

# The Relationship between Job Satisfaction and the Incidence of Unsafe Acts in Metal Smelting Industry Workers in 2017

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## Abstract

**Introduction:** The main cause of most occupational accidents is workers' unsafe acts. Many factors can affect unsafe behaviors. Job satisfaction is one of the most important factors for better job performance. This study was conducted to investigate the correlation between job satisfaction and incidence of unsafe acts among workers in the metal smelting industry. **Materials and Methods:** In this cross-sectional study, 112 workers employed in four metal smelting industries in Kashan were participated. The unsafe acts of these people were determined by observation and using the Tarrant checklist. Job satisfaction was assessed by Minnesota questionnaire with 20 items. Student's *t*-test, one-way analysis of variance, Chi-square, and linear regression were used to data analysis. **Results:** The results showed that there was a significant relationship between unsafe acts with work unit, health and safety education, and working hours and also between job satisfaction with work unit, work shifts, job interest, and occupational accidents ( $P < 0.05$ ). This study showed a significant negative correlation between job satisfaction and incidence of unsafe acts ( $P < 0.05$ ). **Conclusion:** Reducing job satisfaction can be caused to elevation of unsafe acts, and implementation of programs for increasing employee satisfaction can lead to a reduction in occupational accidents.

**Keywords:** Job satisfaction, metal smelting industry, occupational accidents, unsafe acts

## INTRODUCTION

Workplace accidents defined as unpredicted events that may lead to physical and emotional injuries.<sup>[1]</sup> According to the International Labour Organization of nearly 120 million occupational accidents occur annually, two hundred and ten thousands result in fatal and disabling injuries.<sup>[2]</sup> Literature in workplace safety has classified the causes of occupational accidents into unsafe conditions and unsafe workers' behavior. The latter contributed to most of the work-related accidents even in a safe environment.<sup>[3]</sup>

A survey conducted in Australia revealed that 91% of occupational injuries and losses during 1982–1984 attributed to personality factors.<sup>[4]</sup> In Iran, according to the Social Security Organization, the causal analysis of accidents has revealed unsafe acts as common immediate determinants.<sup>[5]</sup>

Heinrich attributed 88% of accidents to individual's unsafe act, 10% due to unsafe conditions, and 2% to unpredictable conditions. His theory suggested a continuum of elements flowing from one sequence to the next, leading to accidents.<sup>[6]</sup>

Lutness believed that human error involved in more 95% of work-related accidents and injuries and eliminating the unsafe act was crucial in preventing injury.<sup>[7]</sup> One of the factors that may affect the way employees behave in the workplace is their degree of job satisfaction. Job satisfaction is the sum of the positive attitudes of the individual toward his/her job,

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which means loving the job duties and the conditions in which employment takes place.<sup>[8]</sup> Job satisfaction in the simplest form of expression is the beneficial and positive emotional sensation that results from the work done by a person. Of course, job satisfaction is not a single agent, but an intermediate and complex relationship between job responsibilities, accountability, actions and responses, motivations, encouragements, and arguments<sup>[9]</sup> and is also one of the most important factors in determining the productivity and efficiency of human resources.<sup>[10]</sup>

Job satisfaction is one of the most important factors for better job performance resulting in increased productivity and market share for that organization. Moreover, it is important to reduce accidents and injuries and to reduce the costs of these incidents and injuries while keeping people safe.<sup>[11]</sup>

Previous studies showed that there was a correlation between stress and job satisfaction, and a lack of job satisfaction can increase the amount of stress. Furthermore, there was a relationship between stress and job satisfaction with occupational accidents and individual factors.<sup>[12]</sup>

Considering these issues and the lack of similar studies on the relationship between unsafe acts and job satisfaction, this study was conducted to investigate the correlation between job satisfaction and unsafe acts in workers of Kashan metal smelting industry in 2017.

