



## Occupational Stress Among Male Employees of Esfahan Steel Company, Iran: Prevalence and Associated Factors

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### ABSTRACT

**Background:** Lack of data on occupational stress among Iranian industrial employees persuaded us to design and conduct this study to evaluate the prevalence and associated parameters of occupational stress among male employees of the Esfahan Steel Company (ESCO), one of the biggest industrial units in Iran.

**Methods:** In this cross-sectional study, 400 male employees were sampled from the operational divisions of the company. Socio-demographic data and stress-related variables were entered into a logistic regression to determine significant associated factors of occupational stress among the participants.

**Results:** From all samples, 53% were found as stressful. A monthly salary of less than \$600 (OR = 1.88, 95% confidence interval [CI] = 1.21-2.94), family-related problems (OR = 2.75, 95% CI = 1.22-6.21), work environment (OR = 3.09, 95% CI = 1.78-5.33) and having a second job (OR = 2.68, 95% CI = 1.78-6.78) were significantly associated with the outcome.

**Conclusions:** Attention to some variables, especially economic problems and the work environment of employees, might play a protective role against the prevalence of occupational stress, not only among the employees of ESCO but also among all industrial employees in Iran.

**Keywords:** Burnout, Iran, male, manpower, professional

### INTRODUCTION

Several definitions have been proposed to explain the concept of “stress” in the literature. As the first definition, Hans Selye introduced “stress” as a non-specific response of an organism in exposure to a demand or a change in the physical situation.<sup>[1]</sup> He also divided stress into two components, including “distress,” which is related to the negative aspects of stress, and “eustress,” which contains positive effects, which might enhance motivation and efforts among people and which seems to be necessary to have a healthy life.<sup>[2]</sup> Similarly, Kendal *et al.* introduced stress as a “natural predictable experience” with both positive and negative consequences.<sup>[3]</sup> Based on such explanations, it seems that

stress might be considered as “absence of internal tranquility,” which contains different aspects.

“Occupational stress” is a relatively modern subject, which frequently has been discussed as a major health-related concern, especially during the recent decades.<sup>[4-6]</sup> Based on the National Institute for Occupational Safety and Health (NIOSH), occupational stress is defined as “any harmful physical or mental response, occurring due to individual’s incompatibility with his/her ability,” which might lead to aggressive behaviors, occupational injuries, physical diseases and even death.<sup>[7]</sup> The International Labour Organization (ILO) considers occupational stress as the most important health threat for employees, while the World Health Organization (WHO) emphasizes health problems, low motivation and low safety as the negative impacts on employees exposed to occupational stress and, consequently, considerable unwanted costs for the employers.<sup>[4]</sup> The ILO statistics demonstrate that occupational stress might account for 1-3.5% of the Gross Domestic Product (GDP) of the countries.<sup>[8]</sup> The annual cost of occupational stress has been estimated to be more than 300 million dollars for the US and 20 million Euros for the European countries.<sup>[9]</sup> Anecdotal reasons highlight the importance of attention to occupational stress as one of the most important health-related problems in the world.

Many studies have been conducted to evaluate occupational stress among Iranian employees; however, most of them have been conducted on nurses and teachers in Iran, rather than being conducted on industrial employees as one of the most at-risk groups. This fact persuaded us to design and conduct this study to evaluate the prevalence and associated parameters of occupational stress among the employees of Esfahan Steel Company (ESCO), one of the biggest and most important industrial sites in Iran.

## METHODS

### Design and setting

As a cross-sectional design, we applied analysis of a data set, extracted from the self-report information of employees who worked in the operational units of ESCO, one of the biggest Iranian governmental companies.

### Participants and sampling

Based on the single proportion formula at 95% confidence interval (CI),<sup>[10]</sup> the sample size was estimated to be composed of 380 respondents, which rose to 440 to increase the confidence level, while 40 were excluded due to their incomplete questionnaires. All the 400 selected participants were male workers who had at least 1 year work experience in ESCO, and were sampled based on the randomized sampling method from March to July 2008.

### Ethical procedures

Informed written consents were taken from the participants and the manager of ESCO. All the questionnaires were anonymous and we assured participants that their information would be kept confidential. This study was also approved and supervised by the head of the Research and Development Department of ESCO.

### Pre-tests

Two different types of pre-tests (formal and informal) were conducted prior to the main study. The informal pre-test was designed to make any correction in question wording, content and clearness of scenarios, and was administered to 25 subjects similar to the main study participants. With a Cronbach’s alpha of 0.87, the formal pre-test was also conducted in March 2008 on 36 ESCO employees who were not entered in the main study. The results of these two pre-tests helped the researchers to improve the questionnaires to be more easy-to-understand for the participants.

### Process

The questionnaires were filled out through interviews and no financial incentives were offered to the participants. Each interview lasted at least 20 min.

