Evaluating the Knowledge, Attitude and Safety Performance in the Prevention of Occupational Accidents among Workers in One of Iran Khodro's Piece Making Companies

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ABSTRACT

Occupational accidents are one of important events in the world. Individual affecting factors on accidents are knowledge, attitude and perception of risk. So this study aimed to determine knowledge, attitude and safety performance in prevention of occupational accidents at one of Iran Khodro's piece making companies' workers. In this cross-sectional study, 212 workers from Mehrcam Pars Company selected by stratified random method at each working site in 2015. By simple random sampling, subjects were enrolled. Questionnaire was completed by workers through self-reporting. Questionnaire consisted of demographic and underlying information and questions about safety knowledge, attitude and performance in the workplace. Data were analyzed using SPSS 21 software. The average workers' age was 34.3 year with a standard deviation of 4.7%. 35.8% were not trained in terms of performing their job. 48.1% of participants had no history of injuries in site, but others reported suffers from mild to severe intensity. There was significant relationship between educational situation with attitude and safety performance. There was significant relationship between job experience with safety knowledge, attitude and performance. Age and workers' safety attitude was a predictive of safety performance. The results showed that there is significant relationship between safety knowledge, attitude and performance in the workplace with some variables. So in order to improve the overall situation of safety, some measures can be effective such as raising the knowledge of personnel, safety staff's participation management, balancing work and time.

Key words*:* Safety, Prevention, Occupational Accidents, Workers

INTRODUCTION

Occupational accidents are one of the main problems among workers in different countries which have following adverse consequences in term of psychological, health, social, economic and institutional status. A study was done by International Labour Organization shows an increase in occupational accidents in the world which such accidents are due to emergence of new technologies [1]. The statistics of Social Security premium shows that in 2014, of 18916 occupational accidents occurred in Iran, the proportion of men was 97.4% and the proportion of women was 2.6%. These statistics only related to insured persons [2]. Most experts believe that most accidents are caused by human error or unsafe behaviors [3], some of the most important accidents occurred in the world, including the Three Mile Island in 1979, Bhopal, India in 1984, Chernobyl in Russia in 1986, the space shuttle Challenger in 1986 and other incidents occurred due to human error [4]. Today, it is proved that the main cause of accidents is unsafe acts by individuals [5].

Individual factors affecting the safety performance (the means to verify the safety performance of the organization and to validate the effectiveness of safety risk controls) include three important psychological factors in accidents are attitude, motivation and risk perception. The meaning of attitude is internal talent and desire toward behavior

and plays an important role in changing safety behaviors, in other words, attitudes determine the kind of behavior and in order to change attitudes, raising knowledge has an effective role. Perceiving the risk is a subjective assessment of likelihood and severity of risk which has a great importance in health and safety, because lot of accidents were occurred due to lack of understanding about risk which having a background of correct perception of events is a sign of high knowledge [6]. One of the main topics is setting personal protective equipment in staff's environment, and improving employees' risk perception [7].now, most advanced countries have found that having only management systems and advanced technologies to achieve sustainable development is not enough, but promoting safe behaviors among workers, values, beliefs and their attitude to safety, as well as organization's attitude toward safety which consist culture safety is the way to avoid accidents [8]. English Health and Safety Commission also states that the safety culture attributes to create values, attitudes, perceptions, competencies and individual and group behavioral patterns that determine commitment, style, skill and health and safety management of an organization and management role in creating it was effective. Also use of new teaching methods and reward and punishment system can be effective which leads to reduce accidents and ultimately has economical and financial advantages which represent a return of capital to the organization over the long term. It should be noted about the importance of training, before having the expectation from a worker to performs their job securely, we should try to teach him the appropriate ways of doing the carrier [9]. Studies in terms of causes of occupational accidents and paying attention to reliable statistics in this regard show the importance of requirement to more safety studies focus on individuals' behavior in the workplace, on the other hand, a healthy workforce is essential for social and economic sustainable development. Therefore, this study aimed to determine knowledge, attitude and safety performance in prevention of occupational accidents outbreak in one of Iran Khodro's piece making companies' workers.

