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Co-Relation of Level of Stress in Different Age Groups with the Levels of HS-CRP, A Sensitive Predictor of Coronary Vascular Events.

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ABSTRACT

In modern competitive world where stress is unavoidable and with an increasing evidence of stress as a major risk factor for various diseases per se, there is a strong need for life style modification and stress management. The present study was undertaken to co-relate the stress level with the levels of c-reactive protein in different age groups. The study was conducted on healthy, normotensive, non-diabetic, voluntary blood donors, males, in the age group of 20-50 years. The sample size was restricted to 60. The risk of illness due to stress was assessed by providing a simple questionnaire- Holmes and Rahe stress scale to the voluntary blood donors and the serum sample was taken for estimation of C-reactive protein, using hsCRP measuring kit. The level of stress and the levels of hsCRP were tabulated and the significance was assessed using appropriate statistical methods. C-reactive protein showed significant positive co-relation with increase in stress levels (p value 0.0001). Also, more importantly there was a significant raise in the CRP levels in the age group of 30-40yrs which indicates that this particular age group is vulnerable for development of coronary vascular diseases.

keywords: Stress, hsCRP, Holmes and Rahe social readjustment rating scale, Coronary vascular diseases.

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INTRODUCTION

Stress is unavoidable in life and is even necessary for healthy growth. But when it goes beyond a certain tolerance level, it affects various systems resulting in illness. Physiological reactions to stress can have consequences on health over a period of time. Researchers have been studying how increased stress affects the cardiovascular system, as well as how work-stress can lead to hypertension and coronary artery disease[1].

Various studies have shown, an association between minor CRP elevation and ongoing pathogenesis of coronary vascular disease. Thus Centres for Disease Control and American Heart Association has recommended that patients at intermediate risk of coronary heart disease might benefit from measurement of hsCRP[2].

Aim of this study is to correlate stress levels with the levels of hsCRP with respect to different age groups.

MATERIALS AND METHODS

The research protocol was approved by the institutional ethical committee, Mysore medical college and research centre, Mysore and conducted over a period of 6 months. Cross sectional study was conducted on healthy, normotensive, nondiabetic males. The study group selected was voluntary blood donors, in the age group of 20 - 50 years after obtaining an informed consent. The sample size was restricted to 60. The risk of developing illness due to stress was assessed by providing the questionnaire- Holmes and Rahe social readjustment rating scale to the subjects before blood donation[3]. During blood donation the blood sample was collected, which was centrifuged and serum was separated for the estimation of C - reactive protein (CRP), by turbidimetric immunoassay using semi-automated analyzer. The level of stress and the levels of CRP were tabulated and correlated statistically by one way annova test and Scheffe's test using SPSS version 17 software.

RESULTS

According to Holmes and Rahe social readjustment rating scale, risk of developing illness due to stress is given in table-1. Reference levels of CRP and risk of developing Coronary Vascular Disease(CVD) is given in table-2 [4].

It was observed that there was significant increase in mean CRP values with increased stress levels(p value of 0.0001) (table-3, fig-1). When stress levels and CRP values were compared in different age groups it was observed that there was a linear raise in the CRP levels in the age group of 30-40 years with increased stress levels (table- 4, fig- 2). which indicates that after this age vulnerability to stress is an important risk factor for the development of pathogenesis of coronary vascular disease(CVD).

Table 1: Stress levels and risk of developing illness due to stress.

SCORE	RISK OF ILLNESS
<150	Low
150 -300	Intermediate
>300	High

Table 2: Reference levels of CRP and risk of developing Coronary Vascular Disease(CVD)

CRP levels (mg/l)	RISK OF CVD
<1.0	Low
1.0-2.9	Intermediate
>3.0	High

Table 3: Levels of stress and corresponding mean CRP levels.

STRESS RISK FOR ILLNESS	hsCRP MEAN (mg/l)
Low	0.4111
Intermediate	1.5333
High	1.8303

Table 4: CRP levels in different levels of Stress in each age group.

		CRP (mg/l)		
Stress Risk of illness	Low	0.3286	1.22	0.9571
	Intermediate	0.4111	1.62	2.1455
	High	0.7	2.4333	2.925
AGE (years)		<30	30 -40	>40

