



Investigation on Safety Knowledge, Attitude, and Performance (Safety-KAP) Among Firefighters of Operating Units in Tehran

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Abstract

Objectives: This study aimed to investigate the knowledge, attitude, and performance in safety (safety-KAP) among firefighters operating throughout all fire stations in Tehran.

Methods: The statistical population (N) of this study is 420. The Morgan table was used to select the sample size, and 200 individuals completed the questionnaire and returned it. The main instrument of this study was a researcher-made questionnaire consisting of three parts. To determine the validity of the questionnaire, it was provided to the supervisors and consultants and they were asked about the research questions. After applying their views and making the necessary amendments, the final form of the questionnaire was compiled and employed. The reliability of the research was confirmed by Cronbach's alpha ($\alpha > .85$). The main method of this study was the descriptive-correlational method, and data analysis was done using SPSS software version 19.

Results: The results showed that the intensity of correlation between the two variables of knowledge, and attitude with the performance was 0.755 and 0.689, which indicates the direct relationship between the two variables. The amount of multi-correlation coefficient (R) of knowledge and attitude with the staff performance of the operational units in the firefighting department of Tehran is equal to 0.766, which implies a high correlation between knowledge and attitude with the performance of employees in the operational units of the firefighting department of Tehran. The coefficient of determination (R^2) is 0.586. In addition, the results showed that there is a positive and significant relationship between the independent variables of age, education, and background of job title with the level of knowledge, attitude, and performance of the staff in operational units of Tehran. Therefore, the age of people between 30 and 40, with a bachelor's degree or higher and high job background, also with a good job title, has an impact on their attitude, knowledge, and performance.

Conclusions: According to the job characteristics of firefighters, this study was designed. Considering safety knowledge, attitude, and performance for firefighters are very important for those that are working in a very high-risk situation and condition.

Keywords: Knowledge, Attitude, Performance, HSE Management, Firefighters

1. Background

Human resources are the most important assets and capital of each organization, therefore, protecting this asset is essential, which requires senior management of each organization to place its significance beyond production and quality (1). On the other hand, the protection of human and physical resources is the most important means of reducing costs in organizations. Establishment and continuity of management systems, especially the safety management system and the reduction of work-related accidents in the organization, are essential to achieve the goals (2). The measure of success of each organization is just the level of desirability in the knowledge and performance of its employees. Therefore, in order to examine the success

of organizations due to progressive human resources systems, they can provide the appropriate strategies and establish the necessary coordination between the goals of the organization and the goals of the staff, to increase the total productivity of the group and help the organization to achieve its goals and finally develop (3). Fire agencies are the main target of saving the lives and property of humans; therefore, a firefighter will be able to help the incident in the most critical environmental conditions and most harmful working conditions. According to the statistics of fire events and accidents, the number of casualties and deaths of firefighters during the recent years is alarming. Subsequently, the firefighters do their job in hazardous environments, including explosions, to provide relief and op-

eration; therefore, their vulnerability is at the upper limit. In addition, occupational hazards in the fire departments are associated with the emergence and exacerbation of various physical and mental illnesses (3).

Although the firefighting profession is of a hard and harmful job group, however, by comparing the professional conditions of the firefighting job in Iran with other developed countries, there is not enough attention to provide facilities and favorable economic/psychological conditions for the firefighters in Iran. Firefighting jobs are considered high-risk occupations in developed countries. It is clear that a firefighter must act without hesitation in the fight against fire and emergencies in order to preserve the lives of individuals and national capital; in this regard, a firefighter must be fully prepared in every way. If continuous theoretical and practical training is not working, as well as knowledge of various factors, then educational material will be forgotten over time, and the application of fire extinguishing and rescue equipment will be mistaken or delayed (4).

Amiri et al. (2), indicated that considering the necessity of desired knowledge and positive attitude toward conflict management and its role on aware performance of managers in this field, it can be stated that conducting training courses in this field for managers and creating necessary skills in using conflict management techniques can play an effective role in the efficiency and productivity of the organization. Dianati et al. (5), showed in a research study that high education level increases the knowledge. In order to raise the level of knowledge of radiation workers, it is better to hold a re-training course on radiation protection. Reisi et al. (6), found that poor performance is unlikely to be acceptable in this group, in regards to the fact that staff at health centers can play a significant role in encouraging radiation workers to adopt preventive and healthier behaviors. For this reason, it is recommended that studies be conducted to identify the factors that encourage women to use monitoring methods and to employ identified factors to encourage them to use these methods.