### Research instruments

The main questionnaire included two main parts; in the first part, socio-demographic data, including age, number of children, marital status, monthly income, educational level, shift work and years of work experience, were asked. An outcome-related questionnaire was designed based on the stress scale extracted from the validated Depression, Anxiety, Stress Scale (DASS). In the stress scale questionnaire, 14 items were designed

specifically to assess stress. Difficulty in relaxing, nervous arousal, being easily upset/agitated, being irritable/over-reactive and restlessness were assessed based on this scale. All items were rated on a four-point scale, where 0 = Does not apply to me, and 3 = Applies to me very much or most of the time.<sup>[11]</sup> As the stress scale questionnaire is designed to be used especially in developed countries (with the cut-off point of 14),<sup>[12]</sup> based on the Receiver Operating Characteristic (ROC) curve, the cut-off point was reconsidered by the authors and found to be 12 for Iran. However, participants who scored 12 or higher were considered as stressful. The stress scale questionnaire was translated and validated by a group of public health tutors and professors in Shahr-E-Kord and Esfahan University of Medical Sciences. The internal reliability of the questionnaire as a DASS subscale was found to be high based on a Cronbach's alpha of 0.84. Afterwards, perceived stress and likely stressors, including economical problems, family-related problems, work environment, colleagues and task type, were asked.

### Statistical analyses

The collected data were analyzed using the Statistical Package for the Social Sciences v. 16 (SPSS Inc., Chicago, IL, USA) for Windows. For bivariate analysis, Mann-Whitney and Chi-square tests were used. The logistic regression model was examined to determine the associated parameters of stress among the participants. Odds Ratios (ORs) and 95% CIs were reported. A  $P < 0.05$  was considered significant.

## RESULTS

From all 400 participants, 351 (87.7%) were married, 316 (79%) had at least one child, 313 (78.2%) attained high school or higher education, 245 (61.3%) were shift workers (with rotational duty) and 358 (89.5%) had a monthly salary of more than \$600. The mean age of the participants was  $37 \pm 7.4$  years and the mean work experience was  $13.6 \pm 7.5$  years [Table 1].

Although the prevalence of perceived stress was 91.8% among the participants, the results showed that 53% of the participants were found to be stressful. Severities of stress were found among 302 (75.8%) as mild or moderate, 53 (13.2%) as severe and 11 (2.8%) as extreme [Table 2].

According to the logistic regression results, a monthly income of less than \$600 ( $P < 0.05$ , OR = 1.88, 95% CI = 1.21-2.94), family-related problems ( $P < 0.05$ , OR = 2.75, 95% CI = 1.22-6.21), work environment ( $P < 0.05$ , OR = 3.09, 95% CI = 1.78-5.33) and having a second job ( $P < 0.05$ , OR = 2.68, 95% CI = 1.78-6.78) were significantly associated with a higher prevalence of stress among the participants [Table 3].

## DISCUSSION

In this study, which was conducted to evaluate the prevalence of occupational stress and its associated factors among the employees of the operational units in ESCO, one of the biggest industrial units in Iran, 53% of the participants were found to

**Table 1:** Socio-demographic profile of the ESCO employees ( $n=400$ )

Socio-demographic factors	Stress		No stress		P value
	N	%	N	%	
Marital status					
Single	26	53.1	23	46.9	
Married	186	53.0	165	47.0	0.99
(widow and divorced)					
Number of children					
No children	47	56.0	37.0	44.0	
1 child or more	165	52.2	151	47.8	0.54
Education level					
Primary and junior high school	46	52.9	41	47.1	
High school diploma or higher	166	53.0	147	47.0	0.94
Monthly income (USD)					
<600	16.0	38.0	26.0	62.0	
≥600	193	54.0	165	46.0	0.01
Shift work					
Yes	130	53.1	115	46.9	
No	82	52.9	73.0	47.1	0.97

ESCO=Esfahan steel company, USD=US dollars

**Table 2:** Perceived stress among the employees of ESCO ( $n=400$ )

	Number	%
No stress	33	8.2
Mild or moderate stress	303	75.8
Severe stress	53	13.2
Extreme stress	11	2.8

ESCO=Esfahan steel company

**Table 3:** Predictors of occupational stress among the employees of ESCO, extracted from logistic regression ( $n=400$ )

	$\beta$	SE	Exp ( $\beta$ ) (OR)	95.0% CI	P value
Economy monthly income $\leq$ \$600	0.634	0.227	1.885	1.21-2.94	0.005
Work environment	1.127	0.279	3.086	1.78-5.33	0.001
Family-related problems	1.012	0.416	2.752	1.22-6.21	0.01
Second job	0.762	0.232	5.84	1.28-6.78	0.005

OR=Odds ratio, CI=Confidence interval, ESCO=Esfahan steel company

be stressful. Factors including monthly income, family-related problems, work environment and having a second job showed a significant association with the outcome among the participants.

