

**Effect of Educational Program on Occupational Health and Safety Behavior among
Workers at Brick Industry.**

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A B S T R A C T

Background: Brick industry exacerbated common health problems of workers . Work-related diseases are under recognized due to the lack of Personal Protective Equipment's utilization (PPE) and lack of studies showing new occupational health and safety behavior among brick industry workers. **Aim:** The purpose of the current study is to evaluate the effect of educational program on occupational health and safety behavior among workers at Brick industry. **Design:** A quasi-experimental one-group pretest-posttest was used. **Setting:** the study was conducted in six brick industries in El-Staff city, Giza Governorate. **Sample:** 380 of brick industry workers were included in this study according to the sample size calculator. **Results:** Showed a highly significant relations between workers determinants occupational health and safety behaviour regarding PPE utilization after participation in the program, p -value < 0.05 . **Conclusions:** Findings demonstrated that workers whom received a health educational program had a positive predictive relationship between workers characteristics and experiences and their behaviour-specific cognitions and affect related to occupational health and safety behaviours at Brick industry. **Recommendation:** Organizing training programs to brick industry workers on occupational health and safety behaviour that covers all brick industries in different settings in Egypt.

Keywords: Educational Program, Occupational Health and Safety Behavior and Brick Industry workers.



Background

Brick industries are the most important industrial sector. These industrial sectors provide a large number of employment opportunities to rural unskilled illiterate and less educated workers. Many workers are working in these sectors on a contract basis, subject to the high risk of industrial accidents and occupational health hazard due to lack of safety, health and sanitary measures.¹The International Labor Organization (ILO,2017) has estimated that over 2 million people die every year from work-related accidents and diseases, and over 300 million non-fatal accidents are recorded each year.²

Workplace can pose threats to workers health in some conditions. Occupational health is to maintain worker's health and working capacity, to improve the working environment to become conducive to safety and health and to develop the working organizations and cultures in a direction which supports health and safety of workers. Successful occupational health and safety practice requires the collaboration and participation of both employers and workers in occupational and environmental health behavior and involves the consideration of issues relating to occupational medicine, industrial hygiene, toxicology, education, engineering safety, ergonomics, psychology, etc.³

Occupational health and safety behaviour applications could help in lowering accidents at industry sites and also to reduce production prices, growth productiveness and profitability as well as it has extra importantly that can save lives of workers.⁴ The use of personal protective equipment (PPE) is one of the most important measures to safeguard workers from exposure to occupational hazards, especially in developing countries where



conventional occupational safety control principles remain a challenge to implement. The use of PPE is affected by sociodemographic, behavioural and work environment factors.⁵

According to a study conducted by Bahadur, Budhathoki, Sushmita and Karki (2018)³ to find out the practice related to occupational health and safety among the brick factory workers at Nepal with a total number of 300 samples of brick factory workers. The study reported that majority of participants were aware about occupational hazard but their practice level of personal protective equipment is low for protecting themselves and about 54.7% of workers use gloves, 25.3% use boot and 18% use mask as personal protective equipment. So, the practice of personal protective equipment should be encouraged in the brick factory for the promotion of occupational health and safety behaviour. Educational health promoting behaviour of workers are crucial for effective and efficient practices of occupational health and safety behavior in work environment.⁶

Aim of the study:

The current study aims to evaluate the effect of educational program on occupational health and safety behavior among workers at Brick industry.

Research Hypothesis:

H1: The post-test- mean personal protective equipment knowledge scores of brick industry workers who are exposed to educational program will be higher than pre-test mean knowledge scores.



H2: The post-test - mean utilization of personal protective equipment practice scores of brick industry workers who are exposed to educational program will be higher than pre-test mean practice scores.

H3: The workers whom received a health educational program will have a positive predictive relationship between workers characteristics and experiences and their behaviour-specific cognitions and affect related to occupational health and safety behaviours at Brick industry.

Operational definition:

Occupational health and safety behavior are the manner of appropriate utilization of personal protective equipment that are intended to prevent accidents and occupational disease which raised from hazards relevant to brick industry.

Material and Method:

Design

A quasi-experimental one-group pre-test, immediate and post-test design was used.

Setting: This study was conducted in in six brick industries in El-Saff city, Giza Governorate. These industries were selected by systematic random sample.

Sampling

The total number of workers of this study was calculated to be 380 according to the sample size calculator.



