

▪ *Basic Research*

Healthy Safety Program for Prevention of Occupational Health Hazards Among Veterinary Assistant Workers

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Abstract

Background: Prevention of occupational health hazards is crucial role to verify the health and safety of veterinary assistant workers in the work environment. **Aim:** Evaluate the effect of healthy safety program for prevention of occupational health hazards among veterinary assistant workers. **Methods:** A quasi- experimental design was utilized. Convenience sample of 62 veterinary assistant workers at thirty-three Veterinary Health Units in Kalyobia Governorate. Two tools were used. Tool I: An interviewing tool composed of four parts as socio-demographic characteristics, work characteristics, medical history, and knowledge of veterinary assistant workers about occupational health hazards. Tool II: Observational checklist was concerned with two parts: a- environmental work setting and b- practices of veterinary assistant workers regarding prevention of occupational health hazards. **Results:** 58.1% of the studied veterinary assistant workers had poor knowledge regarding prevention of occupational hazards pre healthy safety program implementation, which declined to 8.1% post healthy safety program implementation, and 88.7% of the studied veterinary assistant workers had unsatisfactory practices pre healthy safety program implementation compared to 17.7% post healthy safety program implementation. **Conclusion:** Healthy safety program was successful in enhancing knowledge and improving health practices of veterinary assistant workers regarding prevention of occupational health hazards. **Recommendations:** Continuing healthy safety program for veterinary assistant workers to raise and update their knowledge and practices regarding prevention of occupational health hazards.

Keywords: Healthy Safety Program, Occupational Health Hazards, Prevention, Veterinary Assistant Workers

1. Introduction

Veterinary assistant workers serve as vital participants of the veterinary healthcare team who support and assist veterinarians. Veterinary assistants perform a variety of tasks, including help in handling and restraining animals, preparing exam rooms, and surgical equipment, keeping treatment areas cleaned and well-maintained, assisting with medical procedures, administering drugs, interacting with pet owners, arranging appointments and offering details about animal care. [1]

Occupational health hazards are injuries brought on by one's job or the workplace environment. Globally, occupational hazards significantly increase the burden of disease. According to estimates from the International Labour Organization (ILO), around 2.93 million workers worldwide die from work-related diseases or injuries yearly, and 395 million have non-fatal work-related problems, resulting in an estimated \$2.99 trillion in annual economic losses. Veterinary assistant workers suffer from physical, chemical, biological, and psychological occupational health hazards. [2, 3, 4]

Veterinary assistant workers encounter several occupational hazards, such as physical health hazards which are the most frequent health hazard, representing 46–49.85% of all health hazards. Physical health hazards include animals` scratching, biting, injuries sustained from needles, foot attacks, animal kicking, crushing trauma, trips and falls, noise, burns and radiation injuries. In addition, workers in veterinary settings suffer from musculoskeletal disorders. [5, 6]

Hazards from chemicals include hormones, latex, chemical pesticides, waste anesthetic gases, glutaraldehyde and other disinfectants and hazardous medications including antineoplastics. Dermal contact or inhalation are common routes of exposure to these chemicals. Splashes could lead to chemical damage to the skin, eyes, or mucous membranes, lead to more substantial risk of having an occupational skin disease, such as hand eczema, contact urticaria, and irritating/allergic contact dermatitis. [7, 8]

Occupational biological hazards, both infectious and non-infectious, are the most frequent occupational health hazards among veterinary assistant workers. Any nation's economy is heavily burdened by zoonotic illnesses, but developing and poorly developed countries are more severely affected. The World Health Organization (WHO) estimates that zoonotic infections cause one billion cases of illness and many fatalities worldwide each year. Zoonotic infections, including bacterial, viral, mycotic, protozoal, and parasitic infections, were linked to the highest risk of occupational hazards. Brucellosis, Q fever, toxoplasmosis, rabies, scabies lymphocytic choriomeningitis virus, mites, chlamydia psittaci, ringworm, giardiasis, and helminths are some of the diseases which veterinary assistants may be exposed. [9, 10]

Occupational psychological stressors that veterinary assistants may face include an overwhelming workload, financial limitations, physical exhaustion from caring for and handling animals, dealing with the public, and ethical issues about treatment options. These stressors can result in mental health disorders, for example anxiety, burnout, depression, and others. Among veterinary assistants, chronic stress and burnout were major problems that had an impact on the health. Burnout is a condition of physical and emotional exhaustion resulting from prolonged occupational stress. The working veterinarian force is heavily burdened by the shortage of para-veterinarian staff, veterinary field infrastructure, and veterinarians and assistance workers. [11, 12, 13]

Prevention and control of occupational hazards among veterinary assistant workers by implementing a comprehensive workplace safety and health program, controlling the source of disease, risk identification, assessment and training. A health and safety program is a

methodical strategy that directs organizations to safeguard and advance the health of the workers by avoiding and managing occupational diseases as well as averting accidents and injuries at work. It improves workers' social, emotional, and physical well-being. Enabling workers to lead economically and socially productive lives and favorably impact sustainable development is one of the goals of health and safety programs.^[14, 15]

Community Health Nurses (CHNs) have a vital role in educating veterinary assistant workers about how to prevent occupational health hazards. CHNs stress the value of preventative vaccinations and occupational physical examinations. CHNs assist in risk assessment and refer veterinary assistant workers for examinations for occupational injuries` treatment and follow-up. CHNs provide training on the proper personal protective equipment used for animal housing areas, and proper handling of equipment. All veterinary assistant workers need to appreciate the importance of personal hygiene and specific actions that have to be performed periodically for protection against zoonotic agents encountered in dealing with animals in addition to hazardous items used. Veterinary assistant workers should avoid harmful working conditions and be highly trained. ^[5, 16]

1.1. Significance of study

The veterinary sector has the fourth-highest incidence rates of nonfatal occupational diseases and injuries among all industries. There has been an increase in reported injuries in recent years, with a notable rise in animal-related injuries. Injuries are more frequent among less experienced staff. ^[17] So, application of healthy safety program is very important for veterinary assistant workers to increase their knowledge and practices related to prevention of occupational health hazards.

2. Aim of study

The aim of this study was to evaluate the effect of healthy safety program for prevention of occupational health hazards among veterinary assistant workers.

2.1. Research hypothesis

Healthy safety program will raise knowledge and enhance practices of veterinary assistant workers regarding prevention of occupational health hazards.

3. Subjects and Method

3.1. Research design

A quasi-experimental design was used in this study (one group pre/ and post-test).

3.2. Setting

The research was conducted at thirty three Veterinary Health Units were chosen by simple random sample and it was represent 50% from total 66 Veterinary Health Units in Kalyobia Governorate; (Bata, Kafr Saad, Bakira, Tahla, Meet Elhofein, Meet Elsbaa, Damlo, Meet Radi, Kafr Shokr, Kafr Marsafs, Kafr Ali Sharaf Elden, El Barada, Abo Elgheet, Barshom, Begam, Meet Halva, Balqs, Kalma, Qalyub, Toukh, Beltan, Moushtohor, Elammar, Meet Kinana, Elkhanka, El-khosos, Shiben-El Kanater, Tahanob, Kaha, Aghoor., Tahanob, Sheblanga, and Meet Assem Veterinary Health Units).