MATERIALS AND METHODS

In this cross-sectional study, 212 workers of Mehrcam Pars Company who were exposed to damage caused by occupational accidents were studied during September to October 2015. Mehrcam Pars Company locates at Karaj Special Road in 11 Km and has industrial- manufacturing activity. Mehrcam Pars Company has been established to manufacture and supply interior and exterior decorator collection and automobile air conditioning system which its production is kinds of dashboards, bumpers types, all kinds of automobile's air conditioning and heaters, panel types, types of seats and other automobile polymeric pieces. Company's stock was owned by Iran Khodro's Investment Development.

Participants were selected by stratified random method consistent by the number of people in each working site from various working sites of company. Site included mold-making site, operator and sewing, and then through simple random sampling among people in each site and sampling framework, subjects were enrolled. Research's subjects were justified about how to perform the project and information confidentiality and also the aim of this project and all participants after showing the informed consent, desirably entered to the study. The minimum sample size according to previous similar studies [10] and taking into account the maximum standard deviation equal to 6.8 and acceptable error equal of 0.7 and confidence level of 95%, using the formula $n=z^2s^2/d^2$, was estimated 254 persons. In this study, all workers who completed questionnaire through self-reporting was 212 persons (workers' response rate was 83% in this study), 17% were excluded due to lack of informed consent.

Inclusion criteria for entering participants having the reading and writing skill and age older than 18 years and exclusion criteria was workers' dissatisfaction to collaborate on research. The data collection tool was questionnaire used in the studies [10, 11], which was completed through self-reporting by participants. The validity and reliability of questionnaire was reviewed and approved by Sanai Nasab and colleagues. Content validity of questionnaire was certified by twelve health education and promotion as well as risk prevention professionals. Its reliability was tested by doing a pilot study on 30 ***workers*** and Cronbach's alpha coefficient was recorded 0.73, 0.85 and 0.80 for knowledge, attitude and ***safety performance***, respectively [11]. Hypotheses the present study was designed to test following hypotheses; H1, the knowledge in the prevention of occupational accidents among workers; H2, the attitude in the prevention of occupational accidents among workers; H3, the safety performance in the prevention of occupational accidents among workers.

The questionnaire (questionnaire name was knowledge, attitude and safety performance in the prevention of occupational accidents) consisted of two parts. The first part related to workers' demographic and background data, including sex, age, type of employment, the name of the site, marital status, educational level, job experience, type of residence, having sports program, having

insurance, smoking and consuming tobacco products, vaccination history and medical history, training for working in site, history of accidents in site, working hours per week, history of displacement of jobs in site and how to work individually or in groups. The second part of questionnaire included questions about knowledge, attitudes and performance regarding safety of workplace were discussed.

In this regard, the knowledge of people from material and workplace hazards and ways to protect against these factors were assessed by 13 questions. The questions in this section were: "what substances must be avoided when working?" and as well as "How can control the risk of noise?". 4 responses were considered to respond to questions, for correct answers, the score 1 and for wrong answers, score 0 was allocated. So the range of gained scores for this structure was considered 0 to 13 and ultimately knowledge was classified into low knowledge level (0-4), moderate (5-9) and high (10-13).

Attitudes assessment was done by 25 questions about thoughts, feelings and people's desires about safety workplace and the factors affecting it. One of the questions in this section about this statement, "I believe the accident could happen at any moment.", and to answer to these questions, 5 answers were considered included: strongly agree, agree no comment, disagree and strongly disagree. 1 to 5 points was considered for responses. So the range points gained for this structure was considered 25 to 125. Finally, the attitude was classified to three levels: low attitude (25-77), medium (78-100) and high (101-125). Prevention behavior of occupational accidents was assessed with 14 questions. One of these questions was "I use healthy and right tools in workplace." to answer these questions, 4 questions includes never, sometimes, often and always had been considered. For answers, the scores 1 to 4 were considered respectively, so the range of gained scores for safety performance structure was between 14 to 56. Finally, the safety performance was classified into three level of performance: low level (14-28), medium (29-43) and high (44-56). All criteria for this classification were based on study Sanai Nasab and colleagues [11]. The data were analyzed using SPSS version 21 and chi-square test, multiple regressions was used to determine the relationship between variables.

