

# The Relationship between Workers' Safety Attitudes and Their Beliefs in Destiny, Chance and the Rule of Control Measures in Prevention of Tunneling Accidents

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## ABSTRACT

**Background:** The implementation of HSE controlling programs are so complicated in tunneling industries which are considered as one of the hazardous industries. This study aims at investigating the relationship between employees' safety attitudes and status of their belief in destiny, chance and perceived importance of HSE programs in prevention of occupational accidents.

**Methods:** This research is a cross-sectional and descriptive-analytical study on a contracting company specialized in tunneling, and investigates 760 subjects. A standard 25-item questionnaire is used to assess safety attitude and three researcher-made questions are utilized to evaluate the subjects' belief in destiny, chance and perceived importance of HSE programs in prevention of occupational accidents. The reliability and validity of these questionnaire are obtained by Cronbach's alpha test ( $\alpha=0.76$ ). All analyses are done at the significance level of 0.05 by the help of SPSS 16 software.

**Results:** There is a significant statistical correlation between belief in chance in occurrence of occupational accidents with subjects' safety attitudes (P-value<0.05 and  $r=0.76$ ), and also between belief in absolute destiny in occurrence of occupational accidents (P-value<0.05 and  $r=0.59$ ). Furthermore, there is a significant direct correlation between status of acceptance and perceived importance of HSE programs in reducing the occupational accidents with subjects' safety attitudes (P-value<0.01 and  $r=0.51$ ), and also between belief in chance in occurrence of occupational accidents (P-value<0.05 and  $r=0.68$ ).

**Conclusion:** The employees, who consider factors such as chance and destiny as the only reasons for occurrence of occupational accidents have less belief in importance of controlling measures in accidents prevention.

**KEYWORDS:** *Safety attitude, Belief, Accident prevention, Tunneling projects*

## INTRODUCTION

In recent years, tunneling projects are growing in Iran. There were 315 tunneling projects in construction and 233 in study phases in Iran in

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2014 [1-2]. Accidents and the resulting injuries cause major economic losses which are considerable in developing countries. These accidents incur \$230 million in developing

countries compared to \$36 million in developed countries [3-4].

In a case study related to estimation of economic losses of occupational accidents in Iran construction industries in 2012, tunneling projects as a part of these industries, it had been cleared that the total cost of accidents were US\$ 32000 (958120580 Iranian Rials) [5]. Many of mentioned accidents are avoidable by applying effective safety rules and measures in the workplaces [3, 6].

In addition to this, safety is a multi-layer activity and integrates different interventions in the fields to manage the risks. Accidents are rooted in many factors such as unsafe acts and unsafe conditions [7- 8].

The attitude has a significant effect on peoples' behaviors and acts [9]. The unsafe acts are created due to the negative or weak attitudes, inadequate knowledge and skills, and inappropriate working conditions [10-11]. Worker' positive safety attitudes could reduce their unsafe acts [12]. Determination of safety attitude in an organization is a key predictor for anticipation of unreliable behaviors and could be helpful in prevention of accidents [13-14].

The safety attitude shows the individual beliefs and emotions about safety, expresses the individual sense of commitment to safety issues, reflects the level of personal beliefs about safety rules and regulations, processes and methods [13, 15].

Occupational safety in a company could be evaluated in different ways. Safety attitude questionnaires, which investigate the employees' point of views on safety, are one of the most important methods for measuring the safety status of organizations [16-18].

Some people believe that they do not have any role in occurrence of accidents and their destiny was written, therefore it is unchangeable [19-20]. Accordingly, all organization attempts for controlling workplace hazards, were not effective so be informed about these point of views are very vital and the acquired data could be applied in decision-making process for safety control measures.

According to the researchers' surveys, up to now, there had not been any specific study which investigates the relation between attitudes and destiny or chance and the role of Health, Safety and Environment (HSE) measures on accidents prevention in tunneling industries.

According to the above mentioned reasons and formal census about growing the

tunneling activities in Iran and the large numbers of accidents in these industries, the researchers decided to pay attention to these subjects in the workplaces.

The main purpose of this study was determination of relationship between workers safety attitudes and their beliefs in destiny and chance and the rule of HSE control measures in prevention of tunneling accidents.

