

Occupational Health Hazards and Protective Measures among Workers in Pesticide Factory

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Abstract

Background: Using of protective measures at work place can protect workers from physical, chemical or mechanical hazards. **Aim of the study:** Was to assess occupational health hazards and protective measures among workers in pesticide factories. **Research design:** A descriptive research design was utilized to conduct this study. **Setting:** This study was conducted at kafr- El Zayat Pesticide Factory. **Sampling:** A simple random sample was utilized in this study, in the previous mentioned setting to study 225 workers. **Tools:** Two tool were used: **First tool:** A Structured interviewing questionnaire divided into two parts. **Part (I):** Consist of three sections (A) Socio-demographic characteristics of workers, (B) characteristics of work, (C) health problems facing workers in last six months. **Part (II):** Knowledge of workers regarding occupational health hazards in pesticide factories. **Second tool:** Observational check list to assess practices of workers toward preventive measures. **Result:** 45.3% of the studied workers aged 30- <40 years with **Mean age** of workers = 35.93 ± 8.10 , 17.3 % of the studied workers exposes to fracture and 10.2 % exposed to Muscle fatigue and only 4.4% done periodic checkup, 33.8% of the studied employees have good level of total knowledge and 53.8% of the studied workers had satisfactory level regarding their total reported practices. **Conclusion:** Highly statistically significant relation between the studied employees total knowledge level and total reported practices. **Recommendations:** Developing health educational program regarding occupational health hazards and preventive measures should be developed and implemented for workers in pesticide factories.

Key words: Occupational Health Hazards, Protective Measures, Pesticide Factory, Workers.

Introduction

Occupational health is a field of health care made up of multiple disciplines dedicated to the well-being and safety of workers in the workplace. It has a strong focus on injury prevention and employee education. Occupational health services include worker wellness, pre-placement testing, ergonomics, occupational therapy, occupational medicine and more. The health of the workers has several determinants, including risk factors at the workplace leading to cancers, accidents, musculoskeletal diseases, respiratory diseases, hearing loss, circulatory diseases, stress related disorders and communicable diseases and others (Opore-Boaf and Fianko, 2021).

Occupational health hazards are conditions that result from exposure in a workplace to a physical, chemical or biological agent to the extent that the normal physiological mechanisms are affected and the health of the worker is impaired. Exposures to occupational hazards in bakeries are generally indicating poor safety standards, Careless handling and cause serious injuries and health problems. So, workers need to be warned of about safety measure and prevention of health hazards. Studies regarding bakery workers are considered important in order to decrease risk and help to improve health of workers (Mehmood et al., 2021).

Adequate protection against exposure to hazardous factors in the production of pesticides cannot be ensured by other means, such as eliminating the hazard, controlling the hazard at source, or minimizing the hazard, suitable PPE and protective clothing, having regard to the type of work and hazards, and in consultation with workers and/or their representatives, should be provided and maintained by the employer, without cost to the workers, as may be prescribed by national laws and regulations (Sapbamrer and Thammachai, 2020).

Occupational Health Nurses play an important role in the factories as to observe and assess workers' health status with respect to work tasks and hazards. Using their specialized experience and education, they also responsible for hazards management, environmental health, emergency planning, workers treatment, follow-up and referrals, emergency care for job-related injuries and illnesses and rehabilitation for return-to-work issues. (Alengebawy et al., 2021).

Significance of the study:

In Egypt, There are more than 40 different types of pesticides known and used nowadays. Statistics found 26% of intoxicated workers were from age group (10-20) 26% were from age group (30-40). 46% of the of patients were exposed due to suicidal attempts, 40% were accidentally exposed and 14% were due to occupational hazard. 56% of the studied cases were from urban residents. 23% of total numbers of suicidal cases were unemployed, where 50% of them are from low socioeconomic status. The study detected 7 different OPC (Malathion, Dimethoate, Chloropyrofois, Phenthoate, Prothiphos, Profenfos and Ethion) (Ali et al., 2020).

Aim of the study:

The study aimed to assess occupational health hazards and protective measures among workers in pesticide factory.