RESULTS

All 212 surveyed workers were male. The average workers' age was 34.3 years with a standard deviation of 4.7. All participants were covered by social insurance.47.2% of workers had not been vaccinated against tetanus and only 26.9% had been vaccinated and had vaccination injection card. 155 patients (73%) of workers were without disease or disease history. 35.8% of workers were not trained to do their tasks and 64.2% of people trained in this field. Of workers who were trained about their job, 14.2% in free centers,17.5% in conservatory and 4.7% in university and 27.8% were trained in other centers.48.1% of workshop's participants had no history of injuries, but the rest, report the severity of damage from mild to severe. 9.84% of people had no displacement in site. 69.3% preferred to work individually and the rest were interested in the working group.

The type of employment in most participants was contractual employment (91.5%).78.3% of workers in the study were married. 59% had under diploma degree and only 19.9% of them had academicals education. job experience in most participants was 11 to 15 years (56%). The kind of participants' residency (48.1%) was rented house living. The majority of studied participants have no exercise program (84.9%) and among them, 15.1% of people who exercised, the highest hour of exercise belonged to three hours a week (5.2%). 69.3% of workers didn't use any tobacco products, and 17.9% of persons smoked cigarettes. Most working hours per week was 56 hours or more hours per week (45%). Some demographic and background characteristics of the studied population are shown in Table 1.

The results of table 2 shows the relationship between the surveyed variables on knowledge, attitude and performance survey and workers' safety, there was significant relationship between type of employment and attitude ($P<0.00$) and safety performance ($P<0.04$). There was significant relationship between marital status and attitude ($P<0.000$), Also there was significant relationship between educational situation with attitude ($P<0.000$) and safety performance ($P<0.03$). There was significant relationship between job experience with knowledge, attitude and safety performance ($P<0.01$), but there was significant relationship between having an exercise program with safety performance ($P<0.01$). There was significant relationship between the consumption of tobacco products with knowledge and attitude, ($P<0.00$) as well as, there was significant relationship between the use of tobacco with safety performance ($P<0.01$). Also there was significant relationship between the working hours per week with attitude and safety performance in the participants, ($P<0.00$). There was significant relationship between trainee workers before starting new job in the company with knowledge, attitude and safety performance ($P<0.04$).

Table 1: Demographic and background characteristics of the studied population (N= 212)

Characteristics		Number	Percentage
	Formal status	5	2.4
Type of employment	Contract status	13	6.1
	Default status	194	91.5
Marital status	Single	46	21.7
	Married	166	78.3
	Illiterate	5	2.4
Educational level	Middle school	8	3.8
	High school	32	15.1
	Diploma	125	59
	Academicals education	42	19.9
	Under 5 years	48	23
Work experience	5 to 10 years	43	20
	11 to 15 years	118	56
	Over 15 years	3	1
	Personal house	100	47.2
Kind of residency	Organizational house	10	4.7
	Rented house	102	48.1
	Do not have	147	69.3
Consumption of tobacco	Cigarette	38	17.9
	hookah	23	10.8
	Cigarette and hookah	4	1.9
Have exercise program	Do not have	180	84.9
	Have	32	15.1
	45 to 50 hours	71	33
Working hours per week	51 to 55 hours	22	47
	56 hours or more hours	94	45

Table 2: Relationship between the surveyed variables on knowledge, attitude and performance survey and safety of workers (N=212)

