socioeconomic Condition (SEC)</td>
<td>Middle socioeconomic</td>
<td>Middle socioeconomic</td>
</tr>
<tr>
<td>Age (years)</td>
<td>&lt; 30</td>
<td>10%</td>
</tr>
<tr>
<td></td>
<td>30 - 40</td>
<td>75%</td>
</tr>
<tr>
<td></td>
<td>≥ 45</td>
<td>15%</td>
</tr>
<tr>
<td>Weight (kg)</td>
<td>52.6 ± 2.9</td>
<td>53.8 ± 5.0</td>
</tr>
<tr>
<td>Height (cm)</td>
<td>150.4 ± 2.3</td>
<td>149 ± 1.6</td>
</tr>
<tr>
<td>BMI (kg/m²)</td>
<td>23.1 ± 1.4</td>
<td>24.2 ± 2.1</td>
</tr>
<tr>
<td>BMI &gt; 25 (kg/m²)</td>
<td>10%</td>
<td>37.4%</td>
</tr>
<tr>
<td>BMI &lt; 25 (kg/m²)</td>
<td>90%</td>
<td>62.5%</td>
</tr>
</tbody>
</table>

Data was shown as mean ± SD, Percentage of subjects with BMI > 25 (kg/m²) and BMI < 25 (kg/m²) respectively.

<table>
<thead>
<tr>
<th>Stress</th>
<th>College Teachers</th>
<th>Housewives</th>
<th>t - test</th>
<th>Probability</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n = 40</td>
<td>n = 40</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Environmental</td>
<td>21.9 ± 3.2</td>
<td>26.5 ± 5.2</td>
<td>4.7</td>
<td>0.001</td>
</tr>
<tr>
<td>Psychological</td>
<td>22.2 ± 2.3</td>
<td>27.2 ± 3.7</td>
<td>7.2</td>
<td>0.001</td>
</tr>
<tr>
<td>Physiological</td>
<td>20.1 ± 2.3</td>
<td>24.3 ± 4.9</td>
<td>4.8</td>
<td>0.001</td>
</tr>
</tbody>
</table>
concentrations i.e. total cholesterol, HDL-cholesterol, LDL-cholesterol and triglyceride in college teachers and housewives. Statistically significant difference was found in total cholesterol, LDL cholesterol and triglyceride levels but no significant difference in HDL cholesterol in both the groups. There was a slight decrease in HDL cholesterol in housewives as compared to college teachers.

Discussion

Housework is considered to be of low status and esteem. Full time housewives tend to be less happy with their lives and in turn more depressed than working women.

Our results showed a significant difference between the level of stress of college teachers and housewives. Work helps to develop new skills, enhance self-esteem, increase feelings of competence and self-efficiency. Working women are capable of raising children, doing household work, entertaining guests and at the same time, sharing the husband's financial responsibilities. The feeling in turn tends to enhance satisfaction and causes less depression as compared to housewives who become a victim of boredom and monotony.19

The body makes all the cholesterol it needs; saturated fatty acids are the the important contributors for raising blood cholesterol levels, which increase the risk of coronary heart diseases.20 In humans liver produces about 2100 mg cholesterol per day.21 High levels of cholesterol can contribute to atherosclerosis just as low levels of HDL-cholesterol have been associated with an increased frequency of coronary heart disease. The increased levels of cholesterol in housewives may be associated with physical inactivity. Low-density lipoprotein is the major cholesterol carrier in the blood. If too much LDL cholesterol circulates in the blood, it can slowly be deposited upon the walls of the arteries feeding the heart and the brain.10

A decrease of 1mg/dl in LDL cholesterol results in about 21% decrease in the relative risk for CHD. Factors that increase LDL cholesterol include aging, genetics, diet; reduced estrogen levels (as occurs in postmenopausal women) progestins, diabetes, hypothyroidism, nephritic syndrome, obstructive liver disease, obesity, and some steroid and antihypertensive drugs. Diets high in saturated fat and cholesterol elevate LDL by down regulating the LDL receptors in the liver.21

In conclusion, the result of this study showed that housewives are found to be under more stress compared to college teachers. The main contributory factor is their confinement in the house. In case of serum lipid concentrations, housewives have high level of total cholesterol, LDL - cholesterol and triglycerides compared to college teachers.

The health status of women in Pakistan is directly linked to women's low social status. Poverty has an adverse effect on women’s health.

Acknowledgement

This study is the part of project titled 'Effect of stress and nutrition on biochemical constituents of working and non-working females in different ethnic groups of Hyderabad district'. Authors are thankful to Director, Institute of Biochemistry, University of Sindh, Jamshoro, Pakistan, for providing funding and essential laboratory facilities for this project.

References

Association of the number of follicles of various sizes and treatment protocol with multiple pregnancies following ovulation induction and intrauterine insemination

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Abstract

Objective: To find the relationship between the number of follicles of different sizes and the stimulation protocol to the probability of multiple pregnancies.

Methods: Out of 2034 cycles of OI-IUI in a university based infertility center, between March 2003 to March 2006, there were 322 clinically pregnant cycles. The following variables were tabulated for each cycle: female age, treatment protocol, follicle number and size on the day of hCG administration and number of gestational sacs detected by transvaginal ultrasonography at 9 weeks of gestation. Ovulation induction was done by cc, cc+hMG or hMG. Follicles were categorized by size as = 18mm, =15mm and =12mm. To find the relationship between singleton and multiple pregnancy with the average number of follicles of different sizes and the protocol of treatment, a statistical analysis was performed.

Results: There were 38 (11.8%) multiple pregnancies in 322 pregnant cycles. consisting of 26(8.1%) twin, 11 (3.4%) triplet and 1 (0.3%) quintuplet. Multiple pregnancy rate in cc, cc+hMG and hMG cycles were 9.01%, 12.2% and 15% respectively. There was no significant relationship between different treatment protocols and the risk of multiple pregnancy (p>0.1). The number of follicles ≥12mm or ≥15mm or ≥18mm had significant relationship with single and multiple pregnancies (p<0.01), but the correlation coefficient was higher for ≥18mm follicles. The mean age of the singleton and multiple pregnant women was not significantly different (p>0.1).

Conclusions: The risk of multiple conceptions is related to ≥18mm follicles in addition to the total number of follicles >12mm. Different protocol of ovulation induction revealed no relationship with the risk of multiple conceptions (JPMA 58:18;2008).

Introduction

Multiple pregnancy is the most frequent and most serious iatrogenic complication of infertility treatment. Contrary to popular belief, treatment with fertility drugs alone and not Assisted Reproductive Technology (ART) procedures accounts for the largest proportion of the iatrogenic multiples currently being produced. Ovulation Induction (OI) conclusive of In Vitro Fertilization (IVF) was found to be responsible for 38% of high order multiple pregnancies.1

With the very recent reduction in the number of embryos replaced in most ART cycles, ovulation-inducing drugs may become responsible for an even greater relative proportion in the upcoming decade. It is universally recognized that multiple gestation and its attendant prematurity is associated with increased mortality and morbidity, both for the mother, foetuses and newborns. Indeed, complications are so common that some have classified multiple pregnancy as a major pathology.2 Since the mid 1980’s, ovarian stimulants have been administered