As mentioned earlier, 53% of the participants were defined as stressful in this study. Compared with other reports from Iran, it seems that occupational stress is more prevalent among the employees of ESCO; this ratio was a little higher than 30% among the members of the Iranian police force.<sup>[13]</sup> Among managers and matrons of educational hospitals in Tehran, high levels of stress were found among 31.4% of the respondents.<sup>[12]</sup> In addition, about 40% of the Iranian rural health workers reported moderate to severe stress.<sup>[14]</sup> Some exceptions also exist in the literature; for instance, the prevalence of occupational stress was much higher (67%) among the Iranian air force employees, which, given their peculiar occupational situation, seems to be inevitable.<sup>[15]</sup> The results from the developed countries also show a much higher prevalence of occupational stress among our participants.<sup>[16-18]</sup> For example, in an epidemiological survey of 17,000 randomly selected people in the UK, about 20% of the subjects reported having very high or extremely high levels of stress at work.<sup>[16]</sup> However, as the prevalence of occupational stress is usually evaluated among non-industrial employees, comparison of the results would not be a proper touchstone to assess this outcome among Iranian employees.

Having a monthly income less than \$600 was significantly associated with the higher prevalence of stress among the participants (OR = 1.88, 95% CI = 1.21-2.94). Association between a lower salary and a higher prevalence of occupational stress has been suggested in the literature, both in Iran,<sup>[19,20]</sup> and in other countries.<sup>[21,22]</sup> A mismatch between the efforts and income level might lead to negative feelings, which cause stress among the employees.<sup>[23]</sup> A low income also seems to be associated with other negative impacts, such as "increased job insecurity, irregular working hours,

occupational hazards and low work control," which might increase occupational stress and its negative consequences.<sup>[24]</sup>

Family-related problems also increased the prevalence of occupational stress among the employees of ESCO (OR=2.75, 95% CI= 1.22-6.21). The major concern of the ESCO employees was about their children's future, especially about their work situation and housing status. Despite limited existing studies, most of the results support our findings.<sup>[19,20]</sup> However, this association might be directly caused by economic problems.<sup>[21,22]</sup>

As another variable, work environment showed a significant association with the outcome (OR = 3.09, 95% CI = 1.78-5.33). As a suggested theory, Kudielka *et al.* divided work conditions into some components, including job demand, job control, social support and factors related to the effort-reward imbalance.<sup>[25]</sup> Based on this theory, Rusli *et al.* evaluated these components and suggested that one component (job demand) is directly related to stress.<sup>[26]</sup> This hypothesis might justify our finding. Many other researches in the literature have also suggested an association between work environment and the prevalence of stress among employees.<sup>[13,14,27,28]</sup>

Unexpectedly, having a second job was also associated with a higher prevalence of stress among our participants (OR = 2.68, 95% CI = 1.78-6.78). At the first glance, it seems that having a second job might partly reduce the existing economic problems. However, likely consequent negative impacts such as doubled stressful work conditions weakened the protective role of higher income in exposure to occupational stress among the employees of ESCO and, consequently, caused this surprising finding.

The results of this study showed no significant association between the socio-demographic variables such as age, marital status and educational level with the prevalence of occupational stress among the participants. Many other studies

confirm this finding.<sup>[13,27,28]</sup> However, the results of few other studies are not in line with this finding.<sup>[29,30]</sup> In general, it seems that the impact of socio-demographics on the occupational stress is strongly influenced by the effects of more important factors such as economic problems.

Based on the results of this study, we recommend policy makers to pay more attention to non-individual factors, especially to economic problems, rather than socio-demographic variables to get the best feedback in terms of stress reduction among Iranian employees. In this regard, it seems that the role of the economic problems is more striking than other factors. Lack of research about the occupational stress among employees of industrial units in Iran highlights the need for more attention to this population as a more at-risk group in exposure to this outcome. Finally, educating the proper methods of coping with stress might be effective to reduce the prevalence of occupational stress among employees in Iran.

Our study had some limitations; this study had a cross-sectional design and the causative associations were not conclusive. As the data collected were self-reported, consequently, over-report and/or under-report of facts might be likely. And, finally, some variables such as marital status (single/married) and educational level (primary and junior/high school and higher) could be evaluated in a more detailed situation. Despite these limitations, this study is one of the few studies that evaluate occupational stress in a large industrial unit in Iran.

## CONCLUSIONS

Drawing on the results, more than 50% of the employees of the operational units in ESCO were found to be stressful. Monthly income, family-related problems, work environment and having a second job were significantly associated with the prevalence of occupational stress among the participants. Nevertheless, existing evidence asserts the importance of further research to evaluate “occupational stress” among Iranian employees, especially among the industrial employees.

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