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Effectiveness of a Social Cognitive Theory Intervention on Promoting Personal Protective Equipment (PPEs) Use among Iranian Aluminum Company Workers

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ABSTRACT

Workers in industrial workplaces are at increased risk of developing, occupational hazards, work-related accidents, and diseases. Personal Protective Equipment use (PPE) may protect the user against accident or safety risks in the working environment. Educational interventions may improve knowledge and practice related to prevention, but little is known about their knowledge and exposure prevention. This study was aimed to determine the effect of educational intervention based on social cognitive theory (SCT) on knowledge and (PPEs) use among Iranian workers of Aluminum Company (IRALCO). This parallel randomized trial was conducted in a sample of 188 workers who were randomly assigned as the intervention (n=94) and a control (n=94) groups. The intervention group received an educational intervention of six sessions lasting 45-60 minutes augmented with the electronic-learning whereas; the control group attended a routine education program of the company. A researcher-made questionnaire based on SCT constructs and a practice/checklist was used to collect data at baseline and six months after the intervention. Mann-Whitney Test and Wilcoxon Signed Ranks Test analysis were used for data analysis using SPSS version 24.0. $P<0.05$ was considered statistically significant. After the intervention, knowledge, practices (checklist) items, and all SCT constructs (except emotional adaptability ($P= 0.077$) revealed significant differences in the intervention group ($P\leq0.001$) whereas in the control group were no significant differences ($P>0.05$). This study indicated that the application of educational intervention based on SCT constructs can reflect a positive impact on knowledge and appropriate use of PPEs to reduce occupational-related injuries. This theory is a recommended method to improve workers' personal protective behaviors.

Keywords: *Knowledge, Personal Protective Equipment (PPE), Social Cognitive Theory (SCT), Occupational Health, Iranian Aluminum Company Worker*

INTRODUCTION

It is estimated that 2.78 million deaths related to occupational accidents occurring annually as a work-related death. Based on the Global Burden of Disease Study, work-related mortality caused 5% of the global total deaths [1]. Also, 68 million cases of work-related illnesses annually around the world and about 170 million working days are lost every year due to work-related accidents [2]. Ignoring safety rules, carelessness, and inappropriate or non-use of PPEs played an important role in event of these accidents; the most important causes of work-related deaths are falling, tensile, electric shock, and burns [1].

Personal Protective Equipment (PPE) consists of protective clothing, helmets, goggles, and other garments or equipment designed to protect the user's body from injury or infection. Protective Equipment may be worn for job-related occupational safety and health purposes [3].

PPE is equipment worn by a worker to diminish exposure to specific hazards. Any item of PPE imposes a barrier between the wearer/user in the workplace. This can create extra pressure on the users; weaken their ability to do their work and make significant discomfort levels [4].

Technical feasibility, low quality of some PPEs, feeling uncomfortable with the existing PPEs, inappropriate training, stereotypical instructions, and inattention to effective incentives for PPEs use lead workers even supervisors to have a little interest in PPEs use in the workplace. Any of these can discourage users from using PPEs correctly, therefore workers are more vulnerable to *be injured*, or *ill-health* over the course or under extreme circumstances may cause death [4].

In this way, in order to correct the existing situation based on the staff's opinions, revision in the selection of appropriate approaches seems necessary [5]. In many industries, the use of engineering techniques is not feasible to reduce harmful factors, and PPEs use is the best way to maintain individuals' health [6]. Concerning the reduction of accidents, the role of education as the axis of advancement and development has a very important role in different fields [2]. Safety training is one of the effective tools in preventing occupational diseases and accidents. Safety education defined as a process by which workers acquire knowledge, learn new skills and acquire the motivation to do things [7].

Some studies revealed that education as a good prevention strategy for safety and health Industry members should more extensively consider their best practices to protect workers' safety and health [8-9]. But despite the training provided to workers, workers' knowledge of personal protective equipment is still low. Study results on the knowledge and use of personal protective equipment by Welding Workers showed that 31.4% of workers had low knowledge of personal protective equipment and 50.3% of them had moderate knowledge [10].

Preventive behavioral change studies in the safe behavioral field had also demonstrated that the knowledge of potential hazards is insufficient to change behavior and addressing other determinants of behavior, such as attitudes, perceived social norms, and environmental factors that inhibit or encourage behavioral necessity perceive [3-11].