3.3. Sampling

Convenience sample of veterinary assistant workers was used in this study from previously mentioned settings. Some units have one and others have two veterinary assistant workers. The total number of sample was 62 veterinary assistant workers.

3.4. Data collection tool

Two tools were used:

Tool I: An interviewing tool: It was prepared by researchers, segmented into four parts, then translated into Arabic to assess the following:

First part: Socio-demographic characteristics of veterinary assistant workers involving age/year, sex, marital status, educational level, residence, and monthly income.

Second part: Work characteristics of veterinary assistant workers such as number of working hours/ day, number of working days/week, experience/year, taking previous training courses, and name of previous training courses.

Third part: Medical history of veterinary assistant workers such as previously routine medical checkup, previous exposure to allergy from working, an previous vaccines against animals' diseases, and previous health problems exposure from working at Veterinary Unit.

Fourth part: Veterinary assistant workers' knowledge regarding occupational health hazards comprised of (8) multiple choice type questions.

Scoring system:

The knowledge scores for each question rated as "two" for correct and complete answer, "one" for correct and incomplete answer, and "zero" for don't know. The score of the item was calculated and dividing by the number of items giving mean scores. These scores were modified into a percent score, the total score= 16 points. The total scores categorized into: Good knowledge level when the scores $\geq 75\%$ (≥ 12 score), average knowledge level when the scores $50 < 75\%$ ($8 < 12$ score), and poor knowledge level when the scores $< 50\%$ (< 8 score).

Tool II: Observation checklist involved two parts:

Part I: Was used to observe the environment of Veterinary Units which adapted from **Safety and Health Council in collaboration with the Ministry of Manpower, 2014** ^[18], and included 20 items.

Scoring system for environmental work setting

The scoring system was determined as (1) scores for available and (0) scores for unavailable.

Part II: Was concerned with observational practices of veterinary assistant workers regarding prevention of occupational health hazards adapted from **Habib & Alshehhi, 2021**^[19], which consisted of 4 sections **physical health hazards** included 8 items, **ergonomic health hazards** that included 8 items, **chemical health hazards** included 10 items and **biological health hazards** that included 9 items).

Scoring system:

"One" was assigned to practice items that were accomplished, and "zero" was assigned to those that were not. Score of the item was calculated and divided by the number of items offering mean scores. These scores were modified into a percentage score, the total score= 35 points. A total practice level of less than 60% (< 21 points) is deemed unsatisfactory, whereas a total practice level of greater than or equal to 60% (≥ 21 points) is deemed satisfactory.

3.5. Administrative process

Following an explanation of the purpose of the research and the acquisition of statistics regarding the number of assistant workers who attend the Veterinary Health Units, the Dean of the Faculty of Nursing at Benha University sent a formal letter to the Directors of Veterinary Health Units in Kalyobia Governorate to obtain official permission and approval to conduct the study.

3.6. Ethical consideration

This research was approved by the Scientific Research Ethical Committee of Nursing Faculty, Benha University. The researchers informed each worker about the study's goals in order to get their informed consent to participate, noting that they could withdraw the study at any time and that all information would be used exclusively for research.

3.7. Tools validity

Five community health nursing experts from Benha University examined the tools to verify the data's accuracy and make sure it was appropriate, applicable, and complete.

3.8. Tools reliability

The tools evidenced high reliability, which was determined by the Cronbach's Alpha coefficient test, and the tools contained homogenous items. Internal consistency was 0.99 for the knowledge questionnaire and 0.97 for the practices.

3.9. Pilot Study

It was conducted on six veterinary assistant workers from the study sample, equal to 10% of the total veterinary assistants under study. It was implemented to ensure that the study tools were applicable and easy to comprehend. Also, for identifying any challenges or problems that the researchers may encounter during data collection. The veterinary assistant workers who completed the pilot were also included considering no modifications in the tools were made.

3.10. Data collection

Data was collected from veterinary assistant workers through the main four phases utilized: Assessment, planning, implementation, and evaluation. The study was conducted over a period of 6 months and started from the starting of February 2024 to the end of July 2024. The researchers visited the previous settings three days/week from 9:00 am to 1:00 pm. The researchers organized and scheduled sessions with the veterinary assistant workers in order to carry out the program and provide them the accessibility to the educational tools and instructional materials.

The health safety program was carried through:

Assessment phase:

During the assessment phase, baseline data was collected through interviews with the veterinary assistant workers. The pretest phase lasted roughly eight weeks, and the researchers attended to veterinary units three days a week from 9:00 am to 1:00 pm on Saturday, Tuesday, and Thursday. The researchers interviewed veterinary assistant workers to assess their knowledge and practices. At the start of the interview, the researchers greeted each veterinary assistant worker, discussed the objectives, schedule, and study activities, and obtained oral consent at the beginning of the interview and it took 15 to 30 minutes. The number of veterinary assistant workers interviewed ranged according to their compliance and readiness to engage in the study.

Planning phase:

Based on the needs identified by veterinary assistant workers during the assessment phase and in light of relevant literature, the researchers developed the healthy safety program. The researchers adjusted the number of sessions, content, the various training techniques, and the media based on the veterinary assistant workers' understanding with basic Arabic. The program's objectives were then established as follows:

General objectives

The general objective of the healthy safety program was to enhance workers' knowledge and practices concerning prevention of occupational health hazards.

Specific objectives:

After the healthy safety program, the studied veterinary assistant workers should acquire:

A-Knowledge skills

- Meaning of occupational hazard, and physical hazards and its related health problems,
- Chemical hazards and its related health problems,
- Biological hazards and its related health problems,
- Ergonomic hazards and its related health problems,
- Psychological hazards and its related health problems,
- Methods of dealing with psychological hazards, and
- Prevention of occupational hazards.

B- Practical skills

- Practices regarding prevention of physical hazards.

- Practices regarding prevention of ergonomic hazards.
- Practices regarding prevention of chemical hazards
- Practices regarding prevention of biological hazards

Implementation phase: The implementation phase involved the application of the healthy safety program. There were seven scheduled sessions in the program and the duration of each session was 30 to 45 minutes. The researchers visited four units and met four to eight veterinary assistants per day. A variety of methods were used, including group discussions, lectures, and instructional slides. An educational booklet was distributed to all veterinary assistant workers on the first day of the healthy safety program. The first session began with a brief introduction to the program and its goal. A summary of the previous session was given before each new one. A total of seven sessions were provided to the veterinary assistant staff. Three sessions for the theoretical section and four sessions for the practical section. These sessions were provided for each veterinary assistant worker.

Theoretical sessions (3 sessions)

- The first session: Covered an account of meaning of occupational hazard, and physical hazards and its related health problems and chemical hazards and its related health problems.
- The second session: Included an explanation of biological hazards and its related health problems, ergonomic hazards and its related health problems, and psychological hazards and its related health problems,
- Third session: Included methods of dealing with psychological hazards, and prevention of occupational hazards.

