

## Evaluation of stress, anxiety, and depression among workers of one copper mine in Kerman Province, Iran, in 2014

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### Abstract

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**Background:** The workers of mines, during a working day, are exposed to stress and psychological pressure that certainly affect the efficiency of their work. This study aimed to determine the level of stress, anxiety, and depression in workers of one copper mine in Kerman Province, Iran.

**Materials and Methods:** In this cross-sectional study, 250 workers of the operation unit of one copper mine in Kerman Province were examined in 2014. Sampling was done using census method and data were collected using the Depression, Anxiety and Stress Scale (DASS), the validity and reliability of which has been approved. This questionnaire consists of 21 questions that are divided into 3 subscales on depression, anxiety, and stress each containing 7 questions. Data analysis was performed in SPSS software using the Pearson correlation, Spearman's correlation, and regression tests.

**Results:** The mean age and work experience of subjects were  $31.82 \pm 8.61$  and  $6.67 \pm 5.79$  years, respectively. Moreover, the education level of 45 individuals (18%) was below diploma, 85 (34%) diploma, 46 (18.4%) associate degree, and 74 (29.6%) bachelor's degree or higher. Furthermore, 194 subjects (65%) were married. In addition, 135 subjects (54%) worked only on day shifts and 115 (46%) of them had shift work. In this study, 98 (39.2%), 88 (34.8%), and 88 (35.2%) employees suffered from depression, anxiety, and moderate and severe stress, respectively. A statistically significant difference was observed between subjects who worked on day shifts and those who had shift works in terms of stress, depression, and anxiety. In addition, significant relationships were observed between stress, depression, and anxiety in the 4 study groups ( $P < 0.005$ ).

**Conclusions:** The results of this study showed that the rate of stress, anxiety, and depression was high among the examined mine workers.

**Keywords:** Depression, Anxiety, Stress, Mining.

### Introduction

The World Health Organization (WHO) estimates that four hundred million people in the world suffer from anxiety (more than other mental disorders). Thus, among mental disorders, anxiety disorders are the most common. The use of preventive measures at an early stage and complete treatment of anxiety are of great importance (1).

According to the investigation conducted by Shantz, currently, stress and depression are the second most common diseases, after heart disease, in the workplace (2). Today, with the

development of technology and the widespread use of hazardous materials, which are the causes of accidents that result in heavy human, economic, and environmental losses, the presence and role of human resources has been highlighted in industrial workplaces (3). In other words, industrialization is like a double-edged sword; it helps economic, health, and welfare promotion, but also causes disability or death in humans. This issue is

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more evident in developing countries in which working is accompanied with excessive pressure in order to increase production, regardless of preventive safety principles, standards, working hours, training of workers, use of suitable personal protective equipment, and etcetera. For example, the International Labour Organization (ILO) reported the annual global incidence of 270 million occupational accidents leading to loss of more than 3 working days in 2009. Iran is a developing country, and thus, is not exempt from this rule (4). Anxiety is an unpleasant and vague sensation of fear and worry and is often associated with an unknown origin and uncertainty, helplessness, and physiological excitation (5).

All individuals may be anxious at times, but chronic, severe, and unusual anxiety is problematic and is the cause of depression. However, regardless of genetic and congenital factors, the cause of stress and anxiety in acute cases is the living environment of individuals and in most cases is related to social interaction and occupation (6). The words stress and anxiety are used to describe moods and feelings in everyday life.

Anxiety occurs when individuals experience stressful situations for a long period of time or frequently. Under such circumstances, the body becomes strained and vulnerable to physical and mental disorders, such as anxiety (7).

Depression is a set of various psychological states the effects of which range from fatigue to silence and avoidance of everyday activities. Chronic anxiety is one of the numerous factors of depression. The high prevalence of anxiety is due to the lack of primary prevention, early diagnosis, and timely control. (8). Individuals who work in stressful environments such as underground mines are at risk of distress. Their work environment is often stressful and demanding; thus, if they lack the adequate mental and physical preparedness, they will be extremely vulnerable. Factors such as lack of sleep or irregular sleep-wake rhythm, and shift work

sleep disorder (SWSD) that result in burnout are the most common of these damages (7). In this study, workers of the operation unit of a copper mine have been examined to evaluate of stress, anxiety, and depression among workers of copper mine.

### Material and Methods

This cross-sectional and descriptive-analytical study was conducted in 2014 to assess the level of stress, anxiety, and depression among workers of a copper mine in Kerman Province, Iran. Sampling was performed using census method. The study population consisted of all of the operation unit. The inclusion criteria included the willingness to participate in the research, previous work experience in the operation unit, and lack of simultaneous participation in a similar study.

The researcher explained the design and goals of the study to the participants and assured them that participation in the project was voluntary and all information would be considered confidential. He also explained that if they wished the results would be delivered to the operation unit. All those who completed the questionnaire were entered into the study.

