Zoonotic Diseases prevention program for Veterinary Workers in Rural Health Units at Benha City

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ABSTRACT

Context: Zoonotic diseases are infectious diseases that naturally transmitted from animals to humans.

Aims: The study aimed to evaluate the effectiveness of Zoonotic Diseases prevention program for Veterinary workers in Rural Health Units at Benha City.

Methods: A quasi-experimental design. The study was carried out in Veterinary Health Units at Benha City. A convenience sample used which includes (85) Veterinary workers. Two tools used for collecting data: 1) A structured interviewing questionnaire to assess: a) demographic characteristics, b) medical history of previous exposure to Zoonotic diseases and c) knowledge of Veterinary workers regarding zoonotic diseases. 2) An observational checklist sheet was used to assess: a) practices of veterinary workers regarding the prevention of zoonotic diseases, b) veterinary health unit environmental condition.

Results: More than three quarters (76.5%) of veterinary workers were male, less than half (45.9%) aged ranged from 30 < 40 years with mean±SD (32.3±6.62) and about one third (31.8%) of them were secondary education. The majority (89.4%) of veterinary workers had poor total knowledge score regarding zoonotic diseases pre-program intervention compared to more than half (55.3%) of them had good total knowledge score post-program intervention. On the other hand, about two thirds (62.4%) of veterinary workers had unsatisfactory total practices score regarding zoonotic diseases pre-program intervention compared to more than three quarters (78.8%) of them had satisfactory total practices score post-program.

Conclusion: Post-program score was higher than the pre-program score both in knowledge and practices of veterinary workers regarding zoonotic diseases, and there is a positive correlation between total knowledge and total practice pre and post-program (P=0.000). The study recommends an illustrated booklets and brochures in each Veterinary Health Unit focus on the use of protective methods during contact with animals and adherence to adequate sanitary standards.

Keywords: Zoonotic Diseases, Veterinary workers, Rural Health Units, Benha City.

1. Introduction

Zoonoses are very common, with more than six out of every ten infectious diseases known to humans in animals, and three out of every four news or infectious diseases originating in humans spread from animals (Schoonman, 2015& Rajala, 2016).

Animal-borne diseases are diseases that can be transmitted from animals to humans. Zoonotic diseases can cause germs, including viruses, bacteria, parasites, and fungi. Zoonoses from animals transmitted to humans in different ways, through direct contact (saliva, blood, urine, nasal discharge, stool or other body fluids of the infected animal) or indirect contact (contact with areas where animals, organisms or surfaces contaminated with germs live) or vectors (from mosquitoes, ticks, fleas or any other vector) and food (from eating or drinking something unsafe) (Tesfaye et al., 2013).

Zoonotic diseases are diseases and infections that are transmitted naturally between vertebrates and humans. Brucellosis, rabies, trypanosomiasis, bovine tuberculosis, cystic disease, emphysema, and anthrax included in the zoonoses list. In developing countries, zoonotic diseases pose a critical threat to human health, especially for communities that breed and breed animals for food and clothing (Hundal et al., 2016).

Many people interact with animals in their daily lives; either at home or away from home, but some people may be at greater risk than others for some zoonotic diseases such as children under the age of 5, pregnant women, and adults over the age of 65 years, and any person with HIV or a cancer patient undergoing chemotherapy (Tabibi, 2015).

Zoonotic diseases can be prevented by following the basic hygiene guidelines, as well as following routine veterinary care guidelines for Pet, wash hands, avoid direct contact with animals, and not eat raw meat (Molldrem, 2017).

Community Health Nurse (CHN) has a variety of roles and responsibilities in efforts to control zoonotic diseases. These roles generally fall into the categories of monitoring, education, immunization, early detection, referral, and treatment. CHN also provides supportive care for veterinary
personnel, and supportive care may include educating workers about measures to reduce or prevent infection (Mohamed, 2011).

2. Significance of the study

Nearly two-thirds of human infectious diseases caused by pathogens common to wild or domestic animals. Endemic zoonoses cause about 1 billion people suffering from disease and millions of deaths each year. Emerging zoonotic diseases pose a threat to global health, causing economic damage to hundreds of billions of dollars over the past 20 years. Zoonotic diseases account for more than 60% of all infectious diseases that cause disease in humans and 75% of newly emerging infectious diseases (Karesh et al., 2012). So, applied of Zoonotic Diseases prevention program for Veterinary Workers will increase their knowledge and practices related to zoonotic diseases.

3. Aim of the study

The study aimed to evaluate the effect of Zoonotic Diseases prevention program for Veterinary Workers in Rural Health Units at Benha City through:
- Assessing the Veterinary Worker’s knowledge and practices regarding Zoonotic Diseases prevention,
- Designing and implementing Zoonotic Diseases prevention program for Veterinary Workers,
- Evaluating the effect of the Zoonotic Diseases prevention program.