Practical sessions (4 sessions)

- The first session: Included how to prevent physical health hazards.
- The second session: Included how to prevent ergonomic health hazards.
- The third session: Included how to prevent chemical health hazards.
- The fourth session: Included how to prevent biological health hazards.

D- Evaluation phase:

The impact of the healthy safety program was evaluated through posttest was carried at Veterinary Health Units by using the same tools utilized pre-program in order to compare the change in the veterinary assistant workers knowledge and practices immediately after implementation of the program.

3.11. Statistical analysis

Data was examined before entering the computer. This was accomplished by tabulating the data following analysis with version 26 of the Statistical Package for Social Sciences (SPSS). The use of descriptive statistics was made, including mean, standard deviation, frequency, and percentages. The distribution of numbers and percentages was ascertained using chi square, and the relation between the total knowledge score and practices was ascertained using the correlation test (r). $P < 0.001$ was considered highly significant, $p \leq 0.05$ was considered significant, and $p > 0.05$ was considered insignificant.

4. Results

Table (1): Demonstrates that; 46.8% of studied veterinary assistant workers were aged 40 years old and more with mean 41.66 ± 8.0 years, 100.0% of them were male, 87.1% of them were married, 58.1% of them had preparatory education, 85.5% of them lived in rural areas, and hadn't have enough monthly income.

Table (2): Explains that; 90.3%, 95.2% of the studied veterinary assistant workers were worked for 6 hours and more daily and worked 6 day per week respectively. 50.0% of them had 10 years and more regarding experience years, 54.8%, 50.0% of them had took previous

training courses and had taken previous training courses about using personal protective equipment respectively.

Table (3): Reveals that; 41.9% of the studied veterinary assistant workers hadn't previously routine medical checkup and previous exposure to allergy due to chemicals/medications respectively. 66.1% of them took avian influenza vaccine previous.

Figure (1): Illustrate that; 72.6% of the studied veterinary assistant workers suffered from back pain, and 62.9% of them suffered from muscles pain. While 3.2 % of them suffered from fractures.

Table (4): Explains that; there were highly statistically significant differences between all items of the studied veterinary assistant workers` knowledge regarding prevention of occupational hazards pre and post healthy safety program implementation ($p=0.001$).

Figure (2): Explores that; 12.9% of studied veterinary assistant workers had good knowledge regarding prevention of occupational hazards pre healthy safety program implementation which increased to 87.1% post healthy safety program implementation, while 58.1.% of them had poor knowledge regarding prevention of occupational hazards pre healthy safety program implementation, and then this percentage declined to 8.1% post healthy safety program implementation.

Table (5): Explains that; 84.8% of veterinary units' environment had limited access to hazardous chemicals and drugs and preparation areas are limited, 100% of veterinary unit environment hadn't availability of a panic alarm system for staff.

Table (6): Highlights that; there were highly statistically significant differences in all items related to studied veterinary assistant workers` observed practices regarding prevention of physical hazards pre and post healthy safety program implementation($p<0.001$).

Table (7): Clarifies that; there were highly statistically significant differences in all items related to studied veterinary assistant workers` observed practices regarding prevention of ergonomic hazards pre and post healthy safety program implementation ($p<0.001$).

Table (8): Proves that; there were highly statistically significant differences in all items related to studied veterinary assistant workers` observed practices regarding prevention of chemical hazards pre and post healthy safety program implementation ($p<0.001$).

Table (9): Confirms that; there were highly statistically significant differences in all items related to studied veterinary assistant workers` observed practices regarding prevention of biological hazards pre and post healthy safety program implementation ($p<0.001$).

Figure (3): Describes that; 17.7% of studied veterinary assistant workers had satisfactory practices regarding prevention of physical hazards pre healthy safety program implementation which increased to 85.5% post healthy safety program implementation, while 14.5% of them had satisfactory practices regarding prevention of ergonomic hazards pre healthy safety program implementation compared to 82.3% post healthy safety program implementation.

Figure (4): Illustrates that; 11.3% of studied veterinary assistant workers had satisfactory practices regarding prevention of occupational hazards pre healthy safety program implementation which improved to 82.3% post healthy safety program implementation, while 88.7% of them had unsatisfactory practices pre healthy safety program implementation compared to 17.7% post healthy safety program implementation.

Table (10): Indicates that, there were highly positive statistically significant correlations between studied veterinary assistant workers` total knowledge, and their total practices regarding prevention of occupational hazards pre and post healthy safety program implementation.

Table (1): Distribution of the studied veterinary assistant workers regarding their socio-demographic characteristics (n=62).

Socio-demographic characteristics	No.	%
Age / years		
20-	6	9.7
30-	18	29.0
40-	29	46.8
50+	9	14.5
$\bar{x} \pm S.D$ 41.66± 8.0		
Sex		
Male	62	100.0
Marital status		
Single	7	11.3
Married	54	87.1
Divorced	1	1.6
Educational level		
Read and write	2	3.2
Primary education	7	11.3
Preparatory education	36	58.1
Secondary education	17	27.4
Residence		
Rural	53	85.5
Urban	9	14.5
Monthly income		
Enough and save	2	3.2
Just enough	7	11.3
Not enough	53	85.5

Table (2): Distribution of the studied veterinary assistant workers regarding their work characteristics (n=62).

Work characteristics	No.	%
Number of working hours/ day		
6-	56	90.3
8+	6	9.7
Number of working days/week		
4-	3	4.8
6	59	95.2
Experience/ year		
5-	22	35.5
10-	31	50.0
15+	9	14.5
Previous training courses		
Yes	34	54.8
No	28	45.2
* Previous training courses (n=34)		
Occupational and health safety	7	20.6
Using personal protective equipment	17	50.0
First aid	11	32.3
Occupational hazards during dealing with animals	6	17.6

*Answers not mutually exclusive

Table (3): Distribution of the studied veterinary assistant workers regarding their medical history (n=62).