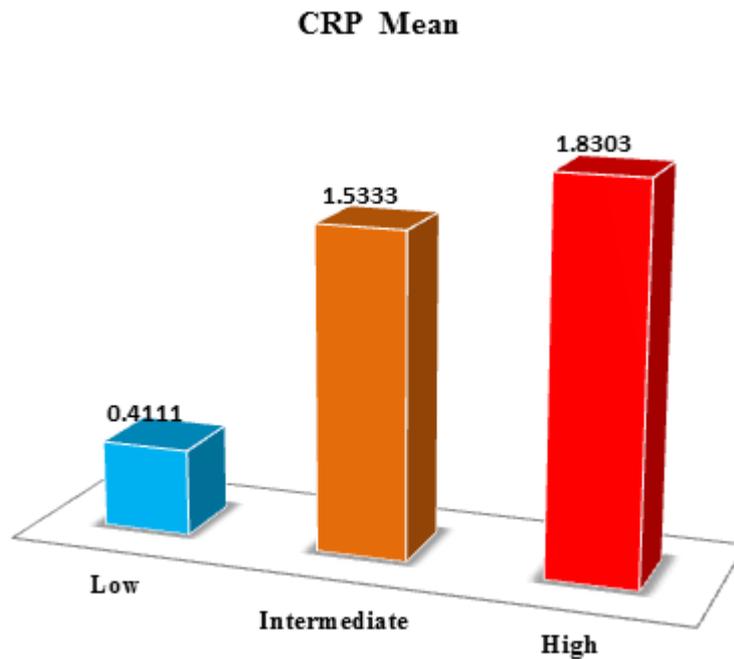


Figure 1: Levels of stress and corresponding mean CRP levels.

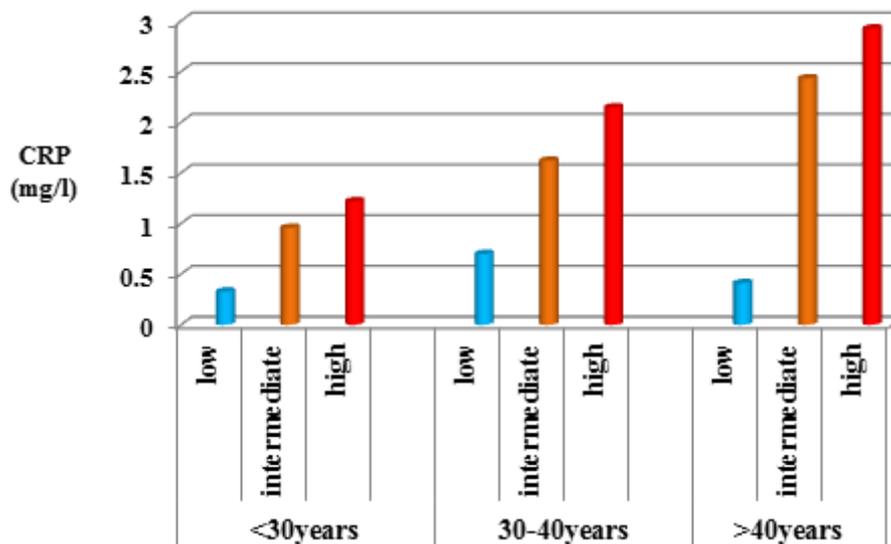


Figure 2: CRP levels in different levels of Stress in each age group.

DISCUSSION

Stress is said to be an important risk factor for the development of various diseases especially coronary vascular disease(CVD) [5-10]. Studies have shown that in recent years there has been a drastic increase in the incidence of coronary vascular disease among young adults[11].

In our study we measured stress quantitatively by accounting various life events which contributes to stress using Holmes & Rahe social readjustment rating scale. Scores <150 were considered as low risk for developing illness, 150-300 were considered as intermediate risk and >300 were considered as high risk for developing illness. We found that there was an increased prevalence of stress after the age of 30 years when compared to younger age group.

We compared this vulnerability for CVD due to stress with corresponding hsCRP levels.

The C – reactive protein is an acute phase protein synthesized in the liver and is normally present as a trace constituent of serum or plasma at levels less than 0.3 mg/l [12]. Its levels in plasma increases during inflammatory states. In recent years a plethora of studies have demonstrated an association between minor increase in CRP plasma levels, and the risk of developing cardiovascular diseases, also it is said to be a good marker of coronary vascular disease[13].

Studies have shown that CRP also has a pro-inflammatory effect and plays a significant role in the pathogenesis of cardiovascular diseases[14]. Native CRP binds to oxidised LDL & partly degraded LDL[15], which promotes complement activation in atheromatous plaque[16]. Hence CRP assay provides useful information for the diagnosis, therapy and monitoring of inflammatory processes and CVD [17].

In our study we did hsCRP assay in subjects under different stress levels and we found that there was a sharp rise in hsCRP levels with intermediate and high stress group whereas CRP levels were low in group having low stress.

We also compared levels of hsCRP in different age groups with respect to stress levels. In our study there was a significant increase in hsCRP levels among the age group 30-40 years and above. Where as in the age group <30 years we found no increase in hsCRP even with high stress.

From our study we hereby infer that transition from physiological adaptation to pathological damage due to stress is more likely to develop above 30 years of age. Hence stress management, life style modification and adaptation to stress is required from young adulthood.

CONCLUSION

Our study depicted a significant association between increased stress and increase in CRP from the age group 30-40 years and above as compared to <30 years.

Hence primordial prevention right from this age may bring about significant reduction in the development of coronary vascular disease in young adults.

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