Stress as a predictor of cardio-vascular diseases in middle aged Indians

■ RITU MATHUR **and** MANIKA MATHUR

See end of the paper for
authors' affiliations

Correspondence to :
RITU MATHUR
Department of Food Science
and Nutrition, Maharshi
Dayanand Saraswati University,
AJMER (RAJASTHAN) INDIA
Email:drritumathur@gmail.com

■**ABSTRACT :** Coronary heart disease (CHD) remains the major cause of death in middle aged Indians. Previous studies suggest that psychological stress may be one of the risk factors in the development of cardio-vascular disease (CVD) during this age. Both short term and long term stress has a direct impact on serum lipids and blood sugar levels. The other risk factors include heredity, faulty dietary habits, obesity and sedentary and stressful life style.In the present study various reasons for stress were assessed and the effects of stress on the serum lipid and blood sugar levels were seen. Forty middle aged subjects (40-60 years) were selected using convenience sampling technique. Complete cardio-vascular risk assessment was done using a score based questionnaire in which psychological stress was also taken into account. Almost 43 per cent of the subjects were at high risk of developing cardio-vascular disease. Ninety five per cent of the subjects were suffering from varying and diverse types of stress. Change in financial state was found to be the major cause of stress among the middle aged Indians. Strong correlation was seen between stress and blood sugar levels (p<0.05). Stress also affected the lipid profile and other biochemical parameters. Results of the present study showed that, if modified, the risk of CVD in middle aged subjects could be reduced. Prevention efforts need to begin a long way before 50 years of age. Modification of life style, stress management, a correct diet and regular exercise can help to a great extent in the prevention of this chronic, irreversible degenerative disease.

■ **KEY WORDS :** Coronary heart diseases, Cardio-vascular disease, Stress, Risk factors, Lipid profile

■**HOW TO CITE THIS PAPER :** Mathur, Ritu and Mathur, Manika (2013). Stress as a predictor of cardio-vascular diseases in middle aged Indians. *Asian J. Home Sci.,* **8** (1): 43-46.

There is an enormous amount of literature on psychological stress and cardiovascular disease (CVD). Throughout medicine, "stress" is one of the most common patient complaints. In cardiology, complaints of stress take on special prominence because the links between brain and heart are so obvious.

Acute stress is of critical importance as a potential trigger of acute coronary syndromes and cardiac arrhythmias in vulnerable individuals. In addition prolonged and repeated exposures to short term stressors and resulting acute distress responses may result in cumulative effects relevant to gradual cardiac and vascular disease progression (Rosengren *et al.,* 2004).

Untreated depression is a major concern because it adversely affects quality of life and significantly increases risk of subsequent cardiac events (Litchman *et al.,* 2008).Exposure to short term mental stress elicits hemoconcentration with associated increases in serum lipid concentrations, haemostatic factors and blood viscosity (Muldoon *et al.,* 1995).The vulnerability of these acute coronary syndromes is determined by the presence of structural myocardial damage. Chronic psychiatric, psychological and social conditions can influence the gradual progression of cardio-vascular disease and enhance the likelihood of emotion related triggers of acute coronary syndromes, primarily in patients with underlying CVD (Dimsdale, 2008).

■ RESEARCH METHODS
Selection of respondents :
The present study was aimed at assessing the risk factors for screening the middle aged Indian population aged 40 to 60 years. A total of 40 subjects were selected for the present piece of research using convenience sampling technique out

of which 20 were men and 20 were women.

Data collection :

Assessment of risk factors included anthropometric assessment, biochemical assessment, dietary assessment and stress scores which were calculated using a standardized questionnaire.

All the stress factors were allotted different scores depending on their severity. More severe stress factors were allotted a higher score, whereas low scores were given to the less severe stress factors. The subjects were asked to circle the scores corresponding to the correct answers. Finally all the scores were taken into account and added to arrive at the total. The subjects were then categorized into different risk categories for cardio-vascular disease risk prediction according to the table given below:

Low risk	-	88-220
Moderate risk	-	101-220
High risk	-	221-350
Very high risk	-	351 and above

Biochemical assessment included analysis of blood sugar (fasting and PP), serum fasting cholesterol, triglycerides, LDL, HDL and homocysteine. Tests were conducted in a standardized pathological laboratory using a fully automated analyzer (XL-300 Transasia).Homocysteine analysis was done using Immulite-1000 analyzer.