Medical history	No.	%
Previously routine medical checkup		
6 months	3	4.8
1 year	11	17.7
2 years and more	22	35.5
Non	26	41.9
* Previous exposure to allergy due to		
Fur/Dandruff	12	19.4
Latex Gloves	27	43.5
Chemicals/Medications	26	41.9
Animal Secretions	19	30.6
Non	21	33.9
*Previous vaccine against animals' diseases		
Rabies vaccine	29	46.8
Anthrax vaccine	9	14.5
Avian influenza vaccine	41	66.1
Non	7	11.3

*Answers not mutually exclusive

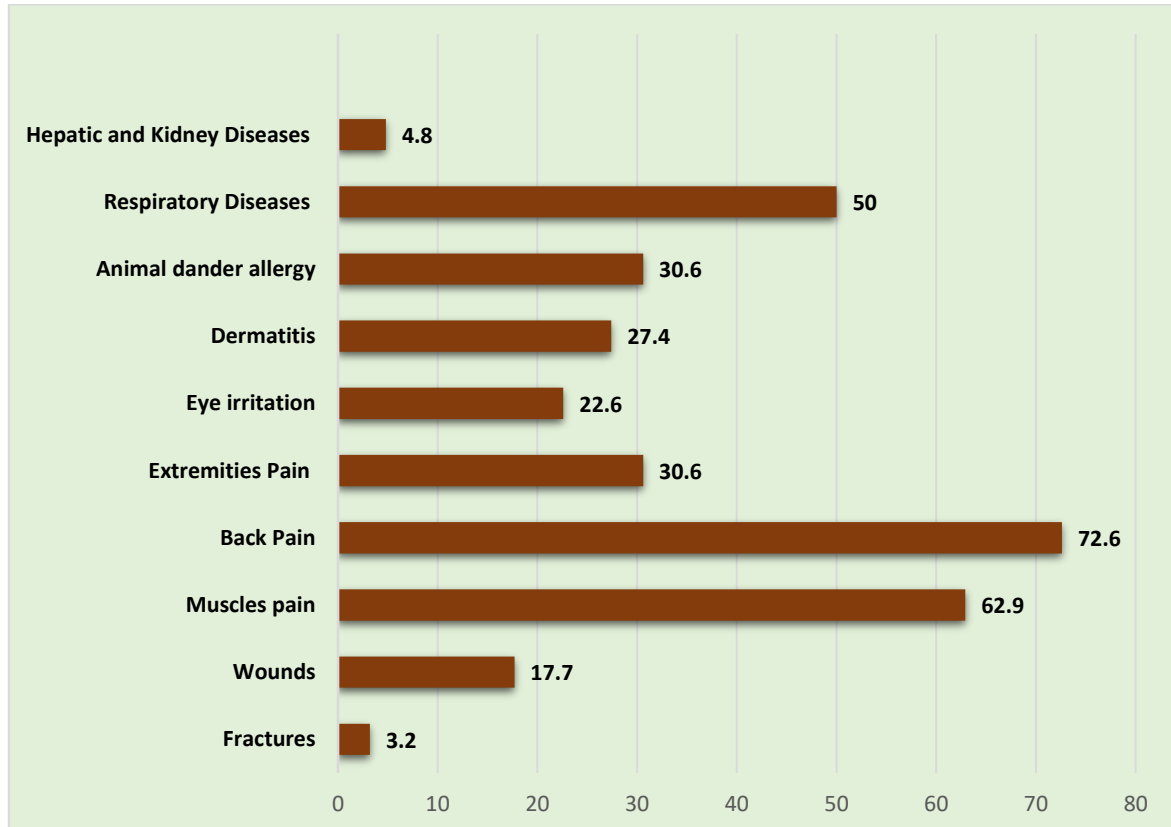
Figure (1): Percentage distribution of the studied veterinary assistant workers regarding previous health problems exposure from working at Veterinary Unit = (n=62).

Table (4): Distribution of the studied veterinary assistant workers` knowledge regarding prevention of occupational hazards pre and post healthy safety program implementation (n=62).

Knowledge	Pre healthy safety program implementation						Post healthy safety program implementation						X ²	p-value
	Complete& correct answer		Incomplete& correct answer		Don't know		Complete& correct answer		Incomplete& correct answer		Don't know			
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%		
Meaning of occupational hazards	8	12.9	28	45.2	26	41.9	54	87.1	7	11.3	1	1.6	69.87	<0.001**
Physical hazards and its related health problems	4	6.5	26	41.9	32	51.6	51	82.3	8	12.9	3	4.8	73.72	<0.001**
Chemical hazards and its related health problems	11	17.7	29	46.8	22	35.5	56	90.3	4	6.5	2	3.2	65.83	<0.001**
Biological hazards and its related health problems	5	8.1	21	33.9	36	58.1	49	79.0	8	12.9	5	8.1	65.11	<0.001**
Ergonomic hazards and its related health problems	9	14.5	22	35.5	31	50.0	50	80.6	9	14.5	3	4.8	57.00	<0.001**
Psychological hazards and its related health problems	6	9.7	27	43.5	29	46.8	54	87.1	6	9.7	2	3.2	75.28	<0.001**
Methods of dealing with psychological hazards	10	16.1	34	54.8	18	29.0	53	85.5	6	9.7	3	4.8	59.66	<0.001**
Prevention of occupational hazards	9	14.5	29	46.8	24	38.7	55	88.7	7	11.3	0	0.0	70.50	<0.001**

(**) highly statistically significant at (p<0.001)

Figure (2): Percentage distribution of the studied veterinary assistant workers` total knowledge level regarding prevention of occupational hazards pre and post healthy safety program implementation (n=62).

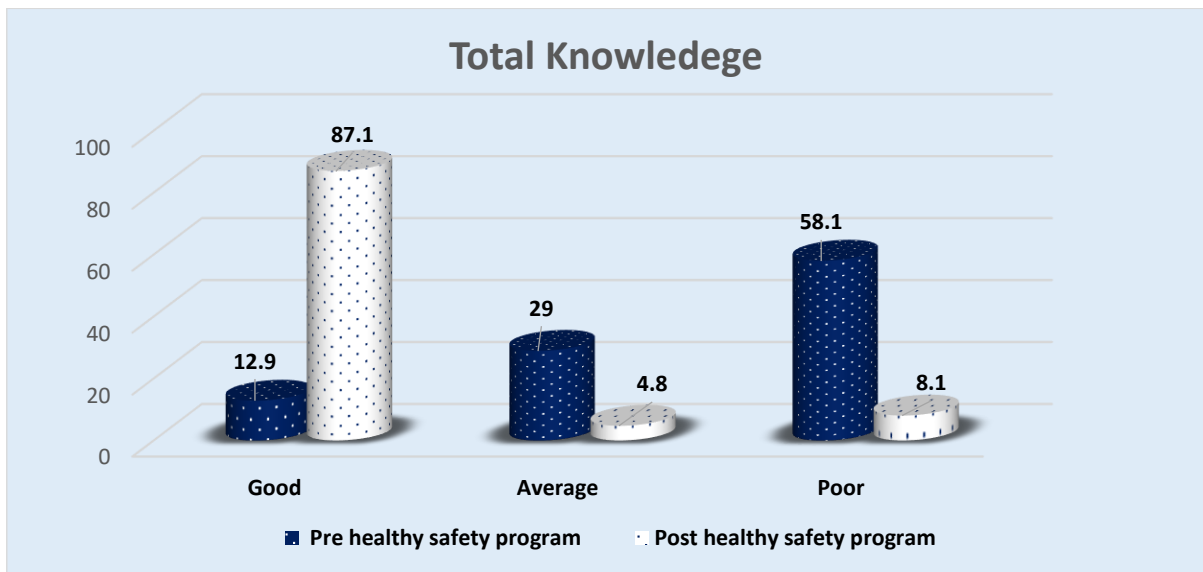


Table (5): Distribution of the studied veterinary assistant workers` observation checklist regarding Veterinary Unit environment setting (n=33).

