

Occupational Program for Improving the Health of Gasoline Workers

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Abstract: The aim of this study was to evaluate the effect of occupational program for improving the health of gasoline workers at stations. **Design:** A quasi –experimental design was used. **Setting:** This study was conducted at gasoline stations in Benha City. **Sample:** The total sample was used as follows, the total number of gasoline stations in Benha City was (10) stations, all workers at stations were included in the study (41). **Tools:** Two tools were used for data collection. 1) An interviewing questionnaire, concerning demographic characteristics, and medical history of the workers about health during last month, workers' knowledge related to effect of gasoline on health and their practices during emergency. 2) Observational checklist was designed to evaluate the gasoline environment, and worker practices related to safety measures during the work. **Results:** The frequency distribution of workers' age ranged between 30 -<50 years as accounted for 75.6%, while 52% of them had intermediate education, and 68.3% hadn't any training program. The workers' knowledge about gasoline by age revealed that 32.3% with age 30->40 had poor knowledge about gasoline meaning, and gasoline toxicity. The workers' knowledge after the program was improved compared to pre program, as well as practices as reported by the workers there were statistically significant differences between pre and post program regarding to knowledge and practices about emergency. **Conclusion:** The gasoline stations' workers are in need for more training program to upgrade their knowledge, and improve their practices to protect them from work hazards and improve their health. The occupational program improved workers' knowledge regarding to gasoline and its dangerous effect on health but the practices slightly improved after the program implementation. **Recommendations:** Workers at gasoline stations need more attention for safety protective devices, regular training program, and regular checkup for their health status. [Mahbouba Sobhy Abd El Aziz, and Ebtisam Mohamed Abd -El Aal. **Occupational Program for Improving the Health of Gasoline Workers.** *J Am Sci* 2012;8(7):33-41]. (ISSN: 1545-1003). <http://www.jofamericanscience.org>. 6

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1. Introduction

A healthy work environment is one in which staff have made health and health promotion a priority and part of their working lives. There are at least 250 million occupational accidents every year worldwide, at least 335,000 of which result in death. Developing countries have more fatal accidents than industrialized nations, so that emphasizing the need for health and safety education programs that focus on prevention (WHO, 2011).

Gasoline is a volatile mixture of toluene, xylene, benzene, and other hydrocarbons. The relative concentrations of these substances are dependent upon manufacture and use gasoline vapor inhalation to produce euphoric effects (Takamiya et al., 2003).

Gasoline is a colorless, pale brown or pink liquid, very flammable; it catches on fire quite easily, evaporates quickly, and forms explosive mixtures with air. Occupational exposure to gasoline occurs in oil refineries, petrochemical plants, petroleum distribution terminals, marine petroleum tankers, and among car mechanics (Eleanor et al., 2010).

Workers in these occupations and industries may be at increased risk of cancer due to gasoline and some of its constituents such as benzene. Many of the

harmful effects seen after exposure to gasoline are due to the individual chemicals in the gasoline mixture, such as benzene and lead in very small amounts. Inhaling or swallowing large amounts of gasoline can cause death. The levels of gasoline that killed people are about 10,000-20,000 ppm when breathed in, and about 12 ounces when swallowed (The American Association of Occupational Health Nurses, 2011).

Workers should be protected from sickness, disease and injury arising from their work. Some two million people die every year from work-related accidents and diseases. An estimated 160 million people suffer from work-related diseases, and there are an estimated 270 million fatal and non-fatal work-related accidents/year. The suffering caused by such accidents and illnesses to workers and their families is incalculable (International Labour Organization, 2011).

People constantly exposed to gasoline leaks have complained of severe nausea, bleedings, memory losses, dizziness and even partial seizures causing fatal heart attacks (Senzolo et al., 2001). Major symptoms of intoxication with leaded gasoline include headache, fatigue, irritability, impaired concentration,

wrist/foot drop, dyspepsia, constipation, colic, loss of libido and anemia (*Mudipalli, 2007*).