## MATERIALS AND METHODS

Since there is not any conducted research on employees' safety attitude and its relationship with status of belief in destiny in occurrence of occupational accidents and accepted importance of safety programs in tunneling projects, this research, which is a cross-sectional and descriptive-analytical research, investigated a specialized contracting company active in tunneling. A total of 1640 people were working at the headquarters of company and all its active projects (including 8 tunneling projects: 4 mechanized drilling projects and 4 traditional drilling projects) in a total of 9 workplaces. From this number, 1153 subjects were eligible according to census and taking into account the inclusion criteria (those with experiences of more than 12 months in tunneling industry). In this regard, the employees who were enrolled were taken informed consent and finally 760 male subjects participated in this study. In order to collect reliable data, the workers were invited to sessions and put into groups of 4-5 subjects, and then the questionnaires were distributed, responded and collected after guiding the respondents.

All analyses were done at significant level of 0.05 by the help of SPSS 16 software (Chicago, IL, USA). The questionnaire had three sections:

**First section:** 11 demographic questions which examined the nature and type of operation, age, weight, height, education, marital status, amount of sleep per day, job satisfaction, second job, occupational accident experience and work experience.

**Second section:** 25 questions about safety attitude.

**Third section:** 3 questions about individual's status of belief in destiny, chance and also their view on the preventive role of HSE programs in occupational accidents.

**Equation 1:**

$$M = \frac{5K + 1K}{2} = 75$$

In Equation 1, M is the mean scale and K is the number of questions.

The third questionnaire section, which had three questions, was designed based on the research objectives. The validity of these three questions was obtained from face validity and content test. These questions were sent to 10 experts after initial design and their recommendations were applied. The reliability of these questions was examined by test-retest. The questions were distributed in 2 weeks and between 50 workers. The scores were calculated and reliability was determined between two periods. The questions reliability were obtained by Cronbach's alpha test  $\alpha=0.76$ . The three questions were as follows:

1- The belief in destiny and absolute determinism in occurrence of occupational accidents:

**Question 1:** The people destiny is a determinant of occupational accident occurrence; hence, will I be able to prevent an accident if it is written in my destiny?

2- Chance is a key factor in occurrence of occupational accidents:

**Question 2:** The people's chance is a determinant of occupational accident occurrence; hence, will the unlucky people experience occupational accidents?

3- Status of acceptance and understanding the importance of HSE programs to reduce accidents:

**Question 3:** Are the HSE control programs unnecessary and unimportant for reducing the occupational accidents?

The answers to three questions above included a 5-point Likert scale (strongly disagree-disagree- no idea- agree- and strongly agree) and they received the scores of 5, 4, 3, 2 and 1 respectively from right to left. According to Table 1, the result of each question ranged from 1 to 5 in which the score 1 was undesirable and score 5 was desirable according to HSE.

Finally, according to statistical distribution, the mean score less than 50% for each question had a weak total score and the scores from 50 and 75 percent were moderate and those higher than 75 percent were good.

In other words, the mean of high and desirable scores is  $3.75 < M \leq 5$ , the mean of normal and moderate scores is  $2.5 < M \leq 3.75$ , and then the mean of weak scores is  $1 \leq M \leq 2.5$  which respectively indicate the people's better acceptance of HSE programs, the peoples' ordinary acceptance, and finally the weak and unsatisfactory acceptance of HSE programs.

## RESULTS

Overall, 760 of 1153 subjects, who were eligible for study, participated in this research (participation rate of 65.92%) . 34.87% of them were less than 35 years old, and 45.53% were at the range of 36 to 50 years, and 55% had under ten years of work experience in tunneling. 57.24% were working in traditional tunneling (blasting and shovel). The mean score of safety attitude was 76.46. Table 2 indicates the participants' demographical information as well as the mean and standard deviation of safety attitude scores for each demographical variable along with statistical t-test and ANOVA. According to this table, there was a significant relationship between the type of nature and operation, educational level, job satisfaction, and second job situation with safety attitude in subjects ( $P$ -value $<0.05$ ). Furthermore, there was not any significant relationship between subjects' safety attitude and demographic variables such as age, work experience, marital status, body mass index and amount of sleep per day (h).

