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A Survey Study on the Incidence of Hydatid Disease in Slaughtered Animals in Nineveh Governorate 2023–2024

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ABSTRACT

A study survey was carried out in Al-saadoun slaughter house to show the prevalence of hydatid cysts among the slaughtered animals during the from 1/11/2023 to 30/4/2024, the slaughtered animals were local breeds, both sexes (male & female), different ages and from different region in Nineveh governorate. To detect the lesions of hydatid cysts we followed gross examination by naked eye and palpation with hands. The study sample include 58223 slaughtered animals (22692 sheep, 688 goats, 34843 cattle). The morbidity of hydatidosis was 0.82% (479 animal from 58223) among the whole slaughtered animals, with a value of 1.68% in sheep, 0.26% in cattle and 0.87% in goat. The highest whole infection rate in slaughtered animals was in spring (1.08%). While the lower whole infection rate in slaughtered animals was in winter (0.67%). The study also show that highest infection rate of sheep, goat and cattle with hydatidosis was in the month of March, which amounted to (2.28%, 1.08%, and 0.27%), respectively. The morbidity of hydatid cysts in the liver was 0.93%, represented by (0.73%, 1.16%, 0.70%) in sheep, goats and cattle, respectively. while the lung cyst was 0.42%, represented by (0.44%, 0.46%, 0%) in sheep, cattle and goats, respectively.

Keywords: Prevalence, Hydatidosis, Al-saadoun slaughter house, Nineveh governorate, Iraq.

Introduction:

Hydatid cyst disease is one of the parasitic diseases that is transmitted from carnivores to humans and herbivorous animals, and this disease arises from the formation of watery alveoli of different sizes in the internal viscera, especially the liver and lungs of both humans and animals, so this disease is known as Hydatid cysts, thirst cysts, or mycorrhizal disease, and the seriousness of the disease depends on the number, size and location of those cysts (10). Aquatic cysts are considered the larval stage of the echinoderm *Echinococcus granulosis* This worm is found in the intestines of dogs and predators, and the worm is 2-8 mm long. The infection occurs as a result of contamination of human or animal food with dog feces containing tapeworm eggs, as well as contact or contact with infected dogs, and after humans or animals eat these eggs, they hatch and an embryo comes out of them that reaches the intestines and then into the blood to move to the liver, lungs and various places in the body, forming what is known as the water vesicle that ranges in diameter between 1-15 cm (11,16).

The disease spreads all over the world, especially in the Middle East, Southern Europe, East Africa, and Australia, where animals and dogs are bred frequently. The disease causes significant economic losses, as the annual report of the Food and Agriculture Organization of the United Nations (FAO) states that the disease causes significant economic losses of 16% and 30% of the total Animal production in developed and developing countries respectively due to the absence of control and treatment procedures in those countries (12,23) where these losses are represented in organ damage, poor quality of meat, decreased milk production, weight loss, birth rates, as well as the costs of diagnosis and control (during animal husbandry), waste of efforts, human injuries, and costs of treatment and control (17,20). Water in the slaughterhouse of Al-Saadoun in Nineveh Governorate for sheep, cows and goats.

Materials and working methods:

The study was conducted in the Nineveh Governorate massacre for the period from (1/11/2023 to 30/4/2024). The statistics were taken from the official records of the massacre in addition to field visits to the massacre for the same purpose, where the number of slaughtered animals reached 58223 slaughtered animals (22692 sheep, 34843 cows, 688 goats) The carcasses were examined to observe the water cysts, especially in the liver and lung areas, and these two areas were focused on macroscopic examination and palpation to see the size of the cysts and their spread sites to distinguish them from the pests Others similar to them, such as cysts, tumors, and the like. The number of animals infected with water cysts in the liver, the number of animals infected in the lung (Figure 1) and Figure (2), the total number of slaughtered animals and the date of examination were recorded.