Occupational and environmental health nursing is a specialty that provides health and safety programs to workers and community groups. An occupational health nurse focuses on promotion and restoration of health, prevention of illness and injury, and protection from work-related and environmental hazards (*McKay, 2011*).

Magnitude of the Problem

Occupational diseases have been recognized for many years and affect workers in different ways, such diseases are still problems in all parts of the world, the numbers of work-related diseases in developing countries are much higher in reality than the numbers that are reported, the numbers of cases and types of occupational diseases are increasing in both developing and industrialized countries (*Saponaro et al., 2009*).

The working age in Egypt ranges from 15-60 years, and the labor force increased in 2003 to 198,768 workers. An estimated 22,570 occupational injuries resulted in 127 fatalities, 366 cases of handicapped and 56 disabilities that lead to 459,779 days of absenteeism (*CAPMS, 2005*).

Hazards in the workplace can be found in a variety of forms, including chemical, physical, biological, psychological, and non-application of ergonomic principles, etc. Because of the multitude of hazards in most workplaces and the overall lack of attention given to health and safety by many employers, work-related accidents and diseases continue to be serious problems in all parts of the world (*International Labour Organization, 2011*).

Aim of the Study

The study aimed to evaluate the effect of occupational program for improving the health of gasoline workers at stations through:

- 1- Assessing the workers' knowledge and practices to determine their needs regarding the effect of gasoline on their health
- 2- Designing and implementing an occupational program according to their needs.
- 3- Evaluating the effect of program on improving the workers' knowledge and practices related to their health.

Research Hypothesis

The occupational program will improve the gasoline workers' knowledge and practices related to their health.

Subjects and Methods

Research design

A quasi experimental design was utilized to conduct the study.

Setting

The study was conducted at all gasoline stations in Benha City; it comprises 10 stations that are namely: Abd Elaziz Eldebaky Station, Khaled Ahmed Station, Ahmed and Mohy Eldepaky Station, Yousef Khelds Station, Hosam Yasin Elgharieb Station, Naguib Bakr Station, Anhar Hassan Taha Station, Sania Ibrahim Morsy Station, Mohamed Samir Heiram Station, and Talal Abd Elhady Station (refused to participate in the study).

Sample

All workers at the gasoline stations in Benha City were recruited for the study. These were (41) workers distributed as follows: (6) car washers, (17) filling gasoline, (9) administrators, and (9) workers for repairing tyres.

Tools for data collection

Two tools were used to collect data:

I- **An interviewing questionnaire** to assess sociodemographic characteristics of the studied sample, workers' physical health, knowledge, and emergency care. It consisted of four parts:

The first part is concerned with sociodemographic data as: Age, years of working at station, training program, smoking, education, regular examination, working days/week, and period of working hours.

The second part included 5 questions related to physical health status of gasoline workers as regular investigation, health problems during last month as respiratory problems, gastrointestinal problems, nervous system problems, skin problems, and eye problems.

The third part included 4 questions related to workers' knowledge about practices during emergency of gasoline hazards' occurrence as reported by the workers; as eye care, respiratory care, digestive care, and skin care.

The fourth part included 11 questions about workers knowledge related to the effect of gasoline on health as gasoline content, signs of gasoline toxicity, effect of gasoline on eyes, skin, respiratory system, nervous system, and the digestive system and how to prevent effect of gasoline hazards.

Scoring system: For knowledge; the correct answer (good) was scored 2, while a correct but incomplete answer (average) was scored 1, and the unknown or wrong answer (poor) was scored 0.

II- Observational Checklist which includes two parts: (a) Data related to station environment such as; safety, cleanliness, ventilation, facilities (bathroom, dressing room); and b) Workers' practices related to safety measures during working with gasoline as smoking, eating, and drinking during working, use of gloves, use of special shoes, and follow up body mechanics.

