Occupational Hazards prevention Program among Vocational Education's Students in Zagazig City

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Abstract

Background: vocational students considered young workers that are usually injured at worksite. Education and awareness programs to prevent those injuries among them are common and always effective. **Aim of the study:** To evaluate the effect of Occupational Hazards prevention Program among Vocational Education's Students in Zagazig City. **Subject and Method**: **Research design:** A quasi-experimental research design [pretest -posttest] was used. **Setting:** At the vocational educational school of El Sayadeen, at Zagzig City. **Subject:** A convenience sample consisted of 82 students. **Tools of data collection:** three tools were used; Interview Questionnaire sheet, Students' knowledge about occupational hazards, and Child labor's practices regarding the occupational health hazards of the work place. **Results**: The mean age of the students was 16.15 ± 0.749 yeaes, 41.46% of them were at their first grade in the school, and about 68.29% of them were from rural areas. Also, there were statistically significant totally improvements in the students' knowledge and practices regarding occupational hazards at ($p<0.001$) in the post-intervention phase. There were highly statistically significant positive correlation among students' total knowledge and practices pre and post-test ($r =0.732, 0.587$) respectively. **Conclusion:** The applying of Occupational Hazards prevention Program among Vocational Education's Students was effective in enhancing their knowledge, and practices. **Recommendation:** Comparative studies to show effectiveness of various teaching methods can be assessed and even attitude dimension can also be assessed.

Key words: Occupational hazards, Prevention, and Vocational Education's Students,.

Introduction:

Statistics show that young workers like the vocational students' considered a group that being at high risk of sustaining injury. Vocational students, in fact, are youth aged between 15–24 whom proportionally more often victims of an injury at work than their older colleagues [(1)]. In vocational training schools, students usually exposed to several hazards because of their activities; a great number of activities which in fact performed in workshops, where there are equipment, tools, many materials, and, in some cases, clients [(2)].

Compared to older workers, these higher numbers of young worker (the vocational students) injuries may be due to their inexperience, insufficient safety, health knowledge and awareness due to a reduction of proper training, cultural and economic barriers, and their biological and physiological characteristics, e.g., inadequate strength and cognitive skills to operate some potentially hazardous manual and automatically operated equipment for certain tasks [(1)].

Occupational health can be defined as a provision of comprehensive health care (personal and also impersonal) to workers through a mix of promotive, preventive, curative and rehabilitative actions so as to elevate their quality of life, additionally, it can be defined as the effect of working environment and work on the health of the workers and in turn the effect of workers health status on productivity [(4)].

Hazards mean an inherent property of a substance, agent, source of energy or situation which has the potential of causing unfavorable effects while risk is the probability that damage and hurt life, health, and\or the environment which usually occur as a result of a hazard. In this regard, occupational hazards refer to workplace activities which have the prospect to cause/elevate the risk of injury and ill health. Occupational safety is the process of control hazards in the work places such as the vocational schools to attain an appropriate level of risk, while workplace safety generally refers to the

process of protecting the health and safety of staff while on the job, irrespective of vocation [5].

Risks in the working environment like vocational schools can be divided into five primary classes; chemical (dusts, liquids, fibers, mists, and smoke), physical (noise, vibration, radiation, and high temperature), biological (bacteria, viruses, fungi, and protozoa), ergonomic and mechanical (lifting, repetitive action, and traps), psychosocial and organizational (work demand and conditions) [6].

Education and training courses and programs are serious tools to inform those students about the dangers at workplace and also controls so they can work more safely and be more productive. Another role of these courses and programs, however, is to provide them with a greater understanding of the safety and health program itself, so that they can participate in its development and implementation; Additionally, Education and training courses provide those students with: many knowledge and also skills that needed to perform their work in a safe way and avoid making hazards or dangers that could place themselves or others at risk, awareness and understanding of workplace dangers and how to identify, report, and control them, and specialized training, when their work contains unique hazards [7].

The triad of Knowledge, Attitude and Practice (KAP) together make up the dynamic system of the life; KAP study serves as an educational diagnosis of the community [8]. Protection to young persons has focused on providing occupational safety and health (OSH) education [9].

