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Original Research Article

Prevalence and factors affecting occupational and non-occupational stress among industrial workers, a descriptive cross sectional study from a single industrial unit in South India

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ABSTRACT

Background: Stress related to work is a complex process that influences both the worker's health and his productivity. Identification of the stressors may elicit psychological, behavioural or physical response in the work environment.
Methods: A descriptive cross sectional study was conducted in a single thermal power unit located in Tamilnadu state. A standard and validated questionnaire by O'Donnell MP, was used to assess the occupational and non-occupational stress.
Results: A total of 126 participants were included in the study. Psychological stress was the most common form of stress reported by 32.5% of the subjects. The prevalence of occupational stress was 9.5% in study population. Physical stress and family stress were reported by 13.5% and 12.7% of the subjects respectively. The highest odds of stress were observed in 30 to 39-year age group, when compared to youngest age group (20 to 29 years). Strong positive association was observed between the psychological stress and hypertension in study population.
Conclusions: Psychological stress was the most common form of stress reported in industrial workers. Male gender, middle age groups, current use of smoking or alcohol is strongly associated with occupational stress.

Keywords: Hypertension, Occupational stress, Stress score, Thermal plant

INTRODUCTION

Stress related to work is a complex process that influences both the worker's health and his productivity.[1-3] Identification of the stressors that may elicit psychological, behavioral or physical response in the work environment therefore has been emphasized through considerable research.[4,5] Such psychological strain can also be attributed to interpersonal conflict at the work place.[2,6,7] The mechanism of how occupational stress may affect workers' health has been broadly explained by two most popular mechanisms as per the cotemporary stress theories.[8-10] First, occupational stress can affect the psychological responses (autonomic, neuroendocrine and immune) by directly influencing the organism's main stress axes thereby increasing the host vulnerability and resistance or directly stimulating to the disease mechanisms. The second mechanism hints at an indirect pathway functioning in the form of behavioural patterns and habits of people under work stress which

might lead to adoption of unhealthy or risky behaviours like tobacco use, alcohol abuse, irregular eating patterns and reduced physical activity.

Apart from this, individual traits may also influence the interaction between stressors and strain of which a feature called negative affectivity (NA) has been drawing lot of researchers attention.[7] NA is defined as per Watson and Clark as a personality trait that reflects pervasive differences in the conception of the self and the tendency to experience negative emotional states.[11] Research points that the negative feelings like guilt, fear, depression or anxiety and nervousness seem to be more common among high-NA individuals, who in turn might anticipate and concentrate on such negative aspects of his fellow workers and population in general.[12,13] NA seems to indirectly affect the strain through interpersonal conflict, which implies that NA might be confounding variable in the stressors-strain interaction.[12] Padsakoff et al in their critical review on common methodological bias in behavioural research point that the negative way of self reporting of both stressors and strain was particularly common among high-NA individuals.[14]

Human beings heavily rely on social support, a perception that a person is a member of an intricate network in which he can give or receive affection, aid and obligation.[15,16] Studies have consistently shown that having social support was positively related to health-related behaviours, which reduces the inclination towards smoking, alcohol use and promotes healthy eating and exercise activities.[17] Contrarily lack of social support had the opposite effect as reported by Milligan et al and Gu et al.[18,19]

Though, it is generally perceived that mental health disorders have a multifactorial origin, the psychological features of the workers in the form of job work stress and job dissatisfaction are two factors most commonly found to be associated with physiological and psychological alterations, which might increase the risk of developing physical and mental problems.[20,21] Hence the present study intends to assess occupational and non-occupational stress among industrial workers in an industrial unit in south India. Not much studies have been done in the occupational stress among industrial workers in South India. Hence the present study was undertaken with the objective to assess the prevalence of occupational and non-occupational stress among industry workers in south India and to assess the factors influencing the occupational and non-occupational stress.