3.1. Research Hypotheses

The program will be improved the veterinary worker’s knowledge and practices regarding Zoonotic Diseases prevention

4. Subjects and Methods

4.1. Research design

A quasi-experimental design was used to conduct this study.

4.2. Research setting

The study conducted at 50% Veterinary Health Units (8 units) which will be selected randomly from the total number of all units are (16 units) in Benha City. These selected units are named (Manshaet Benha, Sandanhor, Sheblanga, Elshomot, Met Elhofeen, Met Rady, Kafer Saad, and Benha Veterinary Unit).

4.3. Subjects

A convenience sample used which includes all workers who worked in previous selected Veterinary Health Units. The total number 85 workers as follows (Manshaet Benha Veterinary Health Unit (13), Sandanhor (9), Sheblanga (10), Elshomot (10), Met Elhofeen (9), Met Rady (10), Kafer Saad (12), and Benha Veterinary Unit (12)).

4.4. Tools of data collection

Two tools used in this study.

4.4.1. A structured interviewing questionnaire:

The researchers designed a questionnaire based on a literature review, approved by supervisors and guided of Mohamed et al., (2017). It is written in simple, clear Arabic language. It consisted of the following three parts: Part I: concerned with the personal characteristics of studied Veterinary workers, which included age, gender, education, level, residence, experience years, income, and previous training. Part II: covered the medical history of previous exposure to Zoonotic diseases for studied Veterinary Health Unit’s workers as type disease, type of treatment, types of animals and birds that treated at Veterinary Health Units which included 18 items divided into (5 items about types of treated animals, 4 items about types of treated birds, and 9 items about source of information on zoonotic diseases).

Part III: constructed to assess worker’s knowledge regarding zoonotic diseases. It included 41 items divided into (two items about the meaning of zoonotic diseases, four items about the causative agent, four items about bacterial diseases, four items about viral diseases, four items about parasitic diseases, two items about fungal diseases. It also included five items about the most vulnerable group for zoonotic diseases, four items about professionals who are most susceptible to zoonotic diseases, four items about the mode of transmission of zoonotic diseases to human, and eight items about methods of prevention of zoonotic diseases).

Scoring system for knowledge items:

The worker's knowledge was calculated for each item as follows: Complete and correct answer scored (2), Incomplete correct answer was scored (1), while do not know or the wrong answer was scored (0).

The total score knowledge was (82) points. These scores were converted into percent scores. Knowledge was considered good if the score of the total knowledge >65% (>55), considered average if it is equals 50-65% (41-54), and considered poor if it is less than 50% (<41).

4.4.2. Observational checklist sheet

It developed to assess Veterinary workers practices regarding prevention of zoonotic diseases. It consisted of the following two parts: Part I: concerned with personal hygiene which included 25 items divided into (eleven items about hand washing, nine items about wearing protective clothes when contact with the animal, five items about dealing with animals inside the Veterinary Health Unit). Part II: observe veterinary health unit environmental condition that included 14 items divided into (one item about water supply, three items about type of water supply source, three items about ventilation, two items about lightning, one item about sanitary sewage disposal, and four items about the type of sewage disposal).

Scoring system for practices items:

Practices score for each item was given as follows: Done = (1), Not done = (0). The total practice score was considered satisfactory if the score of the total practices ≥ 65% (≥ 17 scores) and considered unsatisfactory if it is less than 65% (< 17 scores).
4.5. Procedures

Content validity and reliability of the tool: Validity of all tools of the current study reviewed by three experts in the field of community health nursing from the Faculty of Nursing, Zagazig, and Benha University to ensure its clarity and applicability. The tools modified according to the experts’ opinion on the simplicity of the sentences and suitability of the content. Reliability coefficients are calculated for questionnaire items. The coefficient alpha was 0.87.

Fieldwork started by data collection that took a period of three months, from January to March 2019. The researchers initiate the data collection three days per week during the three months. The accomplishment of the study done through four phases: assessment, planning, implementation, and evaluation.

Assessment phase included the pre-intervention data collection for baseline assessment. The researchers first introduced themselves and explained the purpose of the research to the Manager of Veterinary Health Unit and the workers. All the workers working in the Veterinary Health Unit met. The pre-test knowledge and practices questionnaires distributed and then the same questionnaires were used after the program implementation (one month later) as post-test for comparison. The time consumed for answering questionnaires ranged from 20-25 minutes for each. The data were primarily tested to provide the basis for designing the intervention program.

