INTRODUCTION

The human community is rapidly multiplying in various countries all over the world. However, the rate of multiplication is above the multiplication rate of food animals, particularly in developing areas (Steinfeld et al., 2006). The produced meat from food animals is the major source of high-quality protein and precious food throughout the world. The chief source of red meat is cattle, camel, sheep and goat. However, certain affections caused by parasites, bacteria and viruses restrict the production of meat (Bin Kabir et al., 2010; Fekadu et al., 2012). These illnesses resulting in huge losses ranging from the morality of livestock, decrease the weight and condemnation of meat at slaughterhouses.

Parasitic diseases have a critical effect on human and livestock in developing nations (Abdulhameed et al., 2018). Cysticercosis, dicrocoeliasis, hydatidosis and fascioliasis are major parasitic diseases that have a considerable effect on human health and the safety of meat (Aminzare et al., 2018; Pezeshki et al., 2018). Bovine Cysticercosis can be transmitted to man through the ingestion of infected meat with Cysticercus bovis, while animals are responsible for completing the life cycle in case of hydatidosis and fascioliasis (Youssef and Uga, 2014). Moreover, bovine...
cysticercosis is responsible for the condemnation of the carcass in heavy infected cases. In addition, food animals are able to harbor large number of pathogenic bacteria; these bacteria can be transferred to human during preparation, handling and consumption of infected meat as well as condemnation of meat at slaughterhouse (Fromsa and Jobre, 2012).

Therefore, meat inspection is a useful tool in the detection of animal diseases and in preventing the spread of diseased meat that could harm consumers. Data generated by the inspection of live and slaughtered food animals are valuable epidemiological information for disease assessment and determining the efficacy of the preventive and therapeutic intervention.

Egypt has a great animal population in Africa with approximately 9.5 million heads and 484 abattoirs as reported by the ministry of agriculture and land reclamation in 2019. Slaughterhouses played a crucial role in distinguishing the meat with different affections and thus preventing their marketing to consumers (Alton et al., 2010). There are inadequate data about various illness-causing meat condemnations and their financial loss in Egyptian abattoirs, particularly in southern Egypt. Hence, the aims of this work were to identify the causes of meat condemnations in three Egyptian abattoirs in 2017 and 2018, one abattoir in northern Egypt (Alexandria), while two abattoirs (Qena and Aswan) represented Southern Egypt. In addition to the financial loss due to meat condemnation was estimated. The findings of this study might contribute to establishing a suitable policy for the banning and monitoring of animal diseases in Egypt particularly in southern Egypt.

MATERIALS AND METHODS

STUDY AREA
The study was carried out in three Egyptian slaughterhouses where food animals were slaughtered for local consumption. One in northern Egypt, in the province of Alexandria, and two slaughterhouses in the upper of Egypt, including the province of Qena and Aswan. Alexandria is the second biggest town in Egypt after Cairo, it stretching alongside the Mediterranean Sea and having a population about 5,200,000. Qena is a province in Upper Egypt, located on the east bank of the Nile River, characterized by warm weather and with a population of approximately 230,920. Aswan is situated in southern Egypt and has the hottest summer period with a population around 290,327 (Figure 1).

STUDY DURATION AND ANIMALS POPULATION
The work was conducted over the course of 24 months from January 2017 to December 2018. The slaughtered and inspected animals during the study were 126,686, 18,886 and 22,240 animals in Alexandria, Qena and Aswan abattoirs, respectively. The investigated animals in Qena and Aswan were native cattle, buffalo, camel, sheep and goat. While, the Alexandria abattoir is capable of slaughtering the same species of animals with imported cattle. 
the total condemnation decision was taken in case of
generalized illness and/ or severe anomalies.

ASSESSMENT OF FINANCIAL LOSS
The direct economic loss in each abattoir was determined
by the formula described by Khanjari et al. (2010).

\[ \text{DEL} = N \times P \times W \]

DEL: Direct economic loss; N: number of condemned
carcasses / and offals; P: Average price of carcasses /and
offal (Kg /Egyptian pound); W: average carcasses / and
offal weight (Kg).

The average price of the various carcasses and their offals
was determined by their marketable cost in Alexandria,
Qena and Aswan municipalities during 2017-2018 (Table 1).

