

## Original Article

# Relation between Job Stress Dimensions and Job Satisfaction in Workers of a Refinery Control Room

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### Abstract

**Introduction:** Job Stress can affect individuals and lead to job dissatisfaction. This study was conducted to assess the influence of different job stress dimensions on the job satisfaction among refinery control room workers.

**Materials & Methods:** In this cross sectional study all 100 workers of an oil refinery control rooms were studied. Job stress and job satisfaction was measured using standard questionnaires provided by national institute of mental health (NIMH) and Robbins respectively. A general linear model was used to estimate the effect of different job stress dimensions on the job satisfaction.

**Results:** In this study 62.08 percent of workers were categorized as having high level of stress. In regards to job satisfaction, 9.2, 27.6, 28.7, 16.1 and 18.4 of workers were classified as totally dissatisfied, dissatisfied, neither satisfied nor dissatisfied, satisfied and totally satisfied, respectively. A Pearson correlation test revealed a significant negative correlation between job satisfaction and all studied dimensions of job stress ( $p=0.01$ ). In the general regression model, partial Eta squared was 0.03, 0.3 and 0.23 respectively for interpersonal relationships, physical conditions of work and job interest.

**Conclusion:** This study showed that job satisfaction is mostly influenced by physical conditions and job interest dimensions of job stress. Therefore, for improvement of job satisfaction in workers, different parameters of these two dimensions of job stress should be considered.

**KeyWords:** Job Satisfaction; Workplace; Stress, Psychological; Occupational Health; Industry

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## Introduction

Job stress can be defined as a psychological condition which results from an imbalance between job demands and the subject's ability for coping those demands [1]. In the recent century, the importance of stress in the organizational behavior has been considered dramatically by researchers. But it should be noted that the stress is not intrinsically harmful and some degree of stress is necessary for motivating the people and it increases their work efficiency [2].

High stress levels impose costs for the subjects and their organizations. In the United States of America, 200 billion dollars, which accounts for 10% of gross national production, is spent annually in stress costs including compensation for diseases, job absenteeism, accidents, death from chronic diseases and reduced productivity [3]. On the other hand, high stress level results in the job dissatisfaction in the workplaces. Job satisfaction is defined as the attitude and feelings of a person towards his/her job and has a determinant role in a satisfying job. In their study, Sharif and Behjat showed that there is a relationship between stress dimensions and job satisfaction, wages, manager policy, job security, and social relations [4]. In addition, many stresses induced diseases may arise from harmful environmental

factors such as noise, insufficient lighting, and low level of ventilation, physiologic stressors, aggressive behaviors, and low level of job safety [5]. As a preliminary stage for induction and promotion of job satisfaction, the factors which affect job satisfaction should be determined. In this regard, Herzberg believes there is not only one factor which determines job satisfaction or dissatisfaction. He suggests before implementing the plans for promoting the job satisfaction, factors which induce job dissatisfaction should be considered. On the other hand, although motivating factors result in job satisfaction, their lack doesn't result in job dissatisfaction. Factors which result in job dissatisfaction include physical conditions, wages, safety, security, social factors and interpersonal relationships. It can be concluded from Herzberg studies that if high levels of job satisfaction are going to be attained, as a prerequisite the factors which induce job dissatisfaction should be considered [1].

Kuei-Yun et al in their study which investigated the relationship between job commitment, job satisfaction and job stress among Taiwan nurses revealed that a high level of job stress decreases the level of job satisfaction [6].

