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Full Length Research Paper

Elevated level of serum triglyceride among high risk stress bank employees in Riyadh region of Saudi Arabia

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The objective of this study was to estimate lipid profile among high risk stress bank employees' correlated with heart disorders in Riyadh, Saudi Arabia. A total of 129 patients with high risk stress employees were involved in this study, which were divided into 69 males and 60 females between the age of 25 to 55 years. A total of 80 control healthy subjects with the same age matching were included in this study. Serum triglyceride was found to be high (48.8%), where total cholesterol (TC), level showed no significant difference between the male and female patients. Triglyceride (TG) level in serum was found differing significantly ($p < 0.0001$) between high risk stress employees and control subjects as well as between male and female patients. Higher level of TC and low density lipoprotein (LDL) cholesterol were found more frequently in female patients (20%, 8.3%) respectively whereas more number of male patients was accounted for higher serum level of TG (58%). Overall observation indicated that majority of patients have raised high density lipoprotein (HDL) cholesterol (67.4%) and lowered LDL cholesterol (7.8%). It can be concluded that only raised level of TG not TC cholesterol may be the possible threat of cardiovascular diseases in high risk stress, Saudi population of Riyadh.

Key words: High risk stress, cholesterol, triglycerides, cardiovascular disease.

INTRODUCTION

Elevated serum triglyceride (TG), as a part of lipid metabolism has become a major threat for health. But it is not clear, whether this high level of TG is directly associated with increased risk for heart disease. A risk factor may be defined as an attribute that is associated with an increased probability of occurrence of a disease or other specified outcome and that can be used as an indicator of this increased risk. People with elevated triglyceride level almost invariably have other major risk factors for heart disease such as obesity, diabetes, high blood pressure, etc. and therefore it is not possible to sort out, if the TG poses an independent risk factor. Due to change in life style, various amount of stress such as muscle tension, tiredness, twitching and irritability overwhelm, and fuzzy thinking can be symptoms of stress. During a stressful event, the body switches fuel sources to more easily burned carbohydrates instead of lipids. In addition, most of the stress in modern life relates to brain activity rather than physical activity. As an average in most of the ethnic population, diseases due to altered levels of lipid profile are more. A number of diseases including cardiovascular disease (CVD) are manifested due to the accumulation of fat in the sub endothelial space of arteries. Conversely, regular exercises habits protect against the development of CVD, and may also improve sense of well-being. CVD are major cause of death in the world and is mainly due to atherosclerosis (Birtcher et al., 2000). As of 2007, it is the leading cause of death in the United States, accounting for 25.4% of the total deaths (Miniño et al., 2007; Xu et al., 2010). Abnormal blood lipids are risk factors for CVD. In addition to CVD, other diseases like leukemia (Naik et al., 2006) are also outcome of altered lipid profiles. There is a great variations in serum lipid values in various ethnic populations and usually are affected by food habits, life style, races, social environment and status work (Murray et al., 2004). A reference value of lipid profile may be defined as a value obtained by observation or measurements of a

particular type of quantity on the reference individual (Burtis and Ashwood., 1991). An increased value of lipid profiles can be seen in some other clinical condition such as hypothyroidism and obesity (Lands, 1985). Decreased values are always associated with hyperthyroidism and the condition generally called hypolipidemia.

Stress defined as occupational stress is "a condition arising from the interaction of people and their jobs and characterised by changes within people that force them to deviate from their normal functioning (Beehr and Newman, 1978)." Stress and negligence are a part of daily life and more so of the fast-paced corporate life. Role conflict (Miles and Perreault, 1976), overload of work (Katz and Kahn, 1978), role ambiguity (Brief and Aldag, 1976), lack of group cohesiveness (Ivancevich and Matteson, 1980), lack of supervisory support (Caplan et al., 1975) and inadequacy of role authority (Vansell et al., 1981) etc. are major factor which leads to stress in corporate employees. Moreover, it has been studied and proven that a mental stress is directly related with the significant alteration of serum lipid profile (Bachen et al., 2002)

Hence, this study was undertaken to estimate the lipid profiles with high risk stress employee correlate with risk of cardiovascular disease among Saudi people.

MATERIALS AND METHODS

Defining stress

To define the stress condition, patients were asked a set of question to be replied as “yes” or “no”. The questions were as follows;

(1) Is there any role of conflict? (2) Is there overload of work? (3) Is there role ambiguity? (4) Is there lack of group cohesiveness? (5) Is there any feeling of inequality? (6) Is there lack of supervisory support? (7) Is there constraints of changes, rules and regulations? (8) Is there job difficulty? (9) Is there inadequacy of role authority? (10) Is there job requirements capability mismatch?

