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Studying safety climate among locomotive drivers of Tehran subway transportation lines in 2013

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ABSTRACT

Introduction: Safety is a significant part of the public transportation. Suitable safety climate has a positive effect on safety performance and reduces accidents rate. The aim of this study was investigating safety climate status of Tehran subway drivers in 2013.

Material and method: The present study was a descriptive and cross-sectional study. In this study, statistical population was all drivers of 1, 2 and 4 lines of Tehran Urban & Suburban Railway Operation Company. Also, a questionnaire was used to collect demographics data. Safety climate was investigated using standard Vinod Kumar's questionnaire. Data were analyzed by descriptive statistics and T-Student and ANOVA tests using SPSS21 software.

Results: Overall, 293 questionnaires were analyzed. Among the participants, 38.8% were line 1 derivers, 31.1% line 2 drivers and 33.1% line 4 drivers. The mean and standard deviation of the safety climate was 146.53±49.44, which is less than 147 (median). The results indicated that safety climate had a relation with the age group and education levels ($P<0.01$), while had no significant relationship with the deriving experience, and also marital status ($P>0.05$).

Conclusion: Safety climate status among subway drivers is not desirable. Among the various factors, commitment and performance of management in the safety area had the weakest status. Strengthening the structure of the Health, Safety and Environment (HSE) management system in the Tehran Urban and Suburban Railway Operation Company can enhance the level of safety climate among staff of this organization.

Keywords:

Safety Climate, Subway, Locomotive Drivers, Iran

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1. Introduction

Subway systems are key components of fast and affordable transportation networks in urban communities. The metro's driving job is tough, exhausting and busy. In this job, in addition to doing things in a limited time and with precision, they are also responsible for the safety of locomotives and passengers. This job requires high concentration, high level of awareness and safety due to the presence of multiple signals on the railways [1]. Safety is a significant part of the public transportation [2]. Suitable safety climate has a positive effect on safety performance and reduces accidents rate [3]. The aim of this study was investigating safety climate status of Tehran subway drivers in 2013.

2. Material and Methods

The present study was a descriptive and cross-sectional study. In this study, statistical population was all drivers of 1, 2 and 4 lines of Tehran Urban & Suburban Railway Operation Company. In this study, Vinodkumar questionnaire was used to examine the safety climate and another questionnaire was used to collect demographic data of people including age, driving experience, marital status and level of education [4]. The Persian version of this questionnaire has a high reliability and reliability and has been used in various studies [5]. In this study, the total sample size of 324 people was determined. A selection of 324 samples was performed by simple random sampling. Then the questionnaires were distributed and data were analyzed by descriptive statistics and T-Student and ANOVA tests using SPSS21 software.

3. Results and Discussion

Overall, 293 questionnaires were analyzed. Among the participants, 38.8% were line 1 derivers, 31.1% line 2 drivers and 33.1% line 4 drivers. The mean and standard deviation of the safety barley score of all participants in the study was 146.53±49.44 and shows that the safety climate score is lower than 147 and the safety barley status is negative among subway drivers. The results indicated that safety climate had a relation with the age group and education levels ($P<0.01$), while had no significant relationship with the deriving experience, and also marital status ($P>0.05$). The management dimensions of the safety climate gained fewer points than the other dimensions. In this study, the possible reason for the negative safety climate is the weakness of commitment and poor performance in safety management. The Wu and Kang study showed that safety management as an organizational factor, in addition to individual factors such as gender, age, accident experience and safety training, has a significant impact on the safety atmosphere [6]. In this study, the results of one-way analysis of variance showed that the safety atmosphere in metro drivers has a significant relationship with age group, education levels and leadership of different metro lines ($P <0.001$). In other words, older people have more work experience and more knowledge and awareness of safety issues related to their work. In a study by Andersen et al., and T sung-Chih it was found that age has a significant relationship with safety and the main reason is the increase in experience and knowledge required in older people [7, 8].

4. Conclusions

Safety climate status among the studied subway drivers was not desirable. Among the various factors, commitment and performance of management in the safety area had the weakest status. In general, it can be concluded that individual variables such as marital status and work experience do not have much effect on the safety climate and other variables affect its formation. In the work environment, it is the managers who have the greatest impact on the organizational climate and the safety climate. It is suggested that the senior management of Tehran Metro Operating Company increase the commitment and better performance of managers in the field of safety by implementing programs to increase the level of awareness of managers. Strengthening the structure of the HSE management system in the Tehran Urban & Suburban Railway Operation company can enhance the level of safety climate among staff of this organization.

Table 1. Average score and standard deviation of safety climate dimensions

safety climate dimensions	Number of questions	Average score	standard deviation
Management commitment and performance in the field of safety	26	63.17	26.11
Employee safety knowledge	7	22.75	6.73
Employee safety attitudes	5	19.90	4.65
Employee participation and commitment in the field of safety	5	18.29	4.80
Environment safety	3	12.75	2.98
Emergency preparedness	3	9.87	2.68
Total	49	146.54	48.92

Table 2. The results of the One-Sample T-Test test of safety climate dimensions

safety climate dimensions	Average score*	standard deviation	P-value
Management commitment and performance in the field of safety	2.42	0.705	P<0.001
Employee safety knowledge	3.21	0.677	P<0.001
Employee safety attitudes	3.97	0.750	P<0.001
Employee participation and commitment in the field of safety	3.65	0.628	P<0.001
Environment safety	4.25	0.878	P<0.001
Emergency preparedness	3.28	0.740	P<0.001

* The maximum score for each dimension can be 4.

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