Nakata et al. A study which conducted to assess the effect of job stress on sleep

related breathing disturbances showed that job stress can result in sleep related berating disturbances. Potential job stress effects may include DNA damages. As Akiomiet et al. indicated oxidative DNA damages can be related to job stress. Hannah et al. Showed that job stress and high workload are related to poor sleep quality. High levels of job stress in an organization can result in absenteeism inefficient use of working time increasing the turnover low productivity and resistance against changes in the organization. In addition, studies indicate that high level or prolonged stress can induce physiological changes which may lead to impaired health or even death. Moreover relationship has been found between high levels of stress and cardiovascular diseases, immune system complication, depression and musculoskeletal disorders <sup>[7]</sup>. Regarding the tasks being performed, one of the occupational groups which may have a high level of job stress and low level of job satisfaction are control room workers. In refinery control rooms many tasks are performed including monitoring and control of reactors, temperature, modification of the product characteristics according to the analysis performed in the laboratory and making critical decisions at certain times like when the power, air,

vapor, or water flow is interrupted . Since job satisfaction can have dramatic effects on performing such critical tasks, this study was conducted to evaluate the influence of different job stress dimensions on the job satisfaction.

## Materials & Methods

This descriptive-analytical study was performed in the control rooms of a refinery in the south of Iran. The study population was all 100 workers in control rooms. For evaluation of job stress and job satisfaction relevant questionnaires were prepared and after necessary descriptions, completed by the participants. For determination of the job stress level, American Mental Health Institution job stress questionnaire was used. This questionnaire consists of 57 questions for the evaluation of three dimensions of job stress including interpersonal relations (26 questions) physical conditions (22 questions) and job interest. Each question should be responded with a 5 level Likert scale.

According to this job stress questionnaire, job stress will be expressed in three levels as low stress, normal stress and high stress. For allocation of job stress level according to the obtained score from the questionnaire Table 1 was used <sup>[8]</sup>. For evaluation of job satisfaction, Robins

standard questionnaire was used. This questionnaire consists of 18 five point scale questions. This questionnaire is based on the theory that the feeling of a person towards the job can reveal the level of his/her job satisfaction <sup>[9]</sup>. In this questionnaire each question obtains a score ranging from 1 to 5 and the level of job satisfaction will be determined by

averaging the score of 18 questions according to Table 2. Reliability and validity of the used questionnaires had been considered previously by Hamidi et al. and Mohammad Fam et al. Hamidi et al. reported reliability of job satisfaction questionnaire to be 0.8 and Mohammad Fam et al. reported the reliability of job stress questionnaire to be 0.92 <sup>[10, 11]</sup>.

**Table1.** Job stress levels according to the scores obtained from the questionnaire

	Low stress			Normal stress			High stress		
Interpersonal relations	39	43	46	51	54	57	62	68	75
Physical conditions	35	40	44	48	52	55	58	62	67
Job interest	13	15	17	18	19	21	23	25	27
Total	91	101	111	117	123	134	141	151	167
Percentile	10	20	30	40	50	60	70	80	90

**Table 2.** Job satisfaction levels according to the scores obtained from the questionnaire

job satisfaction status	Score
Strongly dissatisfied	1-1.8
Dissatisfied	1.8-2.6
Neither satisfied nor dissatisfied	2.6-3.4
Satisfied	3.4-4.2
Strongly satisfied	4.2-5

After obtaining the necessary data from questionnaires statistical analysis was performed using SPSS ver. 16 software. The Pearson correlation coefficient was used for evaluating the relationship

between different job stress dimensions and job satisfaction. In addition, general linear model was used to estimate the effect of different job stress dimensions on the job satisfaction level.