Veterinary Unit environment	Available		Not available	
	No.	%	No.	%
Adequate and appropriate personal protective equipment	21	63.6	12	36.4
All chemical containers and drugs must be labelled	23	69.7	10	30.3
Restricted access to dangerous chemicals, medications, and preparation areas.	28	84.8	5	15.2
A chemical spill kit is kept and maintained.	25	75.8	8	24.2
All chemicals have valid safety data sheets.	18	54.5	15	45.5
All flammable materials are kept in proper storage locations.	11	33.3	22	66.7
Sharp edges on therapy equipment should be covered to prevent cuts.	10	30.3	23	69.7
Disposal bin is marked and labelled with the waste it contains.	6	18.2	27	81.8
Adequate ventilation is provided.	18	54.5	15	45.5
The staircases are well lit and with handrails.	21	63.6	12	36.4
Electrical cables have a safety mark sticker and are in a functioning condition.	22	66.7	11	33.3
Fire extinguishers are available and serviced regularly.	15	45.5	18	54.5
Equipment and systems for responding to fires are supplied and maintained.	2	6.1	31	93.9
Obstacles are avoided near emergency exits, and exit signs are prominently posted.	2	6.1	31	93.9
Adequate and appropriate lighting is provided for all work activities.	17	51.5	16	48.5
A panic alarm system is available for staff	0	0.0	33	100.0
Cooking appliances and refrigerators have routine maintenance and cleaning.	12	36.4	21	63.6
Kitchens for humans and animals should be separated	14	42.4	19	57.6
Kitchens should be kept clean, and dry.	11	33.3	22	66.7
Electrical installations and dangerous machinery are maintained and repaired.	8	24.2	25	75.8

Table (6): Distribution of the studied veterinary assistant workers` observed practices regarding prevention of physical hazards pre and post healthy safety program implementation (n=62).

Observed practices regarding prevention of physical hazards	Pre healthy safety program implementation				Post healthy safety program implementation				X ²	p-value
	Done		Not done		Done		Not done			
	No.	%	No.	%	No.	%	No.	%		
Use of proper personal protective equipment	3	4.8	59	95.2	47	75.8	15	24.2	64.88	<0.001**
Wear of hearing protectors.	0	0.0	62	100.0	34	54.8	28	45.2	46.84	<0.001**
Design work breaks.	11	17.7	51	82.3	53	85.5	9	14.5	56.96	<0.001**
Increase the distance between radiation sources.	9	14.5	53	85.5	52	83.9	10	16.1	59.66	<0.001**
Safe handling of needles and sharps and no recapping, bending.	16	25.8	46	74.2	51	82.3	11	17.7	39.77	<0.001**
Dispose glass ampoules properly	20	32.3	42	67.7	54	87.1	8	12.9	38.74	<0.001**
Use appropriate sharps containers	11	17.7	51	82.3	55	88.7	7	11.3	62.71	<0.001**
Wear appropriate footwear	30	48.4	32	51.6	60	96.8	2	3.2	36.47	<0.001**

(**) highly statistically significant at (p<0.001)

Table (7): Distribution of the studied veterinary assistant workers` observed practices regarding prevention of ergonomic hazards pre and post healthy safety program implementation (n=62).

Observed practices regarding prevention of ergonomic hazards	Pre healthy safety program implementation				Post healthy safety program implementation				X ²	p-value
	Done		Not done		Done		Not done			
	No.	%	No.	%	No.	%	No.	%		
Store heavier objects on shelves at waist level	19	30.6	43	69.4	56	90.3	6	9.7	46.19	<0.001**
Use mechanical aids and tools to lift or move heavy objects	9	14.5	53	85.5	49	79.0	13	21.0	51.82	<0.001**
Ask help from others to lift or move heavy objects.	34	54.8	28	45.2	62	100.0	0	0.0	36.16	<0.001**
Place all required work items and equipment in front of the employee	7	11.3	55	88.7	51	82.3	11	17.7	62.71	<0.001**
Ensure that the surface of the handhold is free from oil, and dust	22	35.5	40	64.5	53	85.5	9	14.5	32.42	<0.001**
Perform simple stretching exercises to relax working muscles.	2	3.2	60	96.8	44	71.0	18	29.0	60.96	<0.001**
Use carts to transport supplies rather than carrying.	7	11.3	55	88.7	49	79.0	13	21.0	57.44	<0.001**
Avoiding harmful postures while cleaning.	3	4.8	59	95.2	49	79.0	13	21.0	70.08	<0.001**

(**) highly statistically significant at (p<0.001)

Table (8): Distribution of the studied veterinary assistant workers` observed practices regarding prevention of chemical hazards pre and post healthy safety program implementation (n=62).

Observed practices regarding prevention of chemical hazards	Pre healthy safety program implementation				Post healthy safety program implementation				X ²	p-value
	Done		Not done		Done		Not done			
	No.	%	No.	%	No.	%	No.	%		
Wear proper personal protective equipment.	4	6.5	58	93.5	50	80.6	12	19.4	69.41	<0.001**
Ensure that all containers containing sterilizing solution are always covered with tight-fitting lids.	8	12.9	54	87.1	52	83.9	10	16.1	62.51	<0.001**
Wait until all safety precautions have been read and comprehended before handling.	0	0.00	62	100.0	9	14.5	53	85.5	10.87	<0.001**
Take precautionary measures against static discharge.	6	9.7	56	90.3	50	80.6	12	19.4	63.04	<0.001**
Keep away from dust, fumes, gas, mists or vapors.	23	37.1	39	62.9	59	95.2	3	4.8	46.66	<0.001**
Handle and open container with care.	4	6.5	58	93.5	48	77.4	14	22.6	64.12	<0.001**
Avoid eating, drinking and smoking when using chemical container.	7	11.3	55	88.7	53	85.5	9	14.5	68.32	<0.001**
Avoid contact with chemical substances with skin and eyes.	16	25.8	46	74.2	55	88.7	7	11.3	50.12	<0.001**
Rinse eyes immediately with water and ask medical help in case of contact with eyes	6	9.7	56	90.3	52	83.9	10	16.1	68.54	<0.001**
Remove all contaminated clothing right away, and wash skin in case of contact.	4	6.5	58	93.5	53	85.5	9	14.5	77.95	<0.001**

(**) highly statistically significant at (p<0.001)

Table (9): Distribution of the studied veterinary assistant workers` observed practices regarding prevention of biological hazards pre and post healthy safety program implementation (n=62).

