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## PUBLIC HEALTH RESEARCH

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### Work-Related Stress Dimensions Among A Subsidiary Company Workers of Iranian Oil Refining And Distribution Company

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#### ABSTRACT

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**Received** 11 September 2017

**Accepted** 27 December 2017

**Introduction** Work-related stress and its causes are among the most important issues which can seriously challenge organizational efficiency and employees' health. Different occupational environments and groups have different levels of job stress. The present study aimed to investigate relationships between job stress and its dimensions with three occupational groups (administrative, administrative-operational, and operational) among a subsidiary company workers of Iranian Oil Refining and Distribution Company.

**Methods** The present study had descriptive-analytical and cross-sectional type and was conducted among 468 out of 503 employees (with entry condition of a year of work experience as well as an official and contractual membership) volunteered to participate in research. Data collection tools included demographic questions and job stress questionnaire as well as human resource department information to determine occupational group of employees. Descriptive statistics, statistical tests, Independent test, and one-way ANOVA in addition to SPSS 21 software were used for data analysis.

**Results** There were significant relationships between age, education levels, work experience and smoking with mean score of job stress (P-value <0.05). Mean score of employees' job stress in operational occupation group was significantly higher than other two occupational groups (P-value=0.004), and there were significant relationships between employees' occupational group variables with five dimensions of job stress (demand, relationships and role, managerial support, and peer support) (P-value<0.05). There were not any significant relationships between other variables and job stress (P-value>0.05).

**Conclusions** Exposure to different occupational harmful agents, facing with different safety risks, being far from family, heavy workload, and uncertain employee roles have significantly increased job stress in both operational and executive occupation groups compared to other two occupational groups; hence, there is a positive correlation between high job stress and operational jobs.

**Keywords** Occupational health - worker - Work-related stress.

## INTRODUCTION

According to reports of the World Health Organization (WHO), more than a half of employees suffer from job stress in industrialized countries and job stress is the second most common problem after back pains.<sup>1</sup> In 1992, The United Nations (UN) declared occupational stress as a 20th Century disease, and later the WHO considered it as a worldwide problem. The International Labor Organization (ILO) estimated countries' job stress costs from 1% to 3.5% of GDP (Gross Domestic Product) and introduced job stress as the most well-known phenomenon which threatened workers' health.<sup>2</sup> According to definitions, job stress is the individuals' detrimental physical and emotional response which is produced when job contents, abilities and resources are inconsistent with employees' capabilities. Lack of stressors in workplaces is one of the most basic needs which cause a variety of mental illnesses including job alienation if it is ignored. In other words, since human beings are biological, psychological and social creatures, psychological characteristics play the most important roles in human performance in workplaces. Among these psychological characteristics, job stress may cause many psychological problems such as nervous, intellectual and emotional stress and a set of global problems.<sup>3</sup> According to job stress assessment, Mohammadfam et al. gave the highest score of job stress to physical conditions of workplace.<sup>4</sup> Geographic characteristics are among the factors which cause stress in individuals. Accordingly, characteristics such as high temperature, distancing from urban service, sultry weather, and lack of access to health facilities are studied as geographical stressors.<sup>5</sup> Studies indicate that different occupations and environments have different levels of job stress.<sup>6,7</sup>

Workers employed in oil industries are exposed to various kinds of occupational harmful agents depend on onshore or offshore activities and nature of the work. They are exposed to extreme weather conditions, different chemical substances, fire and explosion hazards, electricity, fall and etc. The workers on oil industries for the sake of encounter to stressful conditions suffer health problem or injury.<sup>8-10</sup>

According to above mentioned sentences, the present study was conducted with the aim to investigate relationship between job stress and its dimensions with three occupational groups (administrative, administrative-operational, and operational) in an subsidiary company of National Iranian Oil Refining and Distribution Company (NIORDC) in order to take steps towards employees' mental and physical health by analysis of demographic factors, which affect status of job stress in employees, and determine its relationship with employees' occupational groups. According to

conducted studies, there is not any similar study on this field in Iran.

## METHODOLOGY

### *Ethics*

The study was approved by the ethics committee of Islamic Azad University, Science and Research branch in Tehran, Iran (ethical code: 9521 on February 18, 2017). The aims and scope of the study were explained to all participants. Informed consent form was obtained from all participants. Privacy and confidential issues were considered throughout the study. The study excluded those respondents who were not interested in being involved in the survey.