## Results

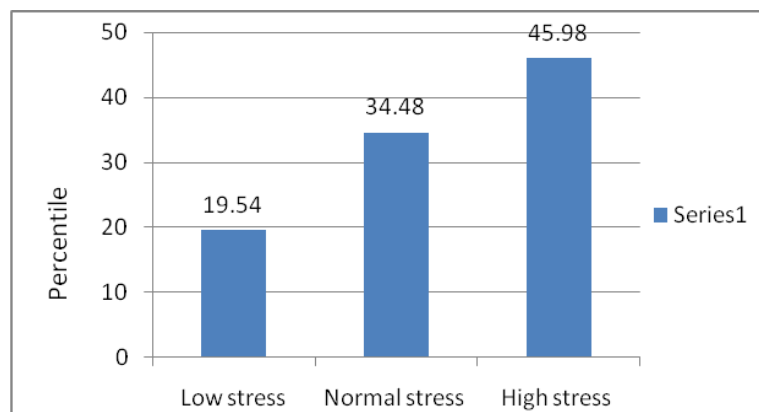
Out of 100 distributed questionnaires 87 were completed and returned. All participations were male and their educational degrees were diploma or higher degrees. The average age of the participants was 26 years and they were working in three shifts (morning, afternoon and night). The results of assessing the job stress in different dimensions (physical conditions, interpersonal relations and job interest) are presented in Table 3.

**Table 3.** The mean score of job stress and job satisfaction among study population

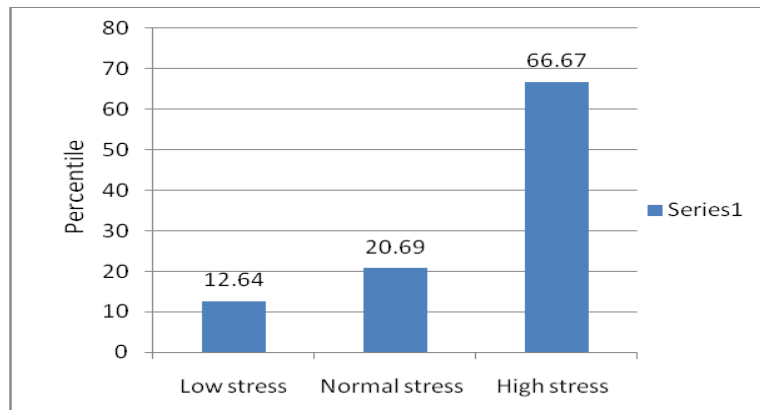
	Means	SD
Job satisfaction	3.29	0.93
Interpersonal relations	64.18	19.71
Physical conditions	67.40	18.65
Job interest	26.21	10.50
Total stress	157.80	44.39

According to these results the mean of interpersonal relations score is 64.18. As shown in Table 1 this level of stress is

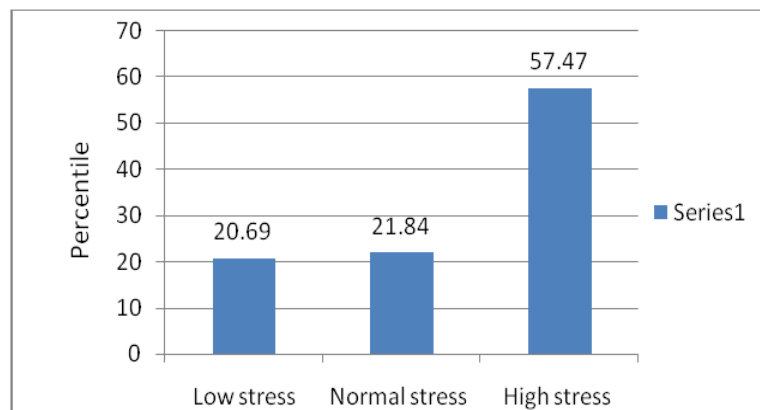
considered high and it is between 70<sup>th</sup> and 80<sup>th</sup> percentiles. The mean scores of the physical conditions dimension is 64.4 and the related stress level according to the Table 1 is more than that of 90<sup>th</sup> percentile. The average of the scores in the job interest dimension is 26.21 and the related stress level according to Table 1 is high which is between percentiles 80<sup>th</sup> and 90<sup>th</sup>. Mean job stress score in general was 157.8 which is considered high stress level and it is between 80<sup>th</sup> and 90<sup>th</sup> percentiles. Considering the distribution of participants in different stress levels it can be seen that in all dimensions most of the participants have a high level of job stress. The percent of the participants with a high level of job stress in interpersonal relations, physical conditions and job stress dimensions respectively are 45.98%, 66.67% and 57.47% (figures 1 to 3). In general 62.07% of the studied population had a high job stress level.