Research questions

- What are the occupational health hazards among workers in pesticide factories at last six months?
- What are workers knowledge about occupational health hazards and preventive measures at pesticide factories?
- What are workers reported practices about occupational health hazards and protective measures at pesticide factories?
- Is there a relation between demographic characteristics of workers and their knowledge regarding occupational hazards related to exposure to pesticide?
- Is there a relation between knowledge and practice regarding occupational hazards?

Subjects and method

Research design:

A descriptive research design was utilized to conduct this study.

Setting:

This study was conducted at Kafr- El Zayat Pesticide Factory.

Sampling:

A simple random sample was taken from total factory workers (700) according to equation $n = \frac{N}{1+N(e)^2} = 225$ workers.

Tools of Data Collection:

Two tools was conducted to carry in this study The data was collected through the following tools:

Tool I: A structured interviewing questionnaire: It was developed by the researchers based on reviewing related literatures, and it was written in simple clear Arabic language, it was comprised of two main parts:

First Part: It was concerned with socio-demographic characteristics of the studied sample this part included three sections:

A-Socio-demographic characteristics of studied workers included five closed ended

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questions about age, educational level, marital status, place of residence and monthly income .

B- It was concerned with work characteristics. It included six closed ended questions about work hours per day, workdays in week, years of experience, training courses in work, name of training courses and facilities taken in work.

C- It was concerned with health problem facing workers in the last six months included four closed ended questions about exposure to accidents, musculoskeletal problems, psychological problems and respiratory problems.

Part II: Included two sections.

First section: Was concerned with knowledge of the workers regarding occupational health hazards which consisted of ten closed ended questions included definition of occupational hazards, causes of occupational hazards, types of occupational hazards can be occurring, definition of chemical hazards, factors lead to occurring of chemical hazards, definition of mechanical hazards, factors lead to occurring of mechanical hazards, definition of physical hazards, factors lead to occurring of physical hazards, health problems can occurring related to working in pesticide factory.

Second section: Was concerned with measures of safety and security in pesticide factory which consisted of six closed ended questions included definition of occupational safety and security, aims of occupational safety and security, measures to achieve occupational safety and security, ways to protect from occupational hazards, equipment's used for safety and security& sources of information about occupational hazards and occupational safety and security.

Scoring system:

The scoring system for workers' knowledge was calculated as follow:(2) for complete and correct answer, while (1) for incomplete and

correct answer, and (0) for do not know or incorrect answer .

The **total knowledge** score= 16 points

The total knowledge score was considered good if the score $\geq 75\%$ (≥ 24 points), while considered average if it equals was $50 < 75\%$ ($16 < 24$ points), and when the total score was considered poor if it equals $< 50\%$ (< 16 points).

Second Tool:

Part I: It was concerned with observed practices of workers toward preventive measures through asking workers divided in to question and consist of two sections.

First section: IN case of emergency and first aids which consist of :

- **Emergency and first aids in case of burn**
Included ten question as follows : put patient in good ventilated, remove tighting clothes, put burning part under cold water and clean it with sterile substance, use ice to reduce pain, maintain skin bubbles without removing, cover burned place with Vaseline gauze, cover patient with clean cover, ask for help in sever burn.

-**Emergency and first aids in case of bleeding** Included eight questions as follows: avoid transport patient, calm patient and put him in comfortable position, put injured part above body level, stop bleeding by pressure with clean cloths, clean the wound by sterile substance, observe any foreign body inside wound, put sterile bandage on wound, transport patient to hospital to stop bleeding.

-**Emergency and first aids in case of fracture** Included six question as follows: remove any clothes above fractured part, avoid remove fractured part, observe color of skin or swelling, avoid return any fracture in normal place, fixed fracture with pillar, raise patient legs and low his head in shock.

Second section: Daily activities practice which include:

- **Nutrition** Include seven questions as follows: Drink enough water daily, reduce or eliminate all kinds of processed sweets and candies to prevent infections, reduce or eliminate salt from food to keep cells from water retention, avoid all kinds of processed meat and fast food to keep heart healthy, eat a complete meal with protein, healthy fats and carbohydrate, eat vegetables and their juices to cleanse the body of toxins, maintain healthy weight.