Table 1: Average prices of carcasses and their offals in
Egypt during 2017-2018.

| Item            | Average weight (Kg) | Average price (Egyptian pound/kg) | Total price (Egyptian pound) |
|-----------------|---------------------|----------------------------------|-----------------------------|
| Cattle          | 200                 | 100                              | 20000                       |
| Buffalo         | 200                 | 90                               | 18000                       |
| Camel           | 312.5               | 80                               | 25000                       |
| Sheep           | 40                  | 125                              | 5000                        |
| Bovine liver    | 6.5                 | 100                              | 650                         |
| Liver camel     | 8.5                 | 100                              | 850                         |
| Ovine liver     | 1.2                 | 100                              | 120                         |
| Bovine lung     | 4                   | 75                               | 300                         |
| Lung camel      | 5                   | 80                               | 400                         |
| Ovine lung      | 1.25                | 80                               | 100                         |
| Bovine Kidneys  | 1.6                 | 75                               | 120                         |
| Kidney camel    | 3.5                 | 80                               | 280                         |
| Ovine Kidneys   | 1                   | 70                               | 70                          |
| Bovine heart    | 2.4                 | 100                              | 240                         |
| Heart camel     | 3.8                 | 100                              | 380                         |
| Ovine heart     | 0.5                 | 100                              | 50                          |
| Bovine spleen   | 1.2                 | 100                              | 120                         |
| Spleen camel    | 2.4                 | 100                              | 240                         |
| Ovine Spleen    | 0.5                 | 100                              | 50                          |

1 USD was equal to 16 Egyptian pound.

DATA ANALYSIS
The data were analyzed by a Microsoft Excel spreadsheet.
The Z test was used to compare the proportions and
when p≤0.05 referred to a significance.

RESULTS AND DISCUSSION
Abattoirs offered a significant chance to identify illness
with financial values and zoonotic significance. Alexandria,
Qena and Aswan abattoirs slaughtered 126686, 18886 and
22240 animals, respectively during the duration of this
study. The variation in the numbers of slaughtered animals
among the studied slaughterhouses may be attributed to
the difference in the population size and their different
economic status. Sheep followed by cattle, buffalo, goat
and lastly camel meat was the preferred form of meat for
Alexandrian individuals. Cattle meat is most preferable for
individuals in Qena Governorate, followed by buffalo, sheep,
camel and goat. Cattle is the first choice followed by camel,
sheep and finally buffalo for people who lived in the Aswan.

CAUSES OF CONDEMNATIONS OF WHOLE
CARCASSES
Out of 126686 animals were slaughtered in Alexandria
abattoir 20 (0.015%) animals were totally condemned
due to various causes. Icterus was the predominant cause
followed by fever, tuberculosis, ill bleeding and emaciation.
Cattle, buffalo and sheep were the condemned animal
species while there was no condemnation in camel
and goat. All the total commended animals were native
breeds, while there was not any total condemnation in the
imported animals (Table 2). In Qena abattoir, out of 18886
livestock, only one sheep was completely condemned as a
result of generalized tuberculosis and one cattle owing to
ill bleeding (Table 3). Out of 22240 animals, 46 (0.20%) were
totally condemned in Aswan abattoir. Icterus, emaciation and
generalized tuberculosis were the causes of
condemnation at Aswan abattoir (Table 4).

In Aswan abattoir, the proportion of whole carcass rejection
was significantly higher than in those in Alexandria and
Qena abattoirs (p<0.05).

In the current study, it is clear that there was no
condemnation during the ante-mortem inspection, whereas
all condemnations occurred as a result of diseases detected
during post-mortem inspection. The obtained results were
comparable with Tembo and Nonga (2015) who found that
0.05% of the animals slaughtered in Dodoma, Tanzania
were completely commended as a result of tuberculosis, icterus
and cysticercosis. The reasons for full carcass
condemnation in the current work were almost identical to
those recorded in Ethiopia (Mummed and Webb, 2015).

PARTIAL CONDEMNATION OF THE
CARCASS
Localized affections of quarters of food animals with
tuberculosis were the main cause of partial condemnation.
Two cases of tuberculosis affection were detected at
Alexandria abattoir (0.001%) as illustrated in Table
2. While at Qena abattoir one cattle and two buffalo
(0.015%) (Table 3). Concerning Aswan abattoir, one case
in cattle and 9 cases in camel carcass (0.044%) (Table 4) were identified.

Table 2: Causes of condemnation of slaughtered animals in Alexandria slaughterhouse during 2017 and 2018.