Scoring system: For practices a regular positive item (good) was scored 2, while for sometimes positive items (average) was scored 1, and never or negative item (poor) was scored 0.

Validity Test: Content validity test was done through five expertises from Faculty members of Community Health Nursing Department.

Ethical Consideration:

Oral consent was taken from each worker and director of the station, they were informed that data will be used for research purposes only, and will be treated in confidential manner.

Occupational Health Program Construction:

The program was conducted in four phases:

I. Preparatory phase: A review of recent, current, national and international literature in various aspects related to the gasoline stations workers (health problems related hazards and needs).

II. Assessment phase: The pre-test questionnaire was implemented to identify the health condition, and environmental hazards and practices when dealing with emergency health problems through their knowledge.

III. Planning and implementing phase: The intervention program was designed with general objective to improve the gasoline station workers' knowledge and practices to prevent hazards during working at stations. The content of the program included the workers' knowledge related to work hazards in stations according to their needs toward health problems such as; respiratory system, skin, nervous system, gastrointestinal tract, and eye to improve their knowledge and practices.

Theory sessions (two) included:

- Knowledge related to gasoline as; meaning, toxicity, and practices during emergency of gasoline hazards.
- Danger of gasoline on body systems such as; **respiratory system** (dyspnea); **eye** (irritation, eye painful); **skin** (dermatitis, skin burn, and dryness); **GIT** (vomiting, burning sensation in mouth and esophagus); and **nervous system** (loss of consciousness, loss of sensation in nerve ending, headache, and drowsy).
- Signs and symptoms of gasoline toxicity such as dizziness, headache, regular bleeding, nausea, and convulsions which may lead to death.

Practical session (one) included:

- Safety measure practices to prevent gasoline hazards. As using gloves, wearing mask, no smoking, using special shoes and uniform, and following body mechanics during work.
- Practices during emergency care related to gasoline hazards such as: For eye; immediate washing of eye with running water, and

observing eye for any redness. For respiratory system; transfer casual worker at a place with fresh air, put him in semi sitting position, and encouraging him to do breathing exercises. For skin; immediately washing skin with water. For gastrointestinal tract; put casual worker in comfortable position, instruct him to avoid trying vomiting, and encourage the casual worker to drink a lot of juice.

Sessions were done twice/weekly from 10.00 a.m. to 3.00 p.m. Two sessions for theory and one session for practices. Workers participated in the sessions according to their working time schedule. The duration of each session lasted 15-30 minutes for theory sessions, and 30-45 minutes for the practical session.

IV. Evaluating phase

Evaluating the effect of the occupational program for improving the health of gasoline workers was performed through a post-test that was similar to pre-test to detect changes.

Field work:

- Preparation of data collection tools was carried out over a period of four months from beginning of May, 2010 to beginning of September, 2010.
- An official letter was issued from the Dean of Faculty of Nursing to the Director of Supply administration in Benha City to carry out the study.
- Approval was taken from the director of every station to conduct the study.
- Pilot study: A pilot study was conducted on 5 workers who were excluded from the main study sample to identify the clarity of questions and statements and estimate the time needed for applicability of the tools.
- The program design to be completed from October, 2010 to January, 2011.
- The researchers visited the gasoline stations during working times (from 10.00 a.m. to 3.00 p.m.), twice per week (Sundays & Thursdays). Assessment was done for 4 workers/day according to the workers' needs.
- Every worker took from 15-30 minutes for the theory sessions and 30-45 minutes for the practical one according to needs assessed from pre-test questionnaire. The program covered 14 weeks.
- During sessions, group discussion was used and booklet was provided about the program for each worker.
- Reassessment was done through a post-test using the same formats to evaluate the effect of the occupational program implementation.

3. Results

Table (1): shows that for 75.6% of workers age ranged from 30 -<50 years; 68.3% hadn't any training program, although 63.4% of them are working all days, and also 63.4% are working from 6-12 hours/day.

