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Prevalence of helminthes, pneumonia and hepatitis in Kirkuk slaughter house, Kirkuk, Iraq

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Abstract

The study was carried out in Kirkuk official slaughter house for the period from the beginning of July 2009 to end of June 2010. Macroscopic examination was performed to demonstrate the distribution of hydatid cyst, fascioliasis, lung worms, pneumonia and hepatitis and their impact on economic losses in the governorate. The number of animals slaughtered during the period of study was: sheep 50518, cattle 16177, goats 7662, buffalos 48 and camels 24. In sheep, the rate of hydatid cysts was 0.77%, with the highest rate was in autumn; liver flukes 0.36% with the highest rate in summer 0.33%; lung worms 0.19%, the highest was in winter 0.27%; pneumonia 0.58%, the highest was in summer 0.74% and hepatitis was 0.32%, the highest was in winter 0.42%. In cattle, the rate of hydatid cysts was 1.70%, the highest was in summer1.65%; liver fluke 1.27%, the highest was in winter 1.57%; lung worms 0.71%, the highest was in spring 0.94%; pneumonia 0.79%, the highest was in summer 0.88% and hepatitis 1.12%, the highest was in summer 1.16%. In goats, no hydatid cysts were seen; the rate of liver fluke was 0.14%, with the highest rate was in winter 0.51%; lung worms was 0.03% and only seen in winter and autumn; pneumonia 0.14%, the highest was in summer 0.25%; hepatitis 0.05% and only seen in summer and autumn. In buffaloes and camels, only 1 case of fascioliasis was seen for each in spring. The economic losses due to condemnation of organs of infected animals in Iraqi diners was: Sheep 4.840.00 millions, cattle 5.434.000 millions and goats 156.000 thousands. The overall economic losses were 10.430.000 Iraqi diners.

Keywords: Prevalence; Helminthes; Pneumonia; Hepatitis.
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انتشار الديدان و التهاب الرئة والكبد في مجزرة كركوك، كركوك، العراق

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الخلاصة

اجريت الدراسة في مجزرة محافظة كركوك للفترة من بداية شهر تموز ٢٠٠٩ النهاية شهر حزيران ٢٠١٠ للتحري عن الاكياس المائية وديدان الكبد وديدان الرئة والتهاب الرئة والكبد لدى الحيوانات المذبوحة في المجزرة وتاثيرها على الخسارة الاقتصادية في المحافظة. في الاغنام وجد ان نسبة انتشار الاصابات وأعلى نسبة هي: الاكياس المائية (٠,٧٧ %) في الخريف (٠,٩٠%) (ديدان الكبد (٠,٣٦ %) في الصيف (٠,٣٣ %)، وديدان الرئة (٠,١٩ %) في الشتاء (٠,٢٧%) والتهاب الرئة (٠,٥٨ %) في الصيف (٠,٧٤ %) والتهاب الكبد (٠,٣٢ %) في الشتاء (٠,٤٢%). اما في الابقار ان نسبة انتشار الاصابات وأعلى نسبة هي الاكياس المائية (١,٧٠%)، في الصيف (١,٦٥%) وديدان الكبد (١,٢٧ %) في الصيف (١,٥٧%) وديدان الرئة (٠,٧١%) في الربيع (٠,٩٤%) التهاب الرئة (٠,٧٩%) في الصيف (٠,٨٨%) والتهاب الكبد (١,١٢%) في الصيف (١,١٦%) وفي الماعز لم يتبين أي حالات للأكياس المائية، اما ديدان الكبد فكانت (٠,١٤%) مع أعلى نسبة من الاصابة في الشتاء (٠,٥١%)، ديدان الرئة (٠,٠٣%) ولوحظت فقط في الشتاء والخريف,التهاب الرئة كان (٠,١٤ %) مع اعلى نسبة كانت في الصيف (٠,٢٥%)، التهاب الكبد (٠,٠٥%) ووجد فقط في الصيف والخريف اما في الجاموس والجمال لم تظهرأي حالات للأكياس المائية، ديدان الرئة، التهاب الرئة والتهاب الكبد ماعدا حالة واحدة من ديدان الكبد في كل من الجواميس والجمال في فصل الربيع. الخسارة الاقتصادية بسبب الإصابة بالديدان فبلغت في الأغنام ٤,٨٤٠,٠٠٠ مليون دينار عراقي، وفي الأبقار ٥,٤٣٤,٠٠٠ مليون دينارعراقي وفي الماعز ١٥٦,٠٠٠ دينار عراقي وقد بلغت الخسارة الكلية ١٠,٤٣٠,٠٠٠ دينار عراقي.