In a study, Amidi Mazaheri et al. found that workers' knowledge of occupational hazards improvement may encourage them to work safely using health education theories [12].

Social Cognitive Theory (SCT) has been widely used in education and health promotion interventions and its effectiveness in improving lifestyle have been confirmed in several studies [13-18]. This theory describes human behavior by triadic mutual causation (behavior, environment, and personal) factors [19-20]. In the theoretic framework of the present study, some constructs as knowledge (learning details and insight obtaining related to PPEs use) outcome expectations (expectation of the possible outcomes which follow as a result of engaging in PPEs use), outcome expectancies (value a worker on the probable outcomes that would result from performing PPEs use), environment (physical or social circumstances of IRALCO), self-efficacy (worker's ability confidence to follow PPEs use), self-efficacy in overcoming impediments (self-confidence that a worker feels to overcome barriers while doing PPEs use), goal setting/self-controlling (setting goals and developing plans to achieve PPEs use), and emotional coping (techniques engaged by a worker to control

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emotional and physiological states associated with gaining of PPEs use) were used [20]. Based on this theory, learning is performed by observation, imitation, and modeling. Moreover, learning is considered an individual as an active creature and confirms the role of thinking and cognitive processes in human learning [20- 21]. This study was grounded in SCT constructs as a conceptual framework for behavioral management to give tailored health education and promotion interventions focusing on knowledge and PPEs use as individual-level factors for behavior change. The purposes of this study were: (1) to increase knowledge of IRALCO workers about PPEs use, (2) improving the mean scores of SCT constructs, and (3) promoting healthy practices for PPEs.

MATERIALS AND METHODS

This randomized intervention trial was conducted in three phases on IRALCO workers at Arak city, south-west of Tehran province, Iran. At the baseline, knowledge and PPEs use was assessed using a self-administered researcher-made questionnaire based on SCT constructs, which served as a need assessment for the other phases of the study. In the second phase, educational intervention was conducted based on SCT constructs during a month and in four educational sessions. In the third phase, six months after the intervention, the questionnaires were completed again by the intervention and control groups and data analysis was performed. Inclusion criteria were workers who live in Arak city, employment as fixed-job in the production line of IRALCO, lack of confirmed occupational diseases and interest in study participating. Participants who did not attend more than two educational sessions were excluded. The protocol was ethically approved by TUMS educational board with application number IR.TUMS.SPH.REC.1396 .4136 and registered Iranian registry of clinical trials (IRCT ID: IRCT20130213012460N17).

In the present study, data gathering instrument was a four-part researcher-made questionnaire based on SCT constructs including:

- Participants' demographic information including age, work experience, level of education, occupational incident history, marital status, occupational disease history, insurance coverage status, job satisfaction, income, Wife's job, employment status, and shift work (12 items).
- Knowledge about PPEs use (38 items) on a three-point Likert scale from e.g. correct answer (2), I do not know (1), false answer (0).
- SCT constructs (56 items) consist of knowledge (8 questions), outcome expectations (8 questions), outcome expectancies (8 questions), self-efficacy (7 questions), self-control/setting goals (7 questions), environment (6 questions), self-efficacy in overcoming impediments (7 questions), emotional coping (5 questions). All items were rated based on a five-point Likert scale ranging from zero = totally disagree to 4 = totally agree.
- Practice/checklist (43 items) was rated based on a three-points Likert-type scaling {Yes (2), somewhat (1), No (0)}.

The content validity of the instrument was assessed. The scale was reviewed by a panel consisted of ten experts in health, education, promotion, and occupational health. The panel was asked to judge the necessity and relevance of the items in order to calculate the content validity ratio (CVR) and content validity index (CVI). The result of CVR was confirmed by the experts' opinions. The CVR values according to constructs (knowledge, SCT, and checklist) were calculated 0.84, 0.79, and 0.83, respectively. The CVR acceptable domain for ten experts' panel was 0.62, which was satisfied [22]. Using the Waltz and Bausell method based on the experts' opinions, CVI was calculated. The CVI of the questionnaire items were calculated for knowledge items (0.83), SCT constructs (0.83), and checklist items (0.82). In this method, the results of questions with a score of more than 0.79 are satisfied. The results between 70.0 and 79.0 need to be corrected and less than 0.7 are unacceptable and should be removed. Therefore, it could be concluded that the CVI of the scales was accepted [23]. Internal consistency was evaluated by Cronbach`s alpha. A coefficient value of more than 0.75 was significantly correlated. The total Cronbach's alpha of SCT questionnaire and Practice were 0.98 and 0.97, respectively.