As for education, figure (1) illustrates that 52% of them had intermediate education.

Figure (2): clarifies that 51% of workers had regular smoking habit.

Table (2): shows that 14.6% of workers had regular medical examination through health insurance. Regarding health problems 68.3% had respiratory problems, while an equal percentage of 31.7% of the workers complained from nervous system and eye problems.

Table (3): displays the workers' knowledge about gasoline by their age, it reveals that only 6.5% of workers' aged 40-<50 years had good knowledge about the dangers of gasoline on eye, skin and respiratory system, while 32.3% of workers with age 30-<40 had poor knowledge about gasoline meaning, and toxicity, followed by 25.8% for GIT and nervous system problems. There were statistically significant relations for gasoline toxicity ($X^2=10.892$, $p=0.012$) and dangerous on eye ($X^2=14.887$, $p=0.0021$).

Table (4): reveals that 38.7% of workers with intermediate education had poor knowledge about gasoline and GIT problems, while the good knowledge was observed in relation to danger on eye, skin problems, and respiratory system problems, accounting for an equal percentage of 6.5%. There

were statistically significant relations about meaning of gasoline and nervous system problems ($X^2=8.119$, $p=0.044$ & $X^2=8.520$, $p=0.036$ respectively).

Table (5): clarifies that 51.6% of workers with 7 years of experience or more had poor knowledge about meaning of gasoline; and 54.8% had also poor knowledge about gasoline toxicity, while the good knowledge was observed in relation to danger on eye and skin problems representing an equal percentage 6.5% of workers. There were statistically significant differences about gasoline toxicity, and respiratory system problems ($X^2=10.70$, $p=0.01$; $X^2=32.58$, $p=0.00$ respectively).

Table (6): indicates that 90.2% of workers weren't using gloves and mask during work, while 65.9% of workers were wearing special shoes during work.

Table (7): shows that the workers' knowledge after the program was improved than pre program. There were statistically significant differences between pre and post program regarding total mean knowledge and total mean practices about emergency ($T=7.59$, $p<0.001$; $T=2.54$, $p<0.05$ respectively). However, for total mean practices the difference was statically insignificant.

Table (8): indicates that 80% of gasoline stations' environment had average dryness and cleanliness of the floor. As for presence of fire extinguishers 40% only had good methods and 100% of gasoline stations had no posters for hazards prevention.

Table (I): Frequency Distribution of Gasoline Workers Regarding their Sociodemographic Characteristics (n=41)

Items	No	%	X^2	P-value
Age (years)				
20-	3	7.3	8.35	0.03
30-	15	36.6		
40-	16	39.0		
50+	7	17.1		
Experience (years)				
1-<3	6	14.7	40.35	0.00
3-<5	3	7.3		
5-<7	3	7.3		
7+	29	70.7		
Training program				
No training	28	68.3	18.25	0.00
1-3	10	24.4		
3+	3	7.3		
Working days				
All days	26	63.4	13.61	0.00
4-5 days	8	19.5		
< 4 days/ week	7	17.1		
Period of work (hours)				
6-12	26	63.4	3.90	0.04

> 12	15	36.6		
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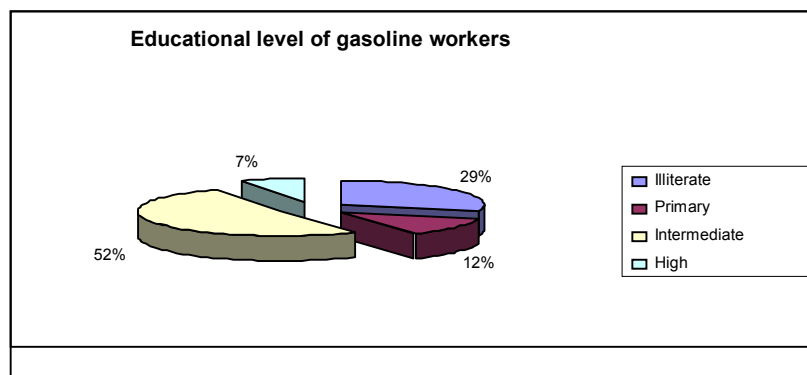