Observed practices regarding prevention of biological hazards	Pre healthy safety program implementation				Post healthy safety program implementation				X ²	p-value
	Done		Not done		Done		Not done			
	No.	%	No.	%	No.	%	No.	%		
Wear proper personal protective equipment.	7	11.3	55	88.7	53	85.5	9	14.5	68.32	<0.001**
Hand hygiene before and after procedures.	4	6.5	58	93.5	49	79.0	13	21.0	66.72	<0.001**
Cover all the open wounds with waterproof plaster.	9	14.5	53	85.5	52	83.9	10	16.1	59.66	<0.001**
Practice basic principles of aseptic technique	4	6.5	58	93.5	51	82.3	11	17.7	72.17	<0.001**
Wash laboratory coats separately from other clothes.	3	4.8	59	95.2	49	79.0	13	21.0	70.08	<0.001**
Dispose contaminated waste and PPE properly	7	11.3	55	88.7	54	87.1	8	12.9	71.27	<0.001**
Maintain a distance of at least one meter between symptomatic and non-symptomatic cases	23	37.1	39	62.9	58	93.5	4	6.5	43.61	<0.001**
Isolate infected animals to prevent the spread of disease.	19	30.6	43	69.4	58	93.5	4	6.5	52.11	<0.001**
Isolate disinfected tools, clothing, etc. that contact infected animals.	5	8.1	57	91.9	52	83.9	10	16.1	71.72	<0.001**

(**) highly statistically significant at (p<0.001)

Figure (3): Percentage distribution of the studied veterinary assistant workers` subtotal observed practices level regarding prevention of physical, ergonomic, chemical, and biological hazards pre and post healthy safety program implementation (n=62).

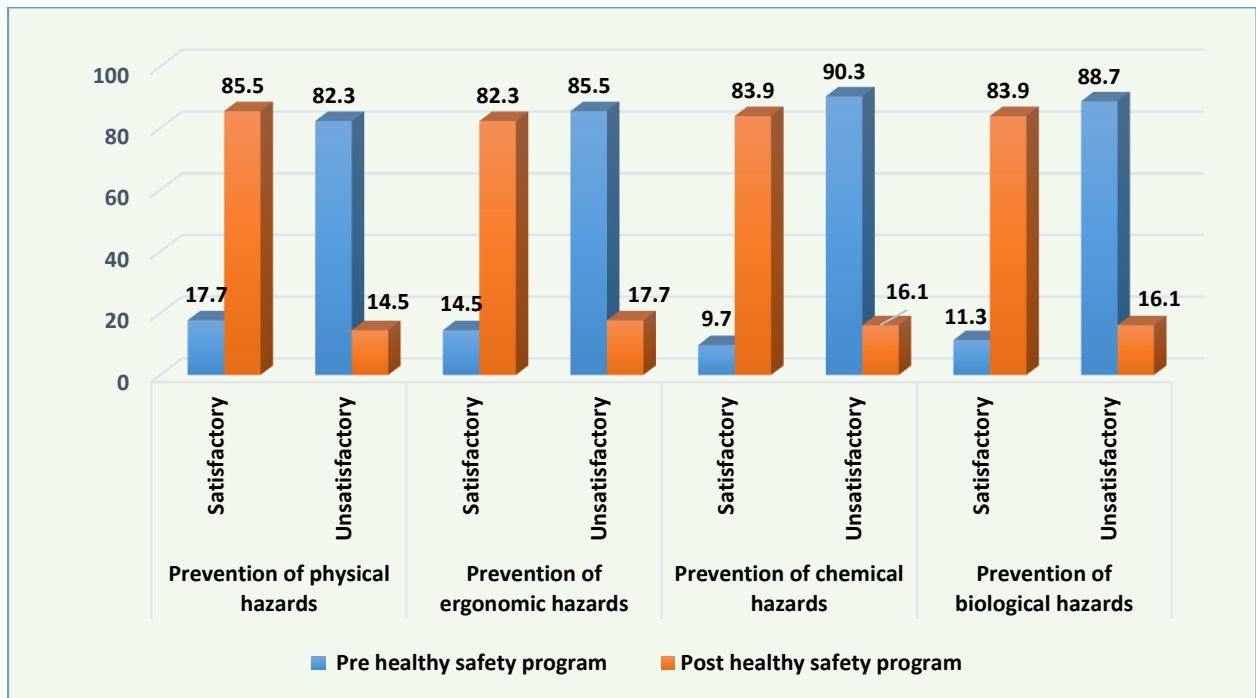


Figure (4): Percentage distribution of the studied veterinary assistant workers` total observed practices level regarding prevention of occupational hazards pre and post healthy safety program implementation (n=62).

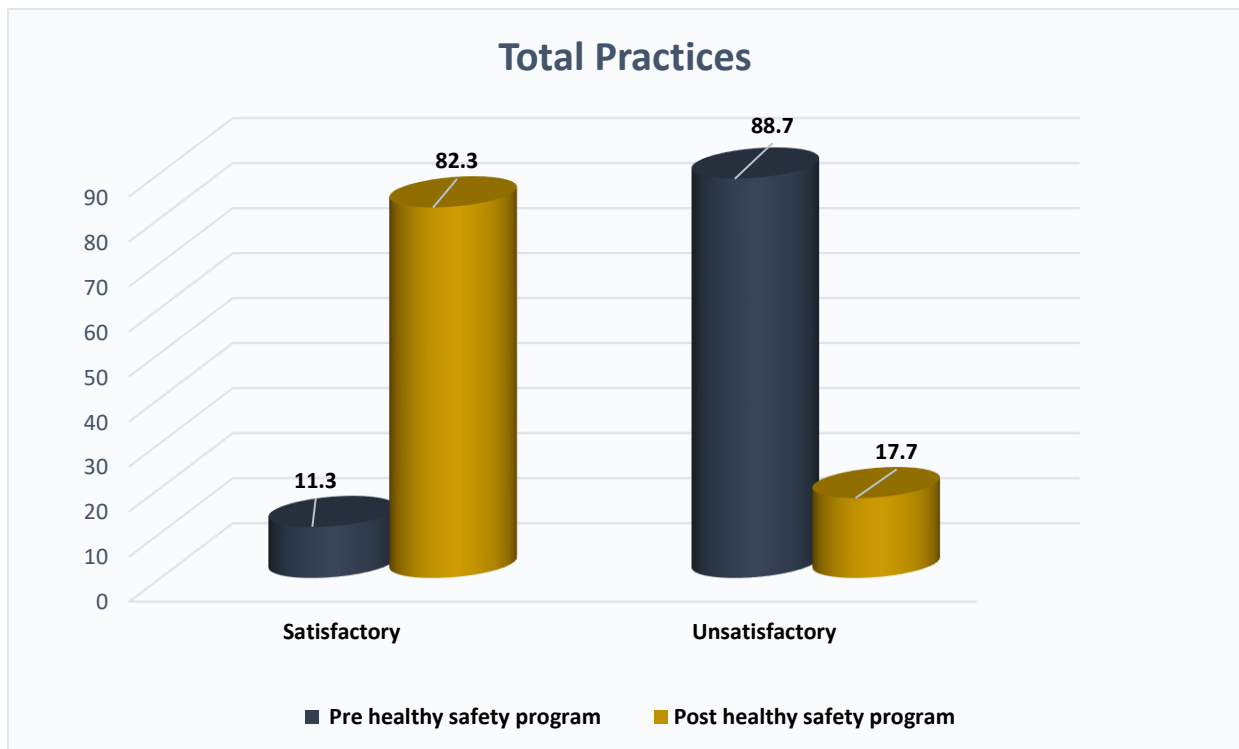


Table (10): Correlation between studied veterinary assistant workers` total knowledge scores and practices scores regarding prevention of occupational hazards pre and post healthy safety program implementation (n=62).