Introduction

Parasitic diseases are of crucial economic importance in domestic animals in all continents, probably constitute one of the major obstacles to the development of profitable livestock industries and are of crucial economic importance in all continents (1-3).

Echinococcosis is a zoonotic infection caused by *E. granulosus*, its definitive host is dog and other canids, and domestic animals and human beings are intermediate hosts (4). There are no reliable methods for routine diagnosis of infections in living animals; the most reliable diagnostic method is at post-mortem examination (3).

In Baghdad slaughter house (5) found 4.5% of sheep and 5.0% of cattle were infected with hydatid cysts. In Erbil (6) found 27.4% of goats and 22.3% of cattle were infected with hydatid cysts. In Kirkuk (7) reported the rate of hydatid cysts in sheep 1.17%, goats 0.32%, cattle 4.33% and buffaloes 2% .

Fascioliasis is widely distributed disease in Iraq; it is present in all parts of the country (8). In AL-Sheikh Omer slaughter house, in Baghdad (9) found that the rate of fascioliasis was 7.1 % in sheep and 27 % in cattle. In Basrah (10) reported that the rate of infection in cattle and sheep was 3.2 % and 0.7 % respectively. In Babylon (11) found that the rate of infection in cattle with *F. gigantica* was 19.3%. The highest rate was in summer 25.5% and the lowest was in winter 14.3%.

Lung worms also consider one of common parasitic infection in Iraq. In Mosul abattoir (12) reported 37% (medium to heavy infestation during winter. In Kirkuk (7) found that the distribution of lung worm in sheep, goats and cattle were 0.55%, 0.22% and 2.98% respectively.

The present study aimed to show the prevalence of hydatid cysts, fascioliasis, lung worm, hepatitis and pneumonia in addition to their impact on economic state.

Materials and methods

The study was carried out in Kirkuk slaughter house for the period from the beginning of July 2009 to end of June 2010. The data was collected by regularly visiting the municipal slaughter house three times weekly. The numbers of animals examined were 50518 sheep, 16177 cattle, 7661 goats 48 buffaloes and 24camels. All slaughter animals were of local breeds.

Liver and lungs of slaughtered animals were inspected macroscopically by veterinarian to show the presence of hydatid cysts, fascioliasis, lung worm in addition to pneumonia and hepatitis. In all pneumonia and hepatitis cases, no parasites were detected.

The total economic losses due to condemnation of infected livers and lungs were estimated by finding the average weight of infected liver and lungs which is estimated by total weight of infected organs divided by number of weight organs (13).

The data was analyzed using Chi- square analysis (x^2), the test was used to find the variation prevalence during the period of study (14).

Results

The total number of sheep, cattle, goats, buffaloes and camels slaughtered in Kirkuk official slaughter house during the period from beginning of July 2009 till end of June 2010 were 50518, 16177, 7662, 48 and 24 respectively.

The number of ruminant slaughtered varies in different seasons. The number of sheep slaughtered was higher in spring followed by summer, winter and autumn. The number of cattle slaughtered was highest in winter followed by autumn, spring and summer, while the number of goats slaughtered was highest in autumn followed by summer. In addition to that only 48 buffaloes and 24 camels were slaughtered; their numbers were highest during summer months (Table 1).