Planning phase was the second phase. Based on a review of the literature, sample features, and the results obtained from the assessment phase, the researchers designed the intervention program content. The researchers prepared an illustrated booklet and after its content validation, it was dole out to Veterinary workers to use as a guide for self-learning.

The general objective of the Veterinary workers’ program was to improve their knowledge, and practices toward Zoonotic Diseases prevention. Specific objectives formulated. By the end of the intervention program, the Veterinary workers should be able to:

1. Define the meaning and causative agents of zoonotic diseases.
2. Enumerate the Bacterial, Viral, Parasitic, and Fungal zoonotic diseases.
3. Discuss the methods of infection transmission to humans.
4. Identify the most susceptible individuals to zoonotic diseases and professionals who are most susceptible to zoonotic diseases.
5. Explain the methods of prevention of zoonotic diseases.
6. Identify the component of Veterinary Unit Health environment.
7. Discuss the practice of hand washing.
8. Explain the practice of wearing protective clothes.
9. Discuss the practices of dealing with animals inside the Veterinary Health Unit.

The intervention implemented (implementation phase) in the Veterinary Health Unit, waiting room. The educational training methods were lectures and group discussions. The sessions aided by using pictures and posters through a laptop, data show to facilitate teaching. The intervention implemented in five sessions (3 theoretic and two practical); the time of each session was 60 minutes. The objectives of the sessions were as follows:

In the first session (60 minutes): The main objective was to help Veterinary workers gain knowledge about the methods of infection transmission to humans in addition to the most susceptible individuals and professionals to zoonotic diseases. Group discussions and lecture used as teaching methods with data show through the laptop to facilitate the teaching.

The second session (60 minutes): The main objective was to help veterinary workers gain knowledge about the methods of infection transmission to humans in addition to the most susceptible individuals and professionals to zoonotic diseases. Group discussions and lecture used as teaching methods with a brochure.

In the third session (60 minutes): The main objective was to help Veterinary workers identify the methods of prevention of zoonotic diseases, as well, identify the component of Veterinary Unit Health environment. Sessions supported by data show, booklet, brochure, posters, images, group discussions, and lecture used as a teaching method.

In the fourth and fifth session (120 minutes): Practical session about hand washing, the main objective was to help Veterinary workers gain satisfactory practices of hand washing (time and methods), wearing the protective cloths, and dealing with animals inside the Veterinary Health Unit. Sessions supported by data show, booklet, brochure, posters, images, demonstration, re-demonstration, and group discussions used as teaching methods.

Evaluation (evaluation phase) of the Veterinary workers’ intervention was done one month later after application of the program; through the same tools.

A pilot study was carried out on eight Veterinary workers, representing 10% of the study sample, in Veterinary Health Units, to assess the feasibility and the applicability of the tools. As well, the time needed to fill in the data collection tools was estimated. Veterinary workers who participated in the pilot study excluded from the study sample.

Administrative and ethical considerations: Approval to conduct the study was obtained from the Dean of the Faculty of Nursing, Benha University directed to the Manager of the selected Veterinary Health Units for conducting the present study. As well, informed consent took from each of the workers who agreed to participate in the study. They also assured about the confidentiality of the information given to carry out the study that will be used only for the study.

4.6. Data analysis

The data was organized, categorized, tabulated, and analyzed by using appropriate statistical methods. Computerized data entry and statistical analysis were fulfilling scored using Statistical Package for Social Science (SPSS) version 18. Using frequency, percentage, chi-square test, mean±, SD, and Spearman Correlation test. Statistical significance was considered at p-value <0.05.
5. Results

Table 1 shows that 45.9% of the studied sample aged ranged from 30 < 40 with mean±SD (32.3±6.62). While 76.5% of them were male and came from rural areas. On the other side, 51.8% of workers married, and 31.8% were secondary education. Furthermore, 38.8% of workers had experience seven years and more and 51.8% of them had not previous training.

Figure 1 shows that 34.1% of the studied sample had exposure to infectious animal diseases, while, 65.9% of them do not get exposure.

Table 2 shows that 35.3% of animals that are reared by the studied veterinary workers were goats. On the other hand, 34.1% and 31.8% of birds that reared were chicken and duck, respectively.

Figure 2 shows that the studied sample source of information about zoonotic diseases was a veterinary physician for 88.2%, while were media (radio-TV) for 52.9% of them.

As revealed in the table 3, 81.2% of the studied sample had complete, correct knowledge about methods of prevention of zoonotic disease. Moreover, 63.5% of them had complete, correct knowledge about most susceptible individuals to zoonotic diseases post-program. It is evident in this table; there were highly statistically significant improvements in the studied sample knowledge regarding zoonotic diseases post-program compared with pre-program.

