

The Survey of Safety Climate and its Impact on Perceived Stress in the Workers of a Tile Industry in 2018

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Abstract

Background: Occupational health and safety is important for workers and their employers. Unfavorable safety climate can affect the workers' health and performance negatively. Job stress is a harmful pheromone in the industries that have been a concerning issue in recent years. This study aimed to determine the safety climate and its effect on the workers' perceived stress in a tile industry in the west of Iran.

Methods: This cross-sectional study was conducted on 135 employees working in a tile industry in the west of Iran in 2018. The data were collected using demographic characteristics, safety climate, and Cohen's perceived stress questionnaires. Data were analyzed by descriptive statistics, Spearman's correlation coefficient, and linear regression test using SPSS version 22 software.

Results: The mean (SD) of safety climate was 3.06 ± 0.55 (out of 5) and that of perceived stress was 26 ± 8.22 (out of 56). A significant inverse relationship was found between safety climate and perceived stress ($r = -0.240$, $p\text{-value} = 0.005$). Safety climate was not significantly correlated with demographic features and background factors ($P > 0.05$).

Conclusion: The results of this study showed that the level of safety climate was moderate to high; besides, the unfavorable safety climate can be a risk factor for perceived stress. Given the inverse relationship between safety climate and perceived stress, improving the staff's safety level by engineering and managerial interventions can be useful in improving the workers' health.

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Introduction

The safety climate is defined as the workers' common understanding about policies, methods, and approaches of the organization with respect to the value and importance of safety within the organization that is associated with the employees' health.^{1,2} Safety climate is a valuable concept that is used markedly for understanding the employees' performance, identifying control methods, and finding appropriate solutions.³ Generally, workplace health management focuses on human resource productivity, such as absenteeism and reducing health

care costs to increase the economic productivity of work. Workplace health promotion programs are associated with costs-cutting for employers such as hospital and non-hospital costs, sick leave, and insurance costs.⁴ Studies have shown that the safety climate is a good predictor of safety behavior and safety output such as accidents and injuries in different workplaces.^{2,5} It is generally estimated that more than 300,000 work-related deaths occur worldwide annually and that lots of disabilities have occupational origins.⁶ Thousands of deaths and disabilities occur each year due to the occupational accidents in the United States, for instance

5,804 work-related deaths and 4.1 million occupational illnesses and injuries in 2006.² It is generally accepted that safety climate affects safe behavior through safety knowledge and motivation, and a positive safety climate can improve the safety measures at work by rewarding or changing approaches and policies.² Bond et al. in a study showed that organizational psychological climate was associated with dictatorial behaviors in the workplace; it moderates the impact of such behaviors on stress symptoms after the accidents.⁷

Stress is the individual's response to the imbalance between the demands of external events and available resources to meet those demands.⁸ Unusual forms of work, including subcontracts made in the workplace with an economic purpose, have led to changes in technologies and specific regulations in the workplace. The working pressure on the contractual employees forces the employers in small workplaces to prioritize the economic returns of ongoing health and safety programs, assess safety and health risk, train safety, and monitor adequately.^{9, 10} The work environment has always affected the workers, and the unstable situation of the contractual workers in such work environments exposes them to more stress.^{11, 12} Stress can have a negative effect on the workers' general health¹³ and their quality of working life.¹⁴ Recently, in a study in the US, more than 50 percent of the workforce felt that stress had a negative impact on their work productivity.¹⁵ Some previous studies on the working population in Iran also indicated high levels of occupational stress,¹⁶ so this is an important issue to be studied.