-**Exercise and Sleep quality** Included nine questions as follows: Do breathing exercises to relax and relieve stress and anxiety, do walking exercises for at least half an hour every day, do meditation and yoga to reduce stress, do aerobics, toning and stretching, Better to sleep at night than to sleep in the day, avoid stimulants and caffeine at least 6 hours before bed, stay away from electronic devices and modern phones at least two hours before bedtime, sleep in a quiet, dark and comfortable place, Maintain the body's biological clock, that is, we do not exceed ten o'clock in the evening, avoid drinking water at least an hour before bed to maintain a consistent sleep.

Scoring system

Each step of workers reported practices has two level of answer: done or no done. These were respectively 1,0 The scores of the items were summed- up and the total divided by the number of the items, giving by the number of the part. These scores were converted into a present score.

The total practices score =49 points

The total practices score was considered satisfactory if the score of the total practices $\geq 80\%$ (≥ 39 points) and considered unsatisfactory if it $< 80\%$ (< 39 points).

Content validity of the tools:

Content validity of the tools was done by three of Faculty's staff nursing experts from

the Community Health Nursing Specialists who reviewed the tool for clarity, relevance, comprehensiveness, applicability, and give their opinion.

Reliability of the tool:

The reliability of the tool applied by the researchers for testing the internal consistency of the tool, by administration of the same tools to the same subjects under similar condition on one or more occasion. Answers from reported testing were compared (test-re-test reliability). The reliability was done by Chronbach's alpha coefficient test which revealed that which of the two tools consisted of relatively homogenous items as indicated by the moderate to high reliability of each tool. The moderate to high reliability of each tool. The internal consistency of the knowledge was **0.793** and reliability of practices was **0.854**.

Ethical consideration

All ethical issues were assured; an oral consent has been obtained from each worker before conducting the interview and given them a brief orientation to the purpose of the study. They were also reassured that all information gathered would be kept confidentially and used only for the purpose of the study. Workers had the right to withdraw from the study at any time without giving any reasons.

Pilot study

The pilot study was carried out on 22 workers who represents 10% of the total sample size (225). The pilot study was aimed to assess the tools clarity, applicability and time needed to fill each tool. No modification were done so the pilot study sample was included in to the total sample.

Field work

The data was collected from workers who attended in the previously selected pesticide factory is through the interview with them. The study was conducted at five months from the beginning of January 2022 to the end of

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May 2022. The researchers visited the Pesticide Factory respectively. Pesticide Factory was visited by researchers, three days per week (Sunday, Tuesday and Wednesday) from 9 Am to 12.30 pm to collect data about occupational health hazards and preventive measures and increased knowledge of workers regarding occupational health hazards and preventive measures the average number interviewed workers was 3-5 workers/week The average time needed to fill the tool was around 30- 45 minutes, tools depending upon their understanding and response.

Statistical Analysis:

All data collected were organized, tabulated and analyzed using appropriate statistical test. The data were analyzed by using the Statistical Package for Social Sciences (SPSS), which was applied to calculate frequencies number and percentages mean standard deviation (SD) as well as test statistical significance and associations by using chi- square (X^2) and correlation Co-efficient (r) to detect the associations between the variables for (p value)

The observation difference and associations were considered as the following (p-value)

- Highly significant (HS) $P \leq 0.001^{**}$
- Significant (S) $*p \leq 0.05$
- Not significant (NS) $P > 0.05$

Results:

Table (1): Shows that, 45.3% of the studied workers aged 30- <40 years with **Mean age** = 35.93 ± 8.10 , 64.4% of them had secondary education and 94.2% of them were married. Regarding, 55.6 % of them were from rural area and 75.1% of them their income was enough.

Table (2): Shows that, 84.4% of the studied workers work 6-8 hours daily, 89.3% of them work for five days or more per week and 37.3% of them had ≥ 10 years of experience. Regarding training courses 63.6% of the studied workers attended training courses, 43.4 % of them took one training courses and 99.3% of these courses was about occupational safety and health standards course and all of aids and facilities provided to all workers.

