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## THE PREVALENCE OF HYDATIDOSIS IN RUMINANTS OF DIFFERENT IRAQI REGIONS

Hussein B. khudhur<sup>1</sup> and Mohammed Abdulazeez Ali<sup>2</sup>

<sup>1</sup>Public Health Department, College of Veterinary Medicine, University of AL Muthanna. Al Samawa, Iraq.

<sup>2</sup>Physiology Department, College of Dentistry, University of AL Muthanna. Al Samawa, Iraq.

Corresponding author. E-mail address: [huseinz56@yahoo.com](mailto:huseinz56@yahoo.com)

[Huseinz56@mu.edu.iq](mailto:Huseinz56@mu.edu.iq)

### ABSTRACT

A retrospective study covered the period of 10-year (2000-2010) to investigate the prevalence of hydatidosis in ruminants of three provinces abattoirs in Iraq (Al Muthanna, Al Qadysiah and Al Najaf). A total of 923391 animals including 424167 sheep, 163070 goats, 264351 cow, 33133 buffalo and 38670 camel, inspected macroscopically for hydatidosis in 10-year period, out of which 9909, 2250, 6387, 740 and 414 respectively were infected with hydatidosis. The incidence of the disease in all slaughtered animals varied according to the province, but in general, Al Muthanna province recorded the highest incidence among all slaughtered species followed by Al Qadysiah then Al Najaf province. Buffalo recorded the highest incidence percentage (5.5%) in Al Muthanna and sheep (3.8%) in Al Qadysiah while in AL Najaf cow showed the highest incidence (2.1%). The current results provide a baseline data for the prevalence of this parasitic disease in these three provinces and its incidence among different species of ruminants, which provide the opportunity for future monitoring and evaluation leading to control programs of hydatid cyst in Iraq.

**Keywords:** Hydatidosis, Abattoir, prevalence, Iraq

### Introduction

Hydatidosis is a zoonotic disease of growing concern mainly in public health of developing countries. It has a notable economic importance and adversely affects various organs in human and animals (Thompson 2008). It caused by parasitic helminthes, the larval stage (hydatid cyst) infects the intermediate hosts both humans and livestock herbivores, whereas the adult parasite lives in small intestine of the final hosts like dog, and other canines (Stamatakos *et al.*, 2009). In the small intestine of carnivorous, the protoscoleces evaginate and develop into worms if ingested by these kind of animals (Yasuhito *et al.*, 2006), then the adult worm produce eggs, which are passed out with the faeces of the final host leading to contamination of plants. If eaten by herbivores or humans, these eggs hatch to larvae that invade the blood vessels of intestinal wall within twelve hours after ingestion, it arrives at the liver or other organs and evolve to hydatid cysts (David *et al.*, 2006; Deplazes *et al.*, 2017; Rahman *et al.*, 2015).

This parasitic disease actually endemic in countries of Middle east, like Iraq, in addition to China, eastern and northern Africa, South America, as well as Australia, thus most of the world suffer from the spread of this disease, especially developing countries (Johanna *et al.*, 2014; Wang *et al.*, 2008). This zoonotic disease is called the cancer of Iraq during 1960s (Babero and AL-Dabagh 1963), the prevalence of this parasitic disease has been reported worldwide in human and different farm animals (Mahmoud and Al-Janabi 1983; Eckert *et al.*, 2001; Sadjjadi 2006;

Rokni 2009; Borji *et al.*, 2012; Kagendo *et al.*, 2014), thus the epidemiological studies referred to the important endemic regions in the world that localized in the North Africa, Middle East, Turkey, Cyprus, and southern Italy and Spain, these regions showed human infestation incidence about 10 cases per 100,000 habitants (Belamalem *et al.*, 2014).