In the present study, researchers were committed to give results to HSE management of company.

### *Study design*

#### Selection and Description of Participants

A total of 503 subjects were employed with official and contractual employment status in three occupational groups of the company. The research was conducted on employees by census method in winter of 2016, and then employees of three occupational groups were divided into categories and received explanation of research dimensions. Official or contractual employee membership with at least a year of work experience was entry condition of study which had a cross-sectional and descriptive-analytical type. According to company's instructions, employees were classified into three occupational groups, administrative, administrative-operational, and operational, based on defined job descriptions. Administrative groups worked at headquarters; and administrative-operational were those employees who worked at headquarters but they also inspected executive plans of company over the year according to their job description service; and finally, the operational group were those who performed operational activities in different workshops of projects. Information on status of employees' occupational groups and their work experience was obtained from human resource department of company. In order to collect reliable information, the researcher visited staff's workplaces in person and asked employees to attend meetings in 4 to 5-individual groups, and then distributed and collected questionnaire after justifying and guiding respondents.

### *Technical information*

The first section of questionnaire included questions about demographic factors (such as gender, age, marital status, educational level, smoking, work experience and occupational accidents).

In the second section and in order to determine job stress the HSE standard questionnaire which is introduced by Health and Safety Executive (UK) has been used. The questionnaire consisted of 35 questions in seven subscales: 1) demands or needs, 2) control, 3) managerial support, 4) peer support, 5) relationship, 6) role, and 7) changes. The reliability and validity of this questionnaire were surveyed in an Iranian research and it is assessed as a useful tool for studying on work-related stress.<sup>13</sup> Reliability coefficient of external studies of this questionnaire was equal to 0.7 and Cronbach's alpha coefficient of subscales of this questionnaire was reported from 0.63 to 0.83.<sup>11,12</sup> Reliability of test was determined and it had an internal stability with Cronbach's alpha of 0.82 in the present study.

Questions of the HSE Job Stress Questionnaire contained a 5-point Likert scale (always, often, sometimes, rarely and never). Scores of questions of any item represented measured value of each item which had a range of 1 to 5 variations in which value of 5 was the undesirable state and 1 was desired state. In other words, lower scores represented higher individual health and safety in terms of stress (very desirable state) and higher scores reflected higher individual stress (very undesirable state).<sup>12</sup>

*Statistics*

SPSS 21 software was used to analyze data. Descriptive statistical methods were used to indicate characteristics of studied population. Among applied statistical methods of study, descriptive statistics, statistical tests, independent test, and one-way ANOVA were used to analyze data. All analyzes were performed at a significant level of 0.05.

**RESULTS**

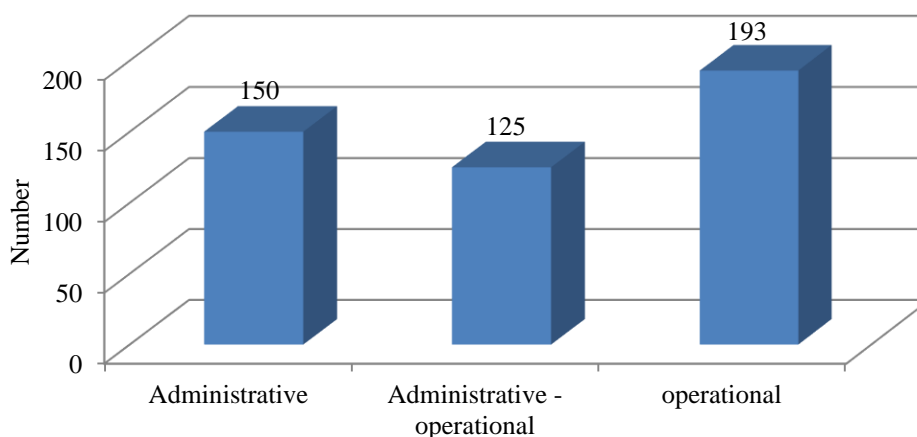
468 out of 503 employees were willing to cooperate in this study (response rate of 93%).