Independent variable		**Knowledge of safety**			**Safety attitude**			**Safety performance**			
Dependent variable		**Average**	**High**	**P**	**Average**	**High**	**P**	**Weak**	**Average**	**High**	**P**
Type of employment	Formal status	3(1.5%)	2(1%)	0.13	3(1.5%)	2(1%)	0.00	0(0%)	5(2.5%)	0(0%)	0.04
	Contract status	11(5%)	2(1%)		9(4%)	4(2%)		0(0%)	13(6%)	0(0%)	
	Default status	109(51.5%)	85(40%)		109(51.5%)	85(40%)		34(16%)	152(71.5%)	8(4%)	
Marital status	Single	19(9%)	27(13%)	0.91	46(21.7%)	0(0%)	0.00	5(2.5%)	36(17%)	5(2.5%)	0.01
	Married	70(33%)	96(45%)		166(78.3%)	0(0%)		29(13.5%)	134(63%)	3(1.5%)	
	Illiterate	3(1.5%)	2(1%)	0.14	5(2.5%)	0(0%)	0.00	0(0%)	5(2.5%)	0(0%)	0.03
	Middle school	6(3%)	2(1%)		5(2.5%)	3(1.5%)		0(0%)	5(2.5%)	3(1.5%)	
Educational level	High school	25(12%)	7(3%)		32(15%)	0(0%)		2(1%)	30(14%)	0(0%)	
	Diploma	89(42%)	36(17%)		115(53.5%)	10(5%)		31(15%)	94(43.5%)	0(0%)	
	Academicals education	24(11%)	18(8.5%)		32(15.5%)	9(4.5%)		1(0.5%)	36(16%)	5(2.5%)	
	Under 5 years	33(15.5%)	15(7%)	0.00	35(17%)	13(6%)	0.00	26(12.5%)	22(10%)	0(0%)	0.00
Work experience	5 to 10 years	27(13%)	16(7.5%)		41(19%)	2(1%)		12(5.5%)	26(12.5%)	5(2.5%)	
	11 to 15 years	82(38.5%)	36(17%)		100(47%)	18(8.5%)		16(7.5%)	99(47%)	2(15)	
	Over 15 years	2(1%)	1(0.5%)		3(1.5%)	0(0%)		0(0%)	3(1.5%)	0(0%)	
Kind of residency	Personal house	55(26%)	45(21%)	0.57	85(40%)	15(7%)	0.09	14(7%)	81(37.5%)	5(2.5%)	0.37
	Organizational house	7(3.5%)	3(1.5%)		10(5%)	0(0%)		0(0%)	10(5%)	0(0%)	
	Rented house	61(29%)	41(19%)		95(45%)	7(3%)		20(9%)	74(35%)	8(4%)	
Have exercise program	Do not have	107(50.5%)	73(34.5%)	0.31	163(77%)	17(8%)	0.29	34(16%)	138(65%)	8(4%)	0.01
	Have	16(7.5%)	16(7.5%)		27(12.5%)	5(2.5%)		0(0%)	32(15%)	0(0%)	
	Do not have	94(44.5%)	53(25%)	0.00	132(62%)	15(7%)	0.00	31(14.5%)	108(51%)	8(4%)	0.01
Consumption of tobacco	Cigarette	14(6.5%)	24(11.5%)		37(17.5%)	1(0.5%)		2(1%)	36(16.5%)	0(0%)	
	hookah	11(5%)	12(5.5%)		21(10%)	2(1%)		0(0%)	23(11%)	0(0%)	
	Cigarette and hookah	4(2%)	0(0%)		0(0%)	4(2%)		1(0.5%)	3(1.5%)	0(0%)	
Working hours per week	45 to 50 hours	43(20%)	28(13%)	0.13	56(26%)	15(7%)	0.00	13(6%)	55(25.5%)	3(1.5%)	0.00
	51 to 55 hours	37(17.5%)	10(5%)		47(22%)	0(0%)		14(7%)	33(15.5%)	0(0%)	
	56 hours or more hours	72(34%)	22(10.5%)		65(31%)	29(14%)		7(3.5%)	82(38.5%)	5(2.5%)	

Table 3 shows raw and standard coefficients of regression equation to predict the safety performance of the subjects in the study, so as by increasing one score of attitude, by being constant of other variables affects, the average performance score increases 0.3 and the score of attitude has direct effect on safety performance average score. The age of participants in study has a direct effect on safety performance average score. The average score of safety performance in older people with the constant effects of other variables is about 0.01 more than younger people. Marriage has opposite effect on average score in safety performance. The average score of safety performance in married persons by being constant of other variables is less than about 0.26 than single people.