METHODS

The study was a descriptive cross sectional study conducted in a single Thermal power unit located in Tamil Nadu State, South India. All the employees working in the selected setting were considered as the study population and regular employees, both from Executive and Non-executive categories aged between 20 to 60 years were included in the study. Contract employees were excluded from the study. The study was conducted between May 1-10th of 2010 and the study participants were selected by simple random sampling after acquiring the list of participants from the concerned authorities

Considering the prevalence of any stress as 10%, with margin of error as 5%, and confidence level of 95%, the required sample size was 139 subjects. But in our study we could include only 126 subjects in the final analysis, which has allowed us to estimate the parameters with a precision of 5.5%. Standard and validated questionnaire, which was recommended by O'Donnell MP et al was used in study population to assess the occupational and non-occupational stress in study population.[22]

The study was conducted during regular health care service provision to the employees and was of non-interventional in nature, thus no ethical approval was sought. Informed written consent was obtained from all the participants. Confidentiality of the participants was maintained throughout the study. Occupational and non-occupational stress as assessed by the specified tools was the primary outcome measure.[22]

The socio demographic factors, substance abuse, work place related factors were considered as explanatory variables. Descriptive analysis of explanatory and outcome variables was done using mean and standard deviation for quantitative variables, frequency and percentage for categorical variables. The association between the explanatory and outcome variables was assessed by calculating odds ratios and 95% CI. Logistic regression analysis was used to test the statistical significance.

RESULTS

A total of 126 participants were included in the study. The age distribution of the population showed gradually declining proportion of subjects in increasing decadal age groups. The proportions were 34.9% in 20 to 29 years and 18.3% in age group 50 to 59 years. The study population was predominantly males constituting 84.13% of the study population. The proportion of the females (15.87%) was from selected working groups like sanitation and canteen workers inside the industry. The proportion of subject who reported current and past smoking were 26.2% and 15.1% respectively. Similarly proportions for current and past alcoholism were 33.35 and 17.5% respectively. The proportion of subjects reporting any current substance abuse was 44.4%. More than 2/3rds (77%) of participants were working in shifts. The proportion of executive and nonexecutive employees was 48.4% and 51.6% respectively (Table 1).

Psychological stress was the most common form of stress reported by 32.5% (24.98% to 41.13%) of the subjects. The prevalence of occupational stress was 9.5% in study

population. Physical stress and family stress were reported by 13.5% and12.7% of the subjects respectively (Table 2).

Table 1: Sociodemographic profile and behavioural pattern among study population (n=126).

Parameter	Frequency	Percent
Age groups		
20 to 29 years	44	34.9
30 to 39 years	33	26.2
40 to 49 years	26	20.6
50 to 59 years	23	18.3
Gender		
Male	106	60.3
Female	20	39.7
Smoking		
Current smoker	33	26.2
Past smoker	19	15.1
Never	74	58.7
Alcohol		
Current	42	33.3
Past	22	17.5
Never	62	49.2
Any substance abuse (current)		
Current addiction	56	44.4
No addiction	70	55.6
Shift Work		
Yes	97	77.0
No	29	23.0
Category		
Executive	61	48.4
Non-executive	65	51.6

The highest odds of stress were observed in 30 to 39-year age group (Odds ratio 4.34, 95% CI 1.22 to 15.44, p value 0.023) in study population, when compared to youngest age group (20 to 29 years). The odds were 1.81 times and 2.1times higher in 40 to 49 and > 50-year age groups. The odds of occupational stress were 2.59 times higher in males, compared to females. The odds of occupational stress were 2.31 times and 2.57 times in current smokers and alcoholics respectively, when compared to people who never used these substances (Table 3).

The highest odds of stress were observed in 50 years & above age group (Odds ratio 4.018, 95% CI 1.38to 11.68, p value 0.011) in study population, when compared to youngest age group (20 to 29 years). The odds were 1.39 times and 1.13times higher in 30 to 39 and 40 to 49-year age groups. The odds of Non occupational stress were 1.36 times higher in males, compared to females. The odds of Non occupational stress were 1.022 times and 0.64 times in current smokers and alcoholics respectively, when compared to people who never used these substances (Table 4).

Table 2: Proportion of stress pattern among study population (N=126).

Parameter	Frequency	Percent	95% CI	
			Lower	Upper
Occupational stress	12	9.52	5.53	15.91
Psychological stress	41	32.54	24.98	41.13
Physical stress	17	13.5	8.60	20.54
Family stress	16	12.7	7.97	19.64

Table 3: Factors influencing occupational stress in study group (N=126).

Parameter	Odds ratio	95% CI		P-value
		Lower	Upper	
Age groups (Baseline= 20 to 29years)				
30 to 39 years	4.348	1.22	15.44	0.023
40 to 49 years	1.818	0.414	7.99	0.429
50 years & above	2.105	0.475	9.33	0.327
Gender (Baseline=female)				
Male	2.593	0.890	7.560	0.081
Smoking (Baseline=Never)				
Current Smoker	2.311	0.802	6.65	0.12
Past smoker	2.579	0.749	8.88	0.13
Alcohol (Baseline=never)				
Current alcoholic	3.31	1.117	9.82	0.031
Past alcoholic	2.74	0.744	10.12	0.129
Any addiction (Baseline=No)				
Current addiction	2.049	0.804	5.221	0.133

Table 4: Factors affecting non occupational stress in study group (N=126).

