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Original Article

Evaluation of Knowledge, Attitude and Behavior of Workers towards Occupational Health and Safety

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Abstract

Background: Studies show that about 90% of accidents occur because of unsafe behavior and human errors. Even if workers do not have the right knowledge, attitude and behavior toward safety measures in a safe workplace, all efforts for an accident-free workplace will be in vain. This study aims to determine the level of knowledge, attitude and behavior of workers toward occupational health and safety.

Methods: This descriptive cross-sectional study was carried out on workers in Mahshahr Razy Petrochemical Complexm Ahwaz, Iran. A sample size of 210 was randomly selected. Data collection tool was a researcher-made questionnaire. Questionnaire's validity was gained by content-validity and its reliability was validated by Kronbach's alpha. Data was analyzed using SPSS 13.

Results: Mean age of workers was 31.1 years. The mean of their knowledge, attitude and behavior was reported 26.02, 153.18 and 36, respectively. 52.9% of workers had low, 36.7% moderate and 10.5% high level of knowledge. In addition, 75.7% of the subjects had a positive attitude towards occupational health and safety; 30% of workers had low safety behavior and 70% had safe behavior. The mean of knowledge grade shows a significant relationship with education level. A same relationship was reported for the mean of attitudes and behavior with age.

Conclusion: Managers should design and implement educational interventions to promote knowledge, attitude and safe behaviors of workers.

Keywords: *Knowledge, Attitude, Safe behavior, Unsafe behavior, Workers, Iran*

Introduction

Up until 1931, safety experts stressed prevention of occupational accidents in physical ways such as fencing machinery and conducting safety inspection. They believed that unsafe conditions play the most important role in these accidents, so they did their best to remove the physical hazards at workplace. Later, Heinrich brought up a theory indicating that the most important factor in industrial accidents is unsafe behavior. He suggests that for every 330 unsafe acts, 29 will result in minor injuries and one in a major or lost time incident. Other studies confirmed his theory and made experts to focus on people as the causing agent of accidents, considering if workplace is safe, all health and safety measures may fail if workers do not have the right knowledge, attitude and behavior toward health and safety of the workplace (1-2).

Studies in industrial countries reveal that the causing agent of 90% of workplace accidents is human error and only 10% of those belong to unsuitable workplace and equipment (3). Human factor includes lack of knowledge, lack of interest, negative attitude, unsafe behavior and incompetence. Lack of interest is among the most important factors that fail health promotion plans at workplace. Planned education is necessary to change the attitude of some workers from risky behavior to safe behavior, so that they observe safety regulations in order to develop safe behavior (4-8). Necessary elements to develop safe be-

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havior are knowledge and attitude of workers about safety, which allows designing safety plans special for that environment (9). A study showed that despite high rate of workers' knowledge [78-100%], a few of them [29-31%] used personal protective equipment to prevent occupational hazards (10).

Since there has been no research on knowledge, attitude and behavior of workers towards safety and health at chemical plants, and considering the fact that such factors may reduce accidents, we conducted this study to evaluate the level of knowledge, attitude and behavior of workers toward safety and health.

This study aimed to determine the level of knowledge, attitude and behavior of workers toward occupational health and safety in Mahshahr Razy Petrochemical Complex, Ahwaz, Iran. It has over 3200 workers and is one of the largest producers of nitrite, phosphate, urea fertilizers ammonium, sulfuric acid and sulfur. It is also the only producer of phosphoric acid and di-ammonium phosphate fertilizer in Iran.