Table 3 represents the impact of mean scores of belief in destiny; chance and HSE control measures on final score of safety attitude according to Pearson statistical test and correlation coefficient. According to this table, there was a significant direct relationship between status of belief in chance in occurrence of occupational accidents with individual safety attitude ( $P$ -value $<0.05$  and  $r = 0.76$ ), and with status of belief in absolute destiny in occurrence of occupational accidents ( $P$ -value $<0.05$  and  $r = 0.5$ ). Furthermore, there was a significant positive relationship between the status of acceptance and understanding the importance of HSE control programs in reducing the occupational accidents with individual safety attitude ( $P$ -value $<0.01$  and  $r = 0.51$ ) and also with status of belief in chance in occurrence of occupational accidents ( $P$ -value $<0.05$  and  $r = 0.68$ ), but there was not any significant relationship between status of belief in destiny in occurrence of occupational accidents with safety attitude in people and also with acceptance and understanding the importance of HSE control programs ( $P$ -value $>0.05$ ).

Moreover, the mean score of belief in chance in occurrence of occupational accidents ( $2.35 \pm 0.84$ ) was at the worst situation and undesirable, but the mean score of belief in destiny in occurrence of occupational accidents ( $3.08 \pm 0.96$ ) was at normal range, and the mean score of accepting and understanding the importance of HSE programs in reducing the occupational accidents ( $3.87 \pm 0.92$ ) was ideal. Therefore, there was a significant relationship between the belief in chance in occurrence of occupational accidents ( $P$ -value $=0.035$ ) and acceptance and understanding the importance of HSE control programs in reducing the occupational

accidents (P-value=0.001) with individuals' safety attitude.

Table 4 represents the classification of individuals' safety attitudes in percentage based on

the status of belief in destiny, chance and HSE control programs in occurrence of occupational accidents and their relationship with each other according to chi-square test.

**Table 1.** Interpretation of individual believe in destiny, chance and accepting the HSE programs in reducing the occurrence of occupational accidents, and the methods for scoring

| Mean score          | Result             | Belief in occurrence of occupational accidents   | Belief in chance in occurrence of occupational accidents  | Acceptance and understanding the importance of HSE control programs to the reduce occupational accidents |
|---------------------|--------------------|--|---|--|
| $3.75 < M \leq 5$   | Good (Desirable)   | The individual destiny does not play any role in occurrence of occupational accidents; and the main cause of accident should be sought in other factors. | The individual chance does not play any role in occurrence of occupational accidents; and the main cause of accident should be sought in other factors. | HSE control programs play very constructive important roles in reduction of occupational accidents.      |
| $2.5 < M \leq 3.75$ | Moderate (Normal)  | The individual destiny plays a minor role in occurrence of occupational accidents.   | The individual chance plays a minor role in occurrence of occupational accidents.   | HSE control programs play partial roles in reduction of occupational accidents.                          |
| $1 \leq M \leq 2.5$ | Weak (Undesirable) | The occurrence of occupational accidents absolutely depends on the individual destiny.   | The occurrence of occupational accidents absolutely depends on the individual chance.   | Reduction in occupational accidents in not related in any way to HSE control programs                    |

**Table 2.** Frequency distribution of employees in terms of personal and occupational characteristics and the relationship of variables with mean score of safety attitudes (N=689)

