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Original

Evaluating the Effects of a Training Intervention on Increasing the Workers' Use of Hearing Protective Equipment by Kirk Patrick Model in Yazd Persepolis Tile Industry

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Abstract

Background: According to the Labor Code, one of the important duties of employers in the field of safety and health is the provision of personal protective equipment and its training to workers. How to train workers who are willing to use the earmuff all the time is an issue that needs to be addressed. Therefore, the aim of this study was to determine the effectiveness of a training intervention with the BASNEF model in increasing the duration of the use of hearing protective equipment by workers. **Methods:** This is an evaluation study that was carried out in Yazd tile industry in 2015. The research population in this study was 50 workers who were trained according to the BASNEF model. After developing a questionnaire based on the structures of Kirk Patrick's evaluation model, with the acquisition of validity, trained workers completed the questionnaire. **Results:** The highest mean scores were respectively in the results 87.06 (12), behavior 86.30 (9.59), learning 84.87 (13.55), content 81.36 (10.70) and the response 81.28 (11.33). In general, the score of the evaluation domains is above 80.**Conclusion:** According to the findings, BASNEF's training course is effective in increasing the duration of workers' use of protective hearing equipment.

Keywords: Kirkpatrick evaluation model; BASNEF model; Earmuff; Training

Introduction

One of the most important complications of excessive noise is hearing impairment.[1] In general, in industries for controlling unwanted noise in the workplace, engineering controls that are the most useful way of controlling the sound are used. But in some cases, this is not possible in practice, and the last resort is to use the protective hearing equipment. According to research on occupational health, it was found that workers do not use the earmuff all the time, which reduces the performance of the earmuff.[2-4]One of the steps that can be taken to increase the duration of the workers'

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use of the earmuff is training. Training models help scientists to influence the individual behavioral change better.[5]One of the most comprehensive and useful models in health training is BASNEF model. As shown in Figure 1, this template is intended to change attitudes. First, individuals must evaluate what they are going to do and before attitude, they must be given awareness so that they can make an evaluation. Along with that, you need to get help from influential people who are trusted by staff. Combining the two parameters of attitude and influential people cause that one has intended to do something that can be used enabling factors to better convey the intention of a behavior to performance.[5,6]

To determine the effectiveness of training and its sustainability, it should be evaluated fist. With proper and principled evaluation, we can identify the strengths and weaknesses of education and it can be used for many educational decisions and planning.[7] Most of the well-known training models in past years have been based on a four-level training evaluation model which was first presented by Kirk Patrick (1959).[8] The Kirk Patrick Evaluation Model is one of the most useful models for evaluating training programs in medical sciences, which includes four levels of evaluation, response, learning, performance and outcome.[9] In addition to evaluation of the knowledge and skills of learners, this template pays attention to the sustainability of learning and its benefits to consumers. At first and second stages of this model, an evolutionary evaluation is used that actually evaluates training programs at the same time as they are running. This stage essentially encompasses the knowledge and skills of previous learners, during and after education. In the third and fourth stages, a congestion evaluation is used, which is, in fact, a judgment about the final value of the program and the result of the work.[10] In a tile industry, training based on the BASNEF model has been given to increase the duration of the use of workers from the earmuff; there is a need for principled evaluation in order to evaluate the sustainability and effectiveness of the training. Therefore, the main aim of this study was to evaluate the training based on the BASNEF model in increasing the period of hearing protection equipment use by workers using the Kirk Patrick model.