Parameter	Odds ratio	95% CI		P value
		Lower	Upper	
Age groups (Baseline= 20 to 29 years)				
30 to 39 years	1.393	0.54	3.57	0.491
40 to 49 years	1.13	0.40	3.16	0.810
50years & Above	4.018	1.38	11.68	0.011
Gender (Baseline=female)				
Male	1.364	0.655	2.84	0.407
Smoking (Baseline= never)				
Current smoker	1.022	0.445	2.34	0.95
Past Smoker	0.64	0.219	1.87	0.41
Alcohol (Baseline=never)				
Current	1.653	0.744	3.67	0.217
Past	1.259	0.465	3.410	0.651
Any current Addiction(Baseline=No)				
Current addiction	2.043	0.991	4.21	0.05

Strong positive association was observed between the psychological stress and hypertension in study population. The odds of hypertension were 2.60 times (95% CI 1.20 to 5.61, p value 0.014) higher in people who had reported psychological stress, when compared to people without any psychological stress, which was statistically significant (Table 5).

Table 5: Association between psychological stress with BP in study group (N=126).

Psychological stress	Hypertension		Odds ratio	Chi-square value	95% CI		P-value
	Positive (%)	Negative (%)			Lower	Upper	
Stress	26 (63.4%)	15 (36.6%)	2.60	6.07	1.204	5.61	0.014
No stress	34 (40.0%)	51(60.0%)					

DISCUSSION

Stress is defined as a common biological response to a variety of sensory or psychological experiences[23]. The study findings reveal that there was early onset of work related stress in relation to the age where in 30-39 year age group had the highest odds (Odds ratio 4.34, 95% CI 1.22 to 15.44, p value 0.023), which was statistically significant. While, non-occupational stress was noticed that most in the elderly individuals, the 50 years & above age group has the maximum odds (Odds ratio 4.018, 95% CI 1.38to 11.68, p value 0.011). This may be related to any prevalent discrepancy between job demands and job resources.[24] Longitudinal studies have pointed that high quantitative and qualitative workloads, low predictability, experienced unfairness, lack of participation and social support contribute to the burden of occupational stress.[25,26] Evidence shows that low level of coherence, high neuroticism, low extraversion and low conscientiousness at individual level considerably influence stress.[27,28]

Though, smoking among workers may be influenced by stress at work, social support and other demographic factors, its association with work stress, the research seems to be equivocal.[9] Greenlund et al in their study on work related psychological factors and cardiovascular system and Lindquist et al who evaluated job stress and lifestyle on blood pressure found that work stress had no role on smoking.[29,30] Whereas other studies reveal a positive association between smoking behavior and job stress.[31,32]

Stressful situations have tended to influence the consumption of alcohol among humans since ages, as it is long been felt to relieve stress and in his study on whether drinking reduces stress, Sayatte categorized drinkers as social drinkers and problem drinkers.[33] Overall research indicates that alcohol consumption to be positively associated with occupational stress.[34,35]

Physical activity seems to be hugely affected by work stress. Some studies reflect that physical and psychological job demands due the inherent fatigue and

longer recovery time can result in sedentary lifestyle.[36] Chen et al reported a positive association between lack of physical activity and perceived stress.[34]

The study findings showed a strong positive association between work stress and hypertension, which was statistically significant. The elevated blood pressure may be related to chronic work stress and lack of supportive environment at work place or perceive lack of social support. Regarding the limitations of the present study, due its cross sectional nature, and also having used a relatively small sample, any causal relationships cannot be made about the role of occupational stress on the workers' physical and mental health.

CONCLUSION

Psychological stress was the most common form of stress reported in industrial workers, followed by physical and occupational stress. Male gender, being in middle age groups, current use of smoking or alcohol were strongly associated with occupational stress and the prevalence of hypertension is very high in industrial workers and was strongly associated with psychological stress.

Recommendations

Detailed qualitative studies are required to thoroughly understand the mechanisms leading to various kinds of stress, so that effective interventions can be planned. Considering the high prevalence of various forms of stress and their association with physical disease (hypertension), work place interventions to increase the coping capacity and stress management are need of the hour

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