Figure 3 shows that 89.4% of the studied sample had poor knowledge score regarding zoonotic diseases at pre-program, while 55.3% of them had good knowledge score post-program.

Table 4 indicates that 21.2% of the studied sample washing their hands frequently at pre-program, while, 71.8% of them wash hands frequently post program, and 56.5% of them do not wash hands after dealing with animals at pre-program, while, 75.3% of them wash hands after dealing with animals post-program. Furthermore, 27.1% of them do not wash hands with soap and water at pre-program, while 71.8% of them wash their hands with soap and water post-program. The same table indicates that there were highly statistically significant improvements in using disinfectants and wet hands with water post-program about zoonotic diseases.

Table 5 shows that 12.9% of the studied sample wears a protective mask at pre-program, while, 72.9% of them post-program wears a protective mask, and 76.5% do not use protective clothing before dealing with animal at pre-program, while, 51.8% of them using protective clothing before dealing with the animal post-program. The same table indicates that there were highly statistically significant improvements in all items post-program about zoonotic diseases.

Figure 5 shows that 37.3% of the studied sample had satisfactory total practices score regarding zoonotic diseases pre the program, while, 78.8% of them had satisfactory total practices score regarding zoonotic diseases post-program.

Table 6 show that positive relation between total knowledge and total practice pre and post-program.

Table 7 reveals that 100.0% of the studied sample reported health units’ environmental condition had water supply, the piped system was the source of water supply for 100.0% of them. Moreover, 50.0% of them had proper ventilation, and 75.0% had sufficient lighting, as regard 100.0% had sanitary sewage disposal, where municipal one was the type of sewage disposal for 37.5% of them.

Table 1: Frequency distribution of the studied veterinary workers regarding their demographic characteristics (No=85).

| Demographic characteristics | No. | %  |
|----------------------------|-----|----|
| Age/ Year                  |     |    |
| 20<30 years                | 33  | 38.8|
| 30 <40                     | 39  | 45.9|
| 40 years and more          | 13  | 15.3|
| Mean±SD                    | 32.3±6.62 |    |
| Sex                        |     |    |
| Male                       | 65  | 76.5|
| Female                     | 20  | 23.5|
| Residence                  |     |    |
| Rural                      | 65  | 76.5|
| Urban                      | 20  | 23.5|
| Marital status             |     |    |
| Single                     | 10  | 11.8|
| Married                    | 44  | 51.8|
| Divorced                   | 20  | 23.5|
| Widowed                    | 11  | 12.9|
| Level of education         |     |    |
| Read and write             | 23  | 27.1|
| Basic education            | 22  | 25.9|
| Secondary                  | 27  | 31.8|
| University                 | 13  | 15.3|
| Experience                 |     |    |
| 1<4years                   | 21  | 24.7|
| 4<7years                   | 31  | 36.5|
| 7 +                        | 33  | 38.8|
| Previous training          |     |    |
| Yes                        | 41  | 48.2|
| No                         | 44  | 51.8|
Figure 1. Frequency Distribution of the Studied Veterinary Workers Regarding History for Exposure to Infectious Animal Diseases, (No=85).

Table 2: Frequency distribution of the studied veterinary workers knowledge regarding types of animals and birds that are reared (no=85).

| Items         | No. | %   |
|---------------|-----|-----|
| Types of animals |     |     |
| Goat          | 30  | 35.3|
| Sheep         | 12  | 14.1|
| Cows          | 15  | 17.6|
| Buffalo       | 14  | 16.5|
| Camels        | 14  | 16.5|
| Types of birds |     |     |
| Chicken       | 29  | 34.1|
| Duck          | 27  | 31.8|
| Geese         | 16  | 18.8|
| Pigeons       | 13  | 15.3|

Figure 2: Frequency distribution of the studied veterinary workers regarding source of information about zoonotic diseases (no=85).
Table 3. Frequency distribution of the studied veterinary workers knowledge score about zoonotic diseases pre and post program (n=85).