## MATERIALS AND METHODS

This cross-sectional study was carried out on all personnel in four Kashan metal smelteries that were in direct contact with molten materials. The number of these workers was 112 at the time of the study. Tarrant checklist was used as the main guide to view and record unsafe acts. This checklist was already used in the study by Hashemi Nejad *et al.*<sup>[13]</sup> Before starting the main observations, a pilot study was conducted to determine the more unsafe acts of the smelting industry workers that may not exist on the Tarrant list and determine the number of observations required. After that, 200 systematic observations of workers' behavior<sup>[14]</sup> and unsafe acts that did not exist in the Tarrant checklist were added. The required number of observations was estimated 3287 views. Then, the main observations were made within 3 s.

A demographic questionnaire including information on age, marital status, work record, degree of education, type of occupation, job unit, smoking rate, type of job shift, job interest, hours of training in safety, and specialized training courses was completed by cases.

The Minnesota Persian version job satisfaction questionnaire was used either.<sup>[15]</sup> The questionnaire has 20 items, which is a well-known measurement tool for job satisfaction assessing in three concepts of external satisfaction, internal satisfaction, and overall satisfaction. Internal satisfaction means how individuals think about the nature of their job responsibilities, but external satisfaction is separated from the duties of the job and the work. The internal satisfaction reliability ranged from

0.84 to 0.91, the external satisfaction ranged from 0.77 to 0.82, and the total ranged from 0.87 to 0.92.<sup>[15]</sup> Internal consistency includes items 1–12, external satisfaction includes items 13–18, and total satisfaction includes all 18 items plus items 19 and 20. This questionnaire is assessed based on a Likert scale (strongly disagree – 1, disagree – 2, no opinion – 3, agree – 4, and strongly agree – 5). The scores of the questionnaire ranged from 20 to 100. The 12-item internal satisfaction score ranged from 12 to 60 and the 6-item scale of external satisfaction ranged from 6 to 30. In general, the score of 75 and above represents a high degree of satisfaction, and the 25 represents a low level of satisfaction. Scores between 26 and 74 represent the average level of job satisfaction. The collected data were analyzed using *t*-tests, one-way analysis of variance, and linear regression or logistic regression analysis for multivariate analysis using SPSS ver 16 (SPSS Co, Chicago, ILL, USA).

## RESULTS

The study was carried out on 112 employees using 3287 observations working in the metal smelting industry (Kian Alloy, Copper World, Iran Ghaltak, and Aliyazh Gostar), who were involved in the casting, processing, technical, and manufacturing sectors. About 29.5% of the participants were under 29 years of age, 51.8%, 30–39 years, and the rest of the participants were 40 years and older, of whom 78.6% were married and the rest were single. Their working experiences were from 1 to 28 years.

Educational level of 23.2% was under diploma and 41.1% had university education. Moreover, 74.1% had turning shifts. About 47.3% of people were interested in their jobs and 8.9% of them had a little interest in their jobs. Nearly 81.3% of participants received health and safety training and 71.4% of the people had received specialized vocational training. 11.1% used tobacco products and 13.4% had second jobs. About 66.1% of the participants worked 8 h and 33.9% 2 h/day. 42.9% of workers have not had an occupational accident.

There was a significant relationship between unsafe acts with work unit, health and safety education, and working hours ( $P < 0.05$ ).

Table 1 showed that there was no statistically significant relationship between age, work experience, education, marital status, and smoking with job satisfaction.

Table 2 showed that there was a statistically significant relationship between unit of work, type of job shift, job interest, and incident with job satisfaction ( $P < 0.05$ ).

Table 3 showed that high job satisfaction caused to less unsafe acts, but the relationship between these two factors is not significant ( $P = 0.39$ ).

Table 4 showed that there is not significant different among factories in term of unsafe acts ratio with medium and high level of job satisfaction.

Table 5 showed Correlation coefficient of job satisfaction with unsafe acts.