Table (1) Number of animals slaughtered in Kirkuk slaughter house according to seasons.

Animals	Winter	Spring	Summer	Autumn
Sheep	2388	3037	4388	1987
	4985	7502	4630	5146
	4054	5048	3201	4052
Total 50518	11427	15587	12219	11285
Cattle	873	888	775	880
	2504	1845	1069	1933
	1213	1100	1675	1422
Total 16177	4590	3833	3519	4235
Goats	624	119	470	712
	491	356	698	1258
	252	604	1218	860
Total 7662	1367	1079	2386	2830
Buffaloes	3	4	5	4
	1	11	8	3
	3	1	4	1
Total 48	7	16	17	8
Camel	0	1	14	0
	2	0	2	2
	0	0	1	2
Total 24	2	1	17	4

The data in table 2 revealed that the rate of hydatid cysts infestation was highest in cattle (1.75%) followed by sheep (0.77%) while no positive cases were detected in goats, buffaloes and camels. Statistical analysis showed that there

was significant different in the rate of infection between different groups of animals (P<0.01).

The distribution of fascioliasis in ruminants was highest in buffaloes 2.08% followed by cattle 1.27%, sheep 0.36% and goats 0.14%. No fasciola parasite was detected in slaughtered camel. Statistical analysis revealed significant difference between slaughtered animals (P<0.01).

For the distribution of lung worms among slaughtered ruminants, it was highest among slaughtered buffaloes 2.08% followed by cattle 1.27%; sheep 0.19% and goats 0.03%. No cases were detected in camels. The difference between slaughtered animals was significant (P<0.01). Hepatitis was observed in liver of slaughtered ruminants. The highest rate among cattle 1.12% followed by sheep 0.32% and goats 0.05%, but no hepatitis observed among slaughtered buffaloes and camels. The difference between animals groups was significant (P<0.05). The rate of pneumonia among slaughtered ruminants was highest in cattle 0.79% followed by sheep 0.58% and goats 0.14%. No pneumonia was observed in buffaloes and camel. Statistically there was significant difference between slaughtered animals (P<0.01).

The data in table (3) shows that the seasonal distribution of diseases in slaughtered ruminants was varied in different ruminants.

In sheep, the rate of hydatid cysts was highest in autumn 0.90%, followed by winter 0.82%, summer 0.78% and the lowest was in spring 0.63%, The rate of liver fluke was highest in summer 0.43%, followed by winter 0.37% and the lowest was in spring and autumn 0.33% for each. The lung worms were highest in winter 0.27%, followed by summer 0.23%, autumn 0.16% and spring 0.13% respectively. The rate of pneumonia was highest in summer 0.74% followed by spring 0.62 %, winter 0.54 % and autumn 0.37%. While the rate of hepatitis was highest in winter 0.42% followed by summer 0.37%, spring 0.29% and autumn 0.26%.

The data in table (4) indicates the rate of diseases in cattle. The rate of hydatid cysts was highest in summer 1.65% then spring 1.33%, autumn 0.89% and winter 0.87%. The rate of liver fluke was highest in winter 1.57 %, summer 1.28%, autumn 1.25% and spring 0.94 %. The lung worm infection was highest in spring 0.94%, followed by autumn 0.68% winter 0.67% and summer 0.54 % respectively. Pneumonia was commonest in summer 0.88% followed by autumn 0.83%, winter 0.74% and spring 0.73 %. Hepatitis rate was highest in summer 1.16% followed by winter 1.13%, spring 1.12% and was lowest in autumn 0.89%.

The distribution of diseases according to seasons in goats indicate in table (5). No hydatid cysts was seen in goats during the period of study, Liver flukes was highest in winter 0.51%, followed by spring 0.09%, autumn 0.07% and summer 0.04%, Lung worms rate was 0.07% in winter, 0.03% in autumn and there was no lungworms showed in spring and summer. Pneumonia rate in summer was 0.25% followed by winter 0.22% and spring 0.18%. Hepatitis rate was 0.08% in summer and 0.07% in autumn.