Material and Methods

The research was a cross-sectional descriptive study. The sample size of 210 was randomly selected. To collect data, we used a researcher- made questionnaire. The questionnaire contained demographic data including age, level of education, position, marital status; 19 questions regarding knowledge consisting knowledge about safe behavior, control of cold, heat, humidity, light, vibration, dust, radiation, manual transportation, noise, gases, chemical vapors; 38 questions regarding safe attitude and 11 questions regarding safe behavior. To study safe behavior of workers, self-report method was used. The validity of the researcher-made questionnaire was checked using content-validity and 12-expert panel. Reliability was gained by test- retest for knowledge questionnaire, and internal consistency for attitude and safe behavior through a sample of 30 workers as pilot. The reliability of the knowledge questionnaire with r= 0.73, attitude scale, and behavior was reported 0.849 and 0.759 respectively, Kronbach's alpha. Data collection was carried out using trained staff and interviews. The mean of knowledge's grade in three different levels; low [0-25], middle [26-37], and high [38-50], the mean of attitude's grade in three different levels; low [38-114], middle [115-152], and positive [153-190], and the mean of behavior's grade in two different levels; unsafe [17-33] and safe [34-44] were been categorized.

Final score was calculated by adding up scores of knowledge, attitude and behavior. ANOVA test was used to compare scores in different age and education level groups. The difference between every group was studied using Tukey. The correlation between every group was studied using pearson and spearman.

Results

The frequency of most important variables such as age, levels of education, level of knowledge, attitudes and behaviors of workers has been shown in Table One. Despite reporting of sound work conditions and existed equipments 69.6 and 70.5% respectively, in doing safe behaviors, 30% of workers practices unsafe (Table 1).

There was a significant relation between level of knowledge and level of education ($P< 0.001$). Tukey test showed meaningful difference in level of knowledge between workers with higher education and workers with low or no education. Table 2 shows the relevant data. The pearson and spearman correlation, was used to examine the relation between knowledge and educational level with attitude and safe behaviors, however, no correlation was reported.

Table 3 contains mean safety attitude score of workers in different age groups. As shown in the table, there was a significant difference in safety attitudes ($P< 0.013$) between different age groups indicating that as workers get older, their mean safety attitude score increases. Tukey test found meaningful difference in this regard between workers at the age group of 35 and over. A statistically significant relationship was seen, how-

ever, between attitude and job duration (Table 4). The pearson correlation, was used to examine the relation between attitudes and safe behaviors. The result show a positive correlation between the two factors (r= 0.57, *P*= 0.000).

Workers' safe behavior also changed with age (*P*< 0.005). Tukey test showed a significant difference in group 20-24 and workers of age groups 30-34, 35 and over (Table 5).

Table 6 showed the mean safe behavior score of workers based on their work hour per week a significant difference (*P*< 0.007). Tukey test showed a meaningful difference in safe behaviors of workers who worked 44 h per week and those who worked 80 h or more.

Table 1: Frequency distribution of workers by age groups, level of education, knowledge, attitude, and behavior

Variables	Groups	n	%
Age(yr)	20-24	27	12.9
	25-29	81	38.6
	30-34	55	26.2
	+35	47	22.4
	sum	210	100
Level of Education	Illiterate/elementary education	31	14.8
	Mid-school	40	19
	High-school drop-out	30	14.3
	High-school diploma	81	38.6
	Higher education	28	13.3
	sum	210	100
Knowledge	Low	111	52.9
	Middle	77	36.7
	High	22	10.5
Attitude	Low	1	0.5
	Middle	50	23.8
	positive	159	75.7
Behavior	Safe	147	70
	Unsafe	63	30

Table 2: Comparison of mean scores of workers' knowledge based on their level of education

Knowledge / Level of education	n	Mean	SD	Test
Illiterate/elementary education	31	22.35	1.49	
Mid-school	40	23.77	1.1	ANOVA F(4, 205)= 5.08 *P*=0.001
High-school drop-out	30	25.73	1.4	
High-school diploma	81	27.2	0.87	
Higher education	28	30.25	1.57	
total	210	26.02	0.56	

Table 3: Comparison of mean scores of workers' attitude based on their age

Attitude / Age (yr)	n	Mean	SD	Test
20-24	27	149.3	3.54	
25-29	81	151.47	1.5	ANOVA F(4, 205)= 3.14 *P*= 0.013
30-34	55	152.45	1.8	
35+	47	159.21	2.29	
total	210	153.18	1.03	