Statistical analysis :

Statistical analysis of collected data was done with respect to calculation of mean, standard deviation; per cent deviation and correlation co-efficient (Kothari, 1990). Percentages were also worked out. Results of the study are presented as under :

■ RESEARCH FINDINGS AND DISCUSSION

Results of the present study showed that, if modified, the risk of CVD in middle aged subjects could be reduced. Results showed that 95 per cent of the total subjects were suffering from varying and diverse types of stress.

The present study revealed that change in financial state was the major cause of stress amongst majority of the subjects. (Table 1).

The other important causes of stress were relationship disputes, change in work responsibilities, change in social habits, personal difficulties at work, illness etc. Fig.1 highlights the major reasons of psychological stress amongst the middle aged people.

The main causes of stress were hard to define and pinpoint because the potential causes of stress were highly varied and based on the individual. Financial stress was found to be a sadly widespread experience. Fig. 1 clearly shows that about 60 per cent of the total subjects were stressed due to

| Table 1: Percentage of subjects suffering from different types of stress				(n=40)
Sr. No.	Type of stress	Stress score	Percentage (%) of subjects	
			40-50 years (n=20)	50-60 years (n=20)
1.	Death of family member	20	10	10
2.	Divorce/Separation	20	0	5
3.	Illness/Surgery	20	0	25
4.	Marriage in family	20	0	5
5.	Dismissal from work	10	5	5
6.	Illness in family	10	15	45
7.	Moving to new place	8	0	5
8.	Relationship disputes	5	25	45
9.	Changes in financial state	5	50	60
10.	Change in occupation	3	15	20
11.	Change in work responsibility	3	40	15
12.	Mortgage	3	15	20
13.	Family events/birthdays	3	30	45
14.	Son/daughter leaving home	3	10	45
15.	Personal difficulties at work	3	25	50
16.	Change on residence	2	5	0
17.	Change in social habits	2	20	55
18.	Change in routine	2	20	30
19.	Holidays	2	15	15
20.	Minor violation of laws	2	5	0
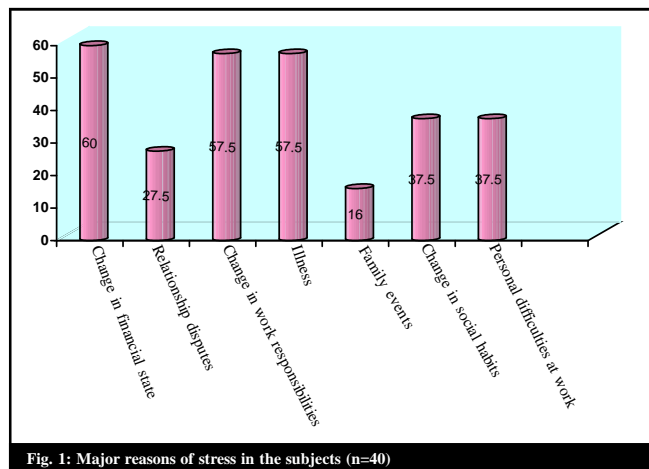
Fig. 1: Major reasons of stress in the subjects (n=40)

the changes in financial state. The proportion of people stressed about money was found to be on the rise. This was pretty significant because financial stress was found to be linked to health problems like depression andsleep problems.

Biochemical analysis revealed that homocysteine levels in all the subjects were found to be high (Table 2).Similarly all the subjects had low HDL levels and higher than normal cholesterol levels indicating their being at high risk of CVD (Dwivedi *et al.,* 2011).

A strong correlation was seen between the triglyceride and cholesterol levels, triglyceride and LDL levels, triglyceride and VLDL levels, LDL and VLDL levels, cholesterol and LDL levels, cholesterol and VLDL levels($p<0.01$) Table 2. Data clearly reveal that all the subjects were at an increased risk of CVD. Stress and sugar levels also seemed to be correlated. Correlation was observed between Blood sugar post prandial (PP) levels and stress scores which were found to be significant at 0.05 level. Stress caused the blood sugar levels to rise. Stress hormones like epinephrine andcortisol kick in since one of their major functions is to raise blood sugar

to help boost energy when it is needed the most. Both physical and emotional stress can prompt an increase in these hormones, resulting in an increase in blood sugars. Prolonged elevated blood sugar is also a predecessor to cardio-vascular disease, which increases the risk of and strokes (*www. medicinenet.com*).