| Cause                      | 2017 Natives | 2017 Imported | 2018 Natives | 2018 Imported | Total |
|----------------------------|--------------|---------------|--------------|---------------|-------|
| Generalized tuberculosis   | 1 (0.006%)   | 0 (0%)        | 0 (0.004%)   | 0 (0.007%)    | 3 (0.002%) |
| Tuberculosis in quarter    | 1 (0.006%)   | 0 (0%)        | 0 (0.004%)   | 0 (0.007%)    | 2 (0.001%) |
| Fever                      | 0 (0%)       | 0 (0%)        | 0 (0.004%)   | 0 (0.007%)    | 0 (0.0002%) |
| Icterus                    | 3 (0.01%)    | 1 (0.009%)    | 3 (0.01%)    | 1 (0.007%)    | 4 (0.009%) |
| Ill bleeding               | 0 (0%)       | 0 (0%)        | 0 (0.007%)   | 0 (0.007%)    | 0 (0.0007%) |
| Emaciation                 | 1 (0.006%)   | 0 (0%)        | 0 (0.007%)   | 0 (0.007%)    | 0 (0.0007%) |
| Lung                       |              |               |              |               |       |
| Tuberculosis               | 67 (0.42%)   | 8 (2.35%)     | 77 (0.71%)   | 0 (0.41%)     | 370 (0.29%) |
| Congestion                 | 39 (0.24%)   | 10 (2.94%)    | 38 (0.35%)   | 0 (0.32%)     | 258 (0.17%) |
| Parasitic cyst             | 3 (0.01%)    | 12 (0.11%)    | 155 (0.56%)  | 0 (0.02%)     | 210 (0.14%) |
| Pneumonia                  | 27 (0.17%)   | 0 (0.47%)     | 141 (0.51%)  | 0 (0.22%)     | 503 (0.39%) |
| Heart                      |              |               |              |               |       |
| Cysticercus                | 65 (0.41%)   | 1 (0.29%)     | 4 (0.03%)    | 0 (0.01%)     | 331 (0.26%) |
| Traumatic pericarditis     | 7 (0.04%)    | 24 (0.22%)    | 44 (0.16%)   | 0 (0.06%)     | 186 (0.14%) |
| Liver                      |              |               |              |               |       |
| Tuberculosis               | 15 (0.09%)   | 4 (1.17%)     | 28 (0.25%)   | 0 (0.12%)     | 123 (0.09%) |
| Cysticercus                | 3 (0.19%)    | 4 (0.037%)    | 33 (0.12%)   | 2 (0.008%)    | 76 (0.05%) |
| Abscesses                  | 14 (0.08%)   | 5 (1.47%)     | 12 (0.11%)   | 0 (0.26%)     | 321 (0.25%) |
| Fasciola                   | 49 (0.31%)   | 8 (2.35%)     | 35 (0.32%)   | 0 (0.27%)     | 372 (0.09%) |
| Head                       |              |               |              |               |       |
| Cysticercus                | 23 (0.14%)   | 4 (0.03%)     | 107 (0.39%)  | 4 (0.01%)     | 162 (0.12%) |
| Tuberculosis               | 14 (0.08%)   | 22 (0.20%)    | 38 (0.15%)   | 16 (0.11%)    | 91 (0.07%) |
| Kidneys                    |              |               |              |               | 0     |
| Hydro nephrosis            | 4 (0.02%)    | 2 (0.01%)     | 0 (0.01%)    | 0 (0.01%)     | 10 (0.007%) |
| Renal fibrosis             | 14 (0.08%)   | 32 (0.58%)    | 49 (0.29%)   | 67 (0.26%)    | 278 (0.21%) |

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Table 3: Causes of condemnation of slaughtered animals in Qena slaughterhouse during 2017 and 2018.

| Cause                      | 2017 | 2018 | Total |
|----------------------------|------|------|-------|
|                            | Cattle | Buffalo | Camel | Sheep | Goat | Cattle | Buffalo | Camel | Sheep | Goat | n=18886 |
| Generalized tuberculosis   | 0     | 0     | 0     | 0     | 0     | 0     | 0       | 0     | 0     | 0     | 1(0.005%) |
| Tuberculosis in quarter     | 0     | 1(0.15%) | 0     | 0     | 0     | 1(0.01%) | 1(0.17%) | 0     | 0     | 0     | 3(0.01%) |
| Ill bleeding                | 0     | 0     | 0     | 0     | 0     | 1(0.01%) | 0       | 0     | 0     | 0     | 1(0.005%) |
| Emaciation                  | 0     | 0     | 0     | 0     | 0     | 0     | 0       | 0     | 0     | 0     | 0       |
| Abscesses in muscle         | 2(0.02%) | 0     | 0     | 0     | 1(0.21%) | 0     | 3(0.03%) | 0     | 0     | 0     | 6(0.03%) |
| Lung                       | 0     | 0     | 0     | 0     | 0     | 0     | 0       | 0     | 0     | 0     | 0       |
| Tuberculosis                | 0     | 0     | 0     | 0     | 0     | 0     | 0       | 0     | 0     | 0     | 0       |
| Congestion                  | 0     | 0     | 0     | 0     | 0     | 1(0.21%) | 0       | 0     | 0     | 0     | 1(0.005%) |
| Pneumonia                   | 0     | 0     | 1(11.11%) | 3(0.64%) | 0     | 3(0.03%) | 0       | 0     | 2(0.41%) | 0     | 9(0.04%) |
| Abscesses                   | 0     | 0     | 0     | 0     | 0     | 1(0.01%) | 0       | 1(4.16%) | 1(0.20%) | 0     | 3(0.01%) |
| Heart                      | 0     | 0     | 0     | 0     | 0     | 0     | 0       | 0     | 0     | 0     | 0       |
| Cysticercus                 | 0     | 0     | 0     | 3(0.64%) | 0     | 0       | 0       | 0     | 0     | 0     | 3(0.01%) |
| Traumatic pericarditis      | 0     | 0     | 0     | 0     | 0     | 0     | 0       | 1(0.17%) | 0       | 0     | 0       |
| Congestion                  | 0     | 0     | 0     | 0     | 0     | 3(0.03%) | 0       | 0     | 0     | 0     | 3(0.01%) |
| Liver                       | 47(0.56%) | 6(0.91%) | 0     | 2(0.43%) | 0     | 41(0.48%) | 6(1.05%) | 1(0.20%) | 0     | 103(0.54%) |
| Head                       | 1(0.01%) | 0     | 0     | 0     | 0     | 0     | 0       | 0     | 0     | 0     | 1(0.005%) |
| Cysticercus                 | 0     | 0     | 0     | 0     | 0     | 0     | 0       | 0     | 0     | 0     | 0       |
| Tuberculosis                | 13(0.15%) | 0     | 0     | 0     | 0     | 0     | 10(0.11%) | 0     | 0     | 0     | 23(0.12%) |
| Kidney                      | 0     | 0     | 0     | 0     | 0     | 0     | 0       | 0     | 0     | 0     | 0       |
| Spleen                      | 0     | 0     | 0     | 0     | 0     | 0     | 0       | 0     | 0     | 0     | 0       |
| Intestine                   | 0     | 0     | 0     | 0     | 0     | 0     | 0       | 0     | 0     | 0     | 0       |