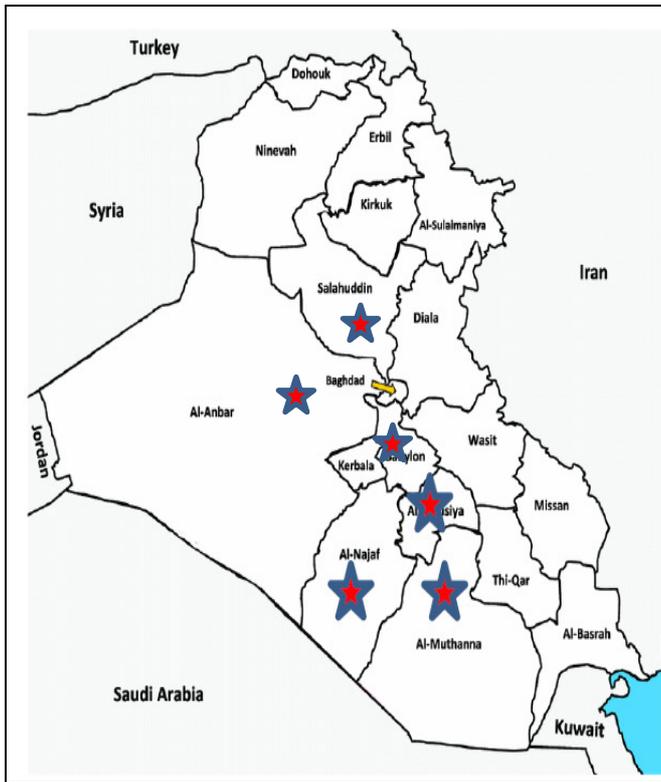
Due to the wide spread of this disease in farm animals, it is classified as one of the most parasitic diseases that cause marked economic losses as a result of the infestation of affected edible viscera with hydatid cysts beside its effects on general animal condition and production (Al-Daraji *et al.*, 1993).

The aim of this study was to clarify the prevalence of this parasitic disease in ruminants of these three provinces which provide a database for further epidemiological studies, as well as it is important to evaluate and update the control programs of hydatidosis in Iraq.

### Materials and Methods

#### Sampling

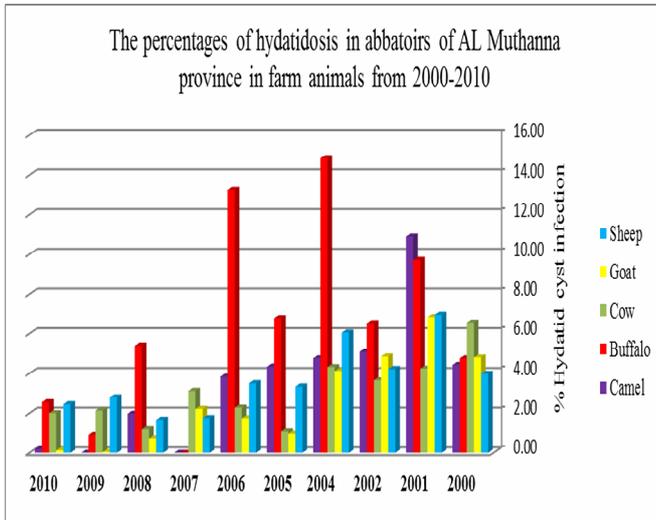
The study performed in slaughter houses of three Iraqi provinces where sheep, goat, cow, buffalo and camel are used as a sources of meat for human consumption. In each province abattoirs where these animals are slaughtered, the incidence percentage of hydatidosis were calculated as the number of affected animals (with post-mortem lesion) divided by the total number of inspected animals and multiplied by 100 over a period of ten years (from 2000 to 2010).



**Fig. 1 :** Map of Iraq, showing the geographical locations of the three Iraqi provinces where hydatidosis in farm animals are recorded.

