

# The Relationship between the Worker's Safety Attitude and the Registered Accidents

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## Abstract

**Background:** Millions of workers are the victims of different kinds of accidents every year throughout the world. The purpose of this study was to investigate the relationships between safety attitude and occurrence of the occupational accidents.

**Methods:** This investigation was a cross-sectional study performed in a gas refinery in south of Iran in 2008. Sample size of this study was 176 people. To determine the value of worker's safety attitude a validated 5 degrees questionnaire was used. Different statistic analyses including Chi-square, t-test and Logistic Regression were used by Spss11.5 to analyze the data. The Cronbachs alpha coefficient was found to be 0.97 in this investigation.

**Results:** In the study population, the average age was 31.67(+/- 5.89), the average work experience was 5.65 (+/- 4.29) and the average of the safety attitude was 188.52(+/- 14.84) and only 28.7% were injured through accidents. The relationship between safety attitude of the workers and the accidents occurred was significant ( $P < 0.0001$ ).

**Conclusion:** The relationship between safety attitude of the workers and the accidents occurred was significant, although the relation was not significant for graduate workers. No significant relationship was found between safety attitude and accident in accordance with worker's age and work experience.

**Keywords:** Safety attitude, Accident, Gas refinery, Unsafe behavior

## Introduction

An accident according to international labor office definition is an unpredictable and an unexpected happening, which causes damage and injury (1). Every year 120 million accidents happen all around the world which leads to the death of hundreds of thousands of people and the injury of millions (2-4). Though the registered number of accidents in Iran cannot be a faultless account of all the accidents happened, but in 2000 about 12000 work related accidents have been registered by the department of social security (2). Now considering the fact that only a small percentage of our industry is given insurance services, we can estimate the extent of the damages as millions of dollars.

According to Heinrich's classification of the factors causing the accidents (3), they are generally the result of unsafe behaviors which themselves are the result of either unsafe attitudes or a poor safety outlook (4-7). Investigation of the safety attitude has been the subject of discussion in industrial countries since 1970s (7, 10-12). All the conducted studies show that if an industrial unit has a positive attitude; it will have the highest number of production and at the same time the least number of work related accidents (5, 6, 8, 9, 13).

Taking into account the important role that safety attitude plays in the accidents (either occupational or non-occupational) (6,8,9), and the huge damages they bring in to the body of the society, this study is concerning

the matter, in hoping to draw the attentions for improving the situation of the most influential elements of the society; its working class. Work related accidents in oil and gas industries is very important (5, 10, 11, 14) in Iran as a second gas producer in the world, this is why using our scientific sources we decided to conduct a complete research on the state of safety attitude and its relationship with job accidents throughout a year in an Iranian gas refinery. In addition, to help in moving towards the reduction of costs caused by accidents, lack of manpower and above all help the growth of economy in the society.

## Material and Methods

This investigation was a cross-sectional study performed in a gas refinery in south of Iran in 2008. Sample size of study population was 176 people. In order to obtain a better view of the worker's safety attitude, a questionnaire, which has already been adopted with the cultural and social state of Iranian statistic population, was used (15, 16). Thus based on previous validated works and especially the studies conducted in Iran (2, 17), a questionnaire containing 10 demographic characteristics such as age, work experience, educational degree, marital status, safety and health education, was created. The questionnaire was also included questions regarding eliciting safety, sociological, psychological, economic and cultural information (18, 19). The questionnaire had 40 questions and was prepared by following the Eckert 5 degrees method, which was filled by the respondents (20). Therefore, the range of safety attitude was set to be between 40 and 200. The Reliability of the questionnaire was firstly investigated by testing on 30 workers and a significant Cronbach alpha coefficient was achieved ( $\alpha = 0.97$ ). The study population was all the refinery workers, which was 176 people at the time of this study.

After the completion of the questionnaires, workers were divided in groups of 15 according to the type of their tasks and in a period of two months, the aims of the study, stages of the work and the points that were vague to the workers were entirely analyzed. The analysis of the data from the questionnaires was done using Chi-square, *t*-test and Logistic Regression.