Table (3): Illustrates that, 17.3% of the studied workers exposes to fracture due slipping or falling heavy equipment, 10.2% of them exposed to muscle fatigue, only 4.9% of them complain from tension and nervousness and 6.7 % of them had sinus infections.

Figure (1): Illustrates that, 33.8% of them had good level of total knowledge and 51.1% of the studied workers had average level of total knowledge while, 15.1% % of them had poor level of total knowledge.

Figure (2): Clarified that, 53.8% of the studied workers had satisfactory level of total practices, while 46.2% of them had unsatisfactory level of total practices regarding the occupational hazards in the pesticide factory.

Table (4): Shows that; there were a highly statistically significant relation between studied workers' socio-demographic characteristics (educational level, attending training course & past experience) and their total knowledge level at preprogram implementation.

Table (5): Shows that, there was a highly statistically significant relation between total knowledge and total practices level among studied workers.

Table (1): Frequency distribution of the studied workers regarding their socio-demographic characteristics (n=225).

Socio-Demographic characteristics	No.	%
Age		
20- <30 years	74	32.9
30- <40 years	102	45.3
≥40 years and more	49	21.8
Mean ±SD	35.93±8.10	
Educational level		
Basic education	35	15.6
Secondary education	145	64.4
University education	45	20.0
Marital status		
Single	13	5.8
Married	212	94.2
Residence		
Rural	125	55.6
Urban	100	44.4
Income		
Enough and saved	40	17.8
Enough	169	75.1
Not enough	16	7.1

Table (2): Frequency distribution of the studied workers regarding their work characteristics (n=225).

Work characteristics	No.	%
No of work hours/ day		
6-8	190	84.4
>8	35	15.6
No of work days per week		
Two days	18	8.0
Four days	6	2.7
Five days or more	201	89.3
Experience/ years		
1-<5	79	35.1
5->10	62	27.6
≥10	84	37.3
Mean ±SD	10.72±5.13	
Attending training courses		
No	82	36.4
Yes	143	63.6
Number of training courses		
One	62	43.4
Two	57	39.9
Three and more	24	16.8
Types of training courses (n=143)		
Occupational safety and health standards course	142	99.3
Occupational safety and health management course and the new laws of ISO 45001	70	49.0
Occupational health and safety assessment specifications course	38	26.6

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Table (3): Frequency distribution of the studied workers regarding their health problems exposure during past six months (n=225).

Health problems	No.	%
Accidents		
Fracture due slipping or falling heavy equipment	39	17.3
Exposure to electrical wires	11	4.9
Wounds occur in any part of the body	16	7.1
Dermatitis due to exposure to dangerous chemicals	10	4.4
Asphyxiation due to inhalation of hazardous chemicals	10	4.4
Burns, sunstroke or fatigue	3	1.3
Hypothermia or skin ulceration	3	1.3
Hearing impairment	14	6.2
Eyestrain due to excessive focus	1	0.4
Injuries to the eyes	0	0.0
Hepatitis C infection as a result of exposure to viruses	13	5.8
Not exposed	131	58.2
Muscular system problems		
Injury to muscles, tendons and cartilage	7	3.1
Disorders of the neck and upper extremities	18	8.0
Muscle fatigue	23	10.2
Not exposed	183	81.3
Psychological problems		
Irritability	6	2.7
Problems sleeping as a result of working too many hours	1	.4
Tension and nervousness	11	4.9
Feeling insecure at work	5	2.2
Depression after an injury at work	5	2.2
Not exposed	197	87.6
Respiratory problems		
Infection with bronchitis	12	5.3
Pneumonia infection	14	6.2
Asthma	11	4.9
Sinus infections	15	6.7
Not exposed	173	76.9