Table 4: Comparison of mean scores of workers' attitude based on their job duration

Attitude / Job duration	n	Mean	SD	Test
0-3 (years)	170	152.01	14.47	T-test F(4, 205)= 2.371 *P*= 0.030
3+ (years)	40	157.75	16.74	
Total	210	153.18	1.03	

Table 5: Comparison of mean scores of workers' safe behavior based on their age

Safe behavior / Age	n	Mean	SD	Test
20-24	27	33.26	6.58	
25-29	81	35.7	4.48	ANOVA F(3, 206)= 4.35; *P*= 0.005
30-34	55	36.6	4.42	
35+	47	37.38	5.24	
total	210	36	5.07	

Table 6: Comparison of mean scores of workers' safe behavior based on their work hours per week

Work hour \ Safe behavior	n	Mean	SD	Test
44 hrs per week	23	38.74	4.6	ANOVA F(4, 205)=3.66; *P*= 0.007
45-59 hrs per week	41	37.1	5.2	
60-69 hrs per week	61	35.8	4.96	
70-79 hrs per week	49	35.39	5.04	
80+ hrs per week	36	34.2	4.56	
total	210	36	5.07	

Discussion

Over 50% of workers were under 30 yr old, which shows that the participants were mostly young. The study by American National Institute of Health reveals that 50% of occupational accidents occur in workers younger than 25 yr old. Also 42% of deaths at workplace happen in age group of 25-44 yr old (6). Young workers are at higher risk, due to the different reasons such as having fewer experiences, less training, curiosity and risk taking (11). Therefore, planning for increasing their level of knowledge, attitude and safe behavior can decrease workplace accidents and improve workers' health in different aspects.

The mean level of knowledge regarding occupational health and safety in the study group is not acceptable. Since mean level of knowledge in 52.9% of workers is low, in 36.7% is average and in just 10.5% is good, there should be suitable planning to increase workers' level of knowledge about workplace health and safety. In the present study, in spite of a significant relationship between knowledge and educational level of the workers, no statistically significant relation was reported between knowledge with attitude and safe behaviors. This result indicated that level of education or knowledge alone, will not lead to positive attitudes or safe behaviors. That is; to promote safety culture, we need to design and specific educational programs which consider the characteristics of workers and their workplace conditions.

Mean attitude of workers regarding workplace health and safety is acceptable. In this study, by increasing the age of workers, their attitudes have been increased. In addition, based on the *t*-test, a statistical significant difference has been seen between attitudes and job duration. That is; workers with having more than three year duration, had more positive attitudes than others with lower durations. Reviewing of 244 studies conducted in different organizations and factories regarding workplace safety and health in Ireland reveal that workers at offices had positive attitude (12). In our study, there was a significant relation between workers' age and their mean attitude score. Older workers have more positive attitude in comparison to younger ones. A same relation between age and attitude was found in a similar study (13). Another positive relation between safe attitudes and workers' safe behavior was reported (14).

Mean score of safe behavior 30% of workers in not suitable, which can cause more occupational accidents. Studies show unsafe behavior increases probability of small and big accidents (2).

The findings of this study show the meaningful relation between workers' age and mean score of their safe behavior, that is, safe behavior increased with age. Using a safety attitude questionnaire, it was reported that there is a significant relation between safety attitude and age, in a way that increasing age causes more positive attitude (15).This correlation confirms the fact that older people work more cautiously.

Comparison of mean scores of safe behavior based on work hours in a week shows that workers who work regular hours have safer behavior than those who work more than standard hours. It is indicated in another study that 31% of accidents occur because of work pressure (16).

In general, it can be concluded that it is of highest importance to educate workers regarding the fact that 52.9% of them had low level of knowledge about occupational health and safety. Instructing workers about the safety regulations and environmental hazards reduces workers' unsafe behavior. To do so, model workers should be selected to incite more enthusiasm among them and to sustain such behavior.

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The authors declare that there is no conflict of interests.

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