Figure 1 shows frequency of individuals in different occupational groups. According to this figure, 150 employees (37.04%) are put in staff group, 125 (30.86%) in staff-operational group, and 193 (47.65%) in operational group. In Figure 2, frequency of employees is divided into four groups of under-diploma, diploma, associate degree, and bachelor and higher in terms of educational levels. The average age, total work experience and duration of working hours per day are respectively  $43.36 \pm 8.38$  years,  $12.31 \pm 8.48$  years and  $9.98 \pm 3.89$  hours per day. Table 1 presents other information about age, educational level, and also means score of job stress ( $2.47 \pm 0.54$ ).

**Table 1** Job stress score, frequency of age and work experience of the staff studied

Variables	N	Min	Max	Mean±SD
Job stress score	468	4	1.3	2.47±0.54
Age (yr)	468	63	28	43.36±8.38
Work experience (yr)	468	34	1	12.31±8.14

**Figure 1** Frequency of people in different occupational groups



**Figure 2** Frequency of people in different educational groups

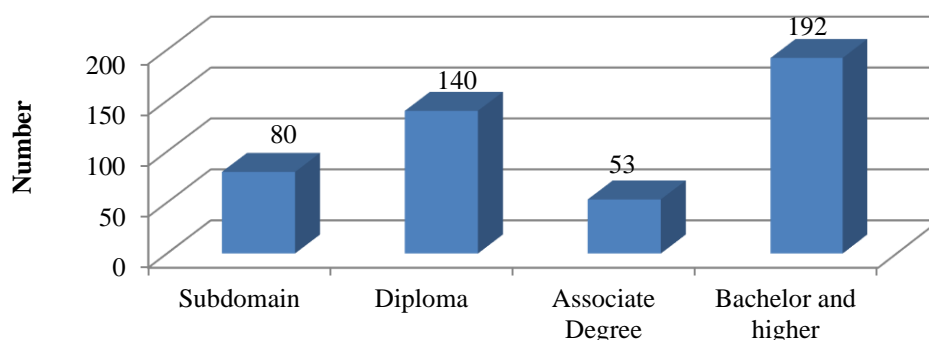


Table 2 indicates that there are significant relationships between all individual and occupational factors except for marital status, gender and occupational accident history with a mean score of job stress (P-value <0.05) based on the statistical ANOVA by study on significant level between age (P-value =0.001), educational level

(P-value <0.001), work experience (P-value <0.001) and also according to statistical t-test by study on significant level between marital status (P-value =0.96), gender (P-value =0.194), smoking (P-value =0.001) and occupational accident history (P-value =0.553) with mean score of job stress.

**Table 2** Process distribution based on demographic characteristics and its relation to the average job stress score

Variables	N	Mean±SD	P- value	*Statistic	
Age category	25-35	112	2.30±0.41	0.001	7.401
	36-50	260	2.49±0.56		
	50<	96	2.53±0.56		
Level of Education	Subdomain	80	2.67±0.61	< 0.001	8.466
	Diploma	140	2.54±0.48		
	Associate degree	53	2.45±0.48		
	Bachelor and higher	192	2.28±0.52		
Marital status	Single	416	2.33±0.35	0.096	0.353
	Married	52	2.49±0.55		
Sex	Male	389	2.50±0.56	0.194	0.992
	Female	79	2.32±0.34		
Smoking	Yes	56	2.73±0.78	0.001	62.421
	No	412	2.43±0.48		
Work experience (yr)	<2	16	1.96±0.35	< 0.001	8.466
	3-10	222	2.45±0.54		
	>10	221	2.52±0.53		
Experience of Occupational Accident	Yes	56	2.51±0.53	0.553	1.279
	No	407	2.47±0.54		

According to ANOVA in Table 3, there is a significant relationship between occupational

groups with mean score of job stress (P-value = 0.004).

**Table 3** Process distribution based on occupational group and its relation with the average score of occupational stress

Variables	N	Mean±SD	P- value	Statistic	
Occupational group	Administrative	150	2.35±0.41	0.004	5.709
	Administrative -operational	125	2.51±0.59		
	Operational	193	2.56±0.57		

Relationships between occupational groups and seven dimensions of job stress seventh

were determined in Table 4 according to ANOVA. There were significant relationship between

demand (factor 1), managerial support (factor 3), peer support (factor 4), relationship (factor 5), and

role (factor 6) with occupational group (P-value < 0.05).