Perceived stress is described as a person's overall understanding and comprehension of how much he or she is influenced by the stressors and its degree depends on his/her belief in the seriousness of stress.¹⁷ If stress in the workplace is not properly managed, it can affect the employees' performance and health.¹⁸ Perceived stress affects the psychological and health variables.¹⁹ Najafi's study showed that stress correlated with productivity.²⁰ In addition to the negative impact of stress on productivity, many researches showed that persistent stress could increase the possibility of mental disorders, gastric ulcers, myocardial infarction, and other human health disorders.²¹ In this case, people's health might be at risk, and sick leave and absenteeism from work may be increased. This issue not only results in wasting human resources that are a precious asset, but also increases the health care costs for the workers and the employer. Several studies have been conducted on the relationship between safety climate and job stress.^{9, 11} The investigation of perceived stress and its relationship with organizational factors is still underdeveloped. In this study, we aimed to investigate the effect of safety climate on perceived stress in workforce of a tile industry.

Methods

Study Design

This cross-sectional study was conducted on employees working in a tile factory in the west of Iran. Before starting the survey, coordination was made with relevant authorities. Sampling was done using census method. The inclusion criterion was the willingness of the workers to participate, while the workers who experienced an injury during the last year were excluded. Regarding these criteria, 135 workers (out of all 150) who were eligible for participation completed the questionnaires. The researchers explained the purpose of the study to the participants and asked them to answer the questions carefully. They were assured that their information would be completely confidential. A demographic questionnaire and two other questionnaires with acceptable reliability and validity were used for this purpose. The questionnaires were collected after two weeks. Informed consent for publication was gained during data collection.

Data Collection Tools

1. Demographic Questionnaire: This questionnaire included questions regarding age, gender, marital status, education level, work experience, and work unit.

2. Safety climate measurement questionnaire at the workplace: This questionnaire has twenty questions and seven components to assess workplace safety climate. It was designed and its validity and reliability were investigated by Mohammadi Zeydi et al., reporting acceptable reliability and validity (Cronbach's alpha=0.77).²² The components of this questionnaire include management commitment, safety communication, safe environment, manager accountability, risk perception, awareness and consciousness of safety issues, and job satisfaction. It is scored based on a Likert-based scale (strongly disagree with score 1 to strongly agree with score 5). A total score ranging from 20 to 46 indicates a weak safety climate, 47-73 a moderate safety climate, and higher than 74 show a high safety climate.^{23, 24}

3. Cohen Perceived Stress Scale: The questionnaire was designed by Cohen that includes fourteen questions and assesses the stress experienced by individuals over the past month. It uses a five-point Likert scale (never, almost never, sometimes, often, and very often). In this questionnaire, seven questions are reversed scored.²⁵ The reliability of this questionnaire was reported from 0.84 to 0.86 by internal consistency with Cronbach's alpha. The reliability of the tool by Cronbach's alpha was 0.86 for Iranian subjects.¹⁷ The minimum score obtained in this method is 0 and the maximum score 56. A

score below 18 indicates low perceived stress; 19-37 moderate perceived stress, and above 38 shows high perceived stress.

Data Analysis

Descriptive statistics measures including mean and standard deviation, Spearman correlation coefficient, and linear regression were used for data analysis. Data were analyzed at a 5% significance level using SPSS version 22 software.

Results

The mean (standard deviation) age and work experience of the participants were 35.80±10.98 and 11.66±4.98 years, respectively. The mean scores (standard deviation) of safety climate and stress were 3.06±0.55 (out of 5) and 26±8.22 (out of 56), respectively. In this study, 8.1 percent of the workers reported a weak safety climate, 78.5 percent reported moderate, and 13.3 percent claimed strong safety climate. Considering perceived stress, moderate stress was felt by 71.9 percent of the subjects, followed by low and high stress in 18.5 and 9.6 percent of participants, respectively. The demographic and contextual information of the participants are shown

in Table 1.

The results of Linear Regression showed that safety climate had no significant relationship with education level (t=-1.640, P=0.105), age (t=0.454, P=0.651), work experience (t=-0.679, P=0.499), and marital status (t=-1.120, P=0.358). There was a significant relationship between perceived stress and work experience (t=2.151, P=0.035), while no relationship was found between perceived stress and each of the mentioned factors (P>0.05). Table 2 shows the relationship between safety climate and perceived stress with respect to demographic characteristics and background factors.