Workers were invited to participate in the study through oral invitation and advertisements were placed in the main halls of the performed factory by research teams. All of the participants were given detailed information about the study and signed written consent before participation. To ensure privacy

and confidentiality, no names and identification number was written on the questionnaire. Eligible participants were randomly selected among a list of 2700 workers working in different shifts at IRANLCO. Intervention and control groups were selected in somehow to minimize the information bias. Following written informed consent, a group of eligible workers was randomly assigned as intervention and control groups using four-block randomizations. Participants in both groups were invited to complete the questionnaires at the baseline and six months after the intervention. Both intervention and control groups attended in routine educational programs based on safety and EPP use. The practice/checklist was completed by operational managers of the production line during standard operating procedures for data collection. Furthermore, the intervention group had received educational safety and EPP use program based on SCT constructs in six sessions lasting 45-60 min twice a week during a month. After analyzing pre-test results, the educational program was run based on SCT constructs such as knowledge, outcome expectations, outcome expectancies, self-efficacy overcoming impediments, goal setting in self-control, environment, emotional coping for workers within a month in the form of blended training with a specific educational strategy based on each construct.

Lecture and providing fact sheets were utilized for improving knowledge construct; setting achievable goals, self-monitoring, and propose rewards provide for goal setting/self-control construct; provide some opportunities to overcome workers and situational obstacles, provide access to the health system to improve environment construct; using educational films, motivational interviewing, question & answer and discussion benefits, role play and virtual training via mobile to enhance outcome expectations and outcome expectancies constructs. To improve self-efficacy and self-efficacy in overcoming impediments constructs using different equipment of PPEs in small steps, utilizing persuasion and reinforcement and decreasing stress and hardship related of using PPEs were performed.

The sessions consisted of information on occupational diseases, occupational accidents, PPE use, PPE demonstrations, fit testing, exposure reduction strategies, and barriers to PPEs use. Appropriate educational strategies were established based on SCT constructs to promote appropriate PPE use. After six months of the educational intervention, two groups filled the questionnaire. Knowledge, SCT constructs, and PPEs use were considered as the primary and secondary outcome measurements, respectively. In this study, the sample size was calculated based on the mean and standard deviation data, SCT constructs, and checklist scores with 95% confidence intervals. The sample size was selected through simple random sampling and finally 188 participants out of 94 persons were selected as the intervention and control group. Data were analyzed via SPSS software version 24 using descriptive methods (mean and standard deviation). To assess data description Mann-Whitney Test, Cross-tabs and Wilcoxon Signed Ranks Test, demographics, SCT constructs, knowledge, and practices/checklist were applied and the relationship between the components before and after intervention in two groups was determined. $P<0.05$ was considered statistically significant. The consort flow diagram of the participants has been presented in Figure 1.