| Knowledge items                                      | Complete correct | Pre-program Incorrect | Do not know | Post-program Correct | Incomplete | Do not know | X² | P-value |
|------------------------------------------------------|------------------|-----------------------|-------------|----------------------|------------|-------------|-----|---------|
| Complete correct No | %                | No | %                | No | %                | No | %                | X² | P-value |
| Meaning of zoonotic diseases                         | 11              | 12.9         | 21 | 24.7          | 53 | 62.4          | 39  | 45.9    | 14  | 16.5    | 40.6 | 0.000 |
| Causative agents of zoonotic diseases                 | 15              | 17.6         | 22 | 25.9          | 48 | 56.5          | 40  | 47.1    | 32  | 37.6    | 13   | 15.3  | 33.2 | 0.000 |
| Bacterial zoonotic diseases                          | 14              | 16.5         | 33 | 38.8          | 38 | 44.7          | 42  | 49.4    | 32  | 37.6    | 11   | 12.9  | 28.8 | 0.000 |
| Viral zoonotic diseases                               | 11              | 12.9         | 34 | 40.0          | 40 | 47.1          | 43  | 50.6    | 38  | 44.7    | 4    | 4.7   | 48.6 | 0.000 |
| Fungal zoonotic diseases                              | 13              | 15.3         | 31 | 36.5          | 41 | 48.2          | 49  | 57.6    | 29  | 34.1    | 7    | 8.2   | 45.0 | 0.000 |
| Parasitic zoonotic diseases                          | 12              | 14.1         | 41 | 48.2          | 32 | 37.6          | 33  | 38.8    | 41  | 48.2    | 11   | 12.9  | 20.0 | 0.000 |
| Most susceptible individuals to zoonotic diseases     | 15              | 17.6         | 11 | 12.9          | 59 | 69.4          | 54  | 63.5    | 25  | 29.4    | 6    | 7.1   | 70.7 | 0.000 |
| Professionals who are most susceptible to zoonotic diseases | 12          | 14.1         | 15 | 17.6          | 58 | 68.2          | 30  | 35.3    | 51  | 60.0    | 4    | 4.7   | 74.3 | 0.000 |
| Methods of infection transmission to humans           | 21              | 24.7         | 28 | 32.9          | 36 | 42.4          | 36  | 42.4    | 49  | 57.6    | 0    | 0.0   | 45.6 | 0.000 |
| Methods of prevention of zoonotic diseases            | 10              | 11.8         | 56 | 65.9          | 19 | 22.4          | 69  | 81.2    | 16  | 18.8    | 0    | 0.0   | 85.2 | 0.000 |

Figure 3: Frequency distribution of studied workers regarding total knowledge score before and after the program.
Table 4: Frequency distribution of the studied veterinary worker practices score regarding handwashing pre and post the program (no=85).

| Practices (Handwashing)                  | Pre-test | Post-test | \( \chi^2 \) | p-value |
|-----------------------------------------|----------|-----------|--------------|---------|
|                                          | Done     | Not Done  | Done         | Not Done |
|                                          | No.      | %        | No.          | %        |
| Handwashing frequently                  |          |          |              |          |
| Time of hand washing                    |          |          |              |          |
| Before dealing with animal              |          |          |              |          |
| After dealing with animal               |          |          |              |          |
| Before and after dealing with animal    |          |          |              |          |
| Wash hands by                           |          |          |              |          |
| Only water                              |          |          |              |          |
| With soap and water                     |          |          |              |          |
| Using disinfectants                     |          |          |              |          |
| Methods of hand washing                 |          |          |              |          |
| Wet hands with water                    |          |          |              |          |
| Put soap on hands                       |          |          |              |          |
| Rub the hands, soles of the hands,      |          |          |              |          |
| seemingly, between the fingers          |          |          |              |          |
| Rinse hands thoroughly with clean       |          |          |              |          |
| running water                           |          |          |              |          |
| Drying hands with a clean towel         |          |          |              |          |
|                                         | 18       | 21.2     | 67           | 78.8    | 61     | 71.8 | 24     | 28.2 | 43.7 | 0.000 |

Table 5: Frequency distribution of the studied veterinary workers practices score regarding wearing protective cloths pre and post program (no=85).

| Protective clothes                      | Pre-test | Post-test | \( \chi^2 \) | p-value |
|-----------------------------------------|----------|-----------|--------------|---------|
|                                          | Done     | Not Done  | Done         | Not Done |
|                                          | No.      | %        | No.          | %        |
| Wear protective clothes:                 |          |          |              |          |
| Uniform                                 | 15       | 17.6     | 70           | 82.4    | 75     | 88.2 | 10     | 11.8 | 85.0 | 0.000** |
| Gloves                                  | 20       | 23.5     | 65           | 76.5    | 72     | 84.7 | 13     | 15.3 | 64.0 | 0.000** |
| Special shoes                           | 43       | 50.6     | 42           | 49.4    | 58     | 68.2 | 27     | 31.8 | 5.48 | 0.019* |
| Protective Mask                         | 11       | 12.9     | 74           | 87.1    | 62     | 72.9 | 23     | 27.1 | 62.4 | 0.000** |
| Headcover                               | 14       | 16.5     | 71           | 83.5    | 58     | 68.2 | 27     | 31.8 | 46.6 | 0.000** |
| Eyeglasses                              | 28       | 32.9     | 57           | 67.1    | 55     | 64.7 | 30     | 35.3 | 17.1 | 0.000** |
| Time of wearing protective clothes:     |          |          |              |          |
| Before dealing with the animal          | 20       | 23.5     | 65           | 76.5    | 44     | 51.8 | 41     | 48.2 | 14.4 | 0.000** |
| Before cleaning the place of animal     | 15       | 17.6     | 70           | 82.4    | 62     | 72.9 | 23     | 27.1 | 52.4 | 0.000** |
| During waste disposal                   | 25       | 29.4     | 60           | 70.6    | 61     | 71.8 | 24     | 28.2 | 30.4 | 0.000** |