Fig (1): Frequency Distribution of Gasoline Workers Related to Educational Level

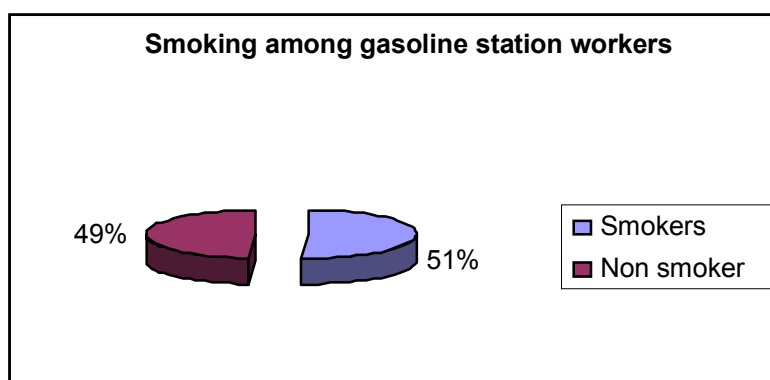


Fig (2): Frequency Distribution among Gasoline Workers Related to Smoking Habit

Table (2): Frequency Distribution of Workers According to Health Problems during Last Month

Items	No	%	X ²	P-value
Medical examination				
Health insurance	6	14.6	14.22	0.00
Private	35	85.4		
*Workers health status				
Respiratory problems	28	68.3	5.48	.019
Gastrointestinal problems	21	51.2	0.024	.876
Nervous system problems	13	31.7	5.48	.019
Skin problems	21	51.2	0.024	.876
Eye problems	13	31.7	5.48	.019

* Frequencies aren't mutually exclusive

Table (3): Frequency Distribution of Workers Knowledge about Gasoline by Age

Knowledge \ Age		Age (Years)								X ²	P-value
		20-<30		30-<40		40-<50		50+			
		No	%	No	%	No	%	No	%		
Meaning of gasoline	Poor	2	6.5	10	32.3	8	25.8	4	12.9	1.359	0.715
	Average	0	0.0	2	6.5	3	9.6	2	6.5		
	Good	0	0.0	0	0.0	0	0.0	0	0.0		
Gasoline toxicity	Poor	0	0.0	10	32.3	5	16.1	6	19.6	10.892	0.012
	Average	2	6.5	2	6.5	6	19.4	0	0.0		
	Good	0	0.0	0	0.0	0	0.0	0	0.0		
Danger	Poor	0	0.0	2	6.5	0	0.0	4	12.9	14.887	0.021

on eye	Average	2	6.5	10	32.3	9	29.1	2	6.5		
	Good	0	0.0	0	0.0	2	6.5	0	0.0		
Skin problems	Poor	0	0.0	4	12.9	5	16.1	2	6.5	6.405	0.379
	Average	2	6.5	8	25.8	4	12.9	4	12.9		
	Good	0	0.0	0	0.0	2	6.5	0	0.0		
Respiratory System problems	Poor	0	0.0	6	19.4	5	16.1	0	0.0	10.945	0.090
	Average	2	6.5	6	19.4	4	12.9	6	19.4		
	Good	0	0.0	0	0.0	2	6.5	0	0.0		
GIT system problems	Poor	2	6.5	8	25.8	6	19.4	4	12.9	1.614	0.656
	Average	0	0.0	4	12.9	5	16.1	2	6.5		
	Good	0	0.0	0	0.0	0	0.0	0	0.0		
Nervous system problems	Poor	0	0.0	8	25.8	2	6.5	2	6.5	7.243	0.065
	Average	2	6.5	4	12.9	9	29.1	4	12.9		
	Good	0	0.0	0	0.0	0	0.0	0	0.0		