## Results

The descriptive analysis of the data showed that all the workers were secondary school graduates and above. 73.3% of workers were married and 11.4% of them were tenants. It was also found that 67% of the workers were adequately educated with health and safety issues, and only 28.7% were injured through accidents. In our study population, the average age was 31.67 ( $\pm 5.89$ ), the average work experience was 5.65 ( $\pm 4.29$ ) and the average of the safety attitude was 188.52 ( $\pm 14.84$ ).

The safety attitude and the accidents occurred were significantly related ( $P < 0.0001$ ), and with increasing the safety attitude, the number of accidents were reduced. In the Logistic Regression analysis of the age and attitude variables with accidents, the age variable did not position itself in the model ( $P > 0.055$ ). Similarly this lack of relation was true about work experience ( $P > 0.13$ ). The relationship between attitude and accident was significant for both technician workers ( $P < 0.001$ ) and secondary school graduates ( $P < 0.012$ ). However, the relationship was not significant for BA employees. Moreover satisfaction of the workers with both their income and work condition had a direct relation with the registered accident, in this case safety attitudes and accidents had a significant relationship in unsatisfied and partly satisfied employees ( $P < 0.001$ ). The statistical data achieved for three variables including age, work experi-

ence and safety attitude are listed in Table 1. The results of statistical analysis for the relationship between worker's safety attitude and registered accidents also showed that relation of accident occurrence in people with low attitude (attitude of under 190) was more than twice (Accident happened:

73.5%, No accident: 30.7%) ( $P < 0.001$ ). The regression analysis for the relationship between accident and safety attitude of workers according to their age and work experience was respectively Age: CI(0.6-0.34), OR(0.15), Work experience: CI(0.073-0.34), OR (0.158).

**Table 1:** Average and standard deviation for age, work experience and safety attitudes of workers

| Variable        | Sample number | Average | Standard Deviation | Min | Max |
|-----------------|---------------|---------|--------------------|-----|-----|
| Age (yr)        | 176           | 31.68   | 5.89               | 24  | 50  |
| Work experience | 176           | 5.65    | 4.29               | 1   | 26  |
| Safety attitude | 176           | 188.52  | 14.84              | 156 | 200 |

## Discussion

To investigate the relationship between safety attitude and registered accident among the workers of an Iranian gas refinery, the abundance of classifications was shown through numbers, which were categorized into safety attitudes below and over 190. The results of the study were consistent with the findings of previous studies in which increasing the safety attitude will decrease the number of accidents (2,10-12,15). This can be explained by the direct relation of safety attitude and safety behavior.

In this study, 69.3% of the workers with safety attitude above 190 had not experienced any accident. The results show it is possible to decrease the number of accident by increasing the safety attitude of the workers. In fact, this is achieved by improving the safety behavior of the workers, which is itself the result of safety attitude enhancement. We can also interpret our findings as those who have a higher attitude, less frequently engage themselves in unsafe behaviors. The interesting result is insignificant relationship between age and accident in this study, which can be interpreted by variety of accidents facing by workers in different stages of their working life, this is why this findings is not consistency with the result of previous studies in Iran (2) and other countries (5, 6, 8-13).

The relationship between safety attitude and accident was significant with regard to the level of education for secondary school graduates and technician employees. The reason can be the big number of samples in this category in comparison with BAs and their superior work experience.

Although accident and attitude had insignificant relationship with regard to marital status in other studies (2, 6, 7, 10), married employees had significantly higher safety attitudes and fewer accidents in this study. This conclusion, of course, can be the result of married employees having more of the feeling of responsibility. Direct relationship between accident and attitude with monetary persuasive for safety acts can be interpret that worker's financial attitude is a priority to human attitude. This study showed that safety attitude and occupational accidents has reverse relationship together, because occupational accidents occurrence is decreased with increasing of workers safety attitude.

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