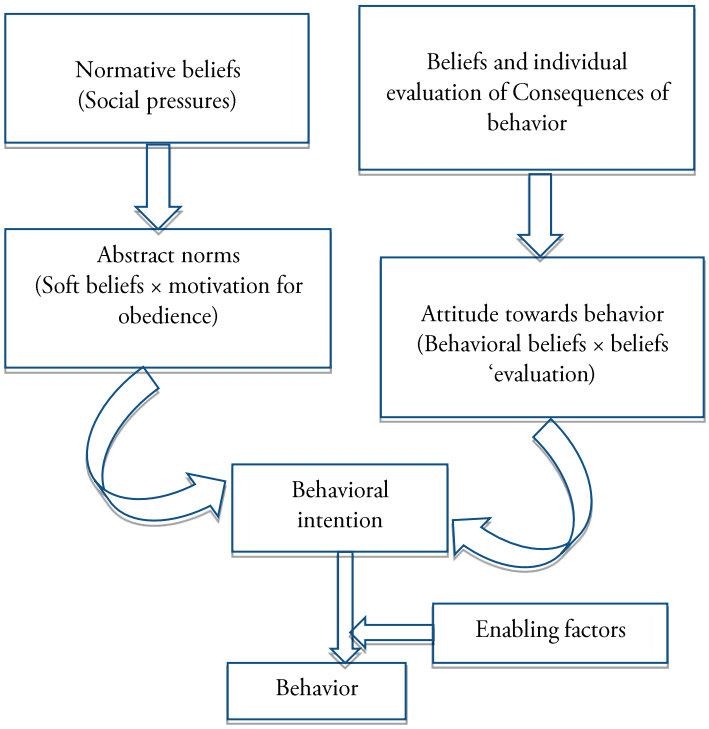

Figure 1. A BASNEF model

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Methods

The present study is a type of evaluation that was carried out in 2015 in the tile industry of Yazd. The research population in this study was 50 previously trained workers. The study protocol was in accordance with institutional medical ethics board and approved by the ethic committee of the University (113840-24931-27-01-93). Workers were almost identical in terms of age, work experience, working environment and exposure to noise, and did not have a significant statistical difference. Theoretical-practical training was held once a week in five sessions each for a period of 30 to 45 minutes based on workers' ability and willingness. According to Table 1, all training classes based on the components of the BASNEF model were designed in the form of consciousness, individual attitude and enabling factors, behavioral intention and performance and classified and implemented with appropriate methods.

The Kirkpatrick model questionnaire was used to evaluate the BASNEF course. After completing the studies, a questionnaire was prepared based on the structures of the Kirkpatrick model according to similar questionnaires. The required information was collected through a self-made questionnaire based on the Kirk Patrick model in four levels.

Table1. Basnef model learning scenario

No	Topic	Trainer	Type of teaching	Type of BASNEF model
First session	-Explaining the importance and purpose of training -A brief explanation of how the training process takes place -Distribution of educational pamphlets and a brief overview of the general noises of the work environment and the performance of the humans' hearing system	Supervisor Professional Health expert	Theory	Awareness attitude influential people enabling factors
Second session	Distribution of educational pamphlets and brief findings on voice complications, hearing loss, prevention and treatment of hearing loss	Medicine specialist	Theory	Awareness attitude influential people enabling factors
Third session	-Distribution of educational pamphlets and a brief overview of the importance of protecting earmuff and the role of earmuff -Demonstration of all kinds of earmuffs through the practical presentation -An explanation of the disadvantages and advantages of earmuffs	Professional health expert	Theory practical	Awareness attitude influential people enabling factors
Fourth session	-An explanation of how to properly use protective devices, how to select and keep and protect the earmuffs with a practical demonstration. - Invitation of a worker who uses the earmuff in work shifts to explain the reasons for its use and benefits (influential people)	Professional health expert	Theory practical	Awareness attitude influential people enabling factors
Fifth session	Review and comparison of the auditory results of previous years by each employee to increase the motivation of using the earmuff	Professional health expert	Theory practical	Attitude influential people enabling factors
Supplementary training 1	Professional health expert was at the workplace to have a face-to-face training to recall previous important topics and to answer their questions about educational pamphlets, training sessions and to summarize the points of the previous sessions to each worker	Professional health expert	Theory practical	Awareness attitude influential people enabling factors
Supplementary training 2	A weekly SMS reminder containing messages from the main training sessions was sent to the intervention group from the end of the fifth session to three months after the weekly intervention and they were asked to send a message to receive SMS.	Professional health expert	Theory	Awareness attitude influential people enabling factors
Supplementary training 3	In the workplace, posters containing messages on the type of protective equipment, how to use hearing protection and the main mentioned points of the training are stuck on the wall.	Professional health expert	Theory	Awareness attitude influential people enabling factors