As the health and safety of the workers such as the vocational students has been known as occupational health and safety training 155 fundamental human right, hence all probable measures including medical, engineering as well as legislative and occupational surveillance need to be strengthened, especially in developing countries [10].So education in how to cope with risks is necessary for those students, today and in the future; Education is, or should be, organized for students in vocational training learning how to protect themselves in the future [11].

Actually, occupational health and safety (OHS) addresses the essential role which played in improving the health and safety at work There is a need to confront the mutual challenges to (OHS) including illiteracy, the reduction of the basic infrastructure, lack the qualified human resource in occupational health and safety, bad sanitation, inadequate nutrition, lack of research and decreased interdisciplinary cooperation among the social sciences and medicine [12].

Within community health nursing, the occupational and environmental health nursing is the specialty practice that provides for and delivers health and safety programs and services to workers, worker populations, and generally community groups. The practice focuses on promotion and restoration of health, protection of diseases and injury, and prevention from work-related and environmental dangers [13].

Significance of the study:

Young workers who aged between sixteen to nineteen years have twice rate of risks among workers of all ages than older workers [4] .Additionally, it is known that Egypt is committed to progress towards achieving the Sustainable Development Goals (SDGs; Egypt Vision 2030, which covered three dimensions such as economic, social and environmental, therefore, the aim of the study was to evaluate the effect of Occupational Hazards prevention Program among Vocational Education's Students in Zagazig City.

Aim of the study:

The aim of the study was to evaluate the effect of Occupational Hazards prevention Program among Vocational Education's Students in Zagazig City.

The aim of this study was full filled through the following objectives:

- Assessed knowledge and practice of students about the occupational health hazards in their workplace.
- Designed an educational program to students to enhance their knowledge, and practices according to their needs.
- Evaluated the effect of the sessions for the students.

Hypothesis:

- Implementation of the occupational hazards prevention program, improves their knowledge, and practices toward safety measures to prevent hazards among vocational education's students in Zagazig City.

Subjects and Method:

Research design:

Quasi experimental design was used to conduct this study.

Study setting:

At vocational educational school of El Sayadeen, at Zagzig City. There are 3 vocational educational schools at Zagazig City; the researcher randomly selected one of them (the vocational educational school of El Sayadeen) for the study; that contains three classes for the three academic years.

Study Subjects:

A convenience sample consisted of 82 students were chosen over a period of 3 months; (those were the months for the first semester of the academic year 2018). The all total number of students at the vocational educational school of El Sayadeen, at Zagzig City was 110 students; (10% of them was randomly selected for polite study and was excluded after that from the study, the remaining 99 students included in the study but during the study there were 17 students who absent the most days of the sessions, so the researcher excluded them

Tools of data collection:

Tool I: Interview Questionnaire: It was developed by the investigator, it was consisted of two parts:-

A) First part: This part was about demographic characteristics of students; included closed questions such as age, residence, child ranking, and academic year.

B) Second part: The characteristics of the Students' family; that consist of some questions like: level of mothers and fathers education and their occupation, income.

Tool (II): Students' knowledge about occupational hazards: This tool was developed by Ebrahim et al [(14)] an Arabic tool consists of 4 parts, those are: Safe working environment (included 11 items such as good ventilation and sufficient lighting, vacuum for fumes dusts, good temperature, noise, enough space), Personal protective equipment [PPE] (included 5 items such as meaning and types of PPE used, its availability, importance of using it, and reasons for not using PPE), Occupational Hazards (included 17 items such as types of occupational hazards and risk exposure to the various occupational hazards, and health problems as a result of exposure to occupational hazards), and Different first aid measures (included 14 items such as first aid meaning, first aid equipment, dealing with injuries).

Scoring system:

The scores of the items was summed –up and the total was divided by the number of items giving a means of score for the part. Theses scores were converted into percent score, means and standard deviations was computed, the incorrect\incomplete answer had 1 score, and correct\complete answer had 2 scores.

Total scores were accounted according to the following:

- **Satisfactory** is ≥ 50% of total knowledge score.
- **Unsatisfactory** is < 50% of total knowledge score.

Tool (III): Child labor's practices regarding the occupational health hazards of the work place: This tool was developed by Ebrahim et al [(14)] included two parts; (1) an Arabic tool consists of 8 items such as: using of personal protective equipment, occupational safety measures, training, proper waste disposal, and (2) an observational checklist sheet: that

included 10 items such as deal with injuries, fractures, wounds, and bleeding, burn, shock, chemical substances poisoning, eye injuries, sun stroke, electrical shock, by using real objects, demonstration and re-demonstration.