**Fig 1.** Distribution of subjects in different levels of stress in interpersonal dimension



**Fig2.** Distribution of subjects in different levels of stress in Physical conditions dimension



**Fig 3.** Distribution of subjects stress levels in job interest dimension

Regarding the job satisfaction the average of the all participants score was 3.29. According to the Table 2, people with this score are considered to be satisfied with their job. Analysis of the distribution of participants in different levels of the job satisfaction showed that most of them are in neither satisfied nor dissatisfied level (28.7%) and in the others are participants who belong to satisfied

(27.6%), strongly satisfied (18.4%) and strongly dissatisfied (9.2%) levels.

Pearson correlation coefficient tests showed that there is a negative and significant correlation between job satisfaction and all stress dimensions and total job stress score ( $p=0.01$ ). In addition, the Pearson correction coefficient revealed that there is a positive and significant correlation between different dimensions of job stress ( $p=0.01$ )(Table 4).

**Table 4.** The Pearson correlation between different aspects of job stress and job satisfaction

	<b>Job satisfaction</b>	<b>Interpersonal relations</b>	<b>Physical conditions</b>	<b>Job interest</b>	<b>Total stress</b>	<b>Barriers to work</b>
Job satisfaction	1					
Interpersonal relations	-0.677(**)	1				
Physical conditions	-0.715(**)	0.769(**)	1			
Job interest	-0.864(**)	0.671(**)	0.716(**)	1		
Total stress	-0.805(**)	0.926(**)	0.931(**)	0.835(**)	1	
Barriers to work	-0.373(**)	0.596(**)	0.546(**)	0.453(**)	0.601(**)	1

(\*\*)  $P \leq 0.01$

In the general regression model, partial Eta squared was 0.03, 0.3 and 0.23 for respectively interpersonal relationships, physical conditions of work and job interest.

## Discussion

Our finding showed that job satisfaction score of studied population belongs to satisfied level. However another issue which should be considered is the distribution of the studied population in different levels of job satisfaction.

Studies show that the distribution of the studied population in different levels of job satisfaction follows a normal distribution model. According to Our finding, 54% of the workers are at a level that is not considered as satisfied with the job. It means 54% of the workers are in neither

satisfied nor dissatisfied (28.7%), dissatisfied (16.1%) and strongly dissatisfied (9.2%) level. Since only 18.4% of the workers are in strongly satisfied level, it can be inferred that 81.6% of the workers are in need of a program to promote their job satisfaction level. Studies show that job satisfaction is related to organizational citizenship behavior, turnover, and absenteeism<sup>[12]</sup>. In addition, occupational injuries and absenteeism are related to job dissatisfaction<sup>[13]</sup>. These findings highlight the importance of job satisfaction and the need for its consideration and management in the organizations.

The results of the job stress assessment showed that the level of stress is considered to be high and it is between 80<sup>th</sup> and 90<sup>th</sup> percentiles.

The used general linear model showed that physical conditions and job interest dimensions of job stress are factors which have statistically significant influence on the job satisfaction level in the studied population ( $p < 0.05$ ). In addition, the model revealed that the dominant factor which determines the level of job satisfaction is the total job stress score (partial Eta squared = 0.86).