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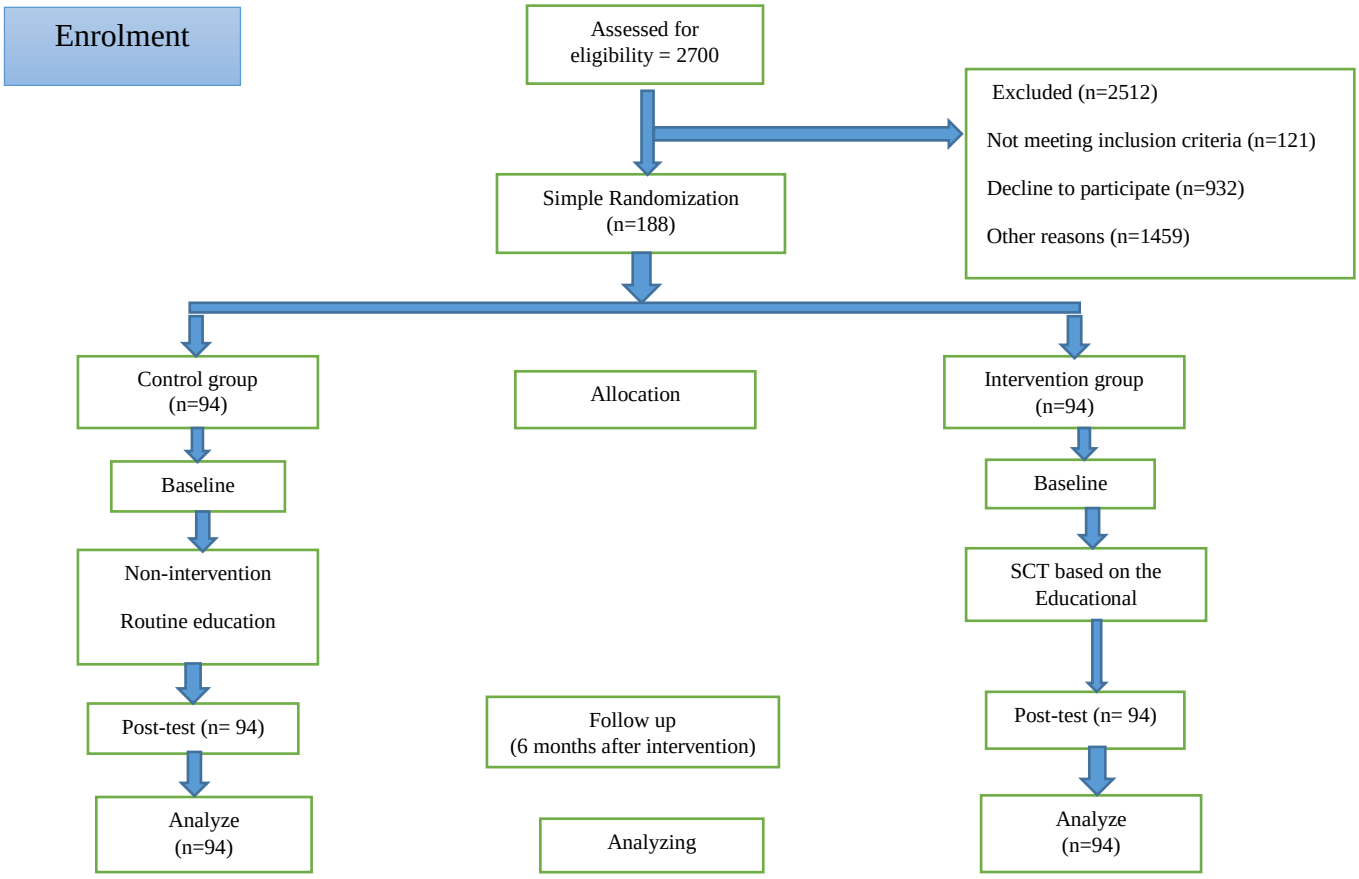

Fig. 1. Consort flow diagram of the study participants

A total of 188 participants were selected as sample size and among them, 94 workers attended the educational programs and 94 workers formed the control group with a response rate of 100 % (n=188). All the participants were male.

At the baseline, the randomized groups did not show any significant difference in terms of demographic variables and work-related information, SCT constructs, knowledge, and practice (checklist) items. In order to find the relationship between variables crosstabs were used which there was no significant difference in demographic variables between intervention and control groups (age, P=0.255; work experience P=0.680; education level P=0.315; occupational incident history P=0.766; marital status P=0.114; occupational disease history P=0.315; insurance coverage status (All the workers were covered by insurance), job satisfaction P=0.052; income P=0.219; Wife's job P=0.592; employment status P=0.023; and shift work P=0.467).

According to the results of the Kolmogorov–Smirnov test, knowledge, SCT constructs, and practice (checklist) items were not normally distributed (p=0.014, p=0.008, and p=0.017, respectively). Therefore, non-parametric tests were used to analyze data. Mann-Whitney test was used to compare the mean of knowledge, SCT constructs, and practice (checklist) items of two groups, and the Wilcoxon Signed Ranks Test was applied to compare the results of before and after the intervention in each group. The comparison of the mean and SD of knowledge scores (Table 1) in the intervention group using Wilcoxon's test before and six months after intervention showed a statistically significant increase in the mean score (P <

0.001). Before the intervention, there was no significant difference between the two groups about knowledge scores using the Mann-Whitney test, but after the intervention, these differences were significant (p<0.001); whereas, no significant difference was found in the control group (P > 0.05). Applying Wilcoxon Signed Ranks Test, it was also found that after implementing the intervention in the intervention group, total scores of knowledge were remarkably improved (p < 0.001); whereas, no significant improvement was found in the control group (p=0.109) (Table 1).