*C: Cysticercus.*
Table 4: Causes of condemnation of slaughtered animals in Aswan slaughterhouse during 2017 and 2018.

| Cause                                      | 2017 Cattle | 2017 Buffalo | 2017 Camel | 2017 Sheep | 2018 Cattle | 2018 Buffalo | 2018 Camel | 2018 Sheep | Total n=22240 |
|--------------------------------------------|-------------|--------------|------------|------------|-------------|--------------|------------|------------|---------------|
| Fracture and contusion                     | 0           | 0            | 0          | 0          | 1(0.011%)   | 0            | 0          | 0          | 1(0.005%)     |
| Generalized tuberculosis                   | 0           | 0            | 0          | 0          | 1(0.11%)    | 0            | 0          | 0          | 1(0.004%)     |
| Tuberculosis in quarter                    | 1 (0.01%)   | 0            | 5(0.24%)   | 0          | 0           | 0            | 0          | 0          | 10(0.044%)    |
| Icterus                                    | 2(0.34%)    | 1(1.13%)     | 0          | 7(0.83%)   | 20(0.17%)   | 0            | 0          | 12(0.77%)   | 42(0.18%)     |
| Emaciation                                 | 0           | 0            | 0          | 3(0.35%)   | 0           | 0            | 0          | 0          | 3(0.013%)     |
| Lung                                       | 18 (0.31%)  | 5 (5.68%)    | 10 (0.48%) | 0          | 29 (0.25%)  | 0            | 12 (2.09%) | 0          | 74 (0.33%)    |
| Tuberculosis in lung                       | 65 (1.13%)  | 15 (17.04%)  | 141 (6.86%)| 0          | 198 (1.76%) | 43 (21.28%)  | 193 (33.62%)| 0          | 655 (2.94%)   |
| Parasitic cysts                            | 0           | 0            | 256(12.46%)| 0          | 65 (0.57%)  | 0            | 176(30.66%) | 0          | 497 (2.23%)   |
| Pneumonia                                  | 0           | 0            | 16 (0.77%) | 7 (0.83%)  | 0           | 0            | 0          | 0          | 23 (0.10%)    |
| Cysticercus                                | 376(6.57%)  | 0            | 55(6.58%)  | 361(3.21%) | 0           | 1(0.17%)     | 130(8.37%)  | 923(4.15%)  |
| Liver                                      | 0           | 0            | 16 (0.77%) | 0          | 7 (0.83%)   | 23 (2.02%)   | 7           | 13 (2.26%)  | 3(0.19%)      |
| Fasciola                                   | 1302(22.76%)| 36 (40.9%)   | 0          | 168 (20.11%)| 1458 (13%)  | 54 (26.73%)  | 0           | 208 (13.39%)| 3226 (14.50%)|
| Head                                       | 150(2.62%)  | 0            | 0          | 0          | 78 (0.69%)  | 0            | 0          | 0          | 228 (1.02%)   |
| Cysticercus                                | 0           | 0            | 16 (0.77%) | 0          | 7 (0.83%)   | 23 (2.02%)   | 7           | 13 (2.26%)  | 3(0.19%)      |
| Tuberculosis                                | 13 (0.22%)  | 0            | 0          | 0          | 17 (0.15%)  | 0            | 0          | 0          | 30 (0.134%)   |
| Kidney                                     | 186(3.25%)  | 4(4.54%)     | 72(3.50%)  | 20(2.39%)  | 217(1.93%)  | 10(1.93%)    | 19 (3.31%)  | 0          | 528 (2.37%)   |
| Hydronephrosis                             | 0           | 0            | 0          | 0          | 12(0.10%)   | 3(1.48%)     | 7(1.21%)    | 0          | 22 (0.09%)    |