| Variables                       | No.                                       | Percentage | Employees' safety attitude |                    | P-value |
|---------------------------------|---|------------|----------------------------|--------------------|---------|
|                                 |   |            | Mean score                 | Standard deviation |         |
| Type of nature and operation    | Traditional tunneling                     | 435        | 24.57                      | 70.02              | 0.045   |
|                                 | Mechanized tunneling                      | 140        | 42.18                      | 76.91              |         |
| Age (years)                     | Staff                                     | 185        | 24.34                      | 93.45              | 0.068   |
|                                 | $35 \geq$                                 | 265        | 34.87                      | 68.29              |         |
|                                 | 36-50                                     | 346        | 45.53                      | 82.95              |         |
|                                 | $51 \leq$                                 | 149        | 19.61                      | 75.52              |         |
| Body mass                       | Low weight (BMI<18.5)                     | 100        | 13.16                      | 77.45              | 0.108   |
|                                 | Normal weight (18.5≤BMI<25)               | 339        | 44.61                      | 81.05              |         |
|                                 | Overweight (25≤BMI<30)                    | 216        | 28.42                      | 70.04              |         |
|                                 | Obesity (BMI≥30)                          | 105        | 13.82                      | 73.25              |         |
| Educational level               | Under diploma                             | 87         | 11.45                      | 69.15              | 0.029   |
|                                 | Diploma                                   | 162        | 21.32                      | 72.91              |         |
|                                 | Academic levels                           | 511        | 67.24                      | 78.50              |         |
| Marital status                  | Single                                    | 160        | 21.05                      | 74.49              | 0.135   |
|                                 | Married                                   | 572        | 75.26                      | 77.06              |         |
|                                 | Other (separation, divorce, spouse death) | 28         | 3.68                       | 74.15              |         |
| Amount of sleep per day (hours) | $8 >$                                     | 286        | 37.63                      | 72.18              | 0.126   |
|                                 | $8 \leq$                                  | 474        | 62.37                      | 78.91              |         |
| Job satisfaction                | Yes (fully)                               | 345        | 45.39                      | 79.82              | 0.038   |
|                                 | To some extent                            | 174        | 22.59                      | 76.15              |         |
|                                 | No (never)                                | 241        | 31.71                      | 71.48              |         |
| Second job status               | Yes                                       | 290        | 38.16                      | 71.59              | 0.021   |
|                                 | No  | 470        | 61.84                      | 79.39              |         |
| Work experience (years)         | $10 \geq$                                 | 418        | 55.00                      | 78.32              | 0.052   |
|                                 | 11-20                                     | 212        | 27.89                      | 75.67              |         |
|                                 | $21 \leq$                                 | 130        | 17.11                      | 70.81              |         |

**Table 3.** Impact of mean score of belief in destiny, chance and HSE control programs on final score of safety attitude according to correlation coefficient analysis

| Variables   | Mean  | Standard deviation | Kind of situation        | 1      | 2     | 3     | 4    |
|---|-------|--------------------|--------------------------|--------|-------|-------|------|
| 1- Employees' safety attitude   | 76.46 | 9.17               | Positive safety attitude | 1.00   |       |       |      |
| 2- Status of belief in destiny in occurrence of occupational accidents  | 3.08  | 0.96               | Medium (normal)          | 0.63   | 1.00  |       |      |
| 3- Status of belief in chance in occurrence of occupational accidents   | 2.35  | 0.84               | Weak (undesirable)       | *0.76  | *0.59 | 1.00  |      |
| 4- Acceptance and understanding the importance of HSE control programs in reducing the occupational accidents | 3.87  | 0.92               | Good (desirable)         | **0.51 | 0.72  | *0.68 | 1.00 |

(\* P value <0.05, \*\* P value <0.01)

**Table 4.** Classification of individual safety attitudes in percentage based on the status of belief in destiny, chance and HSE control programs in occurrence of occupational accidents and their relationship with each other according to chi-square test ( $\chi^2$ )

| Variables  | Status      | Positive safety attitude (percentage of respondents) | Negative safety attitude (percentage of respondents) | Chi-square test ( $\chi^2$ ) | P value |
|--|-------------|--|--|------------------------------|---------|
| Status of belief in destiny in occurrence of occupational accidents  | Desirable   | 21.34  | 6.97   | 34.15                        | 0.078   |
|  | Normal      | 18.14  | 24.82  |                              |         |
|  | Undesirable | 5.66   | 23.08  |                              |         |
| Status of belief in chance in occurrence of occupational accidents   | Desirable   | 30.33  | 6.97   | 52.64                        | 0.035   |
|  | Normal      | 9.87   | 12.34  |                              |         |
|  | Undesirable | 4.93   | 35.56  |                              |         |
| Status of acceptance and understanding the importance of HSE control programs in reducing the occupational accidents | Desirable   | 34.69  | 6.24   | 45.74                        | 0.001   |
|  | Normal      | 7.11   | 12.19  |                              |         |
|  | Undesirable | 3.34   | 36.43  |                              |         |

## DISCUSSION

This study aimed at investigating the relationship between employees' safety attitudes and their beliefs in destiny, chance and understanding the importance of HSE control programs in occurrence of occupational accidents. According to this study, there was not any relationship between individuals' age and work experience with their safety attitudes. These findings conform to the results of other researchers [22-24]. However, it is inconsistent with other [25-29]. Furthermore, Ling Siu et al. reported a significant direct correlation between workers' age and attitude safety [17]; and Hensen found an indirect effect of workers' age on their safety [30]. On the other hand, there was an inverse relationship between individuals' age and safety attitude and age increasing enhances the safety attitude, which is the result of consistency in older workers with risks of workplaces [31].