**Table 4** Proportion distribution in terms of occupational groups and its relation with the average score of occupational stress dimensions

Dimensions (Factor)	occupational group	N	Mean±SD	P- value	F
Factor 1) Demand	Administrative	150	2.67±0.66	0.033	3.427
	Administrative -operational	125	2.71±0.58		
	operational	193	2.85±0.73		
Factor 2) Control	Administrative	150	2.67±0.60	0.060	2.838
	Administrative -operational	125	2.86±0.69		
	operational	193	2.78±0.70		
Factor 3) managerial support	Administrative	150	2.36±0.65	0.001	6.789
	Administrative -operational	125	2.66±0.86		
	operational	193	2.37±0.80		
Factor 4) peer support	Administrative	150	2.42±0.73	0.022	3.836
	Administrative -operational	125	2.70±0.88		
	operational	193	2.48±0.91		
Factor 5) relation ships	Administrative	150	1.84±0.61	0.009	4.795
	Administrative -operational	125	2.05±0.81		
	operational	193	2.11±0.96		
Factor 6) role	Administrative	150	1.80±0.63	0.001	9.394
	Administrative -operational	125	2.13±0.82		
	operational	193	2.15±0.82		
Factor 7) changes	Administrative	150	2.38±0.83	0.052	2.969
	Administrative -operational	125	2.68±1.04		
	operational	193	2.53±1.10		

**DISCUSSION**

In this study, mean score of job stress was significantly increased by an increase in age, in other words, older people were more likely to experience job stress than younger ones as confirmed by most researchers including Guidotti et al<sup>13</sup> and Lindqvist et al.<sup>14</sup>

Reduction of older individuals' readiness to deal with stressors is among the reasons for upward trend of job stress. Aging reduces labor mobility and increases willingness to stay in a particular place.

However, a significant direct relationship between job stress and age in this study is inconsistent with some studies such as Heydarabadi et al's research<sup>15</sup> entitled "Study on status of job stress and work-related stressors among employees of a spinning industry" and Nasiry Zarrin et al.<sup>16</sup> Difference in environment of studied population is perhaps the reason for this inconsistency.

In this study, as mean score of job stress was significantly increased by age increase, mean score of job stress was also significantly increased by an increase in work experience. This is consistent with previous finding indicating that employees gain more work experience by increased age, and this increases mean score of job stress

among them compared to younger people with less work experience.

This may be due to several reasons such as increased in these individuals' expectations from managers and managers' expectations from these individuals; hence, lack of proper support for them can lead to stress. The National Institute for Occupational Safety and Health (NIOSH) in the United States considers job requirements such as workload, lack of task control and organizational factors such as inappropriate managerial behaviors as some stressors in workplaces.<sup>17</sup> If workers' expectations are not adequately fulfilled or managers' expectations exceed workers' abilities, job stress emerges in workplaces.

It seems that if people with work experience do not have diversity in their workplaces, they will do repetitive and boring work because several studies have found that doing repetitive tasks and lack of diverse work programs for reducing work repetition by staff or organization will lead to mental health disorders in addition to reduction of physical health.<sup>18,19</sup>

Obtained results are inconsistent with results of research by Heydarabadi et al.,<sup>15</sup> Azadmarzabadi,<sup>20</sup> Guidotti et al.<sup>13</sup>

This difference may be due to difference in measurement tool of job stress in addition to

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difference in type of studied industry. For instance, Lotfizadeh et al.<sup>21</sup> studied employees in an Iron smelting industry. Obviously, any industry has its own special stress according to nature, management and leadership style, and types of harmful factors in workplaces.

As shown in Table 2, p-values for mean score of job stress and educational level are less than 0.05; hence, there is a significant relationship between mean score of job stress and educational level; and an increase in educational level reduces mean score of job stress; in other words, people with lower education levels are more exposed to higher levels of job stress.