Scoring system:

Responses were measured in all questions on a score as following: 1 score for steps that done incorrectly\or not done, and 2 scores for steps that done correctly \ or completely done

Total score was accounted according to the following:

- **Done correctly** is ≥ 60 % of total score.
- **Not done** is < 60% of total score.

Content validity & Reliability:

The validity of tools had done through five expertise professors of Community Health Nursing Specialties, from different Faculties of Nursing. The tools were modified based on their guidance and views. All tools for data collection were tested for its reliability using test retest reliability and all tools were proved to be strongly reliable. This was done using the assessment of their internal consistency. The reliability proved to be high based on the values of Cronbach alpha coefficients. The tools are proved to be strongly reliable (r=0.8222).

Field work:

The researcher conducted an intensive review of the past and current related literature covering various aspects of the "occupational hazards and their prevention" and associated knowledge, and practices. This was done using available textbooks and articles in scientific periodicals and journals. Based on this review, the tools were prepared in their preliminary forms, and reviewed by a panel of nursing specialists for face and content validation. The review also helped in developing a basic framework of the occupational hazards prevention program. The participants were interviewed individually before applying the planned sessions to collect the baseline data using all study tools.

The researcher started to fill-out the questionnaire from sample. The researcher read and explained each item to the students and recorded their responses to each item. This interview took about 30 to 40 minutes. The execution of the study was through four phases, namely assessment, planning, implementation, and evaluation. This lasted for 3 months from the first of October 2018 to the end of December 2018.

The objective of the program was to improve knowledge, practice, of the students. The program was implemented in the form of 10 sessions. The duration of each session ranged between thirty minutes and forty-five minutes. The sessions were implemented in small homogeneous groups in the school; each group consisted of 5-10 students according to their attendance. The sessions were administered three days per week for each study group. They were held on Sunday, Monday and Wednesday.

The program was implemented through various teaching methods as short lectures, group discussions, brain storming, demonstration re-demonstration, and role-play. The teaching media included power-point presentations and a handbook. Each session was started by a summary about what was taken through the last session and the objectives of the new one to make sure that students recognize the content, taking into consideration the use of simple language to suit the level of students. Motivation and reinforcement techniques as praise and recognition were used during the session to enhance participation and learning. The researcher designed an illustrative booklet in simple Arabic language to be distributed to students.

❖ **Description of the program:**

General objective of the program:

To improve knowledge, practices towards safety measures and first aids in workplace environment, of the students.

Specific objectives: *By the end of this program, the students will be able to:*

- Identify the safe workplace environment.
- Clarify the standardized workplace general environmental conditions.
- Define occupational hazards in work place environment correctly.
- Describe briefly the types of occupational hazards related to workplace environment.
- Recognize the causes and risk factors of occupational hazards related to workplace environment.
- List occupational health problems related to workplace environment.
- Demonstrate the measures to prevent the occupational hazards during work.
- Determine the availability of PPE.
- Mention the types, benefits, importance of using PPE
- Discuss and apply different first aid in workplace environment.

The sessions consisted of two main components:

- **The first component** was for giving an educational background of occupational hazards and the safe workplace environment (this included 3 sessions)
- **The second main component** was for giving practical sessions about first aids in workplace and training for safety environment (this included 5 sessions).
- **There were 2 sessions for starting and ending the program sessions.**

Evaluation phase

Immediately after the end of the sessions. Evaluation was done to assess the impact of the program.

Pilot study:

A pilot study was done on 10 % of the sample to ensure the clarity, applicability and feasibility of the study tools, and necessary modifications were done, and they were excluded after that.

Administrative and ethical considerations:

An official permission was obtained using proper channels of communication. This was done through letters addressed from the Dean of the Faculty of Nursing, Zagazig University; elucidating aim and procedures of the research; asking for cooperation to the Directors of the vocational educational school of El Sayadeen, in Zagzig City. Informed oral consent was obtained from the participants. The investigator met with the subjects, introduced herself and elucidated purpose of the research to obtain their consent to participate in it and gain their cooperation and confidence. Anonymity, confidentiality and privacy of the students were assured. Voluntary participation and right to refuse to participate in the study was emphasized to the subjects. Verbal consent was taken at the beginning of the study from students.