In this field, training is one of the most effective factors in adapting the firefighters with the changing conditions of the current time. Creating a change in the attitude of firefighters, making familiarity and readiness to increase the merit of work to accept important and key responsibilities at times of events, and ultimately raising the level of performance have close links with the training. The expertise and skills of firefighters in carrying out their duties requires continuous training and knowledge of the occupational skills that they must pay attention to, in addition, this preparation must always be maintained at a high level (7). Training is of essential and continuous activity for the adaptation of manpower with chang-

ing organizational and environmental conditions and is a tool that helps managers in case of organizational duties by means of various techniques and methods (5). Creating a desirable function is possible through the training and promotion of human resource capabilities to a large extent. Therefore, the proper training of human resources will improve the performance of firefighters (8). On the other hand, we know that the attitude is where a person analyzes surrounding events from his/her point of view and determines the relationship between himself/herself and them, or in other words, it is the readiness to provide a positive or negative reaction to the world around, and is a combination of resulted safe thinking and safe endeavor (9). Personal attitudes have an important impact on behavior and acts and can change the behavior directly/indirectly and affect persons' safety culture. In addition, a major and effective factor in incidents of work is unsafe performance. The habit of working with unconsciousness in unsafe situations is usually the result of lack of awareness on how to do the job. Therefore, job training, with an emphasis on safety aspects, is very effective in motivating the staff and problem-solving (10). Thus, elaborating an accurate program to investigate the level of knowledge, the type of attitude, and the performance analysis of the learners' is considered as the first step. In such a situation, awareness of the level of knowledge, beliefs, and behavior of firefighters in controlling and preventing accidents is of particular importance (11).

Therefore, measuring the level of knowledge and performance of firefighters, and subsequent training can have a significant contribution to reducing and correcting incidents. It is obvious that the investigation of these knowledge has created a proper and realistic context in order to exploit the obtained results and to provide effective educational programs due to eliminating defects and ultimately reduce negligence related to the observance of safety principles and, consequently, potential damages caused by fire incidents (9).

2. Objectives

It's aimed in this research was to study the necessity of the training required by a firefighter as well as safety issues in regards to knowledge attitude and performance (Safety-KAP) among firefighters in operating units of Tehran.

3. Methods

The purpose of this study is to investigate knowledge, attitude, and performance (Safety-KAP) among firefighters operating in Tehran. The study designed based on

descriptive-correlation of data, which was collected from three different parameters of investigating knowledge, attitude, and performance. The statistical population of this research is the total number of 420 staff members of operational units in fire stations throughout Tehran. The total number of sample volumes were selected randomly from 1850 firefighters of operational units. According to the Morgan table, 200 individuals completed the questionnaire. The main instrument of this study was a researcher-made questionnaire consisting of three parts. There was also a section for collecting demographic data in the questionnaire. The first part of the questionnaire includes information that relates to one's level of job knowledge, including 30 items for determination of firefighters knowledge about health, safety, and environment management, and the second part includes questions pertaining to the attitude of the persons regards to HSE management, including 20 items, and an evaluation performed using 26 questions for determining performances of firefighters related to the HSE approach. To determine the reliability and validity of the questionnaire, Cronbach's alpha, content validity index (CVI), and content validity ratio (CVR) were used. After applying their views and making the necessary amendments, the final form of the questionnaire was compiled and used. The reliability of research was confirmed by Cronbach's alpha ($\alpha > .85$), and validity of the questionnaire was validated by $CVI > 0.89$ and $CVR > 0.92$, and then data analysis was performed using SPSS software version 19.

There were some sub-goals in this research, which surveying the level of knowledge of the operational staff of the fire department of Tehran, evaluation of attitude of staff of operational unit of fire department of Tehran, surveying the performance of personnel of the fire department of Tehran, and also investigating the relationship between age, education, background and job title on the knowledge, attitude, and performance of staff of operational unit of Tehran were among them.

4. Results

4.1. Kolmogorov-Smirnov Test

The Kolmogorov-Smirnov test is a distribution matching test for quantitative data distribution. This test was used to examine the normal distribution of the community. The results of this test are illustrated in [Table 1](#).

4.2. Research Reliability

This test is used to validate the questionnaire. Given the amount of Cronbach's alpha, the Cronbach's alpha

Table 1. Kolmogorov-Smirnov Test Table

Factor	Sig.	Error Value	Conclusion
Knowledge	0.136	0.05	Normal
Attitude	0.146	0.05	Normal
Performance	0.168	0.05	Normal

value of the majority of variables is higher than 0.7, indicating that the questionnaire has a good reliability. The results of this test are illustrated in [Table 2](#).

Table 2. Questions and Cronbach's Alpha Coefficient

Variables	Questionnaire Items			
	Number	Questions	Cronbach Alpha	Number
Knowledge	200	1-10	0.85	10
Attitude	200	11-21	0.87	10
Performance	200	21-35	0.89	15

4.3. Determine the Correlation Between Variables

The results of [Table 3](#) show the relationship between the surveyed variables on knowledge, attitude, and performance survey of firefighters; there was significant relationship between type of employment and attitude ($P < 0.00$) and safety performance ($P < 0.00$). In addition, the coefficient of determination (R and R^2) was calculated for multiple correlation coefficients, knowledge, and attitude with performance of the Fire Department's Operational Units staff ([Table 4](#)).

Correlation of knowledge and attitude with performance of staff in regards to health, safety, and environment management is an important hypothesis that is investigated, results are demonstrated in [Table 4](#). The results show that there is a positive relationship between knowledge and attitude with performance of staff in regards to HSE management.

There was a significant relationship between age and attitude ($P < 0.000$). In addition, there was a significant relationship between educational situation with attitude ($P < 0.000$) and safety performance ($P < 0.000$). There was a significant relationship between job title with knowledge, attitude, and safety performance ($P < 0.000$). The results were shown in [Table 5](#).