Among the safety climate domains, “awareness of safety issues” had the highest mean score, while “management commitment” had the lowest. Table 3 shows the mean scores of safety climate domains.

Spearman correlation coefficient showed that there was a significant inverse relationship between safety climate and perceived stress (r=-0.24, P=0.005). However, each of the components, namely management commitment, secure communication, safe environment, and risk perception had no significant relationship with perceived stress (P>0.05).

Table 1: Demographic features, safety climate, and perceived stress scores of the participants

Variable	Groups	Number of personnel (percent)	Safety climate Mean±SD	Perceived stress Mean±SD
Marital status	Single	42 (31.15%)	3.09±0.63	26.84±5.45
	Married	93 (68.85%)	3.05±0.51	26.92±8.41
Education level	High school	26 (19.25%)	3.05±0.53	27.53±7.52
	Diploma	45 (33.35%)	3.18±0.62	27.15±8.70
	Associate	20 (14.85%)	3.19±0.24	21.90±8.54
	Bachelor	35 (25.85%)	2.90±0.49	28.73±7.57
	Master	9 (6.70%)	2.90±0.79	25.12±6.05

Table 2: Relationship between safety climate and perceived stress with respect to demographic features and background factors

	Safety Climate			Perceived stress		
	Beta	t	Sig.	Beta	t	Sig.
Age	0.053	0.454	0.651	-0.94	-0.804	0.424
Work experience	-0.081	-0.679	0.499	0.256	2.151	0.035*
Marital status	-0.138	-1.120	0.358	-0.126	-1.024	0.309
Education Level	-0.213	-1.640	0.105	-0.320	-0.248	0.805

*Significant

Table 3: Mean and standard deviation of safety climate domains scores and perceived stress

Variable	Mean±SD	Range of score
Management commitment	2.49±1.01	1-5
Secure communication	3.27±0.85	1-5
Safe environment	2.86±0.74	1-5
Manager’s accountability	2.79±0.96	1-5
Risk perception	2.50±1	1-5
Awareness of safety issues	4±0.58	1-5
Job satisfaction	3.44±1.06	1-5
Safety climate	3.6±0.55	1-5
Perceived stress	26±8.22	28-56

Table 4: The relationship between the dimensions of safety climate and perceived stress (spearman correlation coefficient)

Safety climate domains	Perceived stress	
	P value	r
Management commitment	0.131	-0.130
Secure communication	0.096	-0.144
Safe environment	0.460	-0.066
Manager's accountability	0.001**	-0.273
Risk perception	0.123	-0.133
Awareness of safety issue	0.003**	-0.258
Job satisfaction	0.007**	-0.232
Safety climate	0.005**	-0.240

Manager's accountability, awareness, and job satisfaction had a significant inverse relationship with perceived stress ($P < 0.05$). Table 4 shows the relationship between the domains of safety climate and perceived stress in the participants.

Discussion

This study aimed to investigate the effect of safety climate on perceived stress in the workforce of a tile industry. The results showed that the safety climate was moderately high in the work environment and there was a significant inverse correlation between the safety climate and perceived stress. There was also a significant inverse relationship between each of the components, (namely manager's accountability, awareness and consciousness of safety issues and job satisfaction) and perceived stress. Perceived stress was lower in the group that reported a strong safety climate.

The researchers did not find a study addressing the relationship between safety climate and perceived stress, so each variable was discussed separately. The results of this study were in line with those of the Chen's study, showing that the safety climate of the workplace not only affects the safety performance of the workers, but also indirectly causes stress.¹⁸ Therefore, improving various dimensions of the safety climate is effective in reducing stress. If the workplace is healthier and safer, employees will work more calmly.

The safety climate score was obtained medium-to-high in this study, which is consistent with previous studies in Iran^{26, 27} and it is lower than Tsung-Chih, Wu and Kang and Ahmadi's studies.²⁸⁻³⁰ Differences in the population of the study, the items examined in the safety climate as well as different policies and guidelines can be important explanations for this difference. Different work environments have different conditions, and this can be also a reason for the differences.