Statistical analysis:

Data entry and statistical analysis were done using SPSS 20.0 statistical software package. Qualitative variables were compared using qui square test (X2) as the test of significance. A significant level value was considered when p-value ≤ 0.05 and a highly significant level value was considered when p-value ≤ 0.001, while p-value > 0.05 indicates non-significant results.

Results:

Table (1):- showed the distribution of demographic characteristics of students in the study sample. The table showed that the mean age of the students was 16.15 ± 0.749, 41.46% of them were at their first grade in the school, and about 68.29% of them were from rural areas.

Table (2):- showed the Socio-demographic characteristics of students' families; the table showed that 53.65% of the students had extended family. Also, about 65.85% of them reported that their monthly income was insufficient.

Figure 1 showed total Students' knowledge about occupational hazards. The figure revealed statistically significant totally improvements in the students' knowledge regarding occupational hazards at (p<0.001) in the post-intervention phase. Overall, about 7.60% of the students had satisfactory knowledge before the intervention and this percent had increased to 88.00% after the intervention.

Figure 2 showed total score of students' practices regarding the occupational health hazards of the work place. The figure revealed statistically significant totally improvements in the students' practices regarding occupational health hazards of the work place at (p<0.001) in the post-intervention phase. Overall, the total correctly done practices of the students increased from 6.40% at the pre phase to 82.30% after the intervention.

Table (3):- displayed Relation between the students' total knowledge and their practices pre and post-test. It demonstrated that there were highly statistically significant differences between students' total knowledge and practices pre and post-test.

Table (4):- displayed Correlation between the students' total knowledge and their practices pre and post-test. It demonstrated that there were highly statistically significant positive correlation between students' total knowledge and practices pre and post-test (r =0.732, 0.587) respectively.

Discussion:

Young workers such as vocational students can have negative impacts on their health and safety and also face dangers during their work sites in their schools such as Cuts/lacerations, fractures/dislocations, and sprains/strains are the most common types of injuries among young workers, in addition to many physical, chemical and psychosocial dangers Balanay et al [(15)].

Regarding to the demographic characteristics of the studied subjects, the present study showed that nearly less than half of them were at their first grade in the school. These findings agreed with Huang et al [(16)] in their Chines study; who revealed that the most the students were at their first academic year.

Regarding the residence of the studied subjects, the recent results showed that nearly most of them were from rural areas.This finding might be attributed to the setting of data collection in Zagazig City at El-Sharkia governorate which characterized by its agricultural nature and most of its cities are rural areas.This finding was disagreed Abdallah [(17)] in his study in Cairo, Egypt, who mentioned that most of his participants lived in urban areas.

Regarding socio-demographic characteristics of students' families in the study subjects; the current study showed that about third of the students reported that their father's education level were secondary school, while about two thirds of their mothers had secondary level of education. The finding was disagreed with Shafik and Abd El-Aal [(18)] as they mentioned in their Egyptian study at the Garment factories at Benha City that half of the mothers' children can read and write only.

The present study found that nearly half of the subjects revealed that they lived within extended family. That might be due to their rural residence where most families usually prefer to live within extended families. This finding was agreed with Abdallah [(17)] in his study in Cairo, Egypt, who mentioned that his participants lived in extended families.

The current results showed that nearly two thirds of the subjects reported that their fathers' occupations were handicraft, and the same percent of their mothers were housewives. The finding was in the same line with Shafik and Abd El-Aal [(18)] as they found in their Egyptian study at the Garment factories at Benha City that two thirds of their subjects' mothers were housewives.

The current results showed that the monthly income for more than half of the study sample was insufficient. This might be explained by the current results of the study which revealed that nearly two thirds of the subjects reported that their fathers' occupations were handicraft, and the same percent of their mothers were housewives. As, in Egypt after the January's revolution, the handicrafts were negatively influenced. And also, might be due to the mothers were unemployed. The finding was in the same line with Huang et al [16] as they found in their Chinese research that more than half of their total sample had insufficient income.

Regarding total students' knowledge about occupational hazards before the program, the finding of the current study revealed that the majority of the study subjects had unsatisfactory level of knowledge about occupational hazards, and only about 7.60% of them had satisfactory level of knowledge. This unsatisfactory level of knowledge could be explained by the lack of knowledge about the occupational hazards and the safety measures during work in media in Egypt.