Table (2) Prevalence of helminthes, hepatitis and pneumonia in ruminants.

Animals	No. examined	Hydatid cysts (%)	Liver fluke (%)	Lungworms (%)	Hepatitis (%)	Pneumonia (%)
Sheep	50518	0.77%	0.36%	0.19%	0.32%	0.58%
Cattle	16177	1.75%	1.27%	1.27%	1.12%	0.79%
Goats	7662	0	0.14%	0.14%	0.05%	0.14%
Buffaloes	48	0	2.08%	2.08%	0	0
Camel	24	0	0	0	0	0
Chi Sq (X^2)		196.163	216.983	134.391	202.435	38.312
D.F.		4	4	4	4	4
P value		P<0.01	P<0.01	P<0.01	P<0.05	P<0.01

Table (3) Prevalence of infections in sheep in Kirkuk slaughter house according to seasons.

Season	No. examined	Hydatid cysts NO. (%)	Liver fluke N0. (%)	Lungworms N0. (%)	Pneumonia No. (%)	Hepatitis N0. (%)
Spring	15587	99 (0.63%)	51 (0.33%)	21 (0.13%)	97 (0.62%)	45 (0.29%)
Summer	12219	95 (0.78%)	53 (0.43%)	28 (0.23%)	91 (0.74%)	45 (0.37%)
Autumn	11285	102 (0.90%)	37 (0.33%)	18 (0.16%)	42 (0.37%)	29 (0.26%)
Winter	11427	94 (0.82%)	42 (0.37%)	31 (0.27%)	62 (0.54%)	48 (0.42%)
Total	50518	390 (0.77%)	183 (0.36%)	98 (0.19%)	292 (0.58%)	167 (0.32%)

The distribution of diseases in buffalos according to seasons indicated in table (6) No hydatid cysts, lung worms, pneumonia and hepatitis observed in slaughtered goats while only 1 buffalo was infected with liver fluke in spring.

In camels no cases of hydatid cysts, fascioliasis, lung worms, pneumonia and hepatitis were seen observed in slaughtered house, except one case of fascioliasis in spring (Table 7).

Table (4) Prevalence of infections in cattle in Kirkuk slaughter house according to season.

Seasons	No. examined	Hydatid cysts	Liver fluke	Lung worms	Pneumonia	Hepatitis
Spring	3833	51 (1.33%)	36 (0.94%)	36 (0.94%)	28 (0.73%)	43 (1.12%)
Summer	3519	58 (1.65%)	45 (1.28%)	19 (0.54%)	31 (0.88%)	41 (1.16%)
Autumn	4235	80 (0.89%)	53 (1.25%)	29 (0.68%)	35 (0.83%)	38 (0.89%)
Winter	4590	86 (0.87%)	72 (1.57%)	31 (0.67%)	34 (0.74%)	60 (1.13%)
Total	16177	275 (1.70%)	206 (1.27%)	115 (0.71%)	128 (0.79%)	182 (1.12%)

Table (5) Prevalence of infections in goats in Kirkuk slaughter house according to season.

Season	No. Examined	Hydatid cysts	Liver fluke	Lung worms	Pneumonia	Hepatitis
Spring	1079	0	1 (0.09%)	0	2 (0.18%)	0
Summer	2386	0	1 (0.04%)	0	6 (0.25%)	2 (0.08%)
Autumn	2830	0	2 (0.07%)	1 (0.03%)	0	2 (0.07%)
Winter	1367	0	7 (0.51%)	1 (0.07%)	3 (0.22%)	0
Total	7662	0	11 (0.14%)	2 (0.03%)	11 (0.14%)	4 (0.05%)

Table (6) Prevalance of infection in buffaloes according to seasons.