According to study, the age increasing and work experience cannot be considered as important factors in improving the workers' safety attitude and aging and presence in the workplace (which is associated with increasing the work experience) will not have any effect on workers' positive attitude towards safety.

In this study, there was a significant statistical relationship between individuals'

educational levels and safety attitude (P-value=0.029) and the higher educational levels led to the increased safety attitude scores among workers. This finding was in accordance with some researches [21, 25, 32], but inconsistent with others [23, 28- 29, 33]. The higher educational levels lead to promotion of beliefs and mentality towards safety in the workplace, so that these people will have positive attitudes toward safety.

In this study, the workers who had job satisfaction had positive and higher safety attitudes in comparison with worker who were unsatisfied with their jobs. This statistical relationship was significant (P-value=0.038). According to other studies, people who have job satisfaction and understand desirable organizational justice have higher insight and safety attitude [34-36]. According to studies by Gyekye and Salminen [34], the job satisfaction can predict the rate of accidents through impact on workers' causal attributions. The workers, who were dissatisfied with their jobs, had higher tendencies than their colleagues to use external factors (such as destiny and chance) in order to explain the causes of accidents. Job satisfaction predicts the workplace accidents better than the variables such as health, demographic, psychological and stress variables [37]. Workers with higher job satisfaction follow safety management policies, and thus will be less

encountered with occupational accidents than their unsatisfied colleagues [34]. Furthermore, the inadequate understanding of occupational risk factors, job dissatisfaction, and individual carelessness are among the factors, which cause the occupational accidents [39-40]. People who had negative safety attitude had a sense of dissatisfaction with workplace, their colleagues and managers, and thus they were more vulnerable to accidents in the workplace. In other words, stress plays a mediatory role between safety attitude and rate of accidents. The occupational accidents could be predicted by level of safety attitudes in organizations. These findings could be applied in proactive and reactive safety control measures [41-43].

In this study, there was a significant correlation between second job and safety attitude (P-value=0.021). Those who had a second job had negative safety attitudes in comparison with those without second jobs. The effects of second job on safety attitude and accidents should be more taken into accounts in future studies. This finding could be explained through job dissatisfaction. Tendency to second job could be a sign of dissatisfaction with main job, poor financial conditions, job conflicts, hard work etc. [44].

As it is expected and according to results of present study, it is found that those people, who consider the external factors such as chance and destiny as the effective factors in occurrence of accidents, have negative safety attitudes, and vice versa, those, who think that the HSE control programs, are effective, have positive safety attitudes.

The above issues were studied in others researches. False beliefs between employees and employers could lead to lack commitment to safety regulations and procedures such as usage of personal protective equipment [45].

There was a significant statistical correlation between occupational accidents and peoples' beliefs in destiny. These people accept that accidents are unavoidable therefore; preventive actions are not useful [46]. Accident rates are significantly related to people beliefs toward chance and destiny [31].

## CONCLUSION

The employees, who consider factors such as chance and destiny as the only reasons for occurrence of occupational accidents have less belief in importance of controlling measures in accidents. The compulsion-oriented people are more forced with accidents. The role of employees' belief in destiny and chance is very important and decisive in their safety attitude; and all these cases ultimately affect the individual acceptance and cooperation with HSE departments measures in

companies to implement preventive programs It is noteworthy that safety trainings and educations could have undeniable effect on correction of workers and managers beliefs and then their safety attitudes.