Similarly to these present findings, Bekelcho [19] reported in his study in Addis Ababa, Ethiopia, that about two thirds of the subjects had bad knowledge. Moreover, Aly and Mohammed [20] mentioned that the majority of their participants in Assuit City, Egypt didn't know the occupational hazards. Furthermore, Andersson [21] found in their study which assessed knowledge and experiences of risks among pupils in vocational education, that the pupils had low level of knowledge that employers must, by law, conduct risk analyses and prevent risks.

On other hand, the recent results disagreed with Al-aslami et al [22] who mentioned in their results in Saudi Arabia, that most of their participants were aware of occupational hazards. Moreover, Nabil et al [23] revealed in their Egyptian study at faculty of Nursing, Zagazig University, about occupational health hazards that more than half of the students were fully aware of using personal protective equipment (PPE) and safety regulations. Additionally, Aluko et al [24] found in their study in Nigeria, that most respondents (89 %) were knowledgeable about hazards in HCFs. Also, Shinde et al [25] found in their study in Pune that nearly two thirds of their participants had good level of knowledge about occupational hazards.

Fortunately, these unsatisfactory results of students' knowledge regarding occupational hazards were improved after the implementation of the sessions; as most of the participants became having satisfactory level in their total knowledge score. These good amendments in the level of the participant's knowledge could elucidate the favorable impact of the sessions and how the subjects were interested and cooperative within the intervention.

In the same line with the results of the present study after the program, Chandrachood,and Acharya [26] revealed in their study among students of industrial training institute in tribal area of Thane district, Maharashtra, that the training program improved the all knowledge of the participants. Also, Braeckman et al [27] revealed in their study about awareness, knowledge, and practices regarding occupational hazards among medical students, that student awareness and knowledge scores were inadequate but increased after admission as trainees in the study's program. Furthermore, Bandyopadhyay et al [28] found in their study at West Bengal, that there was highly improvement in the level of knowledge after the implementation of the program among the participants.

In addition to that, [4] found in their Egyptian study that after the health education program, there was a statistically significant improvement in the knowledge of occupational law, proper management of chemical spill and knowledge of hazard of machinery noise (64.3%, 96% and 100% respectively) ($P<0.05$), among their participants.

On other hand, Gupta et al [29] disagreed with our results as they mentioned in their study in India that many of participants were not aware of post exposure prophylactic measures to be taken if there is an occupational exposure to the blood of HIV positive patient. Also, Amadhila et al [30] reported in their study in Namibia among registered nurses on occupational hazards, that the majority of registered nurses have knowledge on occupational hazards, yet a few number (24%) have insufficient knowledge.

It is therefore important to develop a culture of risk prevention in the training programs at all levels of education and in all areas, including vocational training schools. This culture has an important role education as basic preventive reflexes are acquired in childhood workers such as the vocational students Rusu-Zagara et al [31].

Regarding total score of students' practices about the occupational health hazards of the work place before the program, the present study declared that most of the participants not correctly done the practices about occupational health hazards of the work place and only 6.40% of them correctly done those practices. This might be explained due to the lack of interest by safety training courses at those schools and also at media in Egypt. Additionally, it might be due to lack of safe environment in workplaces or insufficient safety instruments.

This finding agreed with Swetharani et al [32] in their results in south India; as they mentioned that there was generally inadequate situational practice among their participants. However, they had good knowledge. Fortunately, the sessions of the program of the study positively changed the students' practices; as most of the study sample changed to done the practices correctly after the protocol. This could profess the success of these sessions and declare the positive effect of the practical sessions of the program on the participants. Also, this positive change reflexed the formidable role of education in improving the practices regarding the occupational hazards.

Indeed, those improvements were supported by the point of view of Yee and Abu AL-Rejal [33] who said that prevention of accidents can be prevented by the existence of awareness among workers, and also can affect their safety performance in workplace. This finding was in the same line with El-Ghany, , and Mahmoud [34] in their results about the effect of educational intervention about first aid and ergonomics on improving bakery workers' performance related to occupational hazards at Zagazig City, they mentioned that none of bakery workers had satisfactory first aids practices at pre-educational sessions compared with 76.4% after the intervention. Additionally, Bolbol et al [35] who found in their Egyptian study at Zagazig University that after the intervention, the practices of their subjects significantly increased ($P<0.001$).