Patients answering “yes” for at least 7 questions were considered as highly stressed

Screening of patients

This present study was conducted for a period of one year from March 2009 to June 2010. In this present study, only 129 patients with no previous history of lipid profile related problem were selected as fit for stressed condition from Razi Clinic, Um Al Hamam west, Riyadh. Among 129 patients, 69 were males (age range 22 to 55 years) and 60 were females (age range of 20 to 50 years). 80 control healthy subjects with the same age matching were also included in this study. The patients show one or other clinical symptoms of heart disorder. All participants had no past history of illness, no medication, any diabetes, or hypertension. For the sake of this present study, the patients were again categorized according to their sex, in order to know which group is more prone to the lipid profile (cholesterol, low density lipoprotein (LDL), and HDL, and triglycerides) related diseases.

Sample collection

3 ml fasting blood (after 12 h overnight fasting) was collected in a heparinized tube and centrifuge at 1500 rpm for 5 min and serum is collected fresh vial for biochemical studies by using standard methods as follows. All analyses for lipid profile were done within 5 h after collection.

Estimation of lipids

All samples were measure by biochemical method using Bio-chemical Analyzer (ERMA INC). Total cholesterol and Triglycerides were measured through enzymatic methods, and high density lipoproteins cholesterol using a direct method. When triglyceride values were under 400 mg/dl, LDL cholesterol concentration was calculated using Friedewald's formula.

Statistical analysis

For statistical analysis, SPSS v17 was used. Paired t-test and independent sample t-tests were performed as required. Results were expressed as mean ± SD, p-value <0.05 was considered as significant.

RESULTS

Triglyceride (TG) titer in serum of patients were found to be 48.8% (63/129) with high significant difference ($p < 0.0001$) (Table 1) and in both male (192.6 ± 103.2 mg/dl) and female (139.1 ± 62.6 mg/dl) groups were significantly different ($p < 0.001$). There were non-significant difference ($p > 0.05$) of serum total cholesterol (TC), HDL cholesterol and LDL cholesterol between males and female groups (Table 2). To make a firm conclusion, lipid profiles were categorized for the normal range and elevated value of serum lipids level in both male and female groups (Table 2). Given that the normal control subjects range for TC, TG, HDL cholesterol and LDL cholesterol were 150 to 250 mg/dl, 40 to150 mg/dl, 40 to 65 mg/dl and 130 to 150 mg/dl, respectively (Table 1).

On over all patients, elevated value of TC, TG, HDL cholesterol and LDL cholesterol were 17.8% (23/129), 48.8.0% (63/129), 67.4% (87/129), and 7.8% (10/109), respectively (Figure 1). In the male group, the range value of TC, TG, HDL cholesterol and LDL cholesterol were 213.9 ± 36.7, 192.6 ± 103.2, 70.9 ± 16 and 104.9 ± 24.3 mg/dl, respectively whereas elevated value of TC, TG, HDL cholesterol and LDL cholesterol were 15.9% (11/69), 58% (40/69), 59.4% (41/69) and 7.2% (5/69) respectively (Table 3 and Figure 2).

In the female group, the range value of TC, TG, HDL cholesterol and LDL cholesterol were 211.3 ± 39.8, 139.1 ± 62.6, 76.0 ± 17.4 and 107.4 ± 22.4 mg/dl, respectively whereas elevated value of TC, TG, HDL cholesterol and LDL cholesterol were 20% (12/60), 38.3% (23/60), 76.7% (46/60) and 8.3% (5/60), respectively (Table 3 and Figure 2).

Table 1. Mean (± SD) value of lipid profile of controls and high risk stress employees.

Lipid profile (mg/dl)	Control mean ± SD, (n = 80)	Employee mean ± SD (n = 129)	*p*-Value
Total Cholesterol	200 ± 50	212.7 ± 38.0	0.039
Triglyceride	95 ± 55	167.7 ± 90.5	< 0.0001
HDL Cholesterol	52.5 ± 12.5	73.3 ± 16.8	< 0.0001
LDL Cholesterol	135 ± 15	106.0 ± 23.4	< 0.0001

Table 2. Mean (± SD) value of lipid profile of male and female patients.

Lipid profile (mg/dl)	Male mean ± SD (n = 69)	Female mean ± SD (n = 60)	p-Value
Total Cholesterol	213.9 ± 36.7	211.3 ± 39.8	NS >0.05
Triglyceride	192.6 ± 103.2	139.1 ± 62.6	< 0.001
HDL Cholesterol	70.9 ± 16.0	76.0 ± 17.4	NS >0.05
LDL Cholesterol	104.9 ± 24.3	107.4 ± 22.4	NS >0.05