Season	No. Examined	Hydatid cysts	Liver fluke	Lung worms	Pneumonia	Hepatitis
Spring	16	0	1	0	0	0
Summer	17	0	0	0	0	0
Autumn	8	0	0	0	0	0
Winter	7	0	0	0	0	0
Total	48	0	1	0	0	0

Table (7) Prevalance of infection in Camels according to seasons.

Season	No. Examined	Hydatid cysts	Liver fluke	Lung worms	Pneumonia	Hepatitis
Spring	1	0	1	0	0	0
Summer	17	0	0	0	0	0
Autumn	4	0	0	0	0	0
Winter	2	0	0	0	0	0
Total	24	0	0	0	0	0

The economic losses due to condemnation of liver and lungs in Kirkuk abattoir were estimated depending on the number of completely and partially destroyed organs (Table 8).

In sheep, the total economic losses of completely and partially destroyed liver and lungs due to hydatid cysts in Iraqi diners were 1596000 fascioliasis in liver 1.370.000 lungworm in lungs 158000, pneumonia in lungs 496.000 and hepatitis 1220.000 diners. The overall economic losses due to condemnation of liver and lungs were 4840.000 Iraqi diners. In cattle, the economic losses due to condemnation of liver and lungs in Iraqi dinners was, in hydatid cysts 1778.000, fascioliasis 178.000.lung worms 198.000, hepatitis 1.430.000 and pneumonia 248.000. While in goats were fasciolias 80.000 lung worms 4000, hepatitis 50.000 and pneumonia 22.000, the overall economic loss due to condemnation of liver and lung during in Kirkuk abattoir was 10.435.000 Iraqi diners.

Table (8) The economic losses due to condemnation of infected liver and lungs by helminthes, hepatitis and pneumonia.

Diseases	Sheep Economic loss (Iraqi diners)			Cattle Economic loss (Iraqi diners)			Goats Economic loss (Iraqi diners)		
	Partial	Complete	Total	Partial	Complete	Total	Partial	Complete	Total
Hydatid cysts									
Liver	580.000	840.000	1.420.000	520.000	1080.000	1600.000	0	0	0
Lung	66.000	110.000	176.000	76.000	102.000	178.000	0	0	0
Total	646.000	950.000	1.596.000	596.000	1182.000	1778.000			
Fascioliasis									
Liver	630.000	740.000	1.370.000	760.000	1020.000	1780.000	30.000	50.000	80.000
Lung worm									
Lung	68.000	90.000	158.000	78.000	120.000	198.000	0	4000	4000
Hepatitis									
Liver	660.000	560.000	1220.000	490.000	940.000	1.430.000	0	50.000	50.000
Pneumonia									
Lung	196.000	300.000	496.000	88.000	160.000	248.000	6000	1600	22.000
Total	2200000	2640000	4.840.000	2012000	3422000	5.434.000	36000	120.000	156.000

Discussion

The occurrence of parasitic infection in an area is influenced by multifactor system which comprises hosts, parasitic and environmental effects. Parasitic infection causes considerable impact on the economy of live stock industry.

The number of sheep slaughtered in Kirkuk slaughter house was highest than other animals, this reflects that people in Kirkuk prefer sheep meat than other animals. The low number of buffalos and camels slaughtered because these animals are not common in this governorate.

The highest number of sheep slaughtered in spring season may be related to season of parturition of sheep and preference of people to young fresh meat, as lamb's meat during spring season.

The rate of hydatid cysts in this study was 0.77% in sheep and 1.75% in cattle which was lower than that reported in Baghdad (5) who reported 4.5% in sheep and 5.0% in cattle in Baghdad slaughter house. It is identical to study in Kirkuk (7) who found 1.17% for sheep while it was lower than reported for cattle 4.38%. The difference between two studies may be related to period of study. No hydatid cysts were observed among slaughtered goats, this may be due to goats is more resistant to hydatidosis than other animals. Although low rate of hydatidosis 0.32 % was reported in goats in Kirkuk slaughterhouse in 2006 (7). Also no hydatid observed among buffaloes and camels may be due to less number involved in this study as only 48 buffaloes and 24 camels were slaughtered during the period of this study.