Management commitment had the lowest score among safety climate domains, which is one of the weaknesses of the factory safety climate. It is an important factor that can have an effect on other safety

climate factors and improve them.³¹ Therefore, the management measures to create a safe environment for employees are of great importance. Besides, safe environment had a low score that is considered an important risk factor for the future accidents. Injuries in the workplace occur because of slips, trips, and other minor accidents.⁵ Thus, it seems necessary to investigate and remove the risk factors in this factory. Also, a work environment which is ergonomically designed can be effective in promoting and improving the performance and productivity of its individuals.³² The high scores of secure communication and job satisfaction are the strengths of the safety climate of the factory because an increase in these scores can improve the overall score of the safety climate. However, it should be noted that a safety climate with high scores in all aspects makes better safety conditions compared to a case in which there is a large discrepancy between the scores.

According to the results, the safety climate had no significant relationship with age, which is in line with Mohammadi's study³³ and is not consistent with the results of Han, Tsung-Chih Wu, Heydari, and Shirali studies.^{3, 6, 28, 34} Older people may have a better understanding of the safety climate and can express the condition well. In addition, the personality characteristics, staff-authority relationship, and workers' expectations about the current status may be other reasons for these differences. There was not a significant relationship between safety climate and gender in our study, and it is not consistent with Hahn,³⁴ while it is in the same line with the results of Tsung-Chih Wu and Mohammadi.^{28, 33} It is worth considering that in this study women were working in the administrative department and their duties were different from those who participated in the study mentioned.

The relationship between safety climate and education level in this study is in line with the Heidari and Shirali's study; no significant relationship was found between these two variables.^{3, 6} The conditions of the factory are usually the same for all the employees in the production section or in the administrative department and the employees with any education level are under the same management domain. If

any of the undesirable factors in the workplace are eliminated, it will probably be the same for all workers in all sectors.

In this study, there was a significant difference between the safety climate in the production section and that of the administrative department. Moreover, in Shirali's study, job status had a significant relationship with the safety climate, and it is consistent with Tsung-Chih Wu's study.²⁸ As the tasks performed by the employees in the administrative department were quite different from the ones in the production section, it seems reasonable that the conditions of the safety climate vary according to the environmental conditions, duties, and demands of the staff.

There was no significant relationship between the safety climate and work experience in this study, which is in line with Mohammadi's study³³ and is inconsistent with the study of Shirali.⁶ One possible reason for this is that the more experienced workers may have a different position than the others; hence, they get more attention from management. However, the promotion of experienced workers may also vary from job to job or culture to culture, depending on the factory policies.

In this study, 72.2 percent of the employees reported moderate perceived stress. It should be noted that stress can cause blood pressure and consequently hypertension, which needs more care and follow-up.³⁵ Bovier in his study showed that stress had a negative and strong effect on psychological and physical health.³⁷ Jeffery's study showed that stress was related to health behavior and it had a relationship with heart damage and cancer.³⁸ Given that workers spend considerable time in the workplace, stress may result in loss of human resources and a lack of optimal use due to the need for medical care.

This study had several limitations. First, it was a cross-sectional study, and we cannot generalize its result to employees of other factories. It merely expresses the relationships, not the causes and effects. Second, using questionnaire tools for data collection may allow some participants not to respond correctly because of the fear of punishment. It was moderated by using blind questionnaires and teaching the participants. Third, there was no information on occupational accident data to allow a better interpretation and analysis of the study results. Further research is suggested to be conducted using multi-variable design to assess other organizational factors that may affect perceived stress.

Conclusion

Regarding the relationship between safety climate and perceived stress, it can be said that it is necessary to improve the safety climate of the factory in order to

reduce perceived stress. However, it is necessary to improve the safety climate by implementing the required interventions such as improving the relationships between management and workers, teaching the safety issues and providing a safe physical environment without any risk and obstacles. If safety climate conditions are not taken into consideration by management, the desired safety climate will probably decline in the future.

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