Table 5: Economic loss due to meat condemnation in Alexandria, Qena and Aswan slaughterhouses during 2017–2018.

| Condemned part | Cause for condemnation | Alexandria | Qena | Aswan | Total       |
|----------------|------------------------|------------|------|-------|------------|
|                | Number of animals      | Economic loss (Egyptian pound) | Number of animals | Economic loss (Egyptian pound) | Number of animals | Economic loss (Egyptian pound) |
| Head           | Cysticercus            | 0          | 0    | 0     | 228 (1.02%)|
|                | Tuberculosis           | 13 (0.22%) | 0    | 0     | 30 (0.134%)|
| Kidney         | Hydronephrosis         | 186(3.25%) | 72(3.50%) | 217(1.93%) | 19 (3.31%) | 528 (2.37%) |
| Intestinal Congestion | 0          | 0          | 0    | 0     | 12 (0.10%) | 3 (1.48%) | 7 (1.21%) | 22 (0.09%) |
| Condition                  | Whole Carcass | Generalized Tuberculosis | Fever | Icterus | Ill Bleeding | T.B in Quarter | Lung Tuberculosis | Congestion | Parasitic Cyst | Pneumonia | Abscesses | Heart Cysticercus | Traumatic Pericarditis | Congestion | Liver Tuberculosis | Cysticercus | Abscesses | Fasciola | Kidneys Hydronephrosis |
|----------------------------|--------------|--------------------------|-------|---------|-------------|----------------|-------------------|-------------|----------------|-----------|-----------|-------------------|---------------------------|-------------|-------------------|--------------|-----------|----------|-------------------------|
|                            | 2 cattle     | 1 buffalo                | 1 sheep | 12000 | 6 cattle  | 1 buffalo      | 2000              | 3600        | 12 lungs cattle | 88 lungs   | 0         | 70 hearts cattle       | 124 hearts cattle          | 0           | 51 livers cattle     | 7 livers    | 89 livers | 127 livers | 8 kidneys cattle         |
|                            | 1 buffalo    | 2 buffalo                | 3 sheep | 300    | 2 buffalo  | 2 buffalo      | 3000              | 6600        | 22 lungs cattle | 21 lungs   | 0         | 4 hearts buffalo         | 56 hearts buffalo            | 0           | 33 livers cattle      | 6 livers    | 39 livers | 88 livers | 2 kidneys cattle          |
|                            | 1 sheep      | 4 sheep                  |        | 2000   | 4 sheep    | 4 sheep        | 20000             | 21000       | 21000         | 139400     | 0         | 257 hearts sheep        | 106 hearts sheep             | 0           | 257 livers cattle     | 63 livers   | 193 livers | 157 livers | 157 livers cattle        |
|                            | 5000         | 5000                     | 5000   | 0      | 1 sheep    | 1 sheep        | 5000              | 18000       | 0             | 0         | 0         | 960               | 12850                      | 720         | 33150             | 4550         | 57850      | 82550     | 8 kidneys cattle         |
|                            | 68000        | 68000                    | 68000  | 0      | 1 sheep    | 1 sheep        | 68000             | 18000       | 0             | 0         | 0         | 960               | 12850                      | 720         | 33150             | 4550         | 57850      | 82550     | 8 kidneys cattle         |
|                            |              |                          |        | 0      |           |               | 7200              | 45500       | 14950         | 4550       | 0         | 127 livers cattle        | 106 hearts sheep             | 0           | 257 livers cattle     | 63 livers   | 193 livers | 157 livers | 2 kidneys cattle          |
|                            |              |                          |        | 0      |           |               | 7200              | 45500       | 14950         | 4550       | 0         | 127 livers cattle        | 106 hearts sheep             | 0           | 257 livers cattle     | 63 livers   | 193 livers | 157 livers | 2 kidneys cattle          |
|                            |              |                          |        | 0      |           |               | 7200              | 45500       | 14950         | 4550       | 0         | 127 livers cattle        | 106 hearts sheep             | 0           | 257 livers cattle     | 63 livers   | 193 livers | 157 livers | 2 kidneys cattle          |