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## REFERENCES

1. Statistical Center Of Iran. <https://www.amar.org.ir/english/Statistics-by-Topic/Mining>. 2015.
2. norzadeh a. Conference and Exhibition dam and tunnel. tehran2015.
3. Peden M, Scurfield R, Sleet D, Mohan D, Hyder AA, Jarawan E, et al. World report on road traffic injury prevention. World Health Organization Geneva; 2004.
4. KHandan M, Kavousi A, Koohpaei A. Application of Structural Equations Modeling to Assess Relationship among Emotional Intelligence, General Health and Occupational Accidents. *Int J Occup Hyg* 2015;7(3):124-31.
5. Atrkar roushan S, Alizadeh SS. Estimation of economic costs of accidents at work in Iran: A case study of occupational accidents in 2012. *Iran Occup Health* 2015;12(1):12-9.
6. Health and Safety Executive. Statistics on fatal injuries in the workplace in Great Britain 2014/15. Health and Safety Executive 2015.
7. Correll M, Andrewartha G. Final Report Meat Industry Survey of OHS Culture. Adelaide: SafeWork South Australia; 2001.
8. MohamaadFam I, Kianfar A, Mahmoudi S. Evaluation of relationship between job stress and unsafe acts with occupational accident rates in a vehicle manufacturing in Iran. *Int J Occup Hyg* 2010;2(2):85-90.
9. Haynes AB, Weiser TG, Berry WR, Lipsitz SR, Breizat A-HS, Dellinger EP, et al. Changes in safety attitude and relationship to decreased postoperative morbidity and mortality following implementation of a checklist-based surgical safety intervention. *BMJ Qual Saf* 2011;20(1):102-7.
10. Stranks JW. *Human factors and behavioural safety*. Routledge; 2007.
11. Gharibi V, Mortazavi SB, Jafari AJ, Malakouti J, Bagheri Hossein Abadi M. The Relationship

- between Workers' Attitude towards Safety and Occupational Accidents Experience. *Int J Occup Hyg* 2017;8(3):145-50.
12. Schroder H. Safety performance measurement. *J Safety Res* 1970;2(3):188-95.
  13. Kiani F, Samavtyan H, Poorabdiyan S, Jafari E. How safety trainings decrease perceived job stress: the effects of improvement in employees attitude toward safety issues. *Far East J Psy and Business* 2012;6(4):46-58.
  14. Henning JB, Stufft CJ, Payne SC, Bergman ME, Mannan MS, Keren N. The influence of individual differences on organizational safety attitudes. *Saf Sci* 2009;47(3):337-45.
  15. Neal A, Griffin MA. *Safety climate and safety at work*. The psychology of workplace safety. 2004:15-34.
  16. Sexton JB, Helmreich RL, Neilands TB, Rowan K, Vella K, Boyden J, et al. The Safety Attitudes Questionnaire: psychometric properties, benchmarking data, and emerging research. *BMC Health Serv Res* 2006;6(1):1-10.
  17. Siu O-I, Phillips DR, Leung T-w. Age differences in safety attitudes and safety performance in Hong Kong construction workers. *J Safety Res* 2003;34(2):199-205.
  18. Baker DP, Amodeo AM, Krokos KJ, Slonim A, Herrera H. Assessing teamwork attitudes in healthcare: development of the TeamSTEPPS teamwork attitudes questionnaire. *Qual Saf Health Care* 2010;qshc.2009.036129.
  19. Barling J, Kelloway EK, Iverson RD. Accidental outcomes: Attitudinal consequences of workplace injuries. *J Occup Health Psychol* 2003;8(1):74.
  20. Westaby JD, Lee BC. Antecedents of injury among youth in agricultural settings: A longitudinal examination of safety consciousness, dangerous risk taking, and safety knowledge. *J Safety Res* 2003;34(3):227-40.
  21. Hemmatjoo Y. *Relationship between safety attitude and work accidents in a factory in Tabriz*. Tehran School of Public Health. Tehran University of Medical Sciences; 2004.
  22. Monazzam M, Soltanzadeh A. The relationship between the worker's safety attitude and the registered accidents. *J Res Health Sci* 2009;9(1):17-20.
  23. Hosseini M, Yaghmaei F, Jabbari M. Correlation between population characteristics and safety attitude to work of women workers in food factories. *JHPM* 2012;1(3):64-72.
  24. Grau R, Martínez IM, Agut S, Salanova M. Safety Attitudes and their relationship to Safety Training and Generalised Self-efficacy. *Int J Occup Saf Ergon* 2002;8(1):23-35.
  25. Arab M, Mohammadian F, Rahmani A, Rahimi A, Omidi L, abbasi brojeni P, et al. Safety Attitude in Operating Room's Staff's in selected hospitals of Tehran University of Medical Sciences in 2013. *Hospital* 2014;13(3):25-33.
  26. Mohammad Fam I. HSE culture among employees of MAPNA Group. *Monitoring J* 2009;4.
  27. Heidari M. *Relation to safety and safe behaviors among line workers in the metal industry Arak in 2001*: Iran Medical University; 2001.
  28. Hashemvand Y, editor Assessment relationship between attitude to safety with demographic factors and safe behavior of Saipa company employees. The first international conference on the status of safety, health and environmental organizations 2006; 2006.
  29. Zaroshani V, Sheykhi S, Amini M, Mohamadizeydi M, editors. *Investigation of safety attitude among operating room staff of of educational hospital of Qazvin university of medical sciences*. Selected Proceedings of Safe Community Conference in Tehran; 2009.
  30. Hansen CP. A causal model of the relationship among accidents, biodata, personality, and cognitive factors. *J Appl Psychol* 1989;74(1):81.
  31. Tabibi J, Nasiripour AA, Maleki MR, Raessi P, Mahmmoudi M, Azimi L. Survey of Employees' Safety Attitude in a Teaching Hospital Tehran 2010. *Iran Occup Health* 2011;7(4):5-0.
  32. Soltanzadeh A. *Relationship of safety attitude and work accidents in a gas refinery*: School of Public Health, Tehran University of Medical Sciences; 2008.
  33. Minoo A, Mohseni H, HashemVand SY. *Relationship between safety attitude with demographic characteristics and safety behaviors of workers of SAIPA industry*. The first International Conference on Industrial Safety, Occupational Health and environment in the organization; Tehran 2008.
  34. Gyekye A, Salminen S. Making sense of industrial accidents: The role of job satisfaction. *J Social Sci* 2006;2(4):127-34.
  35. Dobson A, Brown W, Ball J, Powers J, McFadden M. Women drivers' behaviour, socio-demographic characteristics and accidents. *Accid Anal Prev* 1999;31(5):525-35.
  36. Bigos SJ, Spengler DM, Martin NA, Zeh J, Fisher L, Nachemson A, et al. Back Injuries in Industry: A Retrospective Study: II. Injury Factors. *Spine* 1986;11(3):246-51.
  37. Kim CW, McInerney ML, Alexander RP. *Job Satisfaction as Related to Safe Performance: A Case for a Manufacturing Firm*. 2002.
  38. Chau N, Mur J-M, Benamghar L, Siegfried C, Dangelzer J-L, Francais M, et al. Relationships between Some Individual Characteristics and