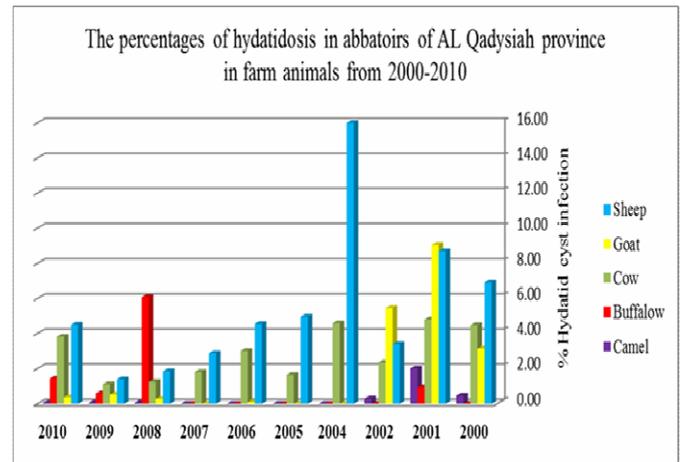
**Results**

In general, the distribution of hydatid cyst cases among farm animals in abattoirs of the three provinces in Iraq during the covered period, recorded the highest incidence in Al Muthanna, followed by Al Qadysiah then Al Najaf provinces, figures (2, 3,4 ).



**Fig. 2 :** The percentages of hydatidosis recorded in abattoirs of Al Muthanna province in different farm animals

In abattoirs of Al Muthanna province, buffalo hydatidosis showed the highest mean of incidence percentage (5.5%) during the covered period of the study followed by camel, sheep, cow then goat (3.7, 3.2, 2.9, 2.4 % respectively). The incidence percentage of hydatid cyst in different studied animals (except buffalo) showed gradual decrease with the time and became in 2010 about 50% lesser than that at the beginning of the covered period (figure 2).

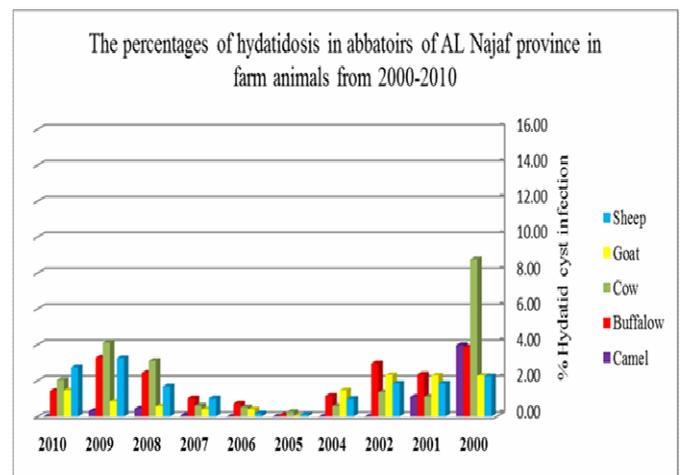


**Fig. 3 :** The percentages of hydatidosis recorded in abattoirs of Al Qadysiah province in different farm animals

While in Al Qadysiah province, the highest mean of incidence percentage of hydatid cyst infection recorded in sheep (3.8%) followed by cow, goat, buffalo then camel (2.8, 1.9, 1.2, 0.4 % respectively), with associated relatively high incidence percentage in goat at the first 3 years of the study (figure 3). The incidence percentage of hydatid cyst in different studied animals tend to be decreased gradually with the time except in 2010, in which in sheep and cow showed relatively elevation, but in buffalo it increased sharply in 2008.

In Al Najaf province, the prevalence of hydatid cysts was relatively lower than that in the other studied provinces (figure 4). In which hydatidosis in cow showed the highest mean of incidence percentages (2.1%) followed by buffalo, sheep, goat, then camel (2.0, 1.9, 1.1, 0.5 respectively).

In all the studied provinces, the total number of each animal species slaughtered during the covered period of the study recorded the highest one in sheep followed by cow, goat, camel then buffalo, except in AL Najaf province in which the total number of slaughtered buffalo was more than that in camel.



