

# Infectious respiratory tract disease in the dairy cattle's in communal farming and their association to the Breeding of Pigeons in the Farm

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## **Abstract:**

*The infectious respiratory disease is one of the serious problems causing lower yield of cattle's production. A study was undertaken in May 2018 to understand the knowledge of cattle's farmers about breeding of pigeons in the farm. The specific objectives of the study were to establish what cattle's farmers know about infectious respiratory tract disease, evaluate the cattle health problem related infectious respiratory disease, examine farmers' practices in managing cattle's disease, and recommend policies on disease management based on the results of the study. Results showed that 85.7% from the tested farm are closed crowded, 67.9% of the respondent farmers breed pigeons in the farm with animals, in addition, the number of animal death annually related respiratory disease reach to 10 to 20 animals. Our study suggests that there is a need to increase awareness about infectious respiratory disease among Palestinians farmers.*

**Key words:** respiratory, Bacteria, Management, Disease, and Cattle's.

## **I. Introduction**

Livestock is one of the main pillars of national income. This sector constitutes a high percentage of the public income in most part developing countries as Palestine. Animals breeding is sometimes considered a secondary activity that is practiced alongside agricultural craft in the countryside. It Provides an important source of food security for population for meat, milk, and all kinds dairy products. The number of animals and mixed holdings in Palestine reached 17,732, which represent about 79.8% of them in the West Bank and 20.2% in the Gaza Strip. Palestine plays a large role in the national economy, the results showed that about 90.6% of agricultural employment in mixed and animal holdings in Palestine are unpaid family members. The rate of meat production in Palestine

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annually is estimated at 3394 tons per year. Sheep meat is estimated at 10440 tons per year and goat meat is 8406 tons annually. Palestine produces about 123098 tons of milk annually (PCSO,2014).

The development of the livestock sector in Palestine are face many problems, the most important problems that the practices of the occupation, in particular the control of the crossings, isolation of citizens from the outside world. In addition, the closures and the confiscation of land and pastures and the construction of settlements and the seizure of water sources. Also, one of the problems of this sector is the instability of the local market, which is flooded with meat, milk and dairy products, which are smuggled from inside Israel into the Palestinian territories, and which in turn lead to instability in prices. Also, the problems that affect this sector is the diverse disease that affect the productivity of the livestock through mortality (Alembrian and Haylegebriel, 2013). Parasitic, viral and bacterial diseases which can attack sheep and cattle which considered the main reservoir host species (Elvander, 1996). Respiratory disease is thought to be a major cause of economic loss in the cattle's industry which leads to more and more death yearly (Yates et al., 1982).

The issue behind these diseases could be not the same pigeon itself, but the whole danger can be neglected in the cleanliness of the place, where the excess secretions and feathers were the source of these diseases. Also these can cause allergies for the respiratory system and eventually cause death. The reason for conducting this type of study is that because cattle's (sheep and goats) in Palestine constitute a high and important source of food supply for thousands of household Palestinian family. However, this sector in most cases face a lot of problems, from these issues infectious disease especially respiratory disease leading to high mortality rate, which will effect on this important food source for these families and the instability of the local market.

Tuberculosis is a chronic infectious disease of animals, more significantly in the lungs, kidney and including others (FAO, 1972). It is caused by bacilli members of the *Mycobacterium tuberculosis* and *M. caprae* species. Which affect many vertebrate animals however, cattle, goats and are found to be most susceptible, while sheep and horses are showing a high natural resistance (Radostits *et al.*, 2000). Therefore, examinations and epidemiological ways on the infectious respiratory disease in the dairy cattle's where the primary observations of infection and numerous death were occurring in the villages due to their similar cultural values in these communities(Addis, 2017).

## II. MATERIALS AND METHODS

### 2.1 Study Site Description

The study was conducted at the laboratory and in the fields. Ten farms were purposely selected from four villages (Raba, Al-Jadida, Sanur, and Maithalon), Jenin, Palestine, the locations regions were tabulated in table 1. Also, control samples were involved in the study to compare the results. In addition, this study was conducted by a farm survey mainly by face to face interviews of farmers in previous locations, to investigate and improve livelihoods through smallholder livestock production, twenty-eight (28) cattle's farmers were randomly selected and interviewed who have already breeding pigeons in the farm.