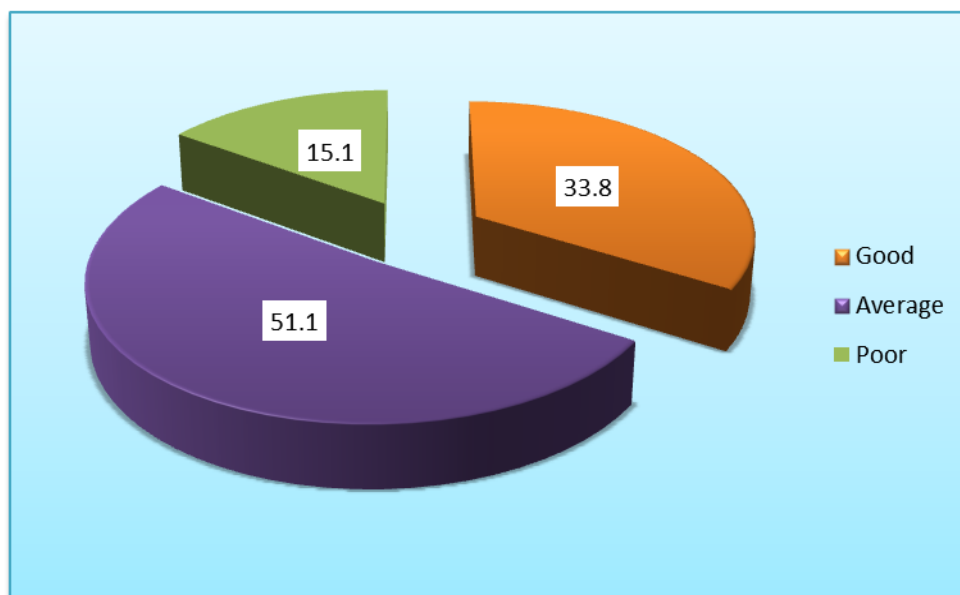


Figure (1): Percentage distribution of the studied workers total knowledge level regarding occupational health hazards. (n=225).

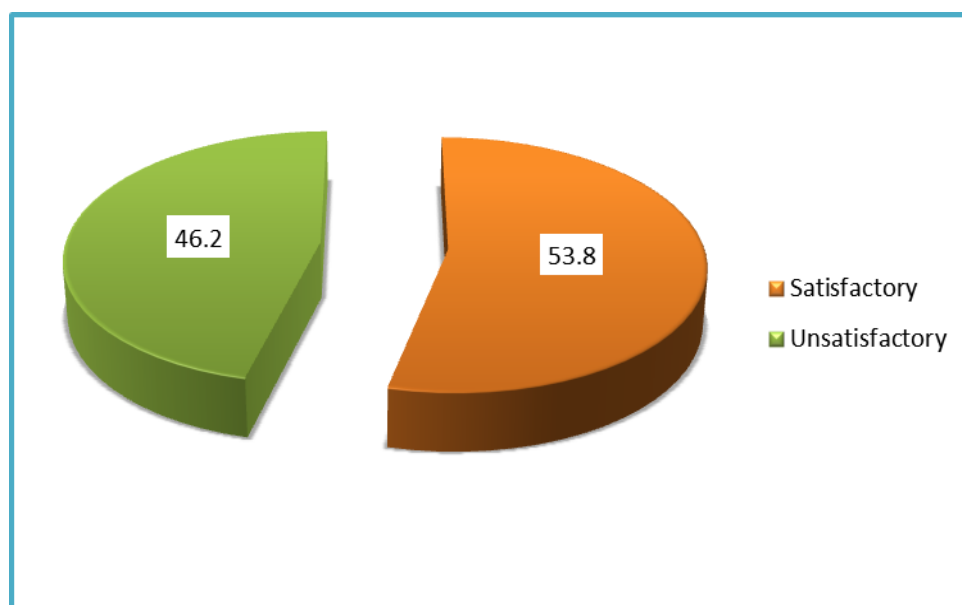


Figure (2): Percentage distribution of the studied workers regarding their total practices level about the occupational hazards in the pesticide factory (n=225).

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Table (4): Statistical relation between studied workers socio-demographic characteristics and their knowledge (n=225).

