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## Active survey of hydatid cysts in slaughtered sheep at Basrah abattoirs, Basrah province, Iraq

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### Abstract

The current study focused on slaughtered sheep in Basrah city which infected with hydatid cysts from the period between June 2016 till February 2017. The total sheep examined 1145 and 169 were found to be positive for hydatidosis. In current study, the prevalence was estimated to be 14.75, and the female sheep 123 (22.9) was found more infected with hydatid cysts than sheep male 46 (7.5). The highest number of infected sheep with hydatid cysts was observed in July and August while the lowest number was observed between September and October. Distribution of cystic hydatidosis according to the cyst localization indicated the livers and lungs were the most frequently infected visceral organs in sheep. The findings of this study demonstrated that hydatid cysts are common and widely distributed in sheep and they might play an important role in the life cycle and transmission of this zoonosis in Basrah province.

**Keywords:** Basrah city, hydatid cysts, prevalence

### Introduction

Hydatidosis is a zoonosis parasitic disease has been distributed worldwide<sup>[1]</sup>. It is caused by a tiny tapeworm *Echinococcus* spp, which belongs to family Taeniid. The life cycle of hydatid cysts consists of a two-stage cycle with a definitive host (canids) that carry the adult worms in the small intestine, while the livestock act as an intermediate host (livestock and human accidentally infected) in which the larval stage (hydatid cysts) develops<sup>[2]</sup>. The infection with hydatid cysts in the intermediate occurs through ingestion the eggs of *Echinococcus* accidentally, which are passed with the faeces of a dog and contaminated the water or food<sup>[3, 4]</sup>. This disease remains a serious threat to a human health and has the greatest impact on an animal production<sup>[5, 6]</sup>.

Hydatid disease is regarded mainly as a rural disease<sup>[2]</sup>. However, some studies carried out in the urban areas of developing countries have shown that domestic dogs that scavenge near or within slaughterhouses, are at risk of ingesting *Echinococcus granulosus* infected offal<sup>[7, 8]</sup>. Other substantial risk factors are commonly presented among the communities such as practice slaughtered an animal at a backyard of their houses, improper disposal viscera, ignore treatment dogs with anthelmintic, most likely can increase the occurrence of hydatid cyst in human and animal<sup>[9]</sup>.

Livestock CE is widespread in many regions of Asia including Middle East countries (Iran, Iraq, Pakistan, and Saudi Arabia), Central Asia (Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan, and Uzbekistan), China, India and Japan<sup>[10-12]</sup>. Hydatid cysts are one of important parasite of farm animals that cause economic problem through losses of edible organs such as livers and lungs<sup>[13, 14]</sup>. The parasite has a reverse effect on performance and growth and reducing a quality and yield of meat and milk. In addition, fertility and the value of fleece are reduced due to infection<sup>[15]</sup>. According to the previous report, hydatidosis is responsible for reducing a 10% of milk yield and 5% in carcas weight<sup>[16]</sup>. Condemned organs or even the whole carcas represents a high financial loss in many countries<sup>[17, 18]</sup>. Few reports are available on the prevalence and economic importance of hydatidosis in Iraq. Hydatid cyst is considered a public health importance in Iraq<sup>[19-21]</sup>. Many cases with hydatid cysts have been reported in all Iraqi province. Therefore, the aim of this study was to determine the prevalence, gender distribution, organs distribution, monthly distribution of hydatid cysts in slaughtered sheep in Basrah abattoirs.

**Materials and Methods**

**Study area**

The present study was conducted at the abattoirs in Basrah province. Basrah lies in the south of the country and borders Iran, Kuwait, and Saudi-Arabia. Basrah is in a fertile agricultural region, with major products including rice, maize corn, barley, pearl millet, wheat, dates, and livestock. The province had an estimated population of 2,403,301 million, in which rural-urban distributed at 20,1% -79,9% 20.1% respectively [22].

**Samples collection and animal selection**

This study was performed at Basrah and Al-Qurna abattoir period from Jun 2016 to February 2017. A total of 1145 slaughtered sheep were included in this study. The abattoirs were visited periodically for eight-month period. Post mortem examination procedure employed visual examination, palpation, and systematic incision of each carcass and visceral organs, particularly the lung, liver, spleen, kidney, and heart. The information such as the age was reported prior to the slaughtering. However, the cysts were carefully removed from targeted organs with a knife and kept in a sterilized container. The samples were retrieved to the Parasitological lab at College of Veterinary Medicine of Basrah University. The total number of cysts was counted per infected organ isolated from the sheep.