Items	Total knowledge scores			
	Pre healthy safety program implementation		Post healthy safety program implementation	
	r.	p-value	r.	p-value
Total practices scores	.889	0.000**	.933	0.000**

**Highly statistically significant difference (p<0.001)

5. Discussion

A veterinary assistant plays a vital role in helping veterinarians and veterinary technicians in providing animals` healthcare. The physical, mental, financial, and social wellbeing of workers are impacted by the workplace. Employees who are working in near contact with animals can experience different hazards. Prevention of workplace incidents and occupational health hazards is addressed through the implementation of occupational safety and health programs at workplace. ^[20]

Regarding socio-demographic characteristics of the studied veterinary assistant workers, the current study revealed that; slightly less than half of the studied veterinary assistant workers were aged 40 years old and more with mean 41.66 ± 8.0 years, and most of them were male. These findings aligned with **Al-Harbi et al. (2023)** ^[10] who performed research about the occupational health hazards among 529 veterinarians in Saudi Arabia and found that 45 % of the studied veterinarians aged from 31-40 years old and 99.1% of them were males. From researchers` point of view, this because of the nature of these professions which demands a level of effort that only men can handle.

Regarding work characteristic of the studied veterinary assistant workers, the current study proved that; most of the studied veterinary assistant workers were worked for 6 hours and more daily and worked 6 day per week. This might be due to veterinary assistant workers frequently in charge of providing emergency care when it is required, which could occur at any time of day or night.

The current study reported that more than half of the studied veterinary assistant workers took previous training courses. This finding was in accordance with **National Institute for Occupational Safety and Health (2024)** ^[14] who reported that animal health care workers trained about hazards before they begin work. This might be due to ensure the safety and wellbeing of veterinary assistants.

Regarding the medical history of studied veterinary assistant workers, the current study disclosed that, two fifths of the studied veterinary assistant workers were previously exposed to allergy due to chemicals/medications. This finding was in accordance with **Al-Harbi et al. (2023)** ^[10] who stated that 76.6 % of the studied sample had allergy from veterinary drugs. This might be due to exposure to medications, vaccines and antibiotics during handling and preparing them may cause allergy for veterinary assistant workers.

The current study revealed that, two thirds of the studied veterinary assistant workers took previously avian influenza vaccine. This finding incongruent with **Palkhade et al. (2022)** ^[21] who made a study on 562 Indian veterinarians regarding occupational biological health hazards and practices regarding infection control, and declared that 49.3% of studied sample did not receive any prophylactic vaccinations. This might be due to working in close to animals and

Veterinary Units increase risk of exposing to influenza viruses, vaccination may reduce the occurring of influenza for veterinary assistant workers.

The current study demonstrated that, slightly less than three quarter of the studied veterinary assistant workers suffered from back pain, and three fifths of them suffered from muscles pain. These findings concurred with **Abd Elgaber et al. (2022)**^[22] who studied occupational hazards among 200 Egyptian veterinary workers in Sohag Governorate and reported that 69.2 of the studied sample suffered from back pain and myalgia. Also, these findings were consistent with **Seagren et al. (2022)**^[23] who performed a study in United State to assess musculoskeletal discomfort among 94 veterinary healthcare professions and mentioned that prevalence of musculoskeletal discomfort exceeded 60% in the neck, low back, and legs/feet. From researchers` point of view, this resulted from the nature of tasks performed in restraining, lifting and carrying heavy animals, and prolonged standing or working in improper postures

Concerning knowledge of the studied veterinary assistant workers, the results of the current study disclosed that; there were highly statistically significant differences between all items of the studied veterinary assistant workers` knowledge regarding prevention of occupational hazards pre and post healthy safety program implementation($p < 0.001$), this finding supported by **Garcia-Sanchez et al. (2024)**^[24] who conducted study in Spain to assess the role of 514 veterinarians in prevention of zoonosis and found certain knowledge gaps among studied sample, indicating the necessity of raising awareness and fostering better communication between veterinary and medical professions. This is evidenced that safety health program succeeded in improving knowledge of the studied veterinary assistant workers

The present study demonstrated that minority, and less than one fifth of the studied veterinary assistant workers had complete and correct answer regarding biological, and chemical hazards and its related health problems pre healthy safety program implementation. These findings were aligned with **Palkhade et al. (2022)**^[21] who reported that 19.9%, and 3.1% of the studied sample had knowledge about biological, and chemical hazards. These findings might be due to the veterinary assistant workers had insufficient awareness due to limited availability of educational courses and training.

Regarding the total knowledge level of the studied veterinary assistant workers regarding prevention of occupational hazards pre and post healthy safety program implementation, the current study uncovered that; slightly more than half of them had poor knowledge concerning prevention of occupational hazards pre healthy safety program implementation, and then this percentage declined to minority post healthy safety program implementation. This finding supported by **Parmar et al. (2022)**^[16] who applied preventive program among 392 Indian veterinarians to avoid occupational health hazards, and reported that the preventive program succeed to create more awareness to the studied sample to adopt various safety and preventive measures to avoid occupational hazards. Also, this finding agreed with **Palkhade et al. (2022)**^[21] who mentioned that 87.7% of the respondents reported an urgent need for an educational training program regarding prevention occupational hazards. In addition, this finding supported by **Jayanthi & Raja (2021)**^[25] who found that veterinary workers may be more susceptible to diverse occupational dangers of variable intensities if they are not knowledgeable about occupational health hazards and safety measures for hazard-free working circumstances.

Regarding to observation Veterinary Unit environment setting, the current study showed that more than three fifths of Veterinary Unit environment had availability of adequate and appropriate personal protective equipment, and all chemical containers and drugs labelled with name and every electrical wire, socket, plug, switch, and appliance is in acceptable functioning condition. These findings are supported by **Biomi & Pertiwi (2024)**^[26] who conducted a study about ergonomics intervention on veterinary clinic workplace layout increasing comfort work

and reported that veterinary clinics should have adequate medical and non-medical equipment and meet quality, safety and safety standards. These findings might be due to the workplace of Veterinary Units is one of those that encourage and support efficient and effective work to lower the possibility of accidents and improve worker comfort.

Regarding observed practices of the studied veterinary assistant workers for prevention of physical hazards, the results of the current study revealed that; one quarter of the studied veterinary assistant workers were safe handling of needles and sharps, no recapping and bending, and less than one fifth of them used appropriate sharps containers pre healthy safety program implementation. These findings were congruent with **Fesseha et al. (2022)**^[2] who studied management practice towards infection control and zoonotic disease among 135 animal care professionals in Southern Ethiopia, and reported that; 24.4% of studied sample never recap needles before disposal at the workplace, and 37% of studied sample always dispose of needles in an approved sharps container. Also, these findings congruent with **Mithun et al. (2024)**^[27] who performed a study among 286 veterinarians in India about zoonotic disease and infection control practices and stated that 5.6% of the studied sample never recapping of needles before disposal, and 24.8% of them disposal of needles in an approved sharp container. These findings might be a result of increased awareness of assistant veterinary workers about the importance of safe discard of sharps and needles to avoid needle sticks.