Items	Poor (n=34)		Average (n=115)		Good (n=76)		X ²	p-value
	No.	%	No.	%	No.	%		
Age								
20- >30	6	17.6	42	36.5	26	34.2	8.445	0.077
30- >40	18	52.9	55	47.8	29	38.2		
≥40	10	29.4	18	15.7	21	27.6		
Educational level								
Basic education	20	58.8	13	11.3	2	2.6	68.4	0.000**
Intermediate education	10	29.4	86	74.8	49	64.5		
University education	4	11.8	16	13.9	25	32.9		
Marital status								
Single	0	0.0	8	7.0	5	6.6	2.468	0.291
Married	34	100.0	107	93.0	71	93.4		
Residence								
Rural	19	55.9	60	52.2	46	60.5	1.295	0.523
Urban	15	44.1	55	47.8	30	39.5		
Income								
Enough and saved	6	17.6	21	18.3	13	17.1	1.447	0.836
Enough	27	79.4	86	74.8	56	73.7		
Not enough	1	2.9	8	7.0	7	9.2		
Attending training courses								
No	31	91.2	43	37.4	8	10.5	66.05	0.000**
Yes	3	8.8	72	62.6	68	89.5		
Past experience/ years								
1->5	28	82.4	45	39.1	6	7.9	59.47	0.000**
5->10	4	11.8	30	26.1	28	36.8		
≥10	2	5.9	40	34.8	42	55.3		

Table (5): Statistical relation between total knowledge and total practices of studies workers. (n=225).

Total practices level	Total knowledge level						X ²	p-value
	Poor (n=34)		Average (n=115)		Good (n=76)			
	No.	%	No.	%	No.	%		
Unsatisfactory	28	82.4	49	42.6	27	35.5	21.95	0.000**
Satisfactory	6	17.6	66	57.4	49	64.5		

Discussion:

According Socio-demographic data of the studied workers, the current study illustrated that less than half of the studied workers aged from 30 to less than 40 years with Mean age = 35.93 ± 8.10 , almost two thirds of the studied workers had secondary education, Majority of the studied workers were married. Concerning residence, the present study displayed that more than half of the studied workers live in rural area. As regards monthly income, the current study clarified that about three quarters of the studied workers their income was enough.

According to the studied workers about their work characteristics, the findings of the current study represented that majority of the studied workers work 6-8 hours daily and work for five days or more per week. This result was harmony with **Berg et al., (2019)**, who studied "Association between occupational exposure to pesticides and cardiovascular disease incidence" In United States, (n= 7557). They reported that three-quarters 75.0% of the study subjects' average of work hours was usually an 8-hour workday or a 40-hour work week. This might be due to the dominant nature of work policy.

The current study showed that less than one fifth of the studied workers exposed to fracture due slipping or falling heavy equipment, about one tenth of them exposed to muscle fatigue and the minority of them had tension, nervousness and sinus infections. These results were different with **Eiz-Elregal et al., (2019)** who reported that more than half (51.6%) of the respondents had muscle pain and less than half of them (44.7%) had anxiety. This might be related to the difference between both study samples as regards health status, work related health problems and improper use of protective measures. The study also showed that minority of the studied workers exposes to sinus infection. In the same line, this result was supported by **Palaniswamy et al., (2021)**, who carried out a study entitled "Occupational

exposure to pesticides and health markers in general population " in Northern Finland, (n= 5037), who reported that the minority of the studied participants (12.5%) had sinus infections. This might be related to continuous wearing of protective mask during work.

Concerning the studied workers' total knowledge level about occupational safety and health hazards, the present study declares that about one third of them had good level of total knowledge about occupational safety and health hazards, about half of the studied workers had average level of total knowledge about occupational safety and health hazards while, less than one fifth of them have poor level of total knowledge about occupational safety and health hazards. These results were in accordance with **Sapbamrer et al., (2020)** who studied "Factors affecting use of personal protective equipment and pesticide safety practices: A systematic review" In Thailand, (n= 1100) and reported that more than half of the studied subjects 56% had moderate level of knowledge about occupational safety and health hazards. This might be related to incomplete knowledge about occupational health hazards reached to workers which can be related to short time of training courses.