Tools and data collection

Data of this study was collected through brick industry workers knowledge and Personal protective equipment (PPE) observational checklist, which was developed by the researcher based on an extensive review of national and international literature to assess. It consists of:

1) Brick worker's characteristics and experiences related to PPE questionnaire:: It consists of three parts:a) Worker's personal factors which include the following: e.gdemographic characteristics, self-reported health problems of the workers, occupational hazards facing the workers and current health status of the workers .b) Worker's knowledge of personal protective equipment questionnaire. It consists of questions related to PPE definition, benefits, uses, types, etc. It was used as pre –post-test). Scoring system: the correct and complete answer (good) was given 2, the correct and incomplete answer (average) was given 1, while the unknown or wrong answer (poor) was given 0. A total score of knowledge was computed by summing correct responses of all questions. Total knowledge was categorized as good ($\geq 75\%$), average (50% to $\leq 75\%$) and poor knowledge ($< 50\%$) .c) Personal protective equipment (PPE) observational checklist: it includes 56 Questions related to PPE utilization. It was designed to evaluate worker's use of PPE as gloves, mask, protective cloth, head cap, protective shoes, hearing protection and eye protection, etc. It was used as pre –post-test. Scoring system:workers were scored 1 point if they adopted good use of PPE and 0 if they did not. A total score of practice was computed by summing correct practice of the total performance. The practice was categorized as good ($\geq 75\%$), average (50% to $\leq 75\%$) and poor ($< 50\%$).



Part II: The determinants of occupational health and safety behaviours (DOHSB) questionnaire: It was including 5 subscales representing the constructs from one of the major health promoting behaviour in nursing. The DOHSB questionnaire was used to investigate multiple determinants of occupational health and safety behaviour regarding PPE use. It was used as pre –post tests. All items (responses) of the DOHSB questionnaire was scored on the basis of the 5-item Likert scale (0: don't know/not applicable, 1: strongly disagree, 2: often disagree, 3: often agree and 4: strongly agree). The scores were categorized into three levels: favourable (mean score of higher than 75), partly favourable (mean score between 50-75), and unfavourable (mean score of less than 50).

Validity & Reliability

Five experts from the community health nursing department and occupational and environmental medicine, Cairo university were asked to check the tools for content validity. Cronbach's alpha was used to determine internal consistency of the tools. Modifications were made according to the panel judges. The tool was tested for reliability using Cronbach's Alpha 0.76.

Data collection:

Data collected for the study before the educational program implementation, all workers completed informed consent, demographic characteristics, then the pretest conducted for assessment of the knowledge, and observational checklist of workers practices. Posttest had conducted immediately and three months after the educational program implementation for all workers. The time spent to fill the questionnaires ranged between 10-15 minutes (pre and



posttest).The program was implemented separately in each brick industry.The target group was divided into sub group in the same manner by the researcher. Duration of session was 20-30 minutes. Teaching methods and media included were group discussions&training,Arabic handout, demonstration, PPE sample andpower point presentations. The program was implemented on 4 sessions fromAugust 2019 till February 2020.

Data Analysis

Statistical Package for the Social Sciences (SPSS)program, version 20. Numerical data were expressed as means and standard deviations. Quantitative data were expressed as frequencies and percentages. Comparison between pretest, posttest, and 3 months follow up test was done by using t-test and ANOVA.



Results

Table (1): Percentage distribution of demographic characteristics of the brick industry workers ($N=380$).

Demographic characteristics	No	%
Age		
18 < 25	150	39.5
25 < 50	195	51.3
≥ 50 +	35	9.2
(mean \pmSD)	33.9 \pm 8.77	
Income		
enough	13	3.4
Enough and more	0	0.00
not enough	367	96.6
Level of education:		
Doesn't read and write	36	9.5
Read and write	114	30.0
Diploma	161	42.4
University	69	18.2
Working experience		
< 5 years	41	10.8
5 < 10yrs	80	21.1
10 < 15 yrs	148	38.9
≥ 15 yrs	111	29.2
(mean \pmSD)	12.17 \pm 5.46	

Table (1) shows that, more than half (51.3 %) of the brick industry workers aged from 25 years to less than 50 years old, while 39.5 % aged from 18 years to less than 25 years old and 9.2 % aged 50 years or more with a mean age 33.9 years and SD \pm 8.77. Regarding level of education, around one third of the workers can read and write (30 %) and 42.4% had diploma education. Working 10 to less than 15 years represented 38.9% while working more than or equal 15 years accounted for 29.2%. Almost all of the workers (96.6%) had no enough income.



Table (2):The relation between the determinants of occupational health and safety behaviours of brick industry workers regarding PPE utilization through intervention (N=380).

