Cardiovascular reactivity to stress and hypertension among school teachers

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ABSTRACT

Teacher stress is a nationwide concern in the past thirty years and has become one of the hottest areas of psychological research, estimating close to 40,000 studies in the last decade alone. Work influenced occupational stress and cardiovascular risks among school teachers are the leading cause of deaths globally, killing more people each year than all other causes combined. Low level of physical activities, unhealthy dietary pattern and occupational stress are common among school teachers. Cardiovascular reactivity to stress may have a pathophysiological role in neurogenic hypertension. The responsiveness of the cardiovascular system to react to stress differs between people. Psychological or physical stress can raise blood pressure, heart rate etc. and lead to physiological arousal in some people more than others. Such stress reactions can have long term health consequences if they persist. Aim of the proposed study is to assess the blood pressure, pulse rate and the prevalence of common stress causing factors and symptoms in teachers of Govt. and Govt. Aided Schools of Pondicherry region which is expected to be influenced by their working environment. A structured questionnaire will be used to collect the demographical data from 150 teachers (100 Govt. School teachers and 50 Govt. Aided school teachers). Perceived stress scale (PSS) is the most widely used psychological instrument for measuring the perception of stress. The items are easy to understand and the response alternatives are simple to grasp. Also the study measured the BP and PR, BMI, WHR and other anthropoemetric information using standardized protocols. The present study confirmed that elevated blood pressure responses to stress causing factors and symptoms. Also, it reveals that work influenced occupational stress, verbal communications may induced blood pressure changes provide a unique marker of future risk of hypertension.

Key Words : Cardiovascular reactivity, Hypertension, Teacher stress

INTRODUCTION

Cardiovascular reactivity, the abrupt increase in blood pressure and heart rate that occurs during stress is emerging as a potential risk factor for hypertension and coronary artery disease. It is widely thought that individuals showing exaggerated cardiovascular responses to these stressful conditions may be more at risk for the development cardiovascular

syndromes such as hypertension, CHD. If it is continuously or frequently occurs may lead to alterations in either the heart or vasculature that can have deleterious effects on the individual health (Michael and Boquet, 2000). Psychological stress has been proposed as a major contributor to the progression of cardiovascular disease (CVD). Acute mental stress can activate the sympathetic-adrenal-medullary (SAM) axis, eliciting the release of catecholamines (NE and EPI) resulting in the elevation of heart rate (HR) and blood pressure (BP) (Veit *et al.,* 1997).

Teaching has been identified as one of the most stressful professions today. Working environment for teachers is highly stress-provoking (Kyriacou and Suctliffe, 1978). Teacher stress is defined as experiences in teachers unpleasant, negative emotions such as anger, frustration ,anxiety, depression and nervousness, resulting from some aspect of their work as teachers (Mills Sandra, 2002). Teacher stress is a nationwide concern in the past thirty years and has become one of the hottest areas of psychological research, estimating close to 40,000 studies in the last decade alone. Work influenced occupational stress and cardiovascular risks among school teachers are the leading cause of deaths globally, killing more people each year than all other causes combined (Monica, 2004). Mental illness among teachers has become an increasing problem in many countries. According to a study (Mohanty, 1992), Psychiatric and or psychosomatic disorders are the leading causes of premature retirement among teachers. Stressors such as disruptive student, heavy workload and lack of support put teachers mental health in danger (Panday, 2003).

The present study was conducted with an objective to assess the blood pressure before and after the class and the prevalence of stress causing factors in teachers of Govt. High schools of Pondicherry region which is expected to be influenced by their working environment.

METHODOLOGY

A total of 7 schools from three zones, covering urban area were selected. A sample of 150 teachers were selected by using simple random sampling. Teachers name list were obtained from School Head Master and they were selected based on the voluntary basis. However, they have to fulfill the criteria with no major risk factors such as major diseases, asthma or undergone any cardiac surgery volunteered for the investigation. They were aged between 35 – 58 years and with a teaching experience >5 years, with teaching periods 5 - 8 periods /day along with student strength of 30 per class. Written consents were obtained from the respondents. General Health Questionnaire will be used to collect the demographic, occupational information and mental health status (Goldberg and Hilier, 1979). Perceived stress scale (PSS) is the most widely used psychological instrument for measuring the perception of stress (Cohen *et al.,* 1983). All the closed ended questions were designed to generate responses on a five point likert scale to measure stress causing factors indicated as 1 No stress, 2 Less stress, 3 medium stress, 4 high stress and 5 Extreme or burnout stress.

RESULTS AND DISCUSSION

The results pertaining to the study are discussed under the following headings.

Out of the entire questionnaire filled in, from the Table 1, it was found that about 56.66

per cent were in the age group of 40 -50 and the remaining 32.68 per cent were above 50. It was noticed that 85.4 per cent of the Teachers were female and 14.6 per cent male. The percentage difference between male and female is more. 10.7 per cent teachers were unmarried and the remaining 89.3 per cent were married. With regards to family income, 92 per cent of the teachers received the income by both members in the family and the remaining 8 per cent are earning by single person. From the years of teaching experience, 10 per cent of the respondents have less than 10 years of experience, 38.66 per cent are having 10 -15 years and the remaining 51.34 per cent having more than 15 years of experience have been reported. Data concluded that major distribution of age and teaching experience may cause work load and responsibilities to higher extent which increases work stress among the teachers.