Regarding the studied workers' total practices level about the occupational hazards in the pesticide factory, the current study illustrated that more than half of the studied workers had satisfactory level of total practices, while less than half of them had unsatisfactory level of total practices. These results were in the same line with **Shaukat et al., (2018)**, who conducted a study entitled "assessment of health and safety issues in a pesticide industry" in Pakistan, (n= 60) and reported that about half of the studied subjects 50.3% had satisfactory level of practice. In contrast **Tuhul et al., (2021)** who conducted a study entitled "Development of a conceptual framework for occupational safety

and health in Palestinian pesticide industries" in Palestine, (n= 175) and mentioned that the majority 83.7% of the studied participants had an unsatisfactory level of safety practices, including insufficient use of personal protective equipment. This might be related to inadequate training about occupational hazards and protective measures among pesticide factory workers.

The present study revealed that there were a highly statistically significant relation between studied workers' socio-demographic characteristics (educational level, receiving training course & past experience) and their total knowledge level. This finding agreed with **Shaukat et al., (2018)**, who found that there was a highly statistical significance relation between the studied respondents total knowledge and their socio demographic characteristics regarding years of experience and educational level ($p < 0.000$). As well, a study by **Wekoye et al., (2019)**, who carried out a study to assess "Occupational safety and health status in the informal Non-food manufacturing sector in Kampala city, Uganda" in Uganda, (n= 424) and mentioned that a statistical significance relation was found between the studied subjects total knowledge and attending training courses.

The current study declared that there was a highly statistically significant practices level regarding occupational health and safety among studied workers, and their total knowledge. This result was in accordance with **Asgedom et al., (2019)**, who reported that level of knowledge was significantly associated with safety practices of the studied subjects. Also, a study by **Waren et al., (2021)**, they stated that there were a highly statistical significance relation ($p < 0.01$) between the studied workers total knowledge and their practices regarding occupational health and safety. This might be explained as level of knowledge has a

significant effect on level of practice among the studied workers.

Conclusion:

The present study revealed that less than one fifth of the studied workers exposed to fracture due slipping or falling heavy equipment, about one tenth of them exposed to muscle fatigue and the minority of them had tension, nervousness and sinus infections. Also, The present study revealed that there were a highly statistically significant relation between studied workers' socio-demographic characteristics (educational level, attending training course & past experience) and their total knowledge level. the current study declared that there was a highly statistically significant relation between total knowledge and total practices level among studied workers.

Recommendations:

- Educational health programs should be developed and implemented for occupational health hazards and preventive measures among workers in pesticide factories.
- Provide an educational booklet for workers in pesticide factories to raise awareness regarding occupational health hazards and preventive measures.
- Personal protective equipment should be available all workers in pesticide factories.
- Regular periodic screening for all workers in pesticide factories for early detection of any health problems.
- Further study must be conducted about workers in pesticide factories adherence to safety measures guidelines and strategies for more activation.

References

Ali, M., Ali, S., Abd- Elraouf, M., and Hassan, O. (2020). Occupational Pesticide Intoxication among Workers , The Egyptian Journal of Hospital Medicine , 81(5), PP. 1916-1923. Accessed on 10/6/2021 At 10:30 pm.