Table 1: Villages zone, farms of the tested locations.

| <i>Site</i>  | <i>Location</i>  | <i>Longitude (E)</i>                       | <i>latitude (N)</i>      |
|--------------|------------------|--|--------------------------|
| <i>Code*</i> | <i>s</i>         |  |                          |
| <i>F1</i>    | <i>Raba</i>      | <i>(N32°23'29.5656", 35°22'32.11528")</i>  |                          |
| <i>F2</i>    | <i>Al-jadida</i> | <i>(N</i>                                  | <i>32°19'47.4708", E</i> |
|              |                  | <i>35°17'54.8304")</i>                     |                          |
| <i>F3</i>    | <i>Maithalo</i>  | <i>(N 32°21'1.5984", E 35°16'10.1928")</i> |                          |
| <i>F4</i>    | <i>n</i>         | <i>(N</i>                                  | <i>32°21'24.8724", E</i> |
|              | <i>Sanur</i>     | <i>35°14'53.0736")</i>                     |                          |

A survey questionnaire was developed, and pre-tested, this questionnaire content and design will structure rely on literature review tested questionnaire (Anderson & Niebuhr 1986). The instrument focused on the knowledge and practices of cattle's farmers on data from about farmers on the respiratory tract disease among the cattle's occurrence, training, location of the farms, size and the ways that treated with disease, by asking the farmers if a knowledge statement presented to them was either true, false, open-ended questions, and multiple choice or as a scale. The questionnaire content focused on three parts. First, the socio-economic aspect (5 statements); second, knowledge about cattle's breeding (5 statements); and the third, about knowledge about respiratory disease (15 statements). farmers were also gathered, address and phone numbers were taken, local enumerators were trained which facilitated the survey interview and minimize questionnaire error.

Clinical studies were undertaking at 10 random farms in four Palestinian villages. Animals at each site will monitored until the signs of respiratory disease was confirmed, and affected cattle were then with the special veterinarian take the samples from the cattle and pigeons as saliva mucus from the mouth and samples as faeces from the anal tract of the sheep. Then these samples were sent to the special lab in the university to make all investigations to see the associations between the cattle respiratory disease and pigeons farm breeding. In order to illustrate their opinion towards breeding pigeons in the farm, exploratory Factor Analysis (EFA) was applied in the study.

### III. Results and Discussion

In order to clarify the underlying factors related to factor to have positive knowledge's toward breeding pigeons in the farm and respiratory disease, 25 statements have been used to run the factor analysis. To measure the sampling adequacy and the correlation, Kaiser-Meyer-Olkin (KMO) sampling adequacy test and Bartlett's test of Sphericity were performed (Jolynn, 2008) Table 2.

Table 2. Bartlett's and Kaiser-Meyer-Olkin (KMO) test value

|  |              |
|--|--------------|
| <i>Cronbach's Alpha (number of items = 25)</i> | <i>0.718</i> |
|--|--------------|

|                        |                           |                |
|------------------------|---------------------------|----------------|
| <i>KMO test</i>        |                           | <i>0.682</i>   |
| <i>Bartlett's test</i> | <i>Approx. Chi Square</i> | <i>228.243</i> |
|                        | <i>df</i>                 | <i>102</i>     |
|                        | <i>Sig</i>                | <i>0.004</i>   |

The result of KMO test of this study was 0.682 is acceptable as it is closer to 1 indicated that the sizeable of the sampling is adequate. And Cronbach's Alpha (number of items = 25) equal 0.718, which clearly indicated the variables hold appropriate internal consistency, the Bartlett's test of Sphericity is significant at 5% level (0.004) of significance indicated that factor analysis with given variables was appropriate.

Demographic profiles of the interviewed 28 farmers are nearly 57% of the respondents was more than 40 years old, and the rest is less 40 years old. The majority of the farmers are male (96%) completed secondary school, majority of the farmer family number are 10 (35.7%) and smallest family number is 2 (3.6%). With regards to farm characteristics, regardless of type of the farm as example, closed crowded farm constitute (85.7%) and open farm is (14.3%). In addition, (89.3%) of the respondent farmers breed birds in the farm with animals, also, regarding to the number of animal death annually related respiratory disease reach to 10 to 20 animals. There were 15 statements presented to the farmer-respondents which described the knowledge about cattle's respiratory infectious disease, one of these important statement is the evaluation of respiratory infectious disease on a scale from (0-5) as tabulated in table 3.