**Notes:**
- Whole carcass: Data for whole carcasses showing the number of cases and the number of animals involved.
- Generalized tuberculosis: Data for cases of generalized tuberculosis, showing the affected animals and their numbers.
- Fever: Data for cases of fever, showing the affected animals and their numbers.
- Icterus: Data for cases of icterus, showing the affected animals and their numbers.
- Ill bleeding: Data for cases of ill bleeding, showing the affected animals and their numbers.
- T.B in Quarter: Data for cases of tuberculosis in the quarter, showing the affected animals and their numbers.
- Lung tuberculosis: Data for cases of lung tuberculosis, showing the affected animals and their numbers.
- Congestion: Data for cases of congestion, showing the affected animals and their numbers.
- Parasitic cyst: Data for cases of parasitic cyst, showing the affected animals and their numbers.
- Pneumonia: Data for cases of pneumonia, showing the affected animals and their numbers.
- Abscesses: Data for cases of abscesses, showing the affected animals and their numbers.
- Heart Cysticercus: Data for cases of heart cysticercus, showing the affected animals and their numbers.
- Traumatic pericarditis: Data for cases of traumatic pericarditis, showing the affected animals and their numbers.
- Congestion: Data for cases of congestion, showing the affected animals and their numbers.
- Liver Tuberculosis: Data for cases of liver tuberculosis, showing the affected animals and their numbers.
- Cysticercus: Data for cases of cysticercus, showing the affected animals and their numbers.
- Abscesses: Data for cases of abscesses, showing the affected animals and their numbers.
- Fasciola: Data for cases of fasciola, showing the affected animals and their numbers.
- Kidneys Hydronephrosis: Data for cases of kidneys hydronephrosis, showing the affected animals and their numbers.
The proportion of partial carcass condemnation in Aswan abattoir was significantly higher than Alexandria and Qena abattoirs \( (p<0.05) \). Tuberculosis is a serious disease of Egyptian livestock and has been shown to occur in various cities. Many reports demonstrated the presence of tuberculosis in the meat, Yibar et al. (2015) showed that the prevalence of tuberculosis in the examined cattle carcasses was 1.32% in Turkey. Therefore, the strict control program is required to reduce the prevalence of tuberculosis.

**CAUSES OF CONDEMNATIONS OF LUNGS**

In the current work, the most pathological affections were identified in the lungs (3198 lesions), which may be attributed to their structure and their direct connection with the external environment.

The total lung lesions in Alexandria, Qena and Aswan abattoirs were 1936 (1.52%), 13 (0.068%), 1249 (5.61%), respectively. Based on statistical analysis, a significant difference was detected between the proportions of lung lesions among three abattoirs.

Congestion (0.52%), pneumonia (0.39%), parasitic cysts (0.31%), and tuberculosis (0.29%) were the primary cause of lung condemnation at Alexandria abattoir (Table 2). Moreover, pneumonia (0.047%) and the formation of abscesses (0.015%) were identified at Qena abattoir (Table 3). In Aswan abattoir, Congestion (2.94%), parasitic cysts (2.23%) and pneumonia (0.103%) were recorded (Table 4). The parasitic cysts in Alexandria abattoir were categorized as cysticercosis in cattle and sheep while hydatid cysts were detected in buffalo. With regard to Aswan abattoir, hydatid cysts were observed in camel lungs and *Cysticercus bovis* was detected in cattle lung. The occurrence of hydatid cyst in the current work with high frequency in Aswan abattoir had a public health concern with financial importance particularly, in the rural areas where comprehensive grazing is carried out.

The obtained findings agreed with Ahmed et al. (2013) who reported that pneumonia was the major cause for lung condemnation in the inspected livestock in Ismailia abattoir, Egypt. The proportion of lungs condemnations in Dodoma, Tanzania abattoir was 10.5%, emphysema, hydatid cyst and hemorrhage were the chief reasons for the condemnations (Tembo and Nonga, 2015). Moreover, an abattoir survey was performed in Iran, cattle were the most infected animals with hydatid cyst, followed by sheep and goats, while the most infected offals were livers followed by lungs (Ghasemian et al., 2018). Pezeshki et al. (2018) recorded that the prevalence of hydatidosis in cattle and sheep in 2015-2018 was 2.25% and 2.48%, respectively in Tehran, Iran. The diversity of hydatidosis incidence in various countries may be attributed to county location, presence of dogs and degree of animal hygiene (Azami et al., 2013). Maxwell (2005) examined 5369 cattle in Nigeria and reported that 8.5% of the total lungs were condemned. Tuberculosis, pneumonia, abscesses and parasitic infection were the main causes of condemnation. Current work has shown that lungs lesions can cause numerous diseases for humans and have a serious impact on animal production. Some stressors factors as polluted air, fatigue, overpopulation in the farms were responsible for respiratory illness.

**CAUSES OF CONDEMNATIONS OF HEARTS**

The overall heart lesions in Alexandria, Qena and Aswan abattoirs were 517 (0.40%), 7 (0.037%) and 923 (4.15%), respectively. Based on statistical analysis, significant difference was detected between the proportions of heart lesions among three abattoirs.