- Alengebawy, A., Abdelkhalek, T., Qureshi, R., and Wang, Q. (2021).** Heavy metals and pesticides toxicity in agricultural soil and plants: Ecological risks and human health implications. *Toxics*, 9(3), p. 42. Accessed on 18-6-2022 at 7: 30pm.
- Asgedom, A., Bråtveit, M., and Moen, E. (2019).** Knowledge, attitude and practice related to chemical hazards and personal protective equipment among particleboard workers in Ethiopia: a cross-sectional study. *BMC public health*, 19(1), PP.1-10. Accessed on 3-7-2022 at 12 am.
- Berg, K., Rodriguez, B., Davis, J., Katz, R., Cooney, V., and Masaki, K. (2019).** Association between occupational exposure to pesticides and cardiovascular disease incidence: The Kuakini Honolulu Heart Program. *Journal of the American Heart Association*, 8(19), P.12569. Accessed on 2-3-2022 at 10 pm.
- Eiz-Elregal, A., Mabrouk, S., and Ali, H. (2019).** The Effect of Safety Measure Educational Guideline on Knowledge, Practice and Adverse Health Outcomes among Pesticide Workers. *Egyptian Journal of Health Care*, 10(1), PP.297-315. Accessed on 11-8-2022 at 12 am.
- Mehmood, Y., Arshad, M., Mahmood, N., Kächele, H., and Kong, R. (2021).** Occupational hazards, health costs, and pesticide handling practices among vegetable growers in Pakistan. *Environmental Research*, 200, p. 111340. Accessed on 22-6-2022 at 12:00am.
- Opare-Boafo, S., and Fianko, R. (2021).** Occupational exposure to pesticides among vegetable farmers in Akuapem North Municipality, 15(3), p.40. Accessed on 23-6-2022 at 10 :00 pm.
- Palaniswamy, S., Abass, K., Rysä, J., Odland, Ø., Grimalt, O., Rautio, A., & Järvelin, R. (2021).** Occupational exposure to pesticides and health markers in general population in Northern Finland: Differences between sexes. *Environment International*, 156, 106766.
- Sapbamrer, R., and Thammachai, A. (2020).** Factors affecting use of personal protective equipment and pesticide safety practices: A systematic review. *Environmental research*, 18(5), P.109444. Accessed on 1-7-2022 at 10 pm.
- Shaukat, M., Chaudhry, A., Rasheed, F., Kamal, B., and Ashraf, A. (2018).** Assessment of health and safety issues in a manufacturing industry. *Journal of Information*, 3(10), PP.90-100. Accessed on 4-7-2022 at 10 pm.
- Tuhul, S., El-Hamouz, A., Hasan, R. and Jafar, A., (2021).** Development of a conceptual framework for occupational safety and health in Palestinian manufacturing industries. *International Journal of Environmental Research and Public Health*; 18(3): P.1338 .Accessed on 6-9-2022 at 1 am.
- Waren, A., Ayuningtiyas, R., and Wahyuda, A. (2021).** Relationship between personal protective equipment use and contact dermatitis in palm oil pesticide workers. *KnE Life Sciences*, 27(2), PP.272–277. Accessed on 3-7-2022 at 10 pm. Accessed on 20-7-2022 at 10 pm.
- Wekoye, A., Moturi, N., and Makindi, M. (2019).** Knowledge and Attitudes on Practices of Occupational Safety and Health in the Informal Non-food Manufacturing Sector in Kampala City, Uganda. *Current Journal of Applied Science and Technology*.12(3), P456. Accessed on 13-7-2022 at 2 pm.

مخاطر الصحة المهنية والتدابير الوقائية بين العاملين في مصانع المبيدات

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يمكن أن يؤدي استخدام التدابير الوقائية في مكان العمل إلى حماية العمال من المخاطر الفيزيائية أو الكيميائية أو الميكانيكية. الهدف من الدراسة: تقييم مخاطر الصحة المهنية والتدابير الوقائية بين العاملين في مصانع المبيدات. وقد أجريت هذه الدراسة بمصنع مبيدات كفر الزياد على عينة عشوائية بسيطة في هذه الدراسة. وتشتمل على (٢٢٥ عاملاً) - واطهرت النتائج بأن ٤٥,٣٪ من العمال المدروسين الذين تتراوح أعمارهم بين ٣٠- < ٤٠ سنة بمتوسط عمر العمال = ٣٥,٩٣ ± ٨,١٠ ، ١٧,٣٪ من العمال المدروسين يتعرضون للكسر و ١٠,٢٪ تعرضوا لإرهاق عضلي و ٤,٤٪ فقط قاموا بالفحص الدوري ، و ٣٣,٨٪ من الموظفين الذين خضعوا للدراسة لديهم مستوى جيد من المعرفة الكلية و ٥٣,٨٪ من العاملين المدروسين لديهم مستوى مرضٍ فيما يتعلق بممارساتهم الإجمالية المبلغ عنها. كما يوجد علاقة ذات دلالة إحصائية عالية بين مستوى المعرفة الكلي للموظفين المدروسين وإجمالي الممارسات المبلغ عنها. واوصت الدراسة بتطوير برنامج تثقيف صحي بشأن مخاطر الصحة المهنية والتدابير الوقائية بين العاملين في مصانع المبيدات.