Figure 5: Frequency distribution of studied sample regarding total practices score before and after the zoonotic diseases prevention program.
Table 6: Correlation between total knowledge and total practices pre and post zoonotic diseases prevention program.

| Total practices | Pre | Post |
|-----------------|-----|------|
| Unsatisfactory  | 46  | 9    |
| Satisfactory    | 30  | 2    |
| Total knowledge |     |      |
| Poor (n=76)     | 60.5| 24.3 |
| Average (n=9)   | 77.8| 25.0 |
| Good (n=12)     | 75.0| 36   |
| Poor (n=12)     | 75.0| 36   |
| Average (n=37)  | 28  | 75.6 |
| Good (n=36)     | 0   | 100  |

X²=1.02 p-value = 0.31 X²=30.7 p-value = 0.000

Table 7: Frequency distribution of the veterinary health units environmental condition (n=8).

| Veterinary Units Environmental conditions | No. | %  |
|------------------------------------------|-----|----|
| Water supply (yes)                       | 8   | 100.0 |
| Source of sanitary water supply          |     |     |
| Piped system                             | 8   | 100.0 |
| Deep wells                               | 0   | 0.0 |
| Shallow wells                            | 0   | 0.0 |
| Ventilation source                       |     |     |
| Good                                     | 4   | 50.0 |
| Average                                  | 2   | 25.0 |
| Poor                                     | 2   | 25.0 |
| Lighting                                 |     |     |
| Enough                                   | 6   | 75.0 |
| Not enough                               | 2   | 25.0 |
| Sanitary sewage disposal (yes)           | 8   | 100.0 |
| Type of refuse disposal                  |     |     |
| Municipal one                            | 3   | 37.5 |
| Self-building one                        | 2   | 25.0 |
| Cesspit                                  | 2   | 25.0 |
| Canal drainage                           | 1   | 12.5 |

6. Discussion

Zoonoses are infectious diseases that are transmitted naturally from vertebrates to humans and vice versa. It caused by all kinds of pathogens, including bacteria, parasites, fungi, viruses, and brines (Wang & Cramer, 2014). So, this study aimed to evaluate the effect of Zoonotic Diseases prevention program for Veterinary Workers in Rural Health Units at Benha City.

Concerning with demographic characteristics of the studied sample; the current study revealed that less than half of veterinary Workers aged ranged from 30 < 40; with mean±SD (32.3±6.62) and more than three-quarters of them were male and came from rural areas. These results in agreement with a study by Mahmoud & Sabry (2019), who conducted a study on a safety training program for clinical laboratory workers regarding prevention of occupational hazards and found more than half of the workers aged from 30 to less than 40 years old and more than two-thirds of them were male. However, disagreed with Abd El-Hameed et al., (2012), who conducted a study on awareness of personnel in direct contact with animals regarding Brucellosis, who reported that most farmers who were in direct contact with animals aged 40 years and over were mostly female and married. This finding may be because most workers of veterinary health units were male, and this period of the age is appropriate for this profession.

As regards educational levels of workers in the current study revealed that, about one-third of workers were secondary education, and more than one-quarter was read and write, while, one-quarter of workers were primary education and the minority were university education. This result in line with a study by Mohammed et al., (2017) on awareness regarding prevention of zoonotic diseases transmission among livestock farmers in rural areas who reported that; just under a third of the sample was illiterate, one fifth had a university education and a minority had graduate studies. Besides, according to Joshi (2013), who conducted a study on the knowledge and practices of livestock farmers regarding brucellosis in Kailali district, zoonoses, and food hygiene news, and indicated that one-third of the farmers were illiterate, and slightly more than a tenth were university educated. However, this result was not consistent with Diez & Coelho (2013), who evaluated farmers' knowledge of bovine Brucellosis in northeast Portugal and indicated that three-quarters of the sample had primary education and a minority had secondary education. The high level of reading and writing among workers reflects a weak educated society that puts them at risk of contracting zoonoses.