5. Discussion

Another purpose of the study was to test the direct and mediating role of safety knowledge and safety motivation on the relationship between the six safety management practices and safety performance components. Out

Table 3. Correlation Coefficient Between Knowledge Level and Attitude with the Performance of the Personnel of Fire Department's Operational Units

Variable	Number	Correlation Coefficient	Calculated T	Sig.
Relationship of knowledge and Firefighter's safety performance	200	0.755	32.25	0.000
Relationship of attitude and Firefighter's safety performance	200	0.689	30.25	0.000

Table 4. Multiple Correlation Coefficients, Knowledge, and Attitude with Performance of Staff in Fire Department's Operational Units

Statistical Index	R	R ²
The coefficient of determination	0.766	0.586

of the six safety management practices, only safety training, safety communication and feedback, and safety rules and procedures were found to predict safety knowledge.

The study results showed that most of the samples (120 persons) were aged 30 to 40 years old (60%), and most of the samples were (180 persons) are married in terms of marital status (90%). In addition, most of the sample population (126 persons) had a bachelor's degree in terms of education status variable (63%). However, in regards to academic background, 96 cases out of the total samples graduated in the human science field (48%). Further, in terms of organizational position variable, 72 percent of samples were specialist, and 53% of the sample population had work experience ranging from 10 to 20 years. Where, talking about salary, 159 people out of the cases (i.e., 79.5%) had an income exceeding 20 to 25 million IRR, per month. Considering the highest frequency, the majority of sample people (79.5%) were in a moderate situation in terms of income. The results of research indicated that the level of significance for variables is larger than the error value of 0.05. As a result, these variables have a normal distribution, and the Cronbach's alpha value of all variables of study was higher than 0.80, and α above 0.7 indicates that the questionnaire has a good reliability.

The results showed that intensity of correlation between two variables of knowledge, attitude, and performance was 0.755 and 0.689, respectively; indicating the direct relationship between the two variables. The amount of multi-correlation coefficient (R) of knowledge and attitude with the performance of the staff of the operational units of the fire department in Tehran is equal to 0.766, implying a high correlation between knowledge and attitude with the performance of employees of Fire departments of Tehran. The coefficient of determination (R²) is equal to 0.586, and obtained results showed a positive and significant relationship between the independent variables of age, education, background, and job title with the level of knowledge, attitude, and performance of staff in operational units of Tehran. Therefore, the age of people be-

tween 30 and 40, with a bachelor's degree or higher, and a rich background, also having a good job title, has an impact on their attitude, knowledge and performance. Thus, the higher knowledge and attitude in fire office staff leads to an increase in staff performance.

These three research parameters of knowledge, attitude, and performance on safety management regards to health, safety, and environment, which contribute towards transferring information regarding the methods of carrying out their job in the healthiest and safest way possible is expected to improve the safety knowledge of the firefighters. This finding is in line with the observations of Burke et al. (12), Stout et al. (13), and Smith-Crowe et al. (14).

When Neal et al. (15), reported the mediating role of safety knowledge and safety motivation on the relationship between safety climate (sum of perceptions of management values, communication, training and safety systems) and safety performance components, this study has gone on to identify the relative importance of various safety management practices.

It is concluded that independent variables such as age, education, background, and job title have a significant effect on the level of knowledge, attitude, and performance of staff in operational units of Tehran fire offices. Therefore, the calculated values of B and beta for all variables are meaningful at 99% level; as though, the age of people between 30 and 40 with a bachelor's degree or higher and a rich background, while having a good job title, has an impact on their attitude, knowledge, and performance. The results of this study were consistent with the ones of Amiri et al. (2), and Soltani and Ebrahimzadeh (16).

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Footnotes

Authors' Contribution: Mahmoud Heidari and Samira Ghiyasi: concept and design, writing the manuscript and revision; Ali Souri: collection and analysis of data.

Table 5. The Effect of Age, Education, Job Title Variable on Employees' Knowledge, Attitude, and Performance

Variables	Sig.	Std. Error	beta	t	Error value	B
Age						
Knowledge rate	0.000	0.149	0.142	5.251 ⁺⁺	0.05	0.278
Attitude rate	0.000	0.179	0.162	6.121 ⁺⁺	0.05	0.245
Performance	0.000	0.139	0.112	3.153 ⁺⁺	0.05	1.057
Education						
Knowledge rate	0.000	0.172	0.158	6.265 ^{**}	0.05	0.338
Attitude rate	0.000	0.152	0.164	6.178 ^{**}	0.05	0.315
Performance	0.000	0.132	0.152	4.273 ^{**}	0.05	1.087
Job title						
Knowledge rate	0.000	0.134	0.121	3.124 ^{**}	0.05	0.251
Attitude rate	0.000	0.128	0.117	3.012 ^{**}	0.05	0.235
Performance	0.000	0.123	0.102	1.168 ^{**}	0.05	1.005

Conflict of Interests: The authors declared no conflict of interest.

Ethical Considerations: The participants in this study gave voluntary informed consent to participate in this research.

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