**Statistical analysis**

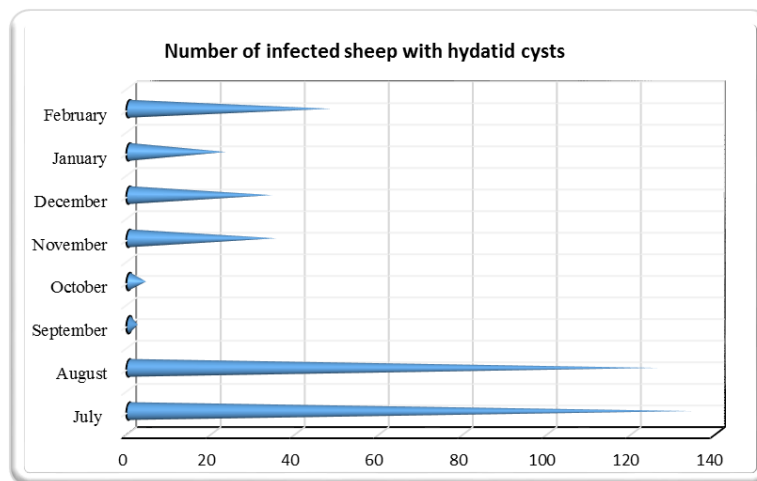
The data collected were entered into Excel sheet. A graph and the tables for the results were created. The SPSS soft version 7 was used for data analysis.

**Results**

Out of 1145 sheep examined 169 (14.7) were found to be positive for hydatidosis table (1). The prevalence of hydatid cysts in slaughtered sheep found to be 14.75%. The female's sheep 22.9% (123/536) was observed to be more infected with hydatid cysts than male's sheep 7.5% (46/609). Fig.1 shows distribution of hydatid cysts in slaughtered sheep based on eight months of sampling. The highest number of infected sheep with hydatid cysts was observed in July and August, while the lowest number was observed between September and October. Around 20% of cases reported had been noticed between November and December. The examination of organ distribution of CE indicated the livers and lungs were the most frequently infected visceral organs in sheep. The cysts in examined animals had a tendency to be located more in the liver than the lungs. Infected liver and lungs constituted 61.6% (104/169) and the lungs 38.4% (65/169), respectively (Table 2). The results of the distribution of number of the cysts were observed to be higher in the liver 51.5% (103/200) than lung 48.5% (97/200).

**Table 1:** Distribution of infected sheep with hydatid cysts inspected at Basrah abattoirs during nine months, Basrah province. (Number of infect sheep were 169).

| Months    | Number of inspected sheep |      |              | Number (%) infected with hydatid cysts in gender |           |  |
|-----------|---------------------------|------|--------------|--|-----------|--|
|           | Female                    | Male | Total number | Female   | Male      | Total infected number (%) with hydatid |
| July      | 42                        | 92   | 134          | 10 (23.8)  | 3 (3.2)   | 13 (9.7)                               |
| August    | 35                        | 91   | 126          | 4 (11.4)   | 6 (6.5)   | 10 (7.9)                               |
| September | 21                        | 52   | 73           | 2 (9.5)  | 0 (0.0)   | 2 (2.7)                                |
| October   | 49                        | 88   | 137          | 3 (6.1)  | 1 (1.1)   | 4 (2.9)                                |
| November  | 41                        | 74   | 115          | 26 (63.4)  | 9 (12.1)  | 35 (30.4)                              |
| December  | 55                        | 40   | 95           | 29 (52.7)  | 5 (12.5)  | 34 (35.7)                              |
| January   | 38                        | 47   | 85           | 19 (50.0)  | 4 (8.5)   | 23 (27.0)                              |
| February  | 255                       | 125  | 380          | 30 (11.7)  | 18 (14.4) | 48 (12.6)                              |
| Total     | 536                       | 609  | 1145         | 123 (22.9)                                       | 46 (7.5)  | 169 (14.7)                             |



**Fig 1:** Number of sheep were inspected infected with hydatid cysts.

**Table 2:** Distribution of hydatid cysts in sheep in the liver and lung based on sex category and number of cysts isolated from each organ.