Analysis of the correlation between job stress and job satisfaction revealed that there is a negative and significant correlation between job satisfaction and all dimensions of job stress and total job stress score ( $p = 0.01$ ). In this study the correlation coefficient between job satisfaction and different dimensions of job stress including interpersonal relations, physical conditions and job interest and total job stress respectively was -0.68, -0.72, -0.86 and -0.8. As it can be seen, in all dimensions, especially in job interest dimension, the correlation coefficient is high. It means of increasing the job stress in all dimensions, the level of job satisfaction decreases. These findings are in agreement with Kuei-Yun Lu et al.<sup>[6]</sup> and Hamidi et al in a glassware industry also showed that there is a significant relationship between job stress dimension, specially physical conditions, and job satisfaction. They showed that the

correlation coefficient between job stress and physical conditions was 0.834<sup>[10]</sup>. According to these findings, it seems that by adopting policies towards decreasing the job stress, job satisfaction can be increased in control room workers. High levels of job stress in an organization can result in absenteeism, inefficient use of working time, increasing the turnover, low productivity, and resistance against changes in the organization<sup>[11]</sup>. Rashmi Shahv et al. study including 100 samples in an industrial unit showed that there is significant relationship between job stress, performance of the workers and job satisfaction which supports the results of our study<sup>[14]</sup>. Mohammad Fam et al. Study in a car manufacturing industry showed that the physical conditions of the workplace have the highest impact on the job stress. In addition, Johnson et al. study in 20 industrial units reported physical and ergonomic factors as the most important factors in induction of job stress<sup>[11, 15]</sup>. The study of Phil Leather on 120 subjects in a governmental industrial workplace showed that the noise pressure level has a direct effect on job satisfaction<sup>[16]</sup>.

In our study, also the highest correlation coefficient was revealed to be between job satisfaction and physical conditions. This finding is in line with Mohammad Fam et al., Johnson et al and



Phil Leather et al. Studies <sup>[11, 15, 16]</sup>. Hence it can be concluded that the most important factor which affects job stress and in turn job satisfaction is physical conditions of the workplace. According to the results of this study the factors in physical conditions dimension which assisted in increasing the level of job stress in the studied control rooms are the need for quick modification in some tasks, the need for emergency responses, bore some of the work and the workplace, high job demands, and busy and noisy workplace. The results of this study highlight the need for considering job stress in the studied control rooms. Since this study has determined critical factors which play key role in inducing job stress, the results can be used as a guideline by managers towards reduction of job stress and increment of job satisfaction.

Herzberg believes that before taking action for increasing job satisfaction level, factors which play role in job dissatisfaction should be considered. In Herzberg's opinion, factors which may cause job dissatisfaction include physical conditions, salary, safety, security, social factors, and interpersonal relations <sup>[1]</sup>.

Our study determined physical conditions as the main cause of job stress, on the other hand, Herzberg believes that workplace physical conditions are one of

the factors which affects job dissatisfaction. Hence it can be concluded that the relationship which was found between job satisfaction and physical conditions dimension of job stress is a real relationship which is supported by Herzberg's theory. Therefore a modification of physical conditions of the studied control rooms is expected to decrease the level of job stress and increase the level of job satisfaction.

One of the factors which should be taken into account for decreasing the level of job stress is the interpersonal relations. Some workers don't have enough skill in interpersonal relations and may be harassed by other workers. Therefore, conducting interpersonal relations courses can be helpful. In addition, there may be a need for reprimands in the case of harassment of workers by their colleagues.

Furthermore, job characteristics should be considered for increasing the job satisfaction and decreasing the job stress. A study has shown that jobs which have feedback are specialized and have a high level of independence lead to higher levels of job satisfaction <sup>[17]</sup>.

Consequently, in the control rooms job satisfaction can be increased by giving feedback and more independence to the workers. Other factors which may be

employed for increasing the level of job satisfaction and decreasing the job stress are using job rotation, decreasing work hours, participation of the workers in decision making processes, giving up to date health and safety services, and preparing a secure workplace.

### Conclusion

Since the result of this study showed a

strong relationship between job satisfaction and all dimensions of job stress, and general linear model proved the influential role of physical conditions and job interest dimensions of job stress in job satisfaction level, it can be concluded that by improving the physical conditions of the workplace and job interest in workers, the level of job stress will be decreased and in turn, job satisfaction will be improved.

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