Regarding history for exposure to infectious animal diseases. The present study indicates that, one-third of veterinary workers have exposed to infectious animal diseases and that two-thirds of them are not exposed to it. This result in agreement with NASPHV (2015), who indicated that zoonotic diseases recognized as occupational hazards faced by veterinarians daily, it is known that (61%) known human pathogens and (75%) are emerging diseases that affect humans from Zoonotic diseases. Additionally, this result is in agreement with a study by Dowd et al. (2013). The study performed on Zoonotic disease risk perceptions and infection control practices of Australian veterinarians: Call for change in work culture who found that under half of the respondents (44.9%) reported having contracted a zoonotic infection during the course of their veterinary work with 25.2% reporting a confirmed incidence and 19.7% reporting a suspected incidence.
Moreover, this result in line with other studies by Helmy et al., (2013); and Wang et al., (2014), who indicated that for people who do not work in a profession with livestock, exposure to animal micro-organisms is much lower than those employed in the livestock sector. While this result disagreed with a study by Kious et al., (2016), who indicated that close contact to livestock animals was not necessary for transmission event, but that living close to cattle can be sufficient to cause adverse health effects among the population.

As regard to species of animals and birds reared. The present study showed that more than a third of the veterinary workers reared goats, most of whom raised chickens and ducks. This result in agreement with a study by Mohammed et al., (2017), who indicated that more than a third of the livestock farmers in rural areas reared goats and the most of them reared chicken and duck. This finding may be due to the needs of veterinary workers owners of chickens and ducks to eat.

The results of this study showed that the majority of workers who mentioned the veterinarian were the primary source of information on zoonotic diseases, while more than half mentioned the media (radio and television). This finding is not consistent with Ahmed (2014), who conducted a study of the perception of farmers regarding brucellosis at Kalyobia Governorate and reported that about one-third of the studied sample received information from friends or relatives. Also, according to the results of Grahn (2013), who conducted a study of brucellosis in small ruminants at Dushanbe, Tajikistan, Uppsala, this was reported; about a third of the studied sample received information about the disease from human physicians. The difference in these results may be due to the positive role of the veterinarian in these veterinary health units.

The score of knowledge of veterinary workers on zoonotic diseases before and after the program in the current study showed that the majority of veterinary workers have a complete, correct knowledge of the methods of prevention of zoonotic disease and about two-thirds of them have complete, correct knowledge of most susceptible individuals to zoonotic diseases post-program. Furthermore, there were statistically significant improvements in the studied sample knowledge regarding zoonotic diseases post-program compared with pre-program. This finding, in agreement with Hezekiah et al. (2013), carrying out a study of knowledge and practices related to the transmission of bovine brucellosis among livestock workers in Yewa, Southwestern Nigeria, indicated that two-thirds of the sample had poor knowledge of zoonotic diseases. However, this finding differs with Holt et al., (2014), who conducted a study of Brucella infection in large ruminants in an endemic area of Egypt and reported that the majority of the sample had good knowledge of zoonotic diseases. Besides, according to Tebug et al., (2014), who conducted a study on the risk, knowledge and preventive measures of smallholder dairy farmers in northern Malawi about zoonotic Brucellosis and bovine tuberculosis, found that the knowledge of Zoonotic diseases among dairy farmers was high. This finding may be due to the positive role of Veterinary Units in recognizing livestock farmers. From researchers, point of view the improving the score of knowledge among Veterinary workers due to the zoonotic disease intervention program.

Regarding the main objectives of the present study was the assessment of veterinary workers knowledge and practices regarding zoonotic diseases. The overall knowledge and practices score in preprogram among veterinary workers related to zoonotic diseases prevention were very poor knowledge and unsatisfactory practices. This study results highlighted the pressing need for implementing zoonotic diseases prevention program, where knowledge and practices often come from program intervention. As well, less than half of the workers under study, have received previous training regarding zoonotic diseases, adding to that more than one-quarter of the study sample was read and write. This finding may be a reason for workers to possess poor knowledge and unsatisfactory practices on zoonotic diseases. This result was in line with Joshi (2013), who reported that most of the farmers had poor knowledge regarding zoonotic diseases and more than half of them had poor hygienic practices regarding brucellosis and agreed with Ahmed (2014), who found that slightly more than half of the studied sample had unsatisfactory practice regarding brucellosis. Additionally, this result in agreement with a study by Swai et al., (2010) on Knowledge and Attitude Towards Zoonoses among Animal Health Workers and Livestock Keepers in Arusha and Tanga, Tanzania. The study found that veterinary field staff and staff in health facilities have a low awareness and poor knowledge of zoonoses.