Table 3. Evaluation of respiratory infectious disease

| <i>Response</i>     | <i>Scale (0-5)</i> | <i>Number</i> | <i>Percent %</i> |
|---------------------|--------------------|---------------|------------------|
| <i>I don't know</i> | <i>0</i>           | <i>5</i>      | <i>17.9</i>      |
| <i>Some</i>         | <i>1</i>           | <i>4</i>      | <i>14.3</i>      |
| <i>knowledge</i>    |                    |               |                  |
| <i>Good</i>         | <i>2</i>           | <i>6</i>      | <i>21.4</i>      |
| <i>Very good</i>    | <i>3</i>           | <i>10</i>     | <i>35.7</i>      |
| <i>Excellent</i>    | <i>5</i>           | <i>3</i>      | <i>10.8</i>      |
| <i>Total</i>        |                    | <i>28</i>     | <i>100</i>       |

In addition, regardless of type of the breeding birds in the farm with cattle's, we observed that most of the tested farm, the respondents breed pigeons in the farm cattle's which may affect the respiratory system and may cause respiratory infectious disease in the future which lead to more cattle's death and more yield loss. As tabulated in the table 4.

Table .4 Type of the bird breeding in the tested farm

| <i>Type of the bird in the</i> | <i>N</i> | <i>Percent</i> |
|--------------------------------|----------|----------------|
|--------------------------------|----------|----------------|

| <i>farm</i>               | <i>umber</i> | <i>(%)</i> |
|---------------------------|--------------|------------|
| <i>No breeding</i>        | 2            | 7.1        |
| <i>peogens</i>            | 1            | 67.9       |
|                           | 9            |            |
| <i>chicken</i>            | 2            | 7.1        |
| <i>peagen and chicken</i> | 5            | 17.9       |
| <i>Total</i>              | 2            | 100        |
|                           | 8            |            |

In the same vein, the most question in the study was regarding to the cleaning of farm especially peogens remnants, cleaning every one month constitute about 46.5% and we observed that cleaning every one-year reach to 32%, which may lead to accumulate birds remains as example feather, faeces, ash from the nest, and bad odor, which may lead to affect the respiratory tract and eventually lead to more complicated diseases and shift up number of the death in the cattle's as shown in the table 5

Table .5 The time of cleaning remnants of peogen in the farm

| <i>farm</i>          | <i>Time of cleaning in the umber</i> | <i>N</i> | <i>Percent (100%)</i> |
|----------------------|--------------------------------------|----------|-----------------------|
| <i>I don't clean</i> |                                      | 2        | 7.1                   |
| <i>1 month</i>       |                                      | 1        | 46.4                  |
|                      | 3                                    |          |                       |
| <i>3 months</i>      |                                      | 1        | 3.6                   |
| <i>5 months</i>      |                                      | 3        | 10.7                  |
| <i>one year</i>      |                                      | 9        | 32.1                  |
| <i>Total</i>         |                                      | 2        | 100.0                 |
|                      | 8                                    |          |                       |

The respondents were asked about their knowledge on the control of infectious disease in the farm. Among the six true (correct) statements, majority of the farmers from the most farm considered four statements to be true Table 6. These statements were: 1) The best way to reduce spread of the infectious disease is by more knowledge about disease (77%); 2) Early vaccination has big effect on reduce spread of respiratory disease invasion (73%); 3)Rotatory ventilation can shift down respiratory disease invasion (87%); and four Continuous training will lead to reduce spread of respiratory disease invasion (98%). However, two statements were perceived by majority of the farmers from the most investigated farm to be false: 1) Respiratory diseases will increase if peogen present in the farm, and 2) Thoroughly cleaning the bird's remnants will help limit respiratory disease invasion (55%) as tabulated in table 6. Regarding to the clinical test results,40 samples were taken from farms for both pigeons and cattle's in addition to the control sample Figure. 1.

Table .6 Farmer-responder's knowledge of the correct or proper management of farm in the two interested villages.

| <i>Management of respiratory disease in the farm</i>   | <i>(%)Al-Jadida Village</i> |              |                 |             | <i>(%)Raba Village<sup>2</sup></i> |                 |             |              |
|--|-----------------------------|--------------|-----------------|-------------|------------------------------------|-----------------|-------------|--------------|
|  | <i><sup>1</sup> (17)</i>    |              | <i>(9)</i>      |             |                                    |                 |             |              |
|  | <i>True</i>                 | <i>False</i> | <i>Not Sure</i> | <i>True</i> | <i>False</i>                       | <i>Not Sure</i> | <i>True</i> | <i>False</i> |
| <i>Respiratory diseases will increase if peogen present in the farm</i>                            | 2                           | 8            | 7               | -           | 4                                  | 5               | 4           | 1            |
| <i>The best way to reduce spread of the infectious disease is by more knowledge about disease.</i> | 7                           | 2            | 2               | 1           | 7                                  | 3               | 0           | -            |
| <i>Early vaccination has big effect on reduce spread of respiratory disease invasion.</i>          | 3                           | 5            | 1               | 2           | 6                                  | 4               | 0           | -            |
| <i>Rotatory ventilation can shift down respiratory disease invasion.</i>                           | 7                           | 2            | 1               | 1           | 1                                  | 0               | 8           | 1            |
| <i>Thoroughly cleaning the bird's remnants will help limit respiratory disease invasion</i>        | 3                           | 5            | 5               | 2           | 7                                  | 3               | 0           | -            |
| <i>Continuous training will lead to reduce spread of respiratory disease invasion</i>              | 8                           |              | 2               | -           | 2                                  |                 | 8           | -            |