Data were collected using a two-part questionnaire. The first part of the questionnaire consisted of 7 questions on the demographic characteristics of the study population including place of work, education, work experience, age, marital status, type of work, and gender. The second part consisted of the Depression, Anxiety, and Stress Scale (DASS-21) that measures the emotional response of workers. The DASS-21 was designed by Lovibond in 1995. Each item in the DASS-21 is scored on a 4-point Likert scale ranging from 0 to 3 (normal, low, medium, and severe). This scale has two forms. The short form consists of 21 items, which evaluate the psychological constructs of depression, anxiety, and stress (7 items each). The long form contains 42 items; every 14 items measure an act or psychological dimension. The short form was validated for

the Iranian population by Sahebi et al. (9). Crawford and Henry, in a study on 1,771 cases in England, compared this tool with other related tools of depression and anxiety (10). They reported the reliability of this tool using Cronbach's alpha in the subscales of depression, anxiety, and stress as 0.95, 0.90, and 0.93, respectively. They also reported that the correlation coefficient for total score of the scale was 0.97 (10). Moreover, Moradipناه et al., in their study in Iran, confirmed the validity of this tool (11). They reported the Cronbach's alpha of depression, anxiety, and

stress subscales as 0.94, 0.92, and 0.82, respectively (11).

Total scores were calculated for each person and percentage score was obtained through dividing the received score by the maximum possible score. Data were entered into a computer after collection and analyzed using SPSS software (version 16, SPSS Inc., Chicago, IL, USA). To determine the relationship between the severity of the main factors and demographic characteristics, the Pearson correlation, Spearman's correlation, and regression test were used.

**Table 1: Frequency of depression, anxiety, and stress among staff**

Emotional reaction	Frequency		Normal		Low		Medium		Sever	
	No.	%	No.	%	No.	%	No.	%	No.	%
Depression	34	18.0	83	42.8	70	36.0	6	3.2		
Anxiety	35	18.4	91	46.8	61	31.6	6	3.2		
Stress	37	18.8	90	46.0	61	31.6	7	3.6		

**Results**

The study population consisted of 250 personnel (contractual, contracting, and official workers) of the operation unit. In this study, mean and standard deviation of participants' age was  $31.82 \pm 8.61$ . Mean and standard deviation of their work experience was  $6.67 \pm 5.97$ . Furthermore, the education level of 18% of subjects was below high school diploma, 34% diploma, 4.18% associate degree, and 6.29% bachelor's degree

or higher. In terms of marital status, 22.4% of participants were single and 77.6% were married. In addition, 54% of subjects worked only on day shifts and 46% of them had shift work. Table 1 shows the frequency of depression, anxiety, and stress (emotional response) among the participants. As can be seen in this table, 32.9%, 34.8%, and 35.2% of employees, respectively, suffered from depression, anxiety, and stress at moderate to severe levels.

**Table 2: Descriptive indicators of occupational stress based on demographic data**

Demographic characteristics	Stress intensity	Normal and low		Medium		Severe		Sum No.	Statistical test results
		No.	%	No.	%	No.	%		
Marital status	Married	117	60.30	68	35.05	9	4.63	194	P < 0.001
	Single	45	23.19	11	5.67	0	0	56	
Education	Below diploma	31	15.97	14	7.21	0	0	45	P < 0.05
	Diploma	56	28.86	27	13.91	2	1.30	85	
	Associate Degree	31	15.97	11	5.67	4	2.60	46	
	Bachelor's degree and higher	35	18.04	27	13.91	3	1.54	74	
Working hours	Day shift	92	47.42	40	20.61	3	1.54	135	P < 0.001
	Shift work	51	26.28	55	28.35	9	4.63	115	

**Table 3: Descriptive indicators of occupational depression based on demographic data**

Demographic characteristics	Stress intensity	Normal and low		Medium		Severe		Sum	Statistical test results
		No.	%	No.	%	No.	%		
Marital status	Married	105	54.12	82	42.26	7	3.60	194	P < 0.001
	Single	47	24.22	8	4.12	1	0.51	56	
Education	Below diploma	25	12.88	20	10.30	0	0	45	P < 0.05
	Diploma	55	28.35	29	14.94	1	0.51	85	
	Associate Degree	32	16.49	10	5.15	4	2.06	46	
	Bachelor's degree and higher	40	20.61	31	15.97	3	1.54	74	
Working hours	Day shift	96	49.48	38	19.58	1	0.51	135	P < 0.001
	Shift work	56	28.86	57	29	2	1.03	115	

As shown in tables 2, 3, and 4, there were differences in terms of stress, depression, and anxiety between married and single individuals. No significant relationship was observed between stress, depression, and

anxiety in the 4 study groups (P < 0.05). Significant differences were observed between the subjects who worked on day shifts and those who had shift work regarding stress, depression, and anxiety (P < 0.001).

**Table 4: Descriptive indicators of occupational anxiety based on demographic data**

Demographic characteristics	Stress intensity	Normal and low		Medium		Severe		Sum	Statistical test results
		No.	%	No.	%	No.	%		
Marital status	Married	119	61.34	67	34.53	8	4.12	194	P < 0.001
	Single	44	22.68	12	6.18	0	0	56	
Education	Below diploma	27	13.91	18	9.27	0	0	45	P < 0.05
	Diploma	59	30.41	26	13.40	0	0	85	
	Associate Degree	32	16.49	10	5.15	4	2.06	46	
	Bachelor's degree and higher	45	23.19	25	12.88	4	2.06	74	
Working hours	Day shift	98	50.51	35	18.04	2	1.03	135	P < 0.001
	Shift work	52	26.80	60	30.92	3	1.54	115	

There was a statistically significant relationship between age and the level of stress,

depression, and anxiety (P < 0.001) (Table 5).