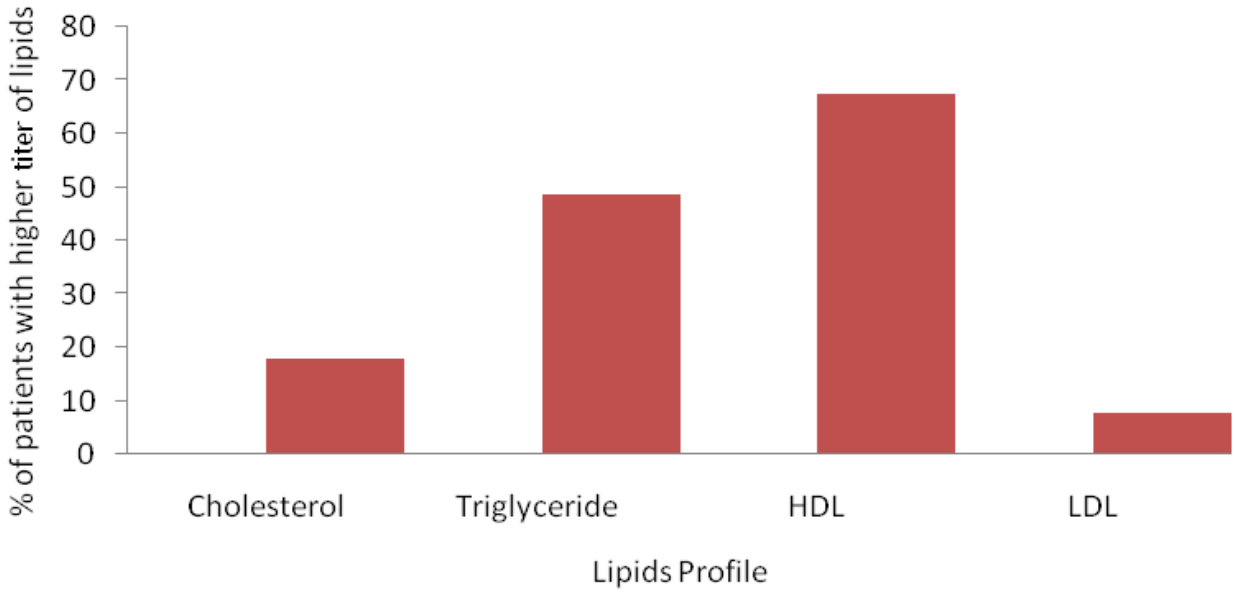

Figure 1. The (%) of all patients with higher level of lipids above the normal controls range.

It was found that the number of female patients with increased value of TC to male cholesterol in serum in comparison of male patients was higher by 20 and 15.9%, respectively. Interestingly, number of male patients with increased value of TG in serum in comparison of female patients was higher by 58 and 38.3%, respectively (Figure 2).

DISCUSSION

Males have higher risk of heart diseases due to higher level of serum TG (Iso et al., 2001). Simultaneously, accumulation of TG in heart also leads to their aging (van der et al., 2008). Our study supports this view since more number of male patients (58%) with an elevated level of serum TG was recorded clinically. This indicates that males of this study group were more vulnerable to heart diseases (Rani et al., 2005). Although, females have more serum TC level than males (Isles et al., 1992). However, mortality due to coronary heart disease (CHD) in females is lesser than males (Higgins and Keller, 1992).

This present study is in disagreement with earlier findings, since mean value of serum TC differ non-significantly but more number of female patients (20%) are acquiring serum TC level above the normal references range than that of males (15.9%). Overall, only 17.8% patients had higher serum TC. A number of

Table 3. Mean (± SD) of above the higher level normal controls range and elevated value of titer of lipids in serum of male and female patients**.**

Parameter	Lipid titer group	Mean ± SD Cholesterol	Lipid titer group	Mean ± SD Triglyceride	Lipid titer group	Mean ± SD HDL	Lipid titer groups	Mean ± SD LDL
Male	> 250 (mg/dl) (%)	273.18 ± 25.1 15.9 % (11/69)	> 150 (mg/dl)	253.85 ± 95.4** 58% (40/69)	> 65 (mg/dl)	81.24 ±11.8* 59.4% (41/69)	>150 (mg/dl)	170.4 ± 17.2 7.2% (5/69)
Female	>250 (mg/dl) (%)	271.35 ±22.0** 20% (12/60)	>150 (mg/dl)	203.8 ± 50.37** 38.3% (23/60)	>65 (mg/dl)	82.54 ±14.33* 76.7% (46/60)	>150 (mg/dl)	155.0 ±4.85 8.3% (5/60)