Study revealed that only 5 per cent of the subjects were at a very high risk and 42.5 per cent of the subjects were at moderate risk of developing cardio-vascular disease and 27.5 per cent of the total subjects were at low or no risk of developing this disease (Table 3).

Conclusion :

In conclusion it can be said that stress is a part of every man's life in the present day times. Daily demands and increasing work pressures including multifarious responsibilities are a constant stress in one's life. Being in a job that is stressful or not liked or worrying about finances on a daily basis, or fighting with spouse or children are daily stressors that can lead to anxiety disorder symptoms. These small stressors occur with such regularity that they often end up affecting man the most, thereby automatically increasing the risk of dreadful diseases like diabetes, hypertension, acid peptic disease, and cardio-vascular diseases.

Since stress is a major predictor of increased risk for cardio-vascular diseases, efforts should be made in the direction to reduce it in the best possible way. Nutrition education, dietary counseling, exercise therapy and stress management can go a long way in the prevention from this major life threatening disease.

Table 2: Biochemical data of the subjects								
	Sugar (fasting) (mg %)	Sugar(PP) (mg %)	Homoc-ysteine (umol/L)	Cholesterol (mg/dl)	Triglycerides (mg/dl)	HDL (mg/dl)	LDL (mg/dl)	VLDL (mg/dl)
Normal values	60-110	<145	5-15	<200	50-160	35-80	0-100	10-50
Mean±S.D.(n=40)	107.8 ± 50. 2**	131.08 ± 67.1**	19.0 ± 7.8**	197.8 ± 36.5**	124.3 ± 49.9**	48.3 ± 8.5	83.3 ± 18.6**	26.2 ± 26.2**

**Indicate significance of value at P=0.01, (a) TG and Cholesterol (b) TG and LDL (c) TG and VLDL (d) LDL and VLDL (e) Cholesterol and LDL (f) Cholesterol and VLDL (g) Stress and fasting sugar (h) Stress and PP Sugar (i) Homocysteine and Stress (j) Homocysteine levels of subjects as compared to normal values.

Table 3: Percentage of subjects under different cardiovascular risk categories	
Category	Percentage (%) (n=40)
Low risk	27.5
Moderate risk	42.5
High risk	25
Very high risk	5

reference to diet, life style modification and impact of intervention with coenzyme Q – 10 supplementation". Hence, the authors acknowledge for the financial assistance provided to carry out the research.

Authors' affiliations:

MANIKA MATHUR, Department of Food Science and Nutrition, Maharshi Dayanand Saraswati University, AJMER (RAJASTHAN) INDIA

Email: manika_mathur@yahoo.com

■ REFERENCES

Dimsdale, J.E. (2008). Psychological stress and cardio-vascular disease. *J. Am. Coll. Cardiol.,* **51**(13):1237-46.

Dwivedi, M.K., Tripathi, A.K., Shukla, S., Khan, S. and Chauhan, U.K.(2011). Homocysteine and cardio-vascular disease. *Biotechnol. & Molecular Biol.Rev.,* **5** (5): 101-107.

Kothari, C.R. (1990). *Research methodology- Methods and techniques.* wishwa Prakashan, NEW DELHI, INDIA.

Lichtman, J.H., Bigger, J.T., Blumenthal, J.A.(2008). Depression and coronary heart disease : Recommendations for screening, referral and treatment: A science advisory from the American Heart Association Prevention Committee of the council on cardiovascular nursing, Council of Clinical Cardiology, Council of Epidemiology and Prevention, and Interdisciplinary Council on quality of care and outcomes research. *Circulation,* **118** (17):1768-1775.

Muldoon, M.F., Herbert, T.B., Patterson, S.M., Kameneva, M., Raible, R. and Manuck, S.B. (1995). Effects of acute psychological stress on serum lipid levels, hemoconcentration and blood viscosity. *Arch. Intern. Med.,* **155** (6):615-620.

Rosengren, A., Hawken, S., Ounpuu, S. (2004). Association of psychological risk factors with risk of myocardial infarction in 11,119 cases and 13,648 controls from 52 countries (the INTERHEART study): Case control study. *Lancet,* **364**(9438):953-962.

■ WEBLIOGRAPHY

http://www.medicinenet.com/script/main/art.asp?articlekey=47115

8th Year

★ ★ ★ ★ ★ of Excellence ★ ★ ★ ★ ★