- Occupational Accidents in the Construction Industry: A Case-Control Study on 880 Victims of Accidents Occurred during a Two-Year Period. *J Occup Health* 2002;44(3):131-9.
39. Aderaw Z, Engdaw D, Tadesse T. Determinants of occupational injury: a case control study among textile factory workers in Amhara Regional State, Ethiopia. *J Trop Med* 2011;2011.
40. Salminen S, Gyekye SA, Ojajärvi A. Individual and organizational factors of safe behaviour among Ghanaian industrial workers. *EMR* 2013;2(1):98.
41. Hosseinpour M, Ghaedi GR. *Inspection of safety attitude of Hakim Farabi Agro Industrial Co. Employees and how it relates to their safety behaviors*. The 3rd Conference on Environmental Planning & Management; Tehran univercity2013.
42. Jafari M, Gharari M, Ghafari M, Omidi L, Kalantari S, Asadolah-Fardi G. The influence of safety training on safety climate factors in a construction site. *Int J Occup Hyg* 2015;6(2):81-7.
43. MohamaadFam I, Nikoomaram H, Fardin M. Evaluation of health, safety and environment (HSE) culture. *Int J Occup Hyg* 2015;5(1):1-5.
44. Salari H, Ahmadi Y, Paktinat E. Assessing factors influenced on teaching hospital staff tendency to incentives' in second job. *J Nurs Manag* 2013;2(3):16-25.
45. Patwary MA, O'Hare WT, Sarker MH. Occupational accident: An example of fatalistic beliefs among medical waste workers in Bangladesh. *Saf Sci* 2012;50(1):76-82.
46. Gyekye SA, Salminen S. Religious beliefs and responsibility attributions for industrial accidents among Ghanaian workers. *JSR* 2007:73-86.