



Research Article

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Work influenced occupational stress and cardiovascular risk among teachers and office workers

T. Mariammal*, A. Amutha Jaisheeba and R. Sornaraj

Research Department of Zoology, Kamaraj College, Thoothukudi, India

ABSTRACT

School Teachers face tremendous stress during teaching and handling children while it is less in case of office workers. In order to assess the impact of working environment on the study group, a standardized questionnaire was designed, covering all the required data, served to the study group and a total of 600 respondents turned up. Among the 600 respondents, 300 were teachers and 300 were office workers including both sexes. The aim of the present study is to assess the blood pressure, pulse rate of teachers and office workers of Thoothukudi which is expected to be influenced by their working environment. There was a significant increase in the mean arterial blood pressure, systolic and diastolic pressure and of heart rate of the teachers and office workers were observed when compared with the control populations. When the parameters of teachers were compared with the office workers, there was a significant increase was observed in teachers. In the anthropometric parameters measured such as height and experience there was no significant change was observed among the teachers and the office workers and when both compared with control. But with regard to the age, weight and BMI of the teachers and office workers, there was a significant increase noted than the control and this was considered as one of the causative factor for the cardiovascular disorders. The study result concluded that the working environment affected the teachers to a greater extent resulted in increased blood pressure, pulse rate and pulse pressure while the working environment of office workers affected their health to a lesser extent than the teachers. But when both of them were compared with the control population, both the workers are affected by their environment.

Keywords- Teachers, Office workers, Blood pressure, Pulse rate.

INTRODUCTION

People have to work hard to meet their needs all around the world. Sometimes the circumstances are such that affect individual's physical and mental condition which in turn leads to the reduction of individuals life qualities. School Teachers face high amount of stress during teaching and handling young students. Teachers face intensive verbal communication, prolonged standing, high volume of workload and studies has shown high incidence of cancer, vehicular accidents and heart disease [1]. People's occupations also have varying impact on their blood pressure.

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. Occupational stress has been defined as the experience of negative emotional states such as frustration, job dissatisfaction, reduced job commitment, worry, anxiety, poor motivation, and depression attributed to work related factors [2-8]. Research conducted in numerous settings, have established the link between the following and occupational disorders, such as stress, hypertension, elevated blood pressure, dryness in the throat, nervous tics, stomach complaints, ulcers, neck or back pain, headache, migraine, tiredness, chest pain, heart disease and stroke [4,9,10]. Teachers regardless of what level they teach are exposed to high levels of stress [11-13].

Job stress has identified a number of other stressors that may be considered more specific to emerging economies [14]. Job stress is associated with several types of chronic health problems, including cardiovascular diseases, hypertension, and musculoskeletal and psychological disorders, reproductive disorders, mental, and neurological problems [15-17]. Poor mental health was directly related to unpleasant work conditions such as the necessity to work fast, the exertion of great physical effort and inconvenient working hours [18]. There is increasing evidence that physical health too, is adversely affected by repetitive work and dehumanizing environment such as the paced assembly line [19].

Low Back Pain (LBP) is a musculoskeletal disorder suspected to be triggered by a combination of chronic overuse or acute injury, psychosocial determinants, and other general health factors, which together culminate in varying degrees of pain and disability [20-22]. Awkward postures such as kneeling or squatting are specific physical activities encountered in many occupations. Organizational consequences of stress include reduction in the quality and quantity of job performance, increased absenteeism and turnover [23].

This study was planned to find out the various disorders which were supposed to be generated by their working environment found among teachers and office workers. It also seeks to identify the symptoms of job disease that teachers and workers have developed after they became teachers and a worker. It also suggests some recommendation that, how teachers and workers could control the effects of job oriented problems and the solutions to the problem.

EXPERIMENTAL SECTION

In present study a total of 600 subjects were involved, including 300 teachers and 300 office workers of both sexes. By supplying a standardized questionnaire personal and work characteristics including sex, age, height, weight, education level and employment history were collected. The blood pressure statuses of the respondents were observed using the sphygmomanometer. A control group was separately maintained using the general public of Thoothukudi including both sexes and given representation for all age group.

For the collection of blood pressure data, the procedure adopted by Kirpa Ram Haldia was followed [24]. Blood pressures of the subjects were measured after a five-minute period of rest, with the back supported and the legs uncrossed. Constrictive clothing was removed from around the upper arm, and it was rested on a table at heart level. The blood pressure cuff was evenly and snugly applied around the upper arm above the elbow, and a stethoscope was placed over the crease of the elbow. The cuff was inflated to 15 millimeters of mercury (mmHg) above the point where radial artery pulse (the artery above the thumb at the wrist) disappears. The pressure in the cuff was then slowly released at 2 mmHg per second. Blood pressure was generally recorded to the nearest 2 mmHg. Optimal blood pressure was considered as 120/80 mmHg. Pulse rate of all the subjects were recorded separately. In order to test the validity of the observed results and to test the significance of difference between the observed value and normal value of samples, the 'Z' test was applied using Microsoft excel equation version 6.1. The mean arterial pressure and pulse pressure was calculated using the procedure adopted by Sangeeta Singhal from the above data [25].

Mean Arterial pressure = Diastolic BP + 1/3 Pulse pressure

Pulse pressure = Systolic BP – Diastolic BP

RESULT AND DISCUSSION

Table 1. Mean Anthropometric parameters of the office workers and Teachers and Control groups, and \pm SD.