Table 1. Knowledge variable before and six months after intervention among participants

Knowledge	Groups	Before Intervention mean(SD)	Six months after Intervention mean(SD)	*P value*
Overall	Intervention	6.15(2.18)	7.91(2.00)	<0.001
	Control	6.16(1.68)	6.24(1.55)	0.180
	p	0.32	**<0.001**	-
Apron	Intervention	4.28(2.00)	5.20(1.08)	**<0.001**
	Control	4.46(1.40)	4.47(1.41)	0.317
	p	0.772	**<0.001**	-
Helmet	Intervention	7.51(2.97)	8.50(1.72)	**<0.001**
	Control	7.48(1.97)	7.52(1.98)	0.317
	p	0.103	**<0.001**	-
Eye goggles	Intervention	7.50(2.58)	8.31(1.46)	**<0.001**
	Control	7.32(1.70)	7.36(1.61)	0.317
	p	0.055	**<0.001**	-
Hearing protection device	Intervention	5.84(2.26)	6.68(1.43)	**<0.001**
	Control	5.73(1.51)	5.79(1.47)	0.180
	p	0.129	**<0.001**	-
Hand glove and hand shield	Intervention	5.94(2.26)	6.65(1.52)	**<0.001**
	Control	5.96(1.70)	6.02(1.68)	0.157
	p	0.462	**<0.001**	-
Safety boot and gaiter	Intervention	8.03(2.93)	9.26(1.22)	**<0.001**
	Control	8.01(2.12)	8.05(2.07)	0.157
	p	0.107	**<0.001**	-
Respiratory protection	Intervention	6.18(2.02)	6.76(1.34)	**<0.001**
	Control	5.98(1.59)	6.02(1.56)	0.317
	p	0.082	**<0.001**	-
Fall arrest belt assembly	Intervention	4.83(1.47)	5.34(0.97)	**<0.001**
	Control	4.70(1.15)	4.74(1.16)	0.317
	p	0.10	**<0.001**	-
Total	Intervention	56.25(16.92)	64.73(9.34)	**<0.001**
	Control	56.73(9.02)	57.26(8.29)	0.109
	p	0.104	**<0.001**	-

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The comparison of mean and SD of SCT constructs (see Table 2) in the intervention group using Wilcoxon's test before and after six months intervention showed a statistically significant increase in the mean score (P < 0.05). Before the intervention, there was no significant difference between the two groups in SCT constructs score using the Mann-Whitney test but after the intervention, these differences were significant (p < 0.001) except emotional compatibility (p=0.077) (refer to Table 2).

Table 2. Changes in SCT constructs before and six months after the intervention among participants

SCT constructs		Before Intervention mean(SD)	Six months after Intervention mean(SD)	*P value*
Knowledge	Intervention	24.99(7.6)	27.20(4.98)	**0.001**
	Control	25.03(5.59)	25.63(5.23)	0.109
	p	0.361	**0.033**	-
Outcome of expectations	Intervention	24.91(6.94)	27.36(4.11)	**<0.001**
	Control	25.46(5.37)	26.03(4.95)	0.109
	p	0.839	**0.043**	-
Outcome of expectancies	Intervention	26.68(6.97)	26.46(4.78)	**0.003**
	Control	24.39(5.95)	24.97(5.68)	0.102
	p	0.321	**0.042**	-
Self-efficacy	Intervention	20.01(6.44)	21.64(5.03)	**0.002**
	Control	19.63(5.21)	19.78(5.07)	0.180
	p	0.175	**0.002**	-
Self-control /Setting goals	Intervention	20.66(6.13)	22.47(4.32)	**<0.001**
	Control	21.02(5.13)	21.18(4.92)	0.317
	p	0.672	**0.019**	-
Environment	Intervention	14.71(5.60)	16.28(4.55)	**<0.001**
	Control	14.28(4.04)	14.23(4.03)	0.655
	p	0.365	**0.001**	-
Self-efficacy in overcoming impediments	Intervention	17.69(5.93)	20.50(3.82)	**<0.001**
	Control	19.07(4.04)	19.19(3.80)	0.180
	p	0.207	**0.012**	-
Emotional coping	Intervention	14.17(4.71)	15.78(3.08)	**<0.001**
	Control	14.73(3.98)	14.84(3.78)	0.157
	p	0.659	0.077	-