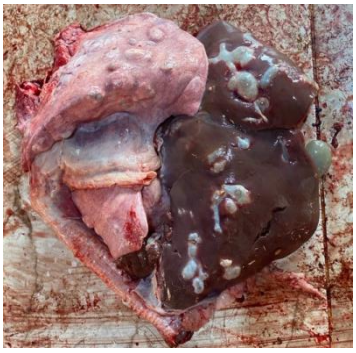

Figure 1: Cysts in sheep organs

Figure 2: Cysts in the organs of

Statistical Analysis:

The data were analyzed according to the global experiment system with a complete randomized design (CRD) and using Duncan's-Multiple-Range-Test. The different averages were significantly distinguished by different alphabets (7).

Results:

The results of a field survey of sheep, goats and cows slaughtered in the Saadoun massacre over six months of the study from the beginning of November 2023 to the end of April 2024 showed that the infection with Hydatid cysts was observed on the three aforementioned tested animals , and that the infection with these cysts was concentrated on both the liver and lungs.

The data in Table (1) show that the rate of infection with parasites above varied according to the months of the year, the type of animal and the type of infected organ, and the statistical analysis of the data in Table (1) showed a significant effect of the rate of infection with parasites according to the months of the year, and the highest percentage of total infection with Hydatid cysts (1.08%) during the month of March, which differed significantly from the rate of infection in the remaining months, except for the month of March.November, which did not differ significantly from it, as the total infection rate during this month reached 1.01%. On the other hand, the lowest percentage of total infection with Hydatid cysts was observed during the month of January, which reached 0.67%.

The statistical analysis also showed that there were no significant differences between all months except April in terms of the total infection rate.

The statistical analysis of the results of the study in Table (2) showed that sheep were more susceptible to infection, followed by goats and then cows, where the total infection rate of water cysts was (1.7%, 0.66%, and 0.25%) respectively, in other words, the injury of sheep with Hydatid cysts was higher than the injury of both goats and cows. 6.8 and 2.57 times, respectively, while goats were infected by almost 2.64 times higher than cows.

On the other hand, the results showed in Table (3) that the type of organ affected the rate of water cysts and it was found that the rate of liver injury was 2.21 times higher than the injury of the lungs, where the rate of liver injury was 0.93% and the rate of lung injury was 0.42%, and the statistical analysis in Table (3) showed a significant difference in the rate of injury to both the liver and lungs.

The results in Table (4) show the effect of overlapping between the months of the year and the type of animal on the rate of infection with water bags. From the data in Table (4), it is clear that the rate of infection varies according to the difference between the months of the year and the type of animal, and the difference was significant, as the highest rate of infection was 2.28% in sheep and during the month of March, which did not differ significantly from its value in each of the sheep during the months of the year.

On the other hand, the lowest rate of infection with water bags was 0.22% in cows during the month of November.

Table (1) shows the effect of the months of the year on the total infection rate of Hydatid cysts in sheep, goats and cows.

Months	Total Injury %
November	1.01 a
December	0.86 a
January	0.67 a
February	0.77 a
March	1.08 a
April	0.83 a

Table (2) shows the effect of animal type on the total infection rate of Hydatid cysts in both sheep and goats and cows

Animal kind	Total Injury %
Sheep	1.7 a
Cows	0.25 b
Goat	0.66 c

Table (3) shows the effect of organ type on the total infection rate of Hydatid cysts in sheep, goats and cows

Organ / Animal kind	Lungs	Liver
Sheep	0.44 e	0.73 b
Cows	0.46 d	0.70 c
goat	0 f	1.16 a
Total % of organ injury	0.42 b	0.93 a

Table (4) shows the effect of the overlap between the months of the year and the type of animal on the total infection rate of Hydatid cysts in sheep, goats and cows.