Comparing the results of this study with that reported in other countries. In Syria (15) studied the epidemiology of hydatidosis among 1515 cattle, 14302 Awassi sheep and 1650 goats, found that 4.2% cattle 6.9% sheep and 12.7% goats were infected with hydatid cysts. In Iran (3) recorded the prevalence of sheep liver hydatid cysts at the municipal slaughterhouse of Tabriz, Northern region of Iran was 23.57%.

In Arezzo slaughter-house in Italy (16) found the incidence of sheep hydatidosis, point out that from 47% of cases at least organ is parasitized the mostly trucked organ were liver and lungs and in lower percentage was in muscles kidneys and spleen,

In Bangladesh (17) examined 12344 goats, he found 1024 (8.29%) were infected with hydatidosis. The incidence of infection by organ was liver 36.72%, lung 32.03% spleen 4.69%, heart 3.13%, kidney1.56%,omentum 0.78% and both liver and lungs 21.09%. Regarding the rate of hydatidosis in buffalos (18) examined 439 buffalos in Bangladesh, found 42.36% were infected. The rate of infection recorded in the liver 28.47% lungs 32.80%, spleen 3.22%, heart 2.15%, kidney 1.08%, omentum 0.54%, and both liver and lungs 3.1%.

In Kuwait (19) and found the rate of hydatidosis in 293 indigenous camel for period from February 1982 to April 1983 was 39.6%.

The rate of fascioliasis among slaughtered sheep in Kirkuk municipal slaughterhouse was 0.77%. It is lower than that observed in Baghdad 7.1% (9) and in Mosul 16.5% (20) while it was higher than that reported in Sulaimania 0.13% (21) and Mohammad and in Kirkuk 0.50% (7).

The lower rate of fascioliasis in this study might be due to low rates of snails intermediate host in Kirkuk. The snails are widely distributed only in Al-Hawija district (9).

The distribution of fascioliasis in cattle according to season, it was distributed throughout the year. In Sulaimania slaughter-house Kadir and Mohammed (22) found the highest rate was in November, this might be related to difference in geographical distribution, sample size and period of study. In Babylon Al-Delimi (11) found the highest rate in summer and lowest in winter months, this may be due to different in geographical distribution variation in environmental conditions.

In goats fascioliasis was also distributed in all seasons, with the highest rate was in winter season, this is in agreement with finding of study in Kirkuk (7).

In buffaloes fascioliasis, observed only in one case, and not observed in any The distribution of fascioliasis in buffaloes and camels is not significant due to small number of these animals slaughtered in kirkuk In Egypt (23) reported that the overall rate of fascioliasis among slaughtered animals were 2.02 % for sheep and goats, 3.54% for cattle and 1.58% for buffalos.

The total economic losses due to partial or complete condemnation of sheep liver and lungs infected with hydatid cyst was (4.840000) Iraqi diners (40333 US dollars). Most of previous studies that involved economic losses resulting from infection of sheep with liver flukes indicate that the greatest part of this loss due to complete or partial destruction of liver infected with Fasciola species (9, 10). The economic loss due to condemnation of liver in fascioliasis (1,370,000 Iraqi diners (11416.6 US dollars), is higher than that reported in Sulaimania governorate (853.300) Iraqi diners (7110.8) US dollars

In cattle the overall economic loss due to partial or complete destruction of liver and lungs in all diseases were: In Fascioliasis the total economic loss due to condemnation of cattle liver was 1.780.000/0 Iraqi diners (14833.3 US dollars. this is lower than that reported in cattle in Sulaimania province which reached 22566840 Iraqi diners (16119.17 US dollars) but higher than that recorded In Baghdad (9) in Baghdad (88407 US dollars) and in Basra (10) it reached (98521.5 US dollars), because of great differences in exchange in Iraqi diners into US dollars between previous studies and the present study.

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