Table 4: Frequency Distribution of Workers Knowledge about Gasoline by Education

Level of education Knowledge		Level of Education								X ²	P-value
		Illiterate		Primary		Intermediate		High			
		No	%	No	%	No	%	No	%		
Meaning of gasoline	Poor	8	25.8	4	12.9	12	38.7	0	0.0	8.119	0.044
	Average	2	6.5	0	0.0	3	9.6	2	6.5		
	Good	0	0.0	0	0.0	0	0.0	0	0.0		
Gasoline toxicity	Poor	6	19.4	4	12.9	9	29.1	2	6.5	3.543	0.315
	Average	4	12.9	0	0.0	6	19.4	0	0.0		
	Good	0	0.0	0	0.0	0	0.0	0	0.0		
Danger on eye	Poor	2	6.5	0	0.0	4	12.9	0	0.0	4.702	0.583
	Average	8	25.8	4	12.9	9	29.1	2	6.5		
	Good	0	0.0	0	0.0	2	6.5	0	0.0		
Skin problems	Poor	4	12.9	0	0.0	7	22.6	0	0.0	7.515	0.276
	Average	6	19.4	4	12.9	6	19.4	2	6.5		
	Good	0	0.0	0	0.0	2	6.5	0	0.0		
Respiratory System problems	Poor	6	19.4	0	0.0	3	9.6	2	6.5	11.732	0.068
	Average	4	12.9	4	12.9	10	32.3	0	0.0		
	Good	0	0.0	0	0.0	2	6.5	0	0.0		
GIT problems	Poor	4	12.9	2	6.5	12	38.7	2	6.5	5.665	0.129
	Average	6	19.4	2	6.5	3	9.6	0	0.0		
	Good	0	0.0	0	0.0	0	0.0	0	0.0		
Nervous system p	Poor	6	19.4	0	0.0	4	12.9	2	6.5	8.520	0.036
	Average	4	12.9	4	12.9	11	35.5	0	0.0		
	Good	0	0.0	0	0.0	0	0.0	0	0.0		

Table 5: Frequency Distribution of Workers Knowledge about Gasoline by Years of Experience

Years of experience Knowledge		Years of experience								X ²	P-value
		1-<3		3-<5		5-<7		7+			
		No	%	no	%	No	%	No	%		
Meaning of gasoline	Poor	4	12.9	2	6.5	2	6.5	16	51.6	3.14	0.37
	Average	0	0.0	0	0.0	0	0.0	7	22.6		
	Good	0	0.0	0	0.0	0	0.0	0	0.0		
Gasoline toxicity	Poor	4	12.9	0	0.0	0	0.0	17	54.8	10.70	0.01
	Average	0	0.0	2	6.5	2	6.5	6	19.4		
	Good	0	0.0	0	0.0	0	0.0	0	0.0		
Danger on eye	Poor	0	0.0	0	0.0	0	0.0	6	19.4	3.75	0.71
	Average	4	12.9	2	6.5	2	6.5	15	48.4		
	Good	0	0.0	0	0.0	0	0.0	2	6.5		

Skin problems	Poor	2	6.5	0	0.0	0	0.0	9	29.1	3.83	0.69
	Average	2	6.5	2	6.5	2	6.5	12	38.7		
	Good	0	0.0	0	0.0	0	0.0	2	6.5		
Respiratory system problems	Poor	2	6.5	0	0.0	0	0.0	9	29.1	32.58	0.00
	Average	2	6.5	2	6.5	0	0.0	14	45.2		
	Good	0	0.0	0	0.0	2	6.5	0	0.0		
GIT problems	Poor	2	6.5	2	6.5	2	6.5	14	45.2	2.70	0.44
	Average	2	6.5	0	0.0	0	0.0	9	29.1		
	Good	0	0.0	0	0.0	0	0.0	0	0.0		
Nervous system problems	Poor	0	0.0	0	0.0	0	0.0	12	38.7	6.81	0.07
	Average	4	12.9	2	6.5	2	6.5	11	35.5		
	Good	0	0.0	0	0.0	0	0.0	0	0.0		