Regarding the relation between the students' total knowledge and their practices pre and post-test; the present study demonstrated that there were highly statistically significant differences among students' total knowledge & practices pre and post-test. Similarly, Wafik and Tork [36] found in their Egyptian study at Zagazig University, that there were generally low levels of satisfactory knowledge and inadequate situational practice among the school students before the intervention, and then statistically-significant improvements were shown at the post- and follow-up tests.

Regarding the correlation between the students' total knowledge and their practices pre and post-test; the present results were demonstrated that there were highly statistically significant positive correlation among students' total knowledge and practices pre and post-test ($r = 0.732, 0.587$) respectively; that means when the knowledge level increased, the level of practices would also increase.

In the same line with this finding Banfai et al [37] reported in their study at Hungary that there was a significant correlation between the level of knowledge

and skills among the participated students. Similarly, Joseph et al [38] reported in their Indian study there was positive correlation between the knowledge and practice of workers in experimental and control group after teaching program.

Conclusion:

The study findings led to the conclusion that the students had unsatisfactory level of knowledge, and also unsatisfactory practices regarding occupational hazards before the program. Fortunately, the implementation of sessions was effective and enhanced their practice, and knowledge. Moreover, there were highly statistically significant differences among students' total knowledge and practices pre and post-test.

Recommendation:

Based on the study findings, the following recommendations can be deduced:

1. That study can be replicated on a large sample of different units of industry or among the Technical education students.
2. Comparative studies to show effectiveness of various teaching methods can be assessed and even attitude dimension can also be assessed.
3. Training on first aid for common accidents or injuries and preventive measures should also be included in the curriculum of industrial/vocational training institutes.
4. Educational pamphlets about occupational hazards and its prevention strategies should be given to all students in different settings such as, vocational schools, worksites and technical schools.

Table 1: Demographic characteristics of students in the study subjects (n=82).

Demographic characteristics	Frequency	%
Age in years		
13- 15	28	34.14
16-	44	53.65
17-	6	7.31
18-	4	4.87
Mean ±SD	16.15 ± 0.749	
Child ranking		
The eldest	53	64.63
The middle	12	14.63
The youngest	17	20.73
Academic Year		
First grade	34	41.46
Second grade	27	32.92
Third grade	21	25.60
Residence		
Rural	56	68.29
Urban	26	31.70

Table 2: Socio-demographic characteristics of students' families in the study subjects (n=82).

Socio-demographic characteristics	Frequency	%
Father's level of education		
Illiterate	10	12.19
Primary	24	29.26
Secondary	29	35.36
University	19	23.17
Mother's level of education		
Illiterate	2	2.43
Primary	7	8.53
Secondary	62	75.60
University	11	13.41
Types of family		
Nuclear family	38	46.34
Extended family	44	53.65
Father's occupation		
Official work	17	20.73
Handicraft	56	68.29
Retired	5	6.09
Not work	4	4.87
mother's occupation		
Official work	5	6.09
Handicraft	21	25.60
Housewife	56	68.29
Family Monthly Income		
Sufficient	28	34.14
Insufficient	54	65.85