**Table 1: Distribution of job satisfaction based on demographic information**

Variable	Status	Job satisfaction		P
		Medium	High	
Age (years)	<29	25 (28.4)	8 (33.3)	0.8
	30-39	47 (53.4)	11 (45.8)	
	>40	16 (18.2)	5 (20.8)	
Work experience (years)	<9	47 (53.4)	16 (66.7)	0.24
	>10	41 (46.6)	8 (33.3)	
Education	Under the diploma	21 (23.9)	5 (20.8)	0.498
	Diploma	38 (43.2)	8 (33.3)	
	University	29 (33)	11 (45.8)	
Marital status	Single	20 (22.7)	4 (16.7)	0.521
	Married	68 (77.3)	20 (83.3)	
Smoking	Yes	11 (12.5)	2 (8.3)	0.572
	No	77 (87.5)	22 (91.7)	

**Table 2: Distribution of job satisfaction according to job characteristics**

Variable	Status	Job satisfaction		P
		Medium	High	
Job unit	Casting	28 (31.8)	3 (12.5)	0.015
	Parsing	20 (22.7)	2 (8.3)	
	Technical	17 (19.3)	4 (16.7)	
	Stoke production	15 (17)	11 (45.8)	
	Others	8 (9.1)	4 (16.7)	
Type of work shift	Rotational	70 (79.5)	13 (54.2)	0.012
	Fixed	18 (20.5)	11 (45.8)	
Hours of work	8 h	61 (69.3)	13 (64.2)	0.165
	12 h	27 (30.7)	11 (45.8)	
Having a second job	Has it	12 (13.6)	3 (12.5)	0.885
	Does not have	76 (86.4)	21 (87.5)	
Job interest	Low	11 (12.5)	0 (0)	0.002
	Medium	43 (48.9)	5 (20.8)	
	High	34 (38.6)	19 (72.9)	
Safety and health education	Yes	69 (78.4)	22 (91.7)	0.14
	No	19 (21.6)	2 (8.3)	
Specialized training	Yes	661 (69.3)	19 (79.2)	0.344
	No	27 (30.7)	5 (20.8)	
Having an incident	Yes	55 (62.5)	9 (37.5)	0.028
	No	33 (37.5)	15 (62.5)	
Witness the incident	Yes	55 (62.5)	12 (50)	0.268
	No	33 (37.5)	12 (50)	

## DISCUSSION

The findings of this study indicated that there was no significant relationship between unsafe acts and demographic information, namely age, work experience, education, and marital status. As the results of Table 1, the highest mean of unsafe acts is for those with an age group of 40 years and older, which indicated that the higher the age of a person, the greater the probability of performing unsafe acts by them, which is consistent with the results of other studies.<sup>[16-19]</sup> Due to increasing age, it can be argued that people are confident with their skills and

**Table 3: Mean and standard deviation of percentages of unsafe acts to total observation according to job satisfaction**

Job satisfaction	Unsafe ratio $SD \pm \bar{x}$	P
Medium	46.1±21.6	0.39
High	41.9±18.4	
Total	45.2±20.9	

SD: Standard deviation

**Table 4: Mean and standard deviation of percentages of unsafe acts to total observation according to job satisfaction in terms of factories**

Factory	Job satisfaction	Unsafe acts ratio $SD \pm \bar{x}$	P
Kian Alloy	Medium	58.8±20.04	0.112
	High	17.14±17.14	
Iran Ghaltak	Medium	58.9±31.7	0.485
	High	41.9±31.03	
Aliyazah Gostar	Medium	55.2±7.4	0.139
	High	51.4±6.2	
Copper World	Medium	33.7±15.9	0.793
	High	32.06±21.8	

SD: Standard deviation

experience while they work and do not pay attention to safety precautions. People with low working experience had more unsafe acts. Another study in the Kermanshah Oil Refinery showed that for 1-year work experience, the chance of doing unsafe act is reduced by 0.971, that is, with an increase in work experience, the chance of doing unsafe act is lower.<sup>[13]</sup> Previous studies showed that accident experience decreases with increasing work experience, which is in line with the results of our research.<sup>[20,21]</sup>