| sex    | Anatomical site of infection |           | Number (%) of cysts isolated |            |           |            |
|--------|------------------------------|-----------|------------------------------|------------|-----------|------------|
|        | Liver                        | Lung      | Total                        | liver      | Lung      | Total      |
| male   | 22 (21.1)                    | 24 (37.0) | 46 (27.2)                    | 45 (43.7)  | 38 (39.2) | 83 (41.5)  |
| female | 82 (78.9)                    | 41 (63.0) | 123 (72.8)                   | 58 (56.3)  | 59 (60.8) | 117 (58.5) |
| Total  | 104 (61.6)                   | 65 (38.4) | 169 (100.0)                  | 103 (51.5) | 97 (48.5) | 200 (10.0) |

## Discussion

This study was performed at two abattoirs located in Basrah province. An abattoir can provide good information about animal diseases that usually have the asymptomatic condition. Therefore, abattoir surveys provide an excellent opportunity for detecting diseases of both economic and public health importance in different animal species [23]. This survey, however, included three important elements regarding with epidemiological aspects of hydatidosis in the sheep. Hydatidosis is a cosmopolitan disease and can cause a huge impact on meat quality and monetary burden.

The investigation has shown a high prevalence of hydatid cysts in sheep (14.75). The present study finding contrasts with another finding of [24-26] who reported a prevalence of 1.5%, 5.9%, and 13.7% in North, Middle and South of Iraq. The current study found that the prevalence of hydatid cysts in the sheep is higher than other prevalence that mentioned in previous studies have been achieved in other provinces of Iraq. A possible reason for that might be due to exist a large number of stray dogs in Basrah province than other provinces. The stray dogs are responsible for scattering the infection due to aimless movement. Similarly, the prevalence of hydatid cysts in the sheep showed a variation in different countries of the world 10.5% in Morocco [27] 3.6% in Kenya [28], 26.6% in Turkey [29] and 29.3% in Ethiopia [30]. The reasons for variation among countries may be attributed to a strain difference of *Echinococcus* that exist in a different geographical situation. The highest number of cases recorded observed in summer and decreased dramatically in the autumn. This indicates the hydatid cysts have a seasonal variation of infection in the sheep. Contrast to our finding, a study was conducted in Kirkuk province has revealed that the highest number of infection with hydatidosis in sheep was noticed in the autumn while the lowest number has been seen in spring [31].

The infection rate was higher in the females than males. A similar finding has been reported by [32]. The reason might be associated with the keeping of female longer than males for reproductive purposes. The majority of infected sheep 61.6% had hydatid cysts in the livers while 38.4% of infection found in the lungs. This comes to the fact that oncosphere (hexacanth embryo) can penetrate the wall of small intestine encounters the capillary beds of the intestine and then through the hepatic portal vein will take up to the liver, which settle for development or carry by hepatic vein to another organ most likely to the lung. This hypothesis of *Echinococcus* transmission and process reaching to a suitable organ has supported by [33]. The presence of the hydatid cysts in other organs like spleen, kidney and heart and other organs was not observed during our survey.

The number of the cysts was counted slightly higher in the liver 51.5% than in the lungs 48.5%. This result is contrary to what was found by Guadu, Gebremicael and Chanie [34] who performed a study in Shire Municipal Abattoir, Ethiopia has reported that the highest of cysts 66.4% occur in the lung than in liver 31.79%. This could be due to the fact that lungs and liver possesses the first great capillaries sites encountered by the migrating *Echinococcus* oncosphere (hexacanth embryo) which adopt the portal vein route and primarily negotiate hepatic and pulmonary filtering system sequentially before any other peripheral organ is involved [33].

## Conclusion

The main goal of the current study was to determine a prevalence of hydatid cysts presenting in sheep slaughtered at

Basrah abattoir. The results of this study indicate that hydatidosis is highly prevalent disease in sheep in Basrah province. Greater efforts are needed to control the transmission of hydatid cysts from abattoirs by the proper disposal of infected offal, especially of sheep. This will reduce the transmission of cysts from abattoirs to potential hosts in this region. Here, veterinary authority should apply a control program to control on this disease through better standardization abattoirs system, increase knowledge of farmers toward hydatid cysts, and eliminated stray dogs from Basrah province. This research has thrown up many questions in need of further investigation on occurrence of hydatid cysts in other animal such as cattle, buffalo, goats.

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