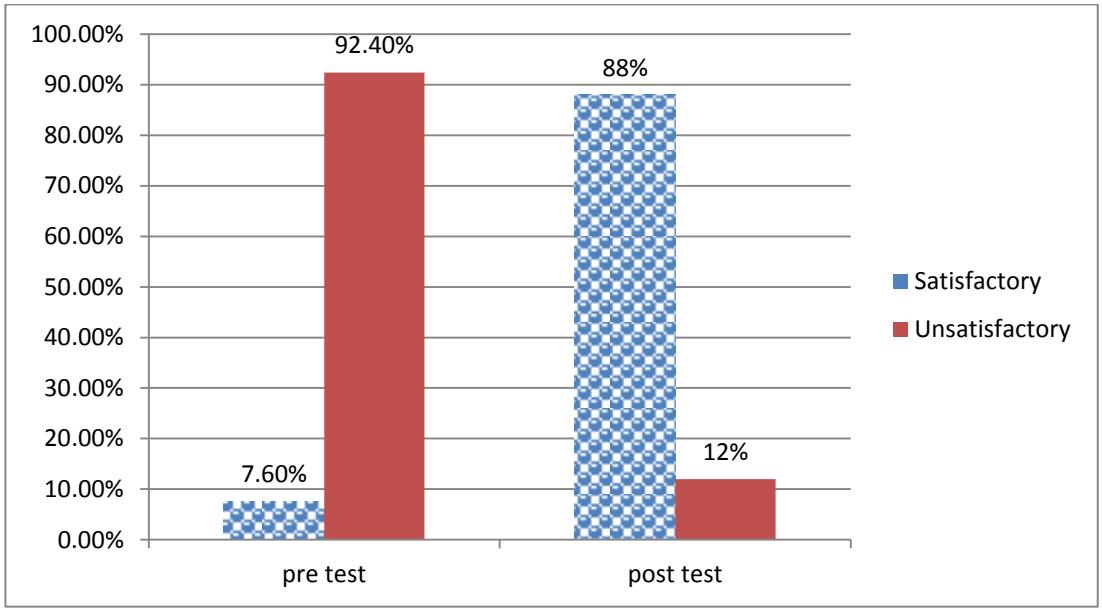

Figure 1: Total Students' knowledge about occupational hazards (n=82).

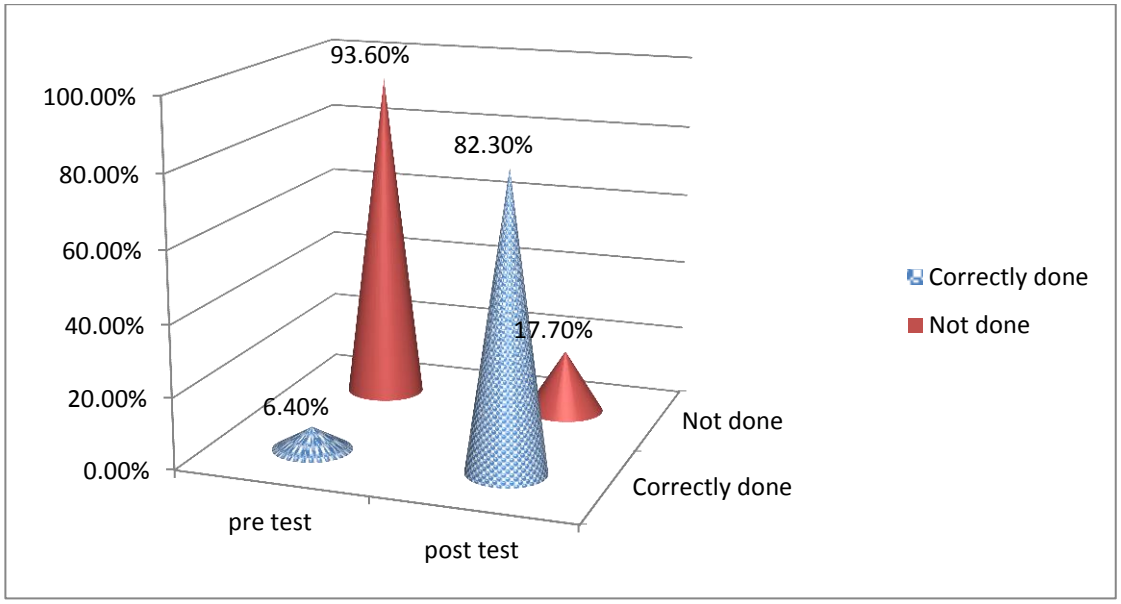

Figure 2: Total score of students' practices regarding the occupational health hazards of the work place (n=82).

Table 3: Relation between the students' total knowledge and their practices pre and posttest (n=82)

Items	Pre test		Post test		X^2	P-value
	No	%	No	%		
Total knowledge						
Satisfied	15	18.29	72	87.80	127.527	0.000***
unsatisfied	67	81.70	10	12.19		
Total practice						
Correctly done	10	12.19	69	84.14	102.561	0.000***
Not done	72	87.80	13	15.85		

Table 4: Correlation between the students' total knowledge and their practices pre and post test (n=82).

Total knowledge				
	Total knowledge			
	Pre test		**Post test**	
Total practice				
	r	**P- value**	**r**	**P- value**
Total practices	**0.732**	0.000***	**0.587**	0.000***

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