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Original

Studying Safety Attitude and its Relationship with Safety Performance among the Operational Staff in a Cement Factory in 2018

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Abstract

Background: Risk perception and employees' attitudes towards safety is one of the requirements for establishing safety culture and having a safer working environment. If the attitude of employees to safety can be improved and accomplished, their safety performance will also be improved. So, to achieve an appropriate working environment, it is necessary to measure a person's perception of safety. The current study aims to explore the relationship between attitudes and safety performance among employees of the cement factory in Fars Province in Iran. **Methods:** The present study is sectional analytical research, which was conducted among employees of the cement factory in the south of Iran in 2018. The required information was collected through the attitude questionnaire and safety performance. Finally, 130 questionnaires were completed. The data analysis was carried out through the SPSS software version 24 by using Kruskal–Wallis tests and man Whitney tests. **Results:** The mean safety attitude was determined by 3.85(0.28). According to the results, there is no significant relationship between the level of safety attitude with age (P=0.32), the degree of education (P=0.36), work experience (P=0.52), accident numbers (P=0.47) and also the education (P=0.320). On the other hand, the safety attitude showed a significant relationship with safety performance (P=0.001). **Conclusion:** According to the results of the study and the significant relation between the safety attitude and performance, functional improvements in employee's safety attitudes could be achieved by planning and taking occupational health preventive measures.

Keywords: Safety attitude; Safety performance; Accidents.

Introduction

The cement factory is one of the significant industries that play an essential role in the national economy of developing countries.[1, 2] Recently, the factories of advanced automation and complex control equipment are used to manage safety and prevent accidents.[3] Accidents are the most important causes of damage in industries, which can directly or indirectly cause financial and property damage, especially in manufacturing industries.[4] According to the published statistics, many workers lose their lives every year in many employments environments. In a report of the year 2003, an

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international labor organization announced that approximately 358 thousand workers in the world lose their lives annually.[5] In recent years, focusing on the human error in industrial accidents has shown that in addition to lack of skill, decision-making ability, and attitude, factors like organizational culture and regulatory factors have also been identified as factors involved in accidents.[6,7] The investigation of accident records of one of the gas refineries indicates that 75 accidents happened from 2007 to 2017 in which unsafe actions in the work environment (%31) had the highest share in the incidence of accidents.[8] Studies have shown that the root cause of more than 80% of occupational accidents is unsafe action and 20% of the causes are related to unsafe conditions and other relevant factors .[9]

Occupational hazards and safety performance are affected by several factors. One study, conducted in 2003, examined factors associated with positive safety results (accidents and minor errors), and they reported four critical factors, including the Senior Management factor, management factor, supervision factor and operator's factor.[10] The senior management factor consists of a safety attitude, leadership style and responsibility. Management factor is divided into seven categories, namely safety commitment, involvement in safety, safety priority, leadership style, interaction, communication, and human management methodology. The supervision factor consists of support supervision, manager participation, manager autonomy, and contributory supervision. Finally, the operator's factors are divided into five categories, including labor involvement, worker autonomy, worker risk perception, worker cohesion, and worker motivation. Each one of these four factors influences safety performance and is affected by a wide range of different aspects such as safety leadership, safety culture, safety climate and employee's behavior.[10]

In 2000, a theoretical model for the safety culture and its impact on safety behavior was presented, which explained that the safety culture affects the behavior of safety through two mechanisms of the hidden error directly and indirectly through the development of the job environment.[11] The unknown error of the organization or the negligence of management (the indifference of management considering the issue of safety) can cause an unsafe behavior of the employees. The job environment causes the formation of some behaviors, including safety violations, accident reporting, minor incidents and safety behaviors. Safety behavior is a part of the safety function.[11] Safety performance is attributed to safety behavior[12] and included practical human factors on safety performance, which are the individual factors that may have physical, mental or physical nature. Some of them are typically related to an unchangeable aspect of an individual's personality. However, others are related to skill, attitude, risk perception and motivation that can be improved through actions such as education.[13]

Attitude is considered as a prior preparation to offer positive or negative responses to the world around an individual and it is a mixture of safe thinking and secure efforts resulting from it.[14,15] The safety attitude focuses on the discussion of individual beliefs and feelings toward safety and expresses a sense of commitment and responsibility for the safety issues and reflects the level of individual's beliefs about the rules and procedures of safety, and the processes and methods.[15,16] People's attitudes influence their behavior and actions, indirectly change their behavior, and affect their safety culture, simultaneously.[17] Determining the type of attitude toward safety in a system is an essential predictor of risky behaviors that can affect the probability of events occurrence.[18,19] Therefore, given the importance and role of safety performance in maintaining the safety of the organization and the necessity of establishing a safety culture, a safe working environment can be achieved by determining the safety attitudes of individuals as well as evaluating their safety performance in which they have taken the necessary measures to develop

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safety. Thus, the present study aimed to investigate the relationship between attitude and safety performance among employees of the cement factory.