Table 1 : Socio demographic profile of the teachers

	Variables	Classification	Number (N = 150)	Percentage
Socio demographic profile of the teachers	Age	Under 40	16	10.76
		40 – 50	85	56.66
		Above 50	49	32.68
	Sex	Male	22	14.6
		Female	128	85.4
	Marital status	Married	134	89.3
		Unmarried	16	10.7
	Family income	Earning by both	138	92
		Earning by single person	12	8
Occupational information	Years of teaching	<10 years	15	10
		10 – 15 years	58	38.66
		>15years	77	51.34
	Work load	5-6 hours	9	6
		6-7 hours	44	29.33
		7-8 hours	97	64.67

Work load based on the stress level among school teachers :

The Table 2, reveals that 52.57 per cent of respondents experienced medium stress with teaching hours 7-8 hours/day followed by 35.05 per cent high stress and 12.3 per cent low stress. Majority of the respondents were in medium stress. Also it was noticed that majority of the respondents taking class 7 to 8 hours (64.6%) per day which influence work stress may rapidly increase blood pressure in later stage.

Table 2 : Classification of work load on the basis of their level of stress

Work load	Level stress			Total
	Low stress	Medium stress	High stress	
5 – 6 Hours	3(33.3)	2(22.2)	4(44.4)	9(6)
6 – 7 Hours	2(4.5)	24(54.4)	18(40.9)	44(29.33)
7 – 8 Hours	12(12.3)	51(52.57)	34(35.05)	97(64.6)
Total	17(11.33)	77(51.33)	56(37.33)	150

Stress causing factors for the varimax rotated principal components of Government and aided school teachers (Factor analysis) :

For the present study, to find an important factor which would affect stress applied factor analysis and found important variables in the Table 3. It was identified as tool to identify suitable dimensions and related items. It shows that various individual factors item loadings exceeding 0.4 with eigen values greater than 2.00 were retained. The percentage of total variance explained by each factor. The selected individual factor consists of 10 items and explained 19.832 per cent of total variance dominant all other factors. Dealing with student discipline was at the highest level or at the first position among them explains major stress causing factor under Govt. high schools followed by subsequent factors.

Table 3 : Statement loadings of stress factors for the varimax rotated principal components (150 teachers)				
Sr. No.	Statement	Loadings	Eigen value	% of variance
1.	Dealing with student discipline	0.819	21.418	19.832
2.	Need to hit targets/ deadlines	0.753	17.915	16.325
3.	Bullying behavior from managers/ staff/ students	0.713	11.681	10.924
4.	Dealing with conflict situations	0.748	6.047	5.559
5.	Interaction with students with a certain limit	0.662	4.757	4.405
6.	Sometimes it become complicated to make adjustments among students with administrative pressures	0.828	3.994	3.698
7.	Lack of participation in decision making	0.841	3.284	3.041
8.	Taking school work at home	0.857	3.086	2.857
9.	Peer-group relations	0.815	2.987	2.765
10.	Superior- subordinate relations	0.729	2.112	1.955

Comparison of cardiovascular reactivity before and after the classes :

The blood pressure and pulse rate was measured with standard electronic device. The blood pressure and pulse rate was measured at the beginning of the first class and end of the last class on the same day. Table 4 represents the mean of the Systolic blood pressure before the class was 125+/-17.11 mm Hg and after the last class was 138.18+/-17.5 mm Hg. Statistically highly significant difference was observed between first and end of the last class with the p value less than 1. Thus it was evident that continuous standing, verbal communication and relationship in the form of teaching and prolonged shouting in the school may increase cardiovascular reactivity at the end of the class.

Table 4 : Comparison of cardiovascular reactivity before and after the classes			
Variables measured	Before first class (Mean +/- SD)	End of the last class (Mean +/- SD)	Level of significance
Systolic Blood Pressure	125.55 +/- 117.1	138.18 +/- 17.5	<0.005
Diastolic Blood Pressure	82.1+/-8.2	86.2 +/- 9.04	<0.005
Pulse rate	81.17 +/- 9.1	86.94 +/- 7.6	<0.005

Association of age with blood pressure :

The Table 5, depicts that 81.5 per cent of the respondents in the age below 40 years had

normal blood pressure under the age of 40. Pre-hypertension were evident for 47.05 per cent of the teacher who were in the age group of 40 -50yrs. 51.02 % of the respondents were in the hypertensive stage. Hence, it was evident that increase in blood pressure associates with the second and third group of age among the teachers, because those groups of teachers are facing more stress related problems in their profession as well as family.

Table 5 : Distribution of teachers on the basis of their age and blood pressure			
	Blood Pressure		
Age	Normal (120/80)mm Hg	Pre-Hypertension Between(120-139/80-89)	Hypertension Between(160 or higher/100 or higher)	Total
Under 40	13(81.5)	3(18.7)	-	16(10.60)
40 – 50	23(27.05)	40(47.05)	22(25.8)	85(56.6)
Above 50	8(16.32)	16(32.6)	25(51.02)	49(32.6)
Total	44(29.3)	59(39.3)	47(31.3)	150

Conclusion :

Present study indicates that school teachers undergo medium to high stress during their occupation and heavy workload, if it persist continuously resulting in cardiovascular reactivity. This study also found that elevated blood pressure responses to a combination of mental and physical challenges which provide a unique marker of future risk of hypertension.

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