The current study demonstrated that there were highly statistically significant differences in all items related to studied veterinary assistant workers` observed practices regarding prevention of ergonomic hazards pre and post healthy safety program implementation ($p < 0.001$). This finding might be due to effective healthy safety program implementation on ergonomic practices among assistant veterinary health care workers.

The current study demonstrated that majority of the studied veterinary assistant workers avoided eating, drinking and smoking when using chemical container. This finding agreed with **Habib & Alshehhi, (2021)**^[19] who conducted study on 110 veterinarians the United Arab Emirates regarding zoonotic disease management and infection control practices and stated that 70% of the studied sample never ate or drank in animal handling areas. This might be due to Veterinary Units often contain animals` fluids, disinfectants, medications that may contaminate food and drinks and cause hazards for workers.

Regarding observed practices regarding prevention of biological hazards; the current study revealed that slightly more than tenth of studied veterinary assistant workers wore proper personal protective equipment, minority of them performed hand hygiene before and after procedures, more than one quarter of them isolated infected animals to prevent the spread of disease, and slightly more than tenth of them disposed contaminated waste and PPE properly pre healthy safety program implementation. These findings disagreed with **Fesseha et al. (2022)**^[2] who reported that 39% of the studied sample used personal protective equipment related to infection control practices at the veterinary unit, 32% of them perform handwashing between animal patient contacts, nearly 25% of studied sample isolate or quarantine diseased animals, and 25% of the studied sample remove their personal protective equipment before interacting with other animals. Also, these findings disagreed with **{39}** who performed a study to assess musculoskeletal injuries among 809 veterinarians associated with palpation, infection control practices, and zoonotic disease risks and found that most of the respondents did not wear the proper PPE when handling potentially contagious specimens or when inspecting an ill animal.

Concerning subtotal observed practices` level of veterinary assistant workers about prevention of physical, ergonomic, chemical, and biological hazards pre and post healthy safety program implementation; the current research revealed that majority of them had unsatisfactory practices regarding physical, ergonomic, chemical, and biological hazards pre healthy safety program implementation. These findings supported by **Helal et al. (2024)**^[4] who performed a

study on 64 Egyptian veterinary health care workers concerning their awareness about physical, chemical and biological hazards and stated that 68.7% of the studied sample had unsatisfactory total practices regarding prevention of physical, chemical, and biological hazards. These findings might be due to lack of awareness among veterinary assistant workers regarding the importance of safety precautions regarding prevention of occupational health hazards during dealing with animals.

Concerning the total observed practices level of the veterinary assistant workers; the current study revealed that majority of them had unsatisfactory practices pre healthy program implementation compared to less than one fifth post healthy safety program implementation. This finding consented with **Ramadan et al. (2019)**^[29] who implemented prevention program for zoonotic diseases among veterinary workers in rural health units at Benha City and reported that 62.4% of them had unsatisfactory practices preprogram implementation compared to 21.2% post program implementation. Also, this finding was symmetrical with **Hosure et al. (2019)**^[30] who made study on 30 veterinarians working in farm sector in Karnataka regarding occupational health hazards and stated that preventive measures are not being appropriately implemented.

On others hands this finding disagreed with **Mhlongo (2022)**^[15] who assessed 105 fieldworkers` occupational health and safety knowledge awareness and practices to prevent zoonotic diseases in South Africa and reported that 72.4% of the participants stated that they needed to training about OHS improvement. This finding might be because the health safety program provides knowledge that concerns their personal safety, which was very interesting for the veterinary assistant workers studied and improved their practices for prevention of occupational health hazards.

The results of the current study disclosed that there were highly positive statistically significant correlations between studied veterinary assistant workers total` knowledge, and total practices regarding prevention of occupational hazards pre and post healthy safety program implementation. These findings concurred with **Ramadan et al. (2019)**^[29] who stated that a positive relation between total knowledge and total practices pre and post-program was found. Also, these findings were in the same line with **Helal et al. (2024)**^[4] who reported that there was a positive correlation between total practices score and total knowledge score of veterinary health care workers. Also, these findings were aligned with **Mhlongo (2022)**^[15] who reported that association in knowledge and practices was observed among the study groups. This outcome could be explained by the fact that good knowledge improves practices.

6. Conclusion

Healthy safety program succeeded in enhancing knowledge, and improving health practices of veterinary assistant workers regarding prevention of occupational health hazards. Minority of studied veterinary assistant workers had good knowledge regarding prevention of occupational hazards pre healthy safety program implementation which increased to majority post healthy safety program implementation. Minority of studied veterinary assistant workers had satisfactory practices regarding prevention of occupational hazards pre healthy safety program implementation which improved to majority post healthy safety program implementation.

7. Recommendations

- Continuing healthy safety program for veterinary assistant workers to improve and update their knowledge and practices regarding prevention of occupational health hazards.
- Veterinary organizations should offer persistent education courses with illustrated pictures and videos for veterinary assistant workers on topics related to preventive measures of occupational health hazards.

- Further research studies are needed for large samples among veterinary assistant workers to prevent occupational health hazards.

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المخلص العربي

برنامج السلامة الصحية للوقاية من مخاطر الصحة المهنية بين العاملين المساعدين البيطريين

مقدمه: تلعب الوقاية من المخاطر الصحية المهنية دورًا حاسمًا في التحقق من صحة وسلامة العاملين المساعدين البيطريين في بيئة العمل.

الهدف: تقييم برنامج السلامة الصحية للوقاية من مخاطر الصحة المهنية بين العاملين المساعدين البيطريين.

التصميم: تم استخدام تصميم شبه تجريبي على عينة ملائمة من 62 عاملاً مساعداً بيطرياً في ثلاث وثلاثين وحدة صحية بيطرية في محافظة القليوبية.

النتائج: تبين ان 58.1% من العاملين المساعدين البيطريين الذين تمت دراستهم لديهم معلومات ضعيفة فيما يتعلق بالوقاية من المخاطر المهنية قبل تنفيذ برنامج السلامة الصحية، والتي انخفضت إلى 8.1% بعد تنفيذ برنامج السلامة الصحية، و88.7% من العاملين المساعدين البيطريين الذين تمت دراستهم لديهم ممارسات غير مرضية قبل تنفيذ برنامج السلامة الصحية مقارنة بـ 17.7% بعد تنفيذ برنامج السلامة الصحية.

الخلاصه: نجح برنامج السلامة الصحية في تعزيز المعلومات وتحسين الممارسات الصحية للعاملين المساعدين البيطريين فيما يتعلق بالوقاية من المخاطر الصحية المهنية.

التوصيات: الاستمرار في تنفيذ برنامج السلامة الصحية للعاملين المساعدين البيطريين لرفع وتحديث معلوماتهم وممارساتهم فيما يتعلق بالوقاية من المخاطر الصحية المهنية.