Methods

The present research is sectional analytical research, which was conducted among employees of the cement factory in the south of Iran in 2018. The cement factory is located in Fars Province. The population of this study is all of the employees of this factory (186 employees). The sample size is determined according to the Cochran formula as 125, and 150 questionnaires were distributed in all units with a systematic random method. Finally, 130 questionnaires were returned. The respondents were all male, and their level of education was different from diploma to master degree.

Measurement tools

The data were collected through three questionnaires (demographic information, safety attitude and safety performance). Demographic information is about age, work experience, education, marital status, number of safety training and number of occupational accidents. The validity of the safety performance questionnaire was measured in the Khaleghi Nejad's[20] study using the average variance (AVE). Menger et al. found that the amount of variance was extracted from 0.4 to higher, which was more than 0.7, according to formula 1.

$$AVE=\frac{\sum\lambda 2}{\sum\lambda 2+\sum var(\varepsilon)} \quad (1)$$

The safety performance questionnaire consists of 7 questions embedded in two parts of safety compliance and safety participation. Each question was graded on a full five-point Likert scale (5), including agree (4), half-agree (3), disagree (2), and fully agree (1). The researcher's questionnaire consisted of 21 questions that investigate the overall attitude toward safety, safety priority in carrying out tasks, and safety communications. Each question is based on a five-point Likert scale, including completely agree, agree, indifferent, disagree, totally disagree. The 8 number panel approved the content validity of the safety attitude questionnaire of experts, and a group of industry experts (CVR:0.79 و CVI:0.85). Its reliability was calculated by Cronbach's alpha factor of 0.91 in the way that 30 workers completed the questionnaire twice in two weeks. The data analysis was carried out through the SPSS software version 24 by using Kruskal–Wallis tests and Mann–Whitney U test.

Results

In the present analytical study, 53.1% of people aged less than 30 years, 37.7% of them had a master's degree, all of them were male, 53.1% of the workers had a work experience of 5 to 9 years, and 74% of the participants had no history of an incident. Other demographic information of 130 participan ts in the study is shown in Table1.

In the current study, 83.3% of the respondents had at least one training class on job safety, and %7.7 of the respondents did not receive any training. The data analysis showed that the average safety attitude was equal to 3.85(0.28), and the average of the safety performance was, 4.11(0.60) which is reported in Table 3.

Table 1. Demographic information of participants in the study

	Demographic factor	Number	Percent
Age range (years)	Less than 30	69	53.1
	31-35	43	33.1
	36-40	9	6.9
	More than 40	9	6.9
Education level	High school	4	30.0
	Associate	39	23.1
	Bachelor	49	37.7
	Master	8	6.2
Work experience (years)	Less than 5	41	31.5
	5-9	69	53.1
	10-14	15	11.5
	More than 15	5	3.8
History of incident	74.6	97	00.
	21.5	28	1.0
	1.5	2	2.0
	0.8	1	3.0
	1.5	2	4.0

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Table 2. The number and percentage of training classes held for personnel participating in the study

Education	Number	Percent
0	10	7.7
1	34	26.2
2	32	24.6
3	16	12.3
4	13	10.0
5	14	10.8
6	3	2.3
7	2	1.5
8	1	0.8
9	2	1.5
10	1	0.8
11	1	0.8
12	1	0.8

Table 3. The mean and standard deviation of performance and safety attitudes of participants in the study

	Safety performance	Safety attitudes
Mean	4.11	3.85
Standard deviation	0.60	0.28
Number	130	130

Table 4. Age relation with each of the factors of performance and occupational attitude

Age(years)		Safety performance	Safety attitudes
Less than 30	Mean	4.06	3.86
	Standard deviation	0.64	0.28
31-35	Mean	4.09	3.79
	Standard deviation	0.55	0.28
36-40	Mean	4.49	3.95
	Standard deviation	0.51	0.29
More than 40	Mean	4.19	3.93
	Standard deviation	0.56	0.15
Total	Mean	4.11	3.85
	Standard deviation	0.60	0.28

Table 5. Relationship of education with each of the performance factors and safety attitudes