Table (6): Frequency Distribution of Gasoline Workers in Relation to their Practices

Items	Never		Sometimes		Always		X ²	P- value
	No	%	No	%	No	%		
Wearing gloves	37	90.2	3	7.3	1	2.4	59.90	0.00
Using mask	37	90.2	3	7.3	1	2.4	59.90	0.00
Wearing special shoes	27	65.9	5	12.2	9	22.0	20.09	0.00
Eating during work	18	43.9	9	22.0	14	34.1	2.97	0.226
Drinking	21	51.2	10	24.4	10	24.4	5.90	0.05
Chewing gum	27	65.9	5	12.2	9	22.0	20.09	0.00
Drinking milk	23	56.1	8	19.5	10	24.4	9.707	0.008
Using body mechanics	23	56.1	11	26.8	7	17.1	10.146	0.006

Table 7: Gasoline Workers Knowledge, Practices, and Practices about Emergency as Reported by Them Pre/Post Program.

Items	Before program		After program		T	P- value P
	Mean	±SD	Mean	±SD		
Total knowledge	4.12	2.33	8.36	2.23	7.59	<0.001
Total observed practices	2.34	2.82	3.21	2.09	1.59	>0.05
Total practices about emergency	6.39	4.83	8.26	3.54	2.54	<0.05

Paired T test was used

Table 8: Distribution of Gasoline Stations' Environmental levels

Items	Poor		Average		Good		X ²	P- value
	No	%	No	%	No	%		
Station structure								
Dry and clean floor	2	20.0	8	80.0	0	0.0	3.60	0.058
Rooms for changing clothing	6	60.0	2	20.0	2	20.0	3.200	0.202
Presence of W.C	8	80.0	0	0.0	2	20.0	3.60	0.058
Ventilation	0	0.0	0	0.0	10	100.0	-	-
Place for bathing	17	41.5	-	-	24	58.5	1.195	0.274
Preventive measures & equipment								
Posters for hazards prevention	10	100	0	0.0	0	0.0	-	-
Presence of fire extinguishers	4	40.0	2	20.0	4	40.0	0.800	0.670
Material for fire	4	40.0	4	40.0	2	20.0	0.800	0.670

Statistical analysis

All results were analyzed using Statistical Package for Social Science (SPSS) which include student's paired T-test, chi square. A change was defined significant if the difference between variables' reached $P < 0.05$ & 0.001 .

4. Discussion

Work plays a central role in people's lives, who in every occupation can be faced by a multitude of hazards in the workplace. Preventing work-related diseases and accidents must be the goal of

occupational health and safety programs, rather than attempting to solve problems after they have already developed.

This study revealed that three quarters of the workers' age ranged between 30 -< 50 years, and more than two thirds hadn't any training program; although less than two thirds of them were working all days, and from 6-12 hours/day (Table 1). These results were in agreement with *Abdel Monem et al. (2010)*, who reported that the gasoline station workers had a mean age $\pm$ SD of 34.4 ± 10.7 years. As for educational level of the workers, results showed that 36.2% had finished secondary school. Neither workers attended training courses, nor they had health professionals visited their station. As well, the previous results were also in accordance with *Yassin and Baroud (2009)*, who stated that the age of the gasoline station workers ranged between 17 and 60 years with the mean of age 30.7 ± 9.4 years old, 51.0% had finished secondary school, and the average weekly working hours was 51.4 ± 11.1 hrs/week; 75.5% of them are working 48 hrs/week.