Traumatic pericarditis and parasitic infection were the main causes of heart condemnation at Alexandria and Qena abattoir. While the parasitic infection was the only cause for condemnation of the heart at the Aswan abattoir. All parasitic cysts have been recognized in all abattoirs as cysticercosis.

Traumatic pericarditis is comparatively widespread and caused by the swallowing of foreign bodies. Ahmed et al. (2013) noted that 8% of examined heart in Ismailia abattoir, Egypt were condemned as a result of heart

| Affection | Animals | Count | Alexandria | Qena | Aswan |
|-----------|---------|-------|------------|------|-------|
| Fibrosis  | Kidneys | 85    | 10200      | 9120 | 1120  |
|           | Cattle  |       |            |      | 120   |
|           | Buffalos| 76    | 1120       |      | 7910  |
| Abscesses | Kidney  | 3     | 360        |      |       |
| Spleen    | Kidney  | 229   | 27480      |      | 13440 |
|            | Buffalo | 112   |            |      | 13600 |
|            | Sheep   | 272   |            |      |       |
| Congestion | Kidney | 26    | 3120       |      | 1920  |
|            | Buffalo | 16    |            |      | 5500  |
|            | Sheep   | 110   |            |      |       |
| Total     |        | 1128490 | 106170    | 3294350 | 4529010 |

The proportion of partial carcass condemnation in Aswan abattoir was significantly higher than Alexandria and Qena abattoirs \( (p<0.05) \). Tuberculosis is a serious disease of Egyptian livestock and has been shown to occur in various cities. Many reports demonstrated the presence of tuberculosis in the meat, Yibar et al. (2015) showed that the prevalence of tuberculosis in the examined cattle carcasses was 1.32% in Turkey. Therefore, the strict control program is required to reduce the prevalence of tuberculosis.
adhesions and traumatic pericarditis. Comparably Jibat et al. (2008) have reported that out of 2688 animals were slaughtered at Debre Zeit, Ethiopia, 214 (7.9%) hearts were condemned as a result of pericarditis, calcification and parasitic infection.

CAUSES OF CONDEMNATIONS OF LIVERS

The overall liver lesions in Alexandria, Qena and Aswan were 892 (0.70%), 103 (0.54%) and 3295 (14.81%), respectively. Based on statistical analysis, a significant difference was observed between the proportions of livers lesions among three abattoirs.

The chief causes for condemnations of livers at Alexandria abattoir were fasciola (0.29%), abscesses (0.25%), tuberculosis (0.09%) and cysticercosis (0.05%). While at Aswan abattoir, fasciola (14.50%) and cysticercosis (0.31%) were the primary causes of liver condemnation. In addition, fasciola infection (0.54%) was the only cause for livers condemnations at Qena abattoir. Moreover, all parasitic cysts in the current study have been identified as cysticercosis in Alexandria and Aswan abattoirs.

The obtained data showed that fascioliasis is widespread in Egyptian slaughterhouses. Aminzare et al. (2018) obtained similar findings in the examined animals in Khorasan Razavi, Iran. Pezeshki et al. (2018) recorded that the prevalence of fasciolasis in cattle and sheep was 0.62% and 0.25%, respectively in a study conducted in Tehran, Iran. The incidence of fasciolasis in cattle and sheep was reported in different counties, Pakistan (51.3% and 14.8%) and Saudi Arabia (0.04% and 0.00%). In Tanzania, there was a high incidence of fasciola (30%) (Nzalawahe and Komba, 2013). The high incidence of fasciolasis in the current study may be attributable to the appropriateness of climate conditions and the presence of snails. Infection with fasciola is widespread and characteristic in many African countries. Nevertheless, fasciolasis infrequently leads to death in farm animals and its impacts had led to decrease the outputs of animals and the rejection of livers in slaughterhouses (Kambarage et al., 1995).

Among 9880 cattle slaughtered in the Ismailia abattoir, 181 cattle had livers abscess and 79 cattle had hepatic cirrhosis (Ahmed et al., 2013). Moreover, fascioliasis, cirrhosis and abscesses were the reasons for liver rejection in Zaria slaughterhouse (Raji et al., 2010). A study was conducted in three slaughterhouses in South Africa showed that the major causes of liver condemnation were fascioliasis, fibrosis and abscesses formation with associated financial loss USD 4527107 (Jaja et al., 2017). Liver lesions of food animals have an adverse effect on the economy via condemnation of diseased livers at the slaughterhouse in addition to their impact on the animal gain.