Level of education		Performance	Attitudes
High school	Mean	4.67	4.03
	Standard deviation	0.37	0.19
Associate	Mean	4.20	3.89
	Standard deviation	0.63	0.30
Bachelor	Mean	3.93	3.87
	Standard deviation	0.56	0.25
Masters and higher	Mean	4.08	3.79
	Standard deviation	0.61	0.29
Total	Mean	4.11	3.85
	Standard deviation	0.60	0.28

Table 6. Relationship of work experience with safety performance and safety attitudes

Work experience (year)		Safety performance	Safety attitudes
Less than 5	Mean	4.20	3.82
	Standard deviation	0.59	0.29
5-9	Mean	4.05	3.85
	Standard deviation	0.64	0.26
10-14	Mean	4.08	3.90
	Standard deviation	0.53	0.33
More than 15	Mean	4.34	3.96
	Standard deviation	0.07	0.15
Total	Mean	4.11	3.85
	Standard deviation	0.60	0.28

The average performance and job attitude of the employees of the cement company in terms of the age group were 3.85 and 4.11, respectively. The average performance score and attitude among employees in terms of the age group showed that individuals in the age group of 36 to 40 years had the highest average score and standard deviation of 3.95(0.29) and 4.49(0.51), respectively. Also, the age group of fewer than 30 years indicated the lowest average and deviation of performance and attitude.

According to Table 5, the average performance and job attitude of employees in terms of education are 4.11 and 3.85, respectively. The lowest average safety performance among employees was obtained by undergraduates (3.93), and the highest average of safety performance was among employees with a diploma. The lowest average concerning safety attitude in the employees was obtained with master and higher education (3.79) and the highest average of safety attitude was in employees with a diploma (4.07)

According to Table 6, the average performance and job attitude of employees in terms of work experience are 4.11 and 3.85, respectively. The lowest average safety performance was observed among employees with a work experience of 5 to 9 years (4.05), and the highest average safety performance was seen among employees with work experience of more than 15 years (4.34). The lowest average safety attitude was found in employees with work experience of fewer than 5 years (3.82), and the highest average safety

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attitude was seen in employees with work experience of more than 15 years (3.96).

There was no significant relationship between the level of safety and age (P=0.32), the degree of education (P=0.36), work experience (P=0.52), the number of incidents (P=0.47), and the level of education (P=0.37). On the other hand, the safety attitude has a direct relationship with safety performance with a coefficient of 0.27 P= (0.001).

Discussion

Safety attitudes and safety performance of a workplace environment can affect the organization's occupational safety and its health system. By determining the weak dimensions of safety attitudes, some effective interventions could be taken into action.[16] In this study, a direct and significant relationship was found between safety attitude and safety performance, which indicates the importance of safety attitude and its contributing factors. In 2000, Zohar found a significant relationship between safety climate and safe behavior (safe behavior percentage). Improvement in the safety climate can lead to an increase in the percentage of treated behavior and reduce the frequency of accidents occurrence and their intensity.[21] There was no significant relationship between the attitude of safety and age, education, number of training classes, history of incidents and work experience. Zare, in his study, surveyed the safety climate and concluded that there was no significant relationship between any of the safety climate factors and age.[22]

In the study of Shokoohi et al., there was no significant relationship between age and safety.[21] On the other hand, Mahmoudi stated that having science and knowledge does not lead to worthy performance. However, it has to establish the foundation of profound beliefs to show proper functioning.[22] In the present study, there was no clear correlation between the safety attitude and work experience factor that matches with the result of the Shirali and Monazam's study .[23,24] In this study, no significant relationship between the number of training classes and attitude of individuals was observed. Jahangiri reached a similar conclusion regarding the inefficiency of the training courses.[25] In this study, the age group of fewer than 30 years had the lowest performance scores and safety attitudes. This factor can be attributed to a variety of reasons, such as limited experience, neglecting safety issues and personal protection. On the contrary, the highest point of attitude and safety performance in people with a diploma has been observed, indicating the lack of a significant relationship between education and attitude and performance. In other studies, the low level of education is a factor for the increase in accidents.[26- 2^]

Conclusion

The result of this study demonstrated a significant relationship between the safety attitude and the safety performance of the operational staff. By increasing safety performance among the operational staff, the safety attitude will be increased. So, it can be concluded that individual variables such as age, education and work experience have little effect on safety attitude. In other words, workers do not develop a safety attitude in the workplace; instead, the management creates an organizational attitude in the workplace. However, using safety attitude as a preventative indicator in assessing the performance of the safety management system along with other quantitative indicators such as the rate of incidence and its severity could make the management capable of taking appropriate measures to improve the level of safety and as a result, reducing occupational accidents.

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Conflict of interests

There is no conflict of interests among the authors of the article.

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