The comparison of mean and SD of Practice (checklist) items (see Table 3) in the intervention group using Wilcoxon's test before and six months after the intervention showed a statistically significant increase in the mean score (P < 0.05). Before the intervention, there was no significant difference between the two groups about Practice (checklist) items scores using the Mann-Whitney test, but after the intervention, these differences were significant (p<0.001); whereas, no significant difference was found in the control group (P > 0.05). Applying Wilcoxon Signed Ranks Test, it was also found that after implementing the intervention in the intervention group, a total score of practice was remarkably improved (p < 0.001); whereas, no significant improvement was found in the control group (p=0.164) (refer to Table 3).

Table 3. Practice (checklist) items before and six months after the intervention among participants

Practice(checklist) items		Before Intervention mean(SD)	Six months after Intervention mean(SD)	*p*
Eye goggles	Intervention	10.21(4.81)	11.38(4.02)	**<0.001**
	Control	9.57(3.39)	9.66(3.44)	0.180
	p	0.094	**0.001**	-
Hearing protection	Intervention	10.21(4.49)	11.60(3.64)	**<0.001**
	Control	9.84(3.27)	9.91(3.25)	0.180
	p	0.161	**0.001**	-
Respiratory protection	Intervention	8.30(3.55)	10.18(2.58)	**<0.001**
	Control	8.51(2.35)	8.60(2.29)	0.180
	p	0.637	**<0.001**	-
Safety boot and gaiter	Intervention	10.30(4.05)	11.39(3.16)	**<0.001**
	Control	9.45(3.38)	9.60(3.26)	0.180
	p	0.022	**<0.001**	-
Helmet	Intervention	5 (2.77)	5.95(2.09)	**<0.001**
	Control	4.85(2.04)	4.89(2.07)	0.180
	p	0.196	**<0.001**	-
Overall and apron	Intervention	7.82(3.41)	8.69(2.86)	**<0.001**
	Control	7.65(2.68)	7.73(2.56)	0.180
	p	0.643	**0.012**	-
Hand glove and hand shield	Intervention	4.40(1.91)	4.86(1.49)	**0.001**
	Control	4.27(1.58)	4.31(1.53)	0.317
	p	0.196	**0.006**	-
Total	Intervention	56.34(21.98)	64.07(15.60)	**<0.001**
		54.10(14.10)	54.73(13.66)	0.164
		0.10	**<0.001**	-

DISCUSSION

The purpose of this study was to evaluate the knowledge and PPEs use in an SCT based intervention among Iranian workers at Aluminum Company. The use of workplace intervention to provide education may be particularly helpful in the industrial sector whereas the workplace as an appropriate setting for health-promoting behavior [20]. As Honda et al. in a study, revealed that adherence to appropriate PPE use can be a challenge related to inadequate education on its usage, technical difficulties, and tolerability of PPE in the workplace but redesigning PPE is a key to improve the safety at the workplace [24].

The study findings revealed that after the intervention, knowledge in the intervention group significantly increased which was in line with studies of Umoren et al. and Adewoye et al. They indicated that the intervention led to knowledge promotion about using personal protective equipment in different workplaces [25-26]. Our finding was also in agreement with the different studies done in Ethiopia and Nigeria among woodworkers which showed

health education intervention improved the use of PPEs [27].

To the best of our knowledge, there was no interventional study based on SCT to compare at the workplace. So, in the current study, some SCT based studies in the other fields were evaluated first. In future studies, it is recommended that this study framework be applied.

The results of this study showed that the mean scores of all SCT constructs (except emotional coping) were increased in the intervention group after the education compared with the control group, with the increase being considered as statistically significant.

These findings were consistent with that of Shojaei et al., findings that showed after the educational program, the mean scores of SCT constructs in the intervention group were increased significantly compared to the pre-intervention and the control groups [28]. This comparison revealed that SCT can be feasible in different settings in a workplace or in the individuals in the community.

In the present study, after the intervention, the mean score of knowledge construction in the intervention group was significantly higher than the control group. These findings were in approved the results of Duncan-Whaley and Shirvani et al., studies [29-30]. Based on Navidian et al. study results, safety educational intervention programs could have a constructive impact on the increasing workers' knowledge, attitude, and adopting safe behaviors. The result of this study was in line with our study and the similarity of developing motivational interviewing as an educational strategy was notable [31].