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CAUSES OF CONDEMNSATIONS OF SPLEENS

In Alexandria abattoir, 765 (0.60%) splenic lesions were observed. The lesions were classified into splenomegaly (0.48%) and congestion (0.001%) of spleen (Table 2). However, Spleens were free from any affection in Qena and Aswan abattoirs. The primary cause of splenomegaly may be due to infection with blood parasites (Gracey et al., 1999). Meanwhile, 120 cattle out of 9880 showed splenomegaly at Ismailia abattoir, Egypt (Ahmed et al., 2013). Splenomegaly, splenitis and contamination were the key reasons for the condemnation of spleen in Tanzania (Mellau et al., 2011). Nevertheless, in some cases in Turkey slaughterhouse, the hydatid cyst was the cause of spleen condemnation (Yibar et al., 2015).

CAUSES OF CONDEMNSATIONS OF INTESTINES

In Alexandria abattoir, the incidence of intestinal lesions was 915 (0.72%) lesions that were significantly higher than those observed in Aswan abattoir 22 (0.09%). Tuberculosis (0.44%) and congestions (0.02%) were the causes for condemnation of the intestines at Alexandria abattoirs. While the congestion was the only cause for condemnation at Aswan abattoir. However, intestines were free from pathological lesions in Qena abattoir there was no intestinal affection.

Tembo and Nonga (2015) stated that 7.3% of the examined intestine in Dodoma, Tanzania were commended, the pimply intestine was the main cause of condemnation followed by inflammation of intestinal wall and abscesses formation. While, parasitic infection and abscesses were the main causes of the condemnation of intestine in Ethiopia (Mummed and Webb, 2015).

The findings of the current work showed that there were various diseases related to condemnation of carcasses and organs at the Egyptian slaughterhouse. Among the investigated abattoirs, Aswan had the highest condemnation rate, which can be attributed to the difference in environmental circumstances, including climate temperature, humidity, animal farming and grassland nature. Meanwhile, Shahraki et al. (2018) attributed the difference in the incidence of parasitic infection to racing behavior and environmental circumstances in a study conducted in Iran.

FINANCIAL LOSSES

An additional aim of the current work was to determine the economic losses due to meat condemnation in the three Egyptian abattoirs. The financial losses in each abattoir were calculated during 2017 – 2018 (Table 5).

The major financial loss was caused by fasciolosis, followed by icterus, pulmonary congestion, the parasitic infection of lung and heart, pulmonary tuberculosis, liver abscesses, tuberculosis affections of quarters. The total two years duration economic loss due to meat condemnation at three abattoirs was estimated as 4529010 Egyptian pound (383063 USD).

A few works have investigated the financial analysis of the disease meat-producing animals in Egypt. In a work performed by Ahmed et al. (2013), 36480 Egyptian pound was lost owing to the condemnation of organs of slaughtered cattle in Ismailia city. The financial loss in the current works was higher than the findings reported (Cadmus and Adesokan, 2009) in Nigeria, which showed a yearly economic loss of 110968 USD. Economic loss due to meat condemnation has been stated by some studies in many countries (Kebede et al., 2011; Regassa et al., 2013). These works stated that parasitic and bacterial diseases could lead to excessive financial loss as well as can harm public health. The major cause of meat condemnation at two slaughter houses in Turkey were hydatidosis, fasciolosis, tuberculosis and icterus and their direct economic loss due to organ condemnation was 16.363 USD (Yibar et al., 2015). A slaughterhouse survey was conducted in Fako slaughterhouse, Cameroon recorded that 357 bovine organs out of 1472 were condemned due to parasitic infection with a related economic loss 2505 USD (Kouam et al., 2019). Kere et al. (2019) revealed that livers and lungs were the most condemned organ in Kenya as a consequence of hydatid cyst infection with an associated financial loss 152003 USD per year. The alteration in the financial loss between various researches could be attributed to the difference in animal population, prices, and incidence of diseases.

CONCLUSION

Finally, a large amount of money was lost owing to pathological conditions recognized in Egyptian slaughterhouses. This work revealed that tuberculosis, parasitic infection and icterus were the most prevalent afflictions that had the greatest influence on the Egyptian budget. It is obvious that an adequate preventive and regular application of anti-parasitic drugs and monitoring procedures are needed in Egypt particularly in Aswan province. Appropriate meat examination and hygienic discarding of condemned meat are necessary to secure the human health.

Considerations should be given the affections commonly detected at slaughterhouses. Monitoring programs at the farm should be followed to minimize the hazard.
of infectious diseases and to decrease the financial losses. Moreover, the building of efficiently equipped slaughterhouses and educating of slaughterhouse personnel are critical.

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CONFLICT OF INTERESTS

None.

AUTHORS CONTRIBUTION

Eman Sayed Mohammed and Mohamed Abdelfattah Maky planned the study and gathered the data. Mohamed Abdelfattah Maky discussed the data and drafted the paper.

ETHICAL CODE

The codes of Alexandria, Qena and Aswan abattoirs were C/0206010312, 270101010617, 580101010310, respectively.

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