** p-value <0.001 , *p-value <0.005.

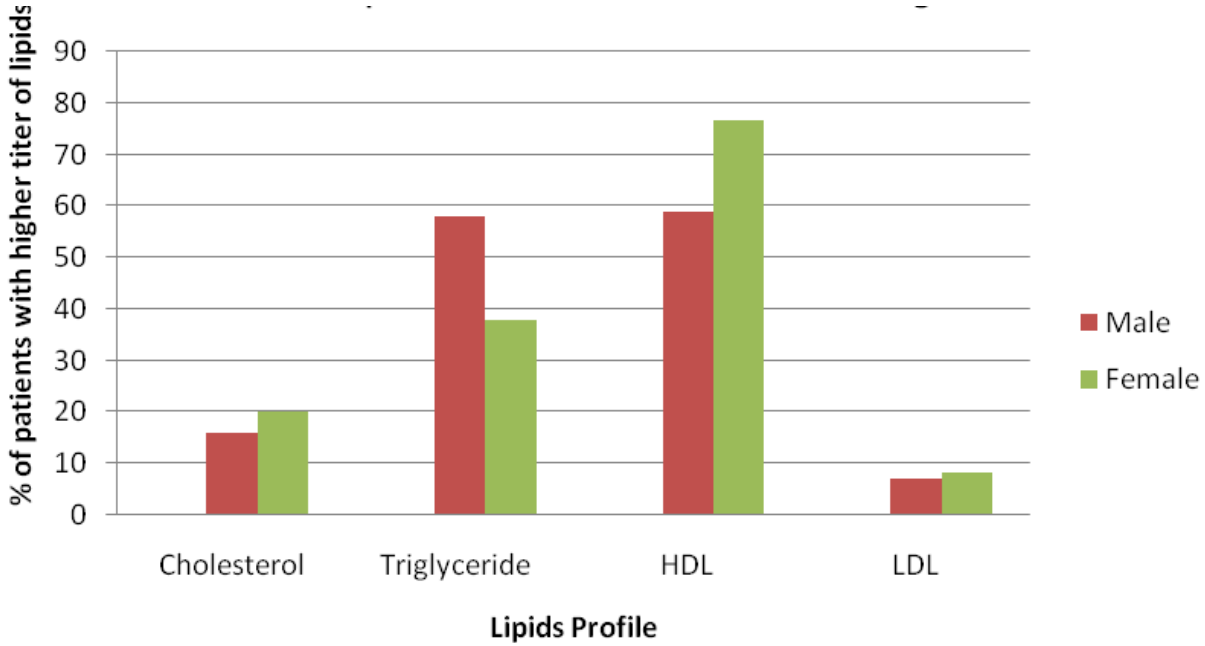

Figure 2. The (%) of male and female patients with higher level of lipids above the normal control range.

studies have indicated that both lowering low density lipoprotein (LDL)-cholesterol as well as raising high density lipoprotein (HDL)-cholesterol can produce many cardiovascular benefits, both in terms of reduction of events and also, to a variable extent, of athero-matous lesions. LDL and HDL have opposite roles in body Cholesterol regulation (Sirtori and Fumagalli, 2006; Olsson et al., 2005). This study indicates that most population has normal value of TC and also number of patients had increased TC. 59.4% of male patients and 76.7% of female patients have

increased level of HDL cholesterol. Only 7.8% of total patients had elevated LDL cholesterol but as a comparison more female patient (8.3%) had the same trend. Hence, this finding is in accordance with earlier studies.

To the best of my knowledge, this is the first study in Saudi Arabian employee with a high stress job profile, while most studies focused directly with lipid profile and hypertension or metabolic syndrome (Barrimah et al., 2009; Salman and Al-Rubeaan 2009). The aim of this present study was to reveal the risk of higher stress and adverse effect on lipid profile where consistent data is seriously lacking. A similar study in a Danish population highlighted that copenhagen male have risk of having a first heart attach twice as high in those with elevated TG level (Davis, 2004). A recent research in Denmark revealed that much job pressure had an almost 50% increased risk of ischemic heart disease (Mayo Clinic staff, 2010). Study by Romon et al. (1992) confirmed that shift work is associated with an increase of TG levels independent of dietary intake, and not influence of cholesterol, and HDL cholesterol levels. They referred the finding associated with coronary risk among shift workers. Another study done on Ohio State University (2002) showed that in all cases, stress caused TG to stay in the bloodstream longer and suggested one of the reason stress can be linked to heart disease. The author notices that everyone in this current study had a history of heart problem which may have amplified the heath impact of high TG.

Conclusion

Our objective was to determine the lipid profile of patients among high risk stress employment of a Saudi people from Riyadh and correlated with the risk of cardiovascular diseases. This study suggests that only raised level of TG (not TC, HDL cholesterol and LDL cholesterol) might be the primary risk factor for the cardiovascular diseases among the Saudi population from Riyadh. During stress, people might be not metabolizing lipid as rapidly and efficiently. Women can clear TG out of their blood streams more quickly than did men. This study recommends a need of lipid profile screening for people whom work in high risk stress and improve awareness of this matter.

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