This is due to educated people's more accurate knowledge and insight about workplace and responsibilities. Level of education can be among the moderating factors of stress in workplaces. Ambiguity in job requirements is one of stress sources.<sup>22</sup>

Educated employees' better understanding of organizational policies, the need for implementation of safety and health instructions, and importance of paying enough attention to principles of physical and mental health during work are among other reasons for reduced mean score of job stress among them. This study indicated that there was not any significant relationship between employees' marital status and their gender with mean score of job stress, despite the fact that mean score of job stress in married people was higher than single ones.<sup>1</sup> This finding was consistent with results of research by Heydarabadi et al.,<sup>15</sup> Gharibi et al.,<sup>3</sup> Azadmarzabadi and Gholami Fesharaki,<sup>20</sup> and Spector et al who studied Iranian and American managers with the aim to investigate resources of job stress and found an insignificant relationship between marriage and job stress.<sup>23</sup>

This study indicated that people who smoking had higher levels of job stress than other employees, and this increase was significant in their job stress scores. This finding was consistent with studies by Azzad et al.<sup>5</sup> and Sapp et al.<sup>24</sup> Some studies conclude that smoking is usually selected as a way to cope with job stress, in other words, people consider job stress as a license for smoking.<sup>25</sup>

The lack of significant relationship between occupational accident history and job stress in this study was inconsistent with similar studies by Beaton et al.<sup>26</sup> and also Cordeiro et al.,<sup>27</sup> and this might be due to differences in studied environments (for instance, in terms of nature, occurrence of accidents, establishment of a preventive system of accidents, etc.), but there is a more detailed examination in this regard.

According to Table 3, those who are in operational occupation group had a significantly higher mean score of job stress than other two

groups (administrative, and administrative -staff groups) (P-value= 0.004), in other words, employees' job stress was significantly increased by enhancing level of their performance, so that mean scores of job stress in administrative, administrative-operational, and operational employees were respectively equal to 2.35, 2.51 and 2.56. According to job stress classification, operational staff was at a low level of job stress, but other two groups were at lower levels.

Table 4 presents mean scores of seven dimensions of employees' job stress in each of three occupational groups. Obtained P-values were less than 0.05 for mean scores of job stress dimensions with occupational group at dimensions namely demand (P-value=0.033), managerial support (P-value=0.001), peer support (P-value= 0.022), relationship (P-value=0.009) and role (P-value=0.001). This also indicated that there were significant relationships between three occupational groups with five out of seven dimensions of job stress.

Among the above-mentioned dimensions, mean scores of employees' job stress were increased by increasing their executive levels in demand, relationship and role dimensions. In these three dimensions, operational staff had more job stress. In managerial and peer support dimensions, employees in administrative-operational occupation groups had higher mean scores of job stress than other two groups.

In five out of seventh dimensions of job stress, employees who do all or parts of their work in operational jobs had higher degrees of job stress because according to company's activities, it seems that the workload of operational jobs is heavier than other jobs, and there are higher adverse environmental factors (including chemical, physical and mechanical factors) in operational workplaces, and this contributes to an increase in employees' job stress because a research suggests that lack of attention to stressors, inappropriate physical factors of workplace, and working pressure create conditions for individual psychological and social balance upset leading to creation of job stress.<sup>28,29</sup>

Shontz<sup>30</sup> studied various jobs in which employees with more executive and operational jobs had higher levels of job stress; and other studies also found that executive jobs creates more job stress than other jobs .Existence of physical, psychological and social stimuli in workplaces has psychological and mental effects and causes stress.<sup>18,19</sup>

Despite significant levels close to 0.05, other two dimensions of job stress including control (P-value=0.060) and changes (P-value=0.052) did not have any significant relationship with occupational groups; and like other five dimensions, mean score of operational

employees' job stress was higher than staff in these two dimensions.

## CONCLUSION

In general, operational group employees are faced with various occupational risks each which have potential for damaging life and facilities. In fact, employees in operational and administrative-operational groups are more faced with job stress than staff group due to higher exposure to risks and occurrence of occupational accidents for themselves and their colleagues.

Job stress is significantly increased in operational and executive jobs, and a positive correlation is created between high levels of job stress and operational jobs due to exposure to different harmful occupational factors, exposure to different safety risks, being far from family, and heavy workload in addition uncertain employee roles.

## ACKNOWLEDGMENTS

This article was extracted from a thesis that was supported by Islamic Azad University, Science and Research Branch, Tehran, Iran.

All of the authors reported that there were no conflicts of interest during the study and there were no financial support for this study.

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