**Fig. 4 :** The percentages of hydatidosis recorded in abattoirs of Al Najaf province in different farm animals

**Discussion**

Hydatidosis is an important medical and veterinary problem in Iraq, mainly in domestic animals, including ruminant which are considered the major reservoirs for the disease in humans. It is an endemic disease in Iraq and still

poses significant health concern for both human and animals (Sawady and Al-Faddagh, 2012). Farm animals species are more susceptible to hydatidosis infection by contamination their feed with the viable eggs (Schantz, 1997). Most epidemiological studies conducted on hydatidosis in livestock are based on the data which obtained from abattoirs (Fakhar and Sadjjadi, 2007). In this study, our data focused on three regions represent the Middle Euphrates provinces in Iraq where sheep, goat, cow, buffalo and camel are traditionally widely used as sources of meat for human consumption.

It is well known that the exact data on the prevalence of hydatidosis is unknown, due to the presence of asymptomatic forms, but the data on the prevalence of this disease in farm animals of abattoirs of different Iraqi regions could provide a reliable indicator.

In Al Muthanna province, the results revealed that buffalo hydatidosis recorded the highest incidence percentage (5.5%) followed by Camel (3.7%), this findings be in accordance with Abo-Aziza *et al.*, (2019) who found that slaughtered buffalo and camel at Cairo and Giza abattoirs were highly infected with hydatidosis.

While in Al Qadysiah province, cow hydatidosis showed the highest incidence percentage which is agreed with Haridy *et al.* (2006) who revealed that slaughtered cow in Egyptian official abattoirs (Mansoura) showed higher incidence with hydatidosis.

Although Al Najaf province recorded the highest number among all slaughtered ruminants of the studied provinces throughout the covered period, but it showed a relatively lower incidence of hydatid cysts than that in the other provinces.

In the present study, generally the prevalence of hydatid cyst in the studied regions was relatively lower than that reported in Iraqi neighbors, such as Iran (Azami *et al.*, 2013), Kuwait (Hassounah & Behbehani, 1976) and Jordan (Abo-Shehada, 1993; Kamhawi *et al.*, 1995), the government run all the abattoirs in different Iraqi provinces, these abattoirs placed under the supervision of veterinarians, but due to the political and economic crises during the covered period of this study, the health control program is affected leading to irregular health inspections, high numbers of slaughter places outside slaughterhouses, all of these factors affect the quarantine of infected carcasses in slaughterhouses leading to allow the discarded carcass being taken by stray dogs which increase the spread of hydatid cyst infection during the first five years of the study, thus this study clarified the prevalence of hydatidosis in abattoirs of three Iraqi provinces as a starting point for future studies in different Iraqi regions, in spite of the relatively low incidence of this parasitic disease among the studied animals, but the intensity of the infection could influenced by the presence of large numbers of stray dogs in the area of abattoirs and lack of anti-parasitic treatment of this stray dogs, beside the geographical position of these provinces and uncontrolled ruminant trading across the borders with surrounding provinces, where hydatidosis probably more prevalent, all of these factors affect the incidence of the disease among studied animals. In addition, political conflict in Iraq exaggerates the difficulty of controlling of animal movement, mainly after the second Gulf War which took place in 1991, this could explain the relatively increase of hydatidosis in all region during the first

five years of the study, despite all of the reasons mentioned above, this disease decreased gradually with the time which indicates that the country is moving toward the disease reduction phase due to the national control program.

## Conclusion

The findings reflect the existence of the life cycle maintenance and the transmission of the infective eggs from definitive host (carnivores) to intermediate hosts (ruminant) in the covered provinces. It showed the importance of these ruminants as an intermediate host of hydatidosis and the potential important role they play in transmission of the parasite in Middle Euphrates Iraqi regions. Thus, it is important to update and improve all the roles that need combined effort between all the provinces in Iraq to establish promising control programs against hydatidosis.

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