Parameters	Control Group (n=100)	Office workers (n = 300)	Teachers (n = 300)
Age (yrs)	33.40 \pm 10.41	36.4 \pm 5.69	39.63 \pm 8.35
'Z'		2.9*	4.1*
Height (cm)	159.97 \pm 6.15	162.2 \pm 10.24	160.53 \pm 8.46
'Z'		1.2	0.4
Weight (kg)	57.87 \pm 8.91	72.34 \pm 12.76	70.37 \pm 13.07
'Z'		6.2*	5.2*
BMI (kg/m ²)	22.6 \pm 2.71	27.71 \pm 4.95	29.28 \pm 4.69
'Z'		5.3*	7.3*
Experience (yrs)	-	15.0 \pm 5.09	15.33 \pm 5.71

* Significant at 0.05% level.

The anthropometric data of the teachers and office workers were matched with the control for their height and experience and it was observed that there was no significant difference in the anthropometric parameters between the teachers, office workers and the control population. But when the age, weight and BMI of the teachers and workers were calculated and compared with the control there was a significant increase was observed (Table 1). The increase in weight and BMI are the main causative factors for the cardiovascular discrepancies observed among the teachers and office workers [26-29].

Table 2. Percent increase of Mean Pulse rate, Systolic Bp, Diastolic Bp, Pulse pressure, and Arterial pressure of Teachers, Office workers in relation to Control and \pm SD.

Parameters	Control (n = 100)	Office Workers (n = 300)	% Increase	Teachers (n = 300)	% Increase
Pulse rate 'Z'	74.13 \pm 3.74	77.67 \pm 3.59 5.4*	4.78	81.57 \pm 7.61 5.3*	10.04
Systolic Bp 'Z'	116.73 \pm 6.99	122.8 \pm 5.51 6.0*	5.20	130.6 \pm 6.08 12.5*	11.88
Diastolic Bp 'Z'	78.12 \pm 4.42	80.13 \pm 6.16 1.8	2.57	88.5 \pm 6.26 9.1*	13.29
Pulse pressure 'Z'	39.73 \pm 3.89	42.93 \pm 5.53 2.9*	8.05	42.1 \pm 4.49 2.9*	5.97
Arterial Pressure 'Z'	90.07 \pm 5.09	94.18 \pm 5.49 4.4*	4.56	102.5 \pm 5.83 11.7*	13.80

*significant at 0.05% level.

The present study conducted among the office workers and teachers showed that the stress generated in the working environment created the possibility of development of cardiovascular risk factors among the office workers as well as teachers. In both the cases the various studied parameters such as systolic blood pressure, diastolic blood pressure, pulse rate, pulse pressure and arterial pressure showed an increased status than the normal control population. When compared to the office workers, all the studied parameters showed a significant increase among teachers (Table.2). The increased percentage of pulse rate, systolic pressure, diastolic pressure, pulse pressure and arterial pressure among office workers were 4.78, 5.20, 2.57, 8.05, and 4.56 respectively. While the increase was very very high among teachers than the control as well as office workers and the percentage increase observed was 10.04, 11.88, 13.29, 5.97 and 13.80 respectively.

The increased level of cardiovascular parameters observed among the teachers than office workers in the present study may be due to the stress and strain that is generated by the young students in their working environment [30-32]. The job stress faced by the teachers are much complicated multidimensional such as job over load, physical discomfort, uncertainty in job, unsupportive co-workers, difficulties given by the students, superiors, heads and the management [33-36]. Among the teachers more than 80% were females and they had greater responsibility in their home, society and school. This kind of family responsibilities of women teachers further aggravated a significant increase of both systolic and diastolic blood pressure [37-40]. Blood pressure (BP) is a powerful, consistent, and independent risk factor for premature death and disability from cardiovascular disease, stroke, flash pulmonary edema, and renal disease in addition to several other risk factors such as smoking and hypercholesterolemia [41-47]. Several studies have suggested that cardiovascular risk factors are associated with an increased risk of elevated systolic and diastolic blood pressure [48,49]. Several epidemiological investigations [50-54] indicated that the excessive psychological, psychosocial factors present in the work place environment created cardiovascular risk factors. The life style modifications, stress dependent higher rate of anxiety developed every moment among teachers due to several factors resulted in high incidence of job strain which resulted in the development cardiovascular risk factors [55-58] and development of several complications in the metabolism of teachers which were already postulated by several workers.

Cartwright and Cooper [59] postulate that when an individual is confronted with a challenging situation, tension or pressure, the sympathetic nervous system can be triggered to activate a wide variety of hormonal secretions. The hypothalamus, when it identifies danger, triggers the pituitary gland to release hormones that cause the adrenal glands to increase its secretion of several hormones, including cortisol which provides more energy to the body, epinephrine which increases both the rate and strength of the heart's contractions and raises blood pressure and norepinephrine, which similar to the body's sympathetic nervous system, acts as the body's fight or flight system when faced with emergencies [60]. Chronic work stress and exhaustion is associated with higher allostatic load in female school teachers [61]. The raise in blood pressure and other related parameters observed among the teachers and office workers in the present study may be also because of the said physiological and hormonal changes that are triggered by their working environment.

The study concluded that the working environment of teachers affect their physical, physiological and mental status to a greater extent than the office workers.

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