*1: Al- jadida village has more farm investigated; and 2 is Raba village is the second village investigated.*

*a)we take these two villages because they occupy the high questionnaire number (17+9=26 from 28)*

The presence of Gram-positive Bacteria(G + bacilli) in barns containing the pigeons and the control sample (barns without pigeons) and Escherichia coli,(E. coli) (G.negative) were found in barns that contain a pigeons and are not found in barns that do not contain pigeons. However, the test didn't decide the type of strain for E. coli which may lead to toxin production as example STEC strain or O157:H7 strain, which lead to sick and eventually death.



Figure .1 Samples were taken from pigeons and cattle's in the farm.

#### IV. Conclusions

Farmers' knowledge of management and treatment with infectious disease did not differ much between villages. Both had almost the same trends as to what they think were true and false. Based on the results of descriptive analysis, it shows that most of the respondents who were involved in the study were male farmers and most of them have secondary education with 10 to 25 years of experience in breeding cattle's in the farm. The result of this study found that a small percentage of farmers have a good knowledge of respiratory diseases, who clean the peogen remnants at short period of time, exposing the sheep to deadly respiratory diseases. In this study, there was a relationship between the transmission of respiratory diseases among sheep in the barn and the raising of birds. A follow-up study is recommended on more farms and comprise more farms in Palestine. This information will strengthen the infectious disease is a big menace in the farm. The presence of bacilli in barns containing the peogen and control sample (barns without peogens) and *E. coli* was found in barns containing a peogens and not in barns that did not contain a peogen. Therefore, the current study may be valuable for the developing country by providing small data for monitoring disease conditions and management practices of animals that have public health hazard and aesthetic value. Loss due to organ condemnation, public education to avoid eating of raw meat, use of latrines and improved standards of human hygiene.

#### **Ethical Considerations:**

All permissions have been taken in to consideration as farmer's agreement for questionnaire fulfillment and animals samples.

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#### **Competing interests**

The authors declare that they have no personal, financial or relationships which may have inappropriately influenced them in doing this research.

## References

1. Addis, A. B. (2017). Causes of organ condemnation and economic loss of cattle in developing countries. Review.
2. Alembrhan, A and Haylegebriel, T. 2013. Major Causes of Organ Condemnation and Economic Loss in Cattle Slaughtered at Adigrat Municipal Abattoir, Northern Ethiopia. *Vet. World*, **6(10)**: 734-738.
3. FAO. 1972. Report to the Government of Ethiopia. Food and Agriculture Organization veterinary service and disease control. Animal health service, Rome, Italy.
4. Jolynn, P. (2008). A brief introduction to SPSS factor analysis. Retrieved on 208/2018 from [http://www.yorku.ca/pek/index\\_files/quickstart/SPSSQuickStart.pdf](http://www.yorku.ca/pek/index_files/quickstart/SPSSQuickStart.pdf)
5. Palestinian Central Statistical Organization. (2014). Retrieved on 15/1/2018 from <http://www.pcbs.gov.ps/default.aspx>.
6. Radostits, O., Gay, C., Blood, C and Hincheliff K. 2000. Disease caused by bacteria – *Mycobacterium*. In: Veterinary Medicine: A Text Book of Disease of Cattle, Sheep, Pig, Goat and Horses. 9th ed. Harcourt Publisher Ltd., London. 909–918.
7. Stott, E. J., Thomas, L. H, Collins, A. P, Crouch, S., Jebbett, J., Smith, G. S., and, Luther, P. D. (1980). A survey of virus infections of the respiratory tract of cattle and their association with disease. *The Journal of Hygiene*, Vol. 85, (2), pp. 257-270.
8. Yates, W. (1982). A review of infectious bovine rhinotracheitis, shipping fever pneumonia and viral-bacterial synergism in respiratory disease of cattle. *46(3)*, 225.