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Table 2. Distribution of Frequency of the surveyed workers' demographic characteristics

Demographic data	variable	number	percent	mean (standard deviation of auditory threshold) (dB)
Age (year)	21-26	24	24	17.90(2.20)
	27-33	49	49	20.20(4.03)
	34-50	27	27	25.07(4.63)
Marital status	Married	69	69	20.93(4.76)
	Single	31	31	21.42(5.80)
Education	Illiterate elementary	27	27	21.53(3.68)
	cycle	38	38	20.98(6.19)
	Diploma	27	27	20.29(4.34)
	Undergraduate diploma - bachelor	8	8	22.75(6.01)
Work experience (years)	1-6	15	15	18.57(3.91)
	6.1-12	66	66	21.12(5.56)
	12.1-18	19	19	23.16(5.06)

Table 3. Results of the evaluation of Kirkpatrick model in the workers' group

Evaluation domains	mean	the standard deviation
Results	87.06	12.00
Behavior	86.30	9.57
Learning	84.80	13.05
response	81.28	11.33

The validity and reliability of this questionnaire were evaluated by twelve occupational health education experts, who had obtained a Cronbach alpha of 0.83 and CVI 0.91. The first domain (response) consists of 15 questions according to the Likert scale, which is related to the evaluation of the participants' opinion about the course, determines respectively the content, the teacher, and the facilities as factors influencing the implementation of the training course. The second domain (learning) consists of 4 questions related to the awareness and attitude of the participants. The third domain (behavior) consists of 4 questions, in which the behavior of the participants has completed through the questionnaire. The fourth domain (results) includes 6 questions, the results of the training can be studied in the form of a questionnaire. For data analysis (mean and standard deviation), SPSS software version 19 was used.

Results

The largest age range is between 27 and 33 years (49%) and the highest work experience ranges from 1.6 to 12 years (66%). 69% are married. Levels of education are illiterate and elementary (27%), cycle (38%), and diplomas (27%) Table 2.

To evaluate the effectiveness of the curriculum, the Kirkpatrick evaluation model was used. The results of the questionnaire of the group of workers who have already passed the BASNEF course for using the earmuff are listed in Table 3.

The results show that the highest average score is respectively in the domain of results 87.06, behavior 86.30, learning 84.88, content 81.36 and response81.28 respectively. In general, the score of the evaluation domains is above 80, which indicates the positive effects of training. The table is adjusted and distribution of the frequency of answers to questions in various dimensions of the questionnaire is also written.

Discussion

In this evaluation, the average response domain was 81/28; which appears that the workers are satisfactorily satisfied with the course. These are related to training, curriculum, materials and educational equipment, classes or equipment and the content of training courses. Mohan et al. stated that most of the respondents had a high degree of satisfaction with the course of the course.[11] In a study by Hadavandi, 62.4% of the participants had a great deal of content, subject, and instructor.[12]The results of this study are consistent with the findings of the Babaei's study on the relevance of the curriculum to the needs of the learners.[13] In this evaluation, the skill level,

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techniques were measured by the learning environment, which had an average score of 80/84. Pourjahromi, in order to evaluate the effectiveness of the course of work with the electroconvulsive therapy (ECT) in nurses based on the Kirkpatrick model, concluded that the triple factors ' response was desirable and could make effective changes in the four domains and have an influential effect.[14] Findings of the learning variable are consistent with the results of Reynolds and Hancock 2010, Akinoglu and Tandoğan 2007, Nandi et al. 2000.[15-17] Finally, the results of the present study show that learning contributes to the effectiveness of industrial training which was commissioned by researchers such as Cortella and Jlaws 2003, and Kirkley et al. 2003, Kent and Barat 2003 and Miguel 2003.[18-21] In this study, Kirkpatrick's evaluation model evaluates the training which shows the positive impact of Kirkpatrick's training model. Therefore, the findings are confirmed by the results of San and Williams 2004.[22] Omar et al. also evaluated the curriculum using the Kirkpatrick model.[23] In this study, using the Kirkpatrick model, the desirability of the course in four levels was evaluated which was desirable at all levels.

Contradiction of interest

The authors did not report any contradiction of interests.

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