Animal Type / Months	goat	Cows	Sheep
January	1.04 ab	0.22 abc	1.73 ab
February	0.71 abc	0.24 abc	1.65 ab

March	0.74 abc	0.25 abc	1.31 ab
April	0.83 abc	0.23 abc	1.36 ab
May	1.08 ab	0.27 abc	2.28 a
June	0.95 abc	0.26 abc	1.93 ab

Discussion

Several researchers have studied the prevalence of hydatid disease in Iraq and found that its spread increased in livestock-rearing areas after 1990. This rise is attributed to the lack of regular dog screenings, poor veterinary care for livestock, and the growing practice of slaughtering animals outside official abattoirs—particularly in urban neighborhoods and rural regions across Iraq. The disease is considered endemic in ecological zones where dogs, livestock, and humans coexist, as this environment completes the parasite's life cycle.

The results of this study showed that the highest infection rate occurred during the spring season, which aligns with findings by (14) in Mosul but differs from those of (15) in Kirkuk and (1) at Al-Qadisiyah University, who recorded peak infection rates in autumn and winter, respectively. This discrepancy may be due to the favorable conditions spring provides for parasite growth and transmission. For example, elevated temperatures negatively affect the development of hydatid cysts, as the eggs shed by the definitive host (carnivores) cannot withstand dryness even for short periods. The lifespan of these eggs ranges from three days to one year, depending on environmental factors such as humidity and temperature (6).

The study also revealed that sheep had a higher infection rate (1.7%) than cattle and goats. This finding is consistent with results reported by (15) in Kirkuk and (18) in Mosul, which recorded infection rates of 4.38% and 4.34%, respectively. However, it contrasts with findings from (19) in Erbil and (3) in Salahuddin, which reported significantly higher rates of 22.3% and 29.2%. These differences may be due to variations in the age and sex of the examined sheep, as infection rates tend to increase with age. Additionally, sheep breeds differ in their resistance to infection—some are more resilient, while others are more susceptible. Other contributing factors include limited veterinary oversight, widespread unsanctioned slaughtering, lack of quarantine for infected abattoir waste, neglect in disposing of infected carcasses, and the ease with which stray dogs can access these remains.

Furthermore, the results indicated that liver infections were more prevalent than lung infections, which agrees with findings by (2,3) but differs from those of (13,21). This is likely because the liver is the first organ reached by the oncospheres after penetrating the intestinal mucosa and entering the hepatic bloodstream. Due to their weight, the larvae tend to settle in the liver (22). As noted by (8), differences in the anatomical location of sinusoids across animal species may explain the variation in organ-specific infection rates.

The highest hydatid cyst infection rate was observed in sheep during spring, reaching 2.28%. This aligns with findings by (5), who recorded a rate of 4.54%, but differs from (1,2), who reported rates of 42.5% and 21.3%, respectively. These discrepancies in seasonal and regional infection rates may be due to several factors, including sample size, geographic location, study duration and timing, environmental conditions, free-range grazing practices, and the management and treatment of stray dogs. Additionally, the age of slaughtered animals plays a role—most sheep and goats are slaughtered at a young age, which may not allow sufficient time for cysts to develop. Hydatid cysts typically require 6–8 months to mature into the larval cyst stage (4,6).

Recommendations

1. Conduct further studies on the prevalence and epidemiology of hydatid disease.
2. Implement thorough inspection protocols for animals at slaughterhouses.
3. Ensure livestock are slaughtered only in officially licensed abattoirs approved by national health authorities, and prohibit unauthorized slaughtering in urban and rural areas.
4. Dispose of livestock waste and infected carcasses safely—either by burial or incineration and prevent stray dogs from accessing these remains or areas near slaughterhouses and butcher shops.
5. Carry out regular screening and treatment of dogs for tapeworm infections, and control stray dog populations.
6. Regulate grazing practices by directing livestock to clean, uncontaminated pastures and rehabilitating polluted grazing areas.
7. Promote public awareness and health education across all segments of society regarding the dangers of hydatid disease.

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