The current study findings revealed that slightly more than half of workers had intermediate education (Figure 1). This result is to some extent supported by *Abdel Monem et al. (2010)*, who reported that 36.2% of the gasoline station workers had finished secondary school education.

Concerning smoking habit, slightly less than half of workers were non smokers (figure 2). This finding was on line with *Abdel Monem et al. (2010)*, who stated that the number of workers who mentioned not smoking represented 48.6%. However, *Carrieri et al. (2006)* Reported that, 27% of all subjects were exposed to passive smoking.

As regards the medical examination, the present study result showed that less than half had regular examination through health insurance (Table 2). This finding was supported by *Monazzam and Soltanzadeh (2009)*, who stated that only a small percentage of their industry is given insurance services. Considering workers health status, in the present study more than two thirds had complaints from respiratory problems, while less than one third of them were complaining from nervous system problems and eye problems (Table 2). This finding was congruent with *Habeck (2010)*, who reported that brief exposure to lower levels of benzene in air can cause drowsiness, dizziness, rapid heart rate, headaches, tremors, confusion, unconsciousness, and can cause general irritation and damage of the eye. In the current study, these problems could be due to that workers exposed to air pollution with smoke for long period of work can cause systematic problems.

According to workers' knowledge, the present study clarified that workers knowledge about gasoline

by their age revealed that less than tenth aged 40-<50 years had good knowledge about danger of gasoline on eye, skin and respiratory system (Table 3). These findings were in agreement with *Caprino and Togna (1998)*, who reported inadequate information on general population exposure. As well, *Abdel Monem et al. (2010)* Emphasized that the gasoline station workers hadn't any training program. The lack in workers' knowledge could be due to lack of training programs.

Regarding to knowledge of workers about gasoline by their education the current study result revealed that more than one third of intermediate education had poor knowledge about meaning of gasoline and gastrointestinal tract problems, while the good knowledge was observed as regards danger on eye, skin problems, and respiratory system problems, representing only a minority of less than tenth of workers (Table 4). This finding was in disagreement with *Yassin and Baroud (2009)*, who reported that the education of the gasoline station workers related to their knowledge about health effects of leaded gasoline showed that the higher the level of education, the more knowledge they had.

The present study result showed that most of the workers had never used protective measures during their work in the station as wearing gloves, using masks (Table 6). This result was supported by *Habeck (2010)*, who stated that workers should receive training courses including instructions about the use and care of appropriate protective equipment and on the manner of wearing it. This may be due to that protective measures were unavailable in the stations.

Investigating the effect of the educational program the current study results clarified that the workers' knowledge after the program implementation was improved than pre program. There were statistically significant differences between pre and post program mean scores regarding total knowledge, total practices about emergency care (Table 7). This result is corresponding with *Young et al. (1999)*, who reported that the employees in gasoline station should be educated regarding knowledge and practices about gasoline.

As well, the previous findings were in accordance with *Bahrami et al. (2002)* and *Habeck (2010)*, who emphasize that the workers in gasoline stations should receive training courses including instruction. The health program led to decrease health risks among gasoline station workers.

As regards safety environment, the present study showed that the majority of gasoline stations' environment had average cleanliness and dryness of the floor, while two fifths had good methods for fire prevention as presence of fire extinguishers and all of gasoline stations had no posters for hazards prevention

(Table 8). These findings were in line with *Young et al. (1999)*, who stated that work environment should be friendly with good lighting, ventilation, noise control, and other facilities. Lack of the control measure at the work place could put workers at risk of gasoline hazards.

Conclusion

In the light of this study results the gasoline stations' workers lack knowledge about effect of gasoline on health and had poor practices during emergency. The occupational program improved workers' knowledge regarding gasoline and its danger on health but the practices slightly improved after the program implementation.

Recommendations

The study recommended that the workers at gasoline stations are in need for more attention in relation to safety protective devices, regular training programs for emergency situations, and regular checkup for health status.

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