Table 3: Raw and standard coefficients of regression equation to predict the safety performance of the subjects in the study (N=212)

Constructs	β (SE)	S.E	Beta	T	P- value
Constant	0.21	0.28		4.22	0.00
Safety attitude	0.30	0.09	0.21	3.19	0.00
Age	0.01	0.00	0.16	2.21	0.02
Marital status	-0.26	0.00	-0.25	-3.43	0.00

DISCUSSION

This study aimed to determine affecting factors in preventing occupational accidents occurrence in workers. Knowledge, attitude and safety performance are including affecting factors in the prevention of accidents in workplace which these three variables are affected by other variable. There was significant relationship between education with attitude and safety performance, but was not significant with knowledge that was consistent with the findings of Aghamollaee and colleagues [10], so employees with higher education had higher safety performance and attitude which could be due to better risks understanding of work environment. But this result did not comply with the results of Che Hassan and colleagues [12], as well as the results of Jahangiry and colleagues [6]. In the Che Hassan and colleagues study, the results showed that people with lower educational level estimate the associated risk of dangers much higher [12]. Also in the study, marital status had opposite effect on safety performance score, according to staff, at the satisfaction of current conditions; it could be likely due to stress and frustration of people's life. There were significant relationships between attitude and type of employment that may be due to high levels of confidence and lack of fear of being fired in employees with formal employment status.

The job history was significant with knowledge, attitude and safety performance of employees that could be due to attention to this issue in site and management's support of safety issues and better people understanding with high job experience which is consistent with the results of Heydari *et al.* [13]. Also the study of Ghamari and colleagues suggests that people with less job experience, are more vulnerable to accidents [14]. But the findings of the study did not comply with Hallowell *et al.* [5] and Jahangiri *et al.* [6]. Probably due to lack of sufficient rigorous to people with more job experience and also stabilize for people with more experience that the first safety status is responsive for the safety management.

In the study, people who had exercise program demonstrated a better safety performance in workplace and this is because the able-bodied and their movement towards the restrictive reaction of safety problems. Working hours have also significant relationship with attitude and safety performance. As the working hour increases, the higher attitude and better safety performance will be seen. While in some studies, working hours have a negative relationship with safety performance [15, 16]. In this study, we can mention to more people's consistency among who had more working hours in the workplace, so that the much working hours effect adaptation with work environment. Checking safety performance score with regression equation showed that attitude and age directly affect safety performance. Therefore the older people had much better safety performance. Chauvin study was not consistent with the results of this study, so in this study, by reducing the age, attitude and safety performance decrease [17]. In the study present, the educational background and experimental of older people was important, so in a similar study the education was causing modify employee's behavior and understanding the better safety performance [18] Heydari *et al*. studies [13] and Mortazavi and colleagues [19] showed a significant relationship between attitude and safety performance that is consistent with the results of this study.

The study of Lehman *et al*. [20] was not consistent with results of current study. So those who had lower perceptions of risk, had better safety performance. This discrepancy is probably due to training courses content and examinations taken in the workplace based on the description of the legal requirements and safety in the workplace which was only emphasizes on safety performance, but it does not attend on safety attitude changing in the workers. There was significant relationship between trainee

workers with knowledge, attitudes and safety performance. This finding was consistent with the study of Rozenfeld *et al*. [21] that training workers lead to behavior modification. Of strengths point of this study include the high number of workers in any company's workshop. But the limit of this study was the lack of cooperation of some workers to participate in the study.

CONCLUSION

The results of this study suggest that there is significance relationship between knowledge, attitude and safety performance of employees at workplace with some of the variables such as employment status, marital status, education, exercise program, work experience, working hours and smoking. Attitude and age has a direct effect on safety performance. In order to improve overall safety in the workplace, strategies such as raising the knowledge of staff, improving the incentive system, the management of employee safety participation, balancing work and time, improving procedures and guidelines and root causes of conflicts between safety and operational goals can be proposed to submit. As well as, implementing the interventional and training programs appropriate to target group and identifying their needs in order to improve the safety level and workers' attitude to safety, finally improve safety performance and recommend reduction of unsafe behaviors fields.

ETHICAL ISSUES

They voluntarily approved a consent form before enrolling in the study

CONFLIC OF INTEREST

There are no conflicts of interest.

AUTHORS' CONTRIBUTIONS

All authors equally help to write this manuscript

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