The number of unsafe acts of married persons was higher the main reason of which may be mental occupation. People who smoke had a higher human error rate, and they tend to have high-risk behavior and hence had higher unsafe act ( $P = 0.074$ ). Those with university education had lower unsafe acts than other groups (diplomas and underdiplomas) explaining the role of education in the full understanding of the type of work and the work environment and avoidance of human error and unsafe acts which were similar to the results of previous studies.<sup>[17,19,22-24]</sup>

The findings showed that job satisfaction did not have a significant correlation with demographic characteristics such as age which was in line with the findings of other studies.<sup>[25-27]</sup> In Raeissi and Kebriaei study, there was a relationship between the age and job satisfaction of employees,<sup>[28]</sup> and in some studies, it was inverse.<sup>[29,30]</sup> Considering that job satisfaction depends on various factors such as salaries, benefits, promotion, communications, reward, and that the conditions for married and single workers were the same in the workplace, it can be argued that job satisfaction has little association with marital status which was in line with Daniali *et al.* and Bodur study,<sup>[25,27]</sup> while, in other studies, single individuals enjoyed

**Table 5: Correlation coefficient of job satisfaction with unsafe acts**

	Inner satisfaction	Exterior Satisfaction	Total satisfaction	The proportion of unsafe acts
Inner satisfaction	1 (0) $P=0$	0.59 (109) $P=0$	0.94 (109) $P=0$	-0.14 (109) $P=0.10$
Exterior Satisfaction		1 (0) $P=0$	0.82 (109) $P=0$	-0.19 (109) $P=0.034$
Total satisfaction			1 (0) $P=0$	-0.17 (109) $P=0.044$
The proportion of unsafe acts				1 (0) $P=0$

more job satisfaction than married ones,<sup>[28,30]</sup> but in Moradi *et al.* study, the satisfaction of married workers was higher than singles,<sup>[26]</sup> and there was no significant relationship between education and job satisfaction, which was consistent with the findings of previous studies.<sup>[28,29]</sup> However, in other studies, there was a reverse relationship between the level of education with job satisfaction<sup>[25,30]</sup> and advancement of education and fair promotion in the organization can be effective in creating satisfaction and motivation for work.<sup>[28,31,32]</sup>

Moreover, there was a significant relationship between job satisfaction with job unit characteristics, job shift type, job interest, and accident ( $P < 0.05$ ). When a person is interested in his job and continues to work more enthusiastically, he will also be satisfied with the job. People with fewer accidents have higher job satisfaction. Studies have also shown that unhappy people are more likely to be at risk of an accident.<sup>[33,34]</sup> Studies show that people with average job satisfaction have a higher proportion of unsafe acts than those with high levels of job satisfaction. The higher the job satisfaction, the lower the unsafe acts. This issue appeared in the correlation between job satisfaction and unsafe acts, and there was a statistically negative relationship ( $P < 0.05$ ) between them, but there were no similar studies in this area so that these results could be compared with them. Since there were significant relationships between job stress and job satisfaction as well as job stress and unsafe acts, comparisons have been done indirectly.

There was a significant negative correlation between job satisfaction and incidence of unsafe acts ( $P < 0.05$ ). This means that job dissatisfaction can increase unsafe acts and result in occupational accidents. This finding is consistent with previous studies. Zare *et al.* study in one of Iran's oil refineries showed that there was a negative and significant correlation between job satisfaction and job stress.<sup>[35]</sup> Bahrami *et al.* study found that occupational stress with unsafe acts, unsafe acts and incidents had significant direct relationships, and a 1% increase in the unsafe acts was more important relative to the 1 point increase in job stress score.<sup>[36]</sup> According to the mentioned studies, unsafe acts and job satisfaction can also have a significant relationship.

## CONCLUSION

Reducing job satisfaction can be a factor in the emergence of unsafe acts, and implementation of programs to increase employee satisfaction can lead to a reduction in occupational accidents.

## Limitations

The research limitations are the lack of cooperation of some directors and employers of the metal smelting industry, which could be due to the lack of trust in the researchers to transfer company information. Another limitation was the rapid occurrence of workers' behavior, so the researcher must have a decent focus on the behavior of the worker.

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## Conflicts of interest

There are no conflicts of interest.

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