Item	Intervention time [n (%)]	Don't know/ Not applicable (0)	Strongly disagree (1)	Often disagree (2)	Often agree (3)	Strongly agree (4)	X2	p
Occupational health safety behaviour.	<i>PRE</i>	159(41.8%)	31(8.15%)	48(12.6%)	55(14.5%)	87(22.9%)	224.4	0.000
	<i>Immediate</i>	42(11.05%)	53(13.9%)	54(14.2%)	75(19.7%)	156(41.05%)		
	<i>Post</i>	10(2.6%)	47(12.3%)	51(13.4%)	84(22.1%)	188(49.4%)		
Perceived benefits	<i>PRE</i>	337(88.7%)	13(3.4%)	14(3.7%)	10 (2.6%)	6 (1.5%)	281.1	0.000
	<i>Immediate</i>	174(45.7%)	25(6.5%)	15(3.9%)	71(18.6%)	95(25%)		
	<i>Post</i>	135(35.5%)	8(2.1%)	25(6.5%)	91(23.9%)	121(31.8%)		
Perceived barriers	<i>PRE</i>	131(34.4%)	24(6.3%)	34(8.9%)	27(7.1%)	164(43.1%)	91.57	0.001
	<i>Immediate</i>	57(5%)	52(13.6%)	74(19.4%)	29(7.6%)	168(44.2%)		
	<i>Post</i>	45(11.8%)	57(15%)	79(20.7%)	37(9.7%)	162(42.6%)		
Perceived self-efficacy	<i>PRE</i>	201(52.8%)	67(17.6%)	38(10%)	46(12.1%)	28(7.3%)	158.7	0.000
	<i>Immediate</i>	176(46.3%)	33(8.6%)	31(8.1%)	62(16.3%)	78(20.5%)		
	<i>Post</i>	136(35.7%)	17(4.4%)	5(1.3%)	80(21.0%)	142(37.3%)		
Interpersonal influences of friends and family	<i>PRE</i>	249(65.5%)	6(1.5%)	2(0.5%)	28(7.3%)	95(25%)	130.9	0.000
	<i>Immediate</i>	210(55.2%)	4(1.05%)	0(0.00%)	26(6.8%)	140(36.8%)		
	<i>Post</i>	104(27.3%)	3(0.78%)	0(0.00%)	45(11.8%)	228(60%)		

Table (2) depicts highly significant relations between workers determinants occupational health and safety behaviour (occupational health and safety behaviour, perceived benefits, perceived barriers, perceived self- efficacy and interpersonal influences of friends and family) and the pre-test, immediate test and post-test score, p -value < 0.05.

Discussion

Occupational health and safety behavior are neglected and often given less attention. Negligence of occupational health and safety behavior in day to day brick industry workers life is seen. It can prevent the workers from occupational diseases and accidents and same time increased the efficiency of workers.³ Having proper occupational health and safety



behavior measures against industrial accidents and occupational health hazards is the fundamental right of all workers.⁸

Findings of the present study revealed that workers' knowledge total score about PPE utilization were statistically significant improvement among workers' post-test program implementation. This improvement in knowledge score of workers' post-test program may be due to the health education program implementation and booklet. As well as, workers' education is not an once time session and there is immediate test follow the program implementation.

In accordance with a study conducted by Ahmad et al. (2018)⁸ to assess the availability and use of PPEs as well as self-reported occupational exposures among workers in surveyed small industries in Saudi Arabia. The study found that, lack of education limits workers accessibility to knowledge, information and training prospects along with putting them at a greater risk to injuries, diseases and other negative health outcomes. Studies proved that small scale enterprises workers have deficiency of understanding, knowledge and information on proper use of PPEs and are least aware of health effects resulting from the workplace activities and materials.

Findings of the present study depicts highly significant relations between workers determinants occupational health and safety behavior (occupational health and safety behavior, perceived benefits, perceived barriers, perceived self- efficacy and interpersonal influences of friends and family) and the pretest, immediate test and posttest score, p -value < 0.05.



In the present study, the PPE most often mentioned as a requirement were mask, safety shoes, gloves, etc. The perceived benefits listed in the present study were consistent with a study conducted by Wright, Adhikari, Yin, Vogel, Smallwood and Shah (2019)⁹ to examine wastewater worker's beliefs and practices on wearing PPE in USA. Findings indicated that workers were not knowledgeable of mandatory PPE that is required to wear during their work. It is supposed that prior knowledge of workers about safety measures increased their utilization and compliance with PPE in their industries.

Also, the perceived barriers listed in the present study were consistent with findings from the last study. Unavailability of PPE and equipment being expensive may be a barrier that hinders PPE compliance among brick industry workers. It is suggested that training workers on safety measures is vital in increasing their knowledge, competence, and use of PPE at the workplace. Regarding the perceived self-efficacy of PPE utilization compliance, brick industry workers indicated that they agreed that they are confident that the PPE utilization is the proper equipment to protect them from hazards exposure. Therefore, the workers confidence increases through wearing PPE. Therefore, inter personal influences could be an important factor that increases PPE compliance in industries.

Conclusion:

Based on the study results, it can be concluded that knowledge and observed practices of brick industry workers had been improved after program implementation with statically significance differences between pre, immediate, and post-test (3 months later). The workers whom received a health educational program had a positive predictive relationship between



workers characteristics and experiences and their behaviour-specific cognitions and affect related to occupational health and safety behaviours at Brick industry.

Recommendations: According to the result, the following recommendations are suggested:

1. Organizing training programs to brick industry workers on occupational health and safety behavior that covers all brick industries in different settings in Egypt.
2. Enforcing the pre-employment medical, periodic examination and health insurance of brick industry workers.

Ethical consideration:

The researcher emphasized that participation in the study was entirely voluntary, written informed consent was obtained from each participant, after explanation of the study objectives and procedures. Anonymity and confidentiality were assured. Participants were assured that all data would not be reused in another research without taking the permission of the participants.

Source of Support: Self

Conflict of Interest:None



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