After the implementation of the program regarding zoonotic diseases prevention the objectives and hypothesis were highly achieved since the findings pointed to more than half of veterinary workers had good knowledge and more than three-quarters of them had satisfactory practices score regarding zoonotic diseases post-program intervention. These improvements might be due to the effect of the program intervention, which provided to workers. Also, they were an enthusiast to participate in the program and willing to attend future health education programs as they reported. These results in agreement with a study by Tebug et al., (2014) on Risk, knowledge and preventive measures of smallholder dairy farmers in northern Malawi about zoonotic Brucellosis and bovine tuberculosis who found that the knowledge of zoonoses amongst dairy farmers was high. Furthermore, these results in line with a study by Mahmoud & Sabry (2019), who conducted study on safety training program for clinical laboratory workers regarding prevention of occupational hazards who found that before the program implementation 23 % of the laboratory workers had good total knowledge scores regarding laboratory safety, while after the program implementation total knowledge scores increased to 62 %.

Additionally, these results in agreement with study result by Narjis et al., (2015), who revealed that there was a significant increase in the knowledge mean scores of the intervention group after the training program (p=0.001). The result of the present study revealed that there was a positive correlation between total knowledge and total practice pre and post-program implementation. This finding in line with a study by Oshjer et al., (2015), who found that the positive effect of zoonosis knowledge was associated
with the practice of hand washing before cooking and after handling live animals.

Regarding the practices score of handwashing among veterinary workers pre and post the Program. Less than one-quarter of veterinary workers wash their hands frequently at pre-program, while, about three-quarters of them wash hands frequently post-program, and more than half of them do not wash hands after dealing with animals at pre-program, while, three quarters of them wash hands after dealing with animals post-program. Furthermore, more than one-quarter of veterinary workers do not wash hands with soap and water at pre-program, while, nearly three-quarters of them wash their hands with soap and water post-program, there were highly statistically significant improvements in using disinfectants and wet hands with water post program about zoonotic diseases. This result has disagreed with a study by Addo et al., (2011) in Ghana under the title of knowledge, attitudes and practices of herd men in Ghana with respect to milk-borne zoonotic diseases and the safe handling of milk, who reported that most of the studied sample practiced hand washing before dealing with livestock. Also, Ashbaugh (2010), who performed a study of a descriptive survey of dairy farmers in Vietnam. The study agreed with this result and reported that slightly more than three-quarters of the studied sample washed their hands with soap after dealing with livestock. Also, these results agreed with Samad (2011), who mentioned that the zoonotic disease might have serious consequences for a poor person who will probably have poor access to healthcare and can ill afford to have the ability to work impaired by sickness.

As regard veterinary workers practices score regarding wearing protective cloths pre and post the program. the results of the present study showed that; few percentages of veterinary workers wear protective mask at pre-program implementation compared to about three-quarters of them wear a protective mask post-program intervention. More than three-quarters of veterinary workers do not use protective clothing before dealing with the animal at pre-program compared to more than half using protective clothing before dealing with animal post-program. This result agreed with Holt et al., (2014) & Lindahl et al., (2015), who found that most of the studied sample did not use protective equipment when dealing with animals. This finding might be due to poor veterinary workers knowledge regarding the importance of wearing protective clothes to prevent the transmission of zoonotic diseases when dealing with animals before program intervention.

Concerning health units’ environmental condition. The current study reveals that most of the veterinary workers reported health units’ environmental condition had water supply, piped system was the source of water supply of them, half of them had good ventilation, three-quarters of them had sufficient lighting and most of them had a sewage system where more than one third of them had municipal sewage. These results agreed with Sofian et al., (2013), who conducted a study of screening of family members of patients with acute brucellosis in an endemic area of Iran. The study reported that most of the studied sample had water supply, good lighting, and adequate ventilation in their home. This finding may be because of improved government resources and in line with a study by Mohammed et al., (2017) on awareness regarding the prevention of zoonotic diseases transmission among livestock farmers in rural areas. The study found that most of the studied sample had a water supply in their home which was piped system, most of them had proper ventilation, most of them had sufficient lighting, and most of them had sewage system where half of them had municipal sewage.

7. Conclusion

In light of the results of this study, it can conclude that the zoonotic diseases prevention program has been effective in increasing the level of knowledge of veterinary workers as well as their zoonotic practices. Besides, the result showed that the score of knowledge after the program was higher than the pre-program score in both knowledge and practices of veterinary workers.

8. Recommendations

Based on the findings of the current study, the following recommendations proposed: health education programs researches should give for veterinary workers on measures to prevent the transmission of zoonotic diseases in Veterinary Health Units. Also, they should provide illustrated booklets and brochures in each Veterinary Health Unit to maintain knowledge of zoonotic disease and focus on the use of preventive methods during contact with animals and adherence to appropriate health standards and use as a reference. Finally, the prevention and control of zoonotic diseases must be an integral part of Veterinary health unites safety measures.

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