The difference in the mean scores of outcome expectations and outcome expectancies in the intervention groups was statistically significant in comparison to the control groups after the intervention. The findings by Vanderhoof [6] were consistent with the current study. The results of Abbasian et al., and Hashemi et al., studies among Iranian students in this construction were not consistent with the findings of the present study [32-33]. The reasons mentioned for the difference in the results may be the difference in workplace conditions and different levels of knowledge. Contrary to the findings of this study, in studies by Abbasian et al., and Hashemi et al., the mean score of outcome expectancies did not change significantly [32-33]. It seems that the use of blended education strategies can be effective to change this structure significantly after the intervention. Also, in Poddar et al. study educational intervention had no effect on outcome expectancies, which could be due to education via Email and superficially education [34]. The study results showed that the mean scores of outcome expectancies and outcome expectation increased significantly after the intervention, which was consistent with the results of Taymoori et al., and Shirvani et al., studies [35-30].

The findings of this study showed a significant increase in self-efficacy in the intervention group in comparison to the control group. The findings of a study entitled "The effect of educational program based on self-efficacy theory on occupational stress management of nurses" showed that the difference between the mean score of self-efficacy of the intervention group compared to the pre-intervention and the control group was statistically significant, which was consistent with the results of this study [36-37]. The results of Stacey et al. and Chan studies showed that educational intervention in the intervention group caused a significant difference in outcome expectancies and self-efficacy compared to the control group [38-39] which was consistent with the results of this study.

The difference in the result of environment construction in the intervention group was statistically significant in comparison to the control group after the intervention. In the study of Lubans and Sylva which was done using a social cognitive theory (SCT), there was a significant difference between the intervention and the control groups at the end of the educational program [40] and it was consistent with the results of the present study. Also, similar results were found by Shirvani et al. who worked using Social Cognitive Theory [30]. The results of two studies conducted by Pirasteh et al., and Taymoori et al., [35-37] were consistent with the findings of the present study.

Similar to the findings, results of Shojaei et al, which evaluated the effects of an educational program based on the Social Cognitive Theory (SCT) on low back pain severity in healthcare workers showed the mean differences between the baseline and 6-month follow-up of four constructs of SCT including self-efficacy, self-control, outcome reinforcement, and emotional coping were significant. However, a significant difference was found in the

intervention group after the educational intervention, and the total mean scores of all predictor constructs were higher in the intervention group than the control group following the intervention [28]. Moreover, six months after the intervention, a significant difference was found between the mean scores of practice (checklist) items between the two groups. Studies carried out among welders in Nigeria [25-26] reported similar findings.

Furthermore, in a study, Quach et al. suggested that the operational managers should continuously be updated about PPE use and its importance. Therefore, researchers may broadly able to investigate both managers and workers who can have a monitoring control in their workplaces [41].

Overall, the effective implementation of the educational program combined with the high follow up rate, indicated that the intervention was feasible. The study questionnaires were designed based on self-reporting whereas it could increase the likelihood of Socially Desirable Bias. Moreover, this study was conducted in a limited statistical society, so precaution should be exercised when generalizing these results to all workers. Also, in the future researches more detailed questions to define which barriers are associated with individual PPEs use in occupational exposures is recommended. Future efforts may examine long time frame compared to this study to assess the result of sustainability. The study novelties were the application of SCT for the industrial safety intervention and a comprehensive review of the impact of the intervention program on all PPEs use.

CONCLUSION

To the best of our knowledge, in the previous studies, the effect of educational intervention based on social cognitive theory (SCT) on knowledge and PPEs use among Iranian workers of Aluminum Company (IRALCO) was not evaluated. Overall, target group knowledge and practice on PPEs use could be improved through educational efforts. The current study results indicated that the intervention based on SCT can promote knowledge and PPEs use among studied workers. It seems that establishing appropriate workshops to enhance the knowledge and practice of workers about PPEs use. Future research about industrial workers will optimistically fill gaps between occupational risk factors and PPEs use to prevent adverse health outcomes among workers. According to the important role of managers to audit PPEs use among workers, it is recommended that managers be involved in all the safety and health services delivered by the workplace.

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CONFLICTS OF INTEREST

The authors have no conflict of interests to declare.

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