**Table 5: Comparison of occupational stress, depression, and anxiety in terms of age (in years)**

Occupational	Age	No	Mean ± SD	F	df	P-value
Occupational stress	Normal and low	162	28.62 ± 5.3	17.94	3	P < 0.001
	Medium	79	35.25 ± 8.93			
	Severe	9	41.55 ± 13.97			
Occupational depression	Normal and low	152	28.14 ± 6.4	23.62	3	P < 0.001
	Medium	90	35.73 ± 8.31			
	Severe	8	43.12 ± 14.06			
Occupational anxiety	Normal and low	163	28.4 ± 6.42	23.62	3	P < 0.001
	Medium	79	35.17 ± 8.6			
	Severe	8	46.75 ± 12.36			

## Discussion

This study aimed to evaluate stress, anxiety, and depression in workers of the operation unit of a copper mine in Kerman Province in 2014. The results showed that 39.2%, 34.8%, and 35.2% of employees suffered from depression, anxiety, and stress at moderate to severe levels, respectively. This is due to the stressful nature of work in the mines. Factors such as inappropriate environment, lack of a stable work environment, lack of employment security, unbearable physical environment, and unfamiliarity with ways of dealing with stress are the cause of workers' high scores in stress, anxiety, and depression. This issue was illustrated clearly in several studies that were performed in the field of stress in mines (12,13). According to the National Institute for Occupational Safety and Health in America, 40% of workers reported that their job was extremely stressful, and 26% of workers stated that they were often under pressure due to their jobs (14, 15). Psychological stress in the workplace includes stress factors that impact the mental health of workers, and are able to damage their job function and safety. A review of studies in the field of mental health status in individuals of 15 years of age and older in Iran indicates that on average about 21% of the population suffer from mental disorders (16). Moreover, women have higher vulnerability to these disorders than men (16). Thus, mental health is defined as the ability to be flexible in difficult situations and to achieve mental balance in any situation (8). In a study that was conducted by Shinar, human behavior was identified as the main cause of most accidents (17). Many studies have shown that occupational stress is the cause of occupational accidents. For example, Norris et al., in their study, observed a significant association between stress levels of and accident by employees (18). A study in England found that more than 500 thousand workers suffer from occupational stress and it is the second leading cause of absenteeism from work (19, 20). Some jobs are inherently stressful, and thus,

cause anxiety. Wang et al., in their study on the mental health of workers, reported occupational stress as a very important factor in the development of mental disorders (21). Moreover, Hashemzadeh, in his study of time management behavior and occupational stress among supervisors of the surgical department, stated that 46.6% of subjects had moderate stress (17). The results of the present study showed that age had a statistical relationship with depression, anxiety, and stress; so that with the increasing of age, stress, depression, and anxiety also increased.

This finding corresponds with the study by Babalhavaeji (17) and Lotfizadeh (22), but is inconsistent with the results of the studies by Goudarzi (23) and Khaghanizadeh (16).

Aghaee et al. reported a relationship between stress and anxiety (24). The studies of McMaha (25) and Malakooti (19) also confirmed the relationship between stress, and depression and anxiety.

The results of this study showed that marital status was associated with depression. This finding is consistent with results of the study by Smith that showed employed single women are more likely to develop depression than employed married women (31). Furthermore, Assadzandi found a significant relationship between depression and marital status (17). In this regard, we can say that married individuals experience considerably less feelings of depression because they receive more support from their families.

In the present study, there was a significant relationship between stress and anxiety that was consistent with previous studies (9). This finding was also in agreement with research results by Richey et al., who reported that nurses experience high levels of stress in their daily life (10). In a study by Smith on stress among nurses, nursing occupation-related stress factors consisted of facing mortality, dealing with colleagues, lack of readiness to deal with patients' emotional problems, lack of support for the organization, workload, and lack of job promotion (32). Burch (24) and Wong (27) reported in their study that

individuals with shift work have a higher occupational stress that is consistent with the results of this study. Disturbance of the circadian cycle due to shift work impairs the secretion of enzymes, and this causes stress. In addition, one of the causes of high stress in shift workers was less resting time (22, 28).

In the present study, no significant relationship was found between education and stress, depression, and anxiety that was consistent with the findings of Abedi and Lotfizadeh (29). The results of the study by Ofili indicated that low education level is a stress factor (30). This was not consistent with the present study results. We can prevent accidents and physical and mental illnesses by applying individuals to stressful jobs accurately. It is suggested that workers receive training on methods of coping with stress.

### Conclusion

According to the results of this study, ultimately 40% of the employees suffered from depression, anxiety, and stress at moderate to severe levels. The results of this study showed that stress, anxiety, and depression were at a high level among the examined miners.

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