

## Full Length Research Paper

## Zoonotic parasitic diseases in Ilam Province, Western Iran

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Zoonotic parasitic diseases are a significant and widespread public health threat, globally. This study aimed to investigate the prevalence of zoonotic parasites in slaughtered animals at industrial abattoir in Ilam Province, Western Iran. In the present descriptive and retrospective study, all records of abattoir were analyzed. It was conducted on 61,442 indigenous animals including 37167 sheep, 13421 goats and 10854 cattle. Overall, prevalence of parasitic infections was 8.69% in slaughtered animals in the region and prevalence of liver hydatidosis, lung hydatidosis, *Fasciola hepatica* and *Dicrocoelium dendriticum* was 3.18, 3.6, 1.06 and 0.6%, respectively. 0.22% prevalence was found for *Cysticercus*. Macroscopic cysts of *Sarcocystis* were not seen in slaughtered animals. The prevalent rate of parasites is 11.92, 10.10, 8.92 and 6.54% in summer, autumn, winter and spring, respectively. In conclusion, prevalence of zoonotic parasites in Ilam Region is considerable. It also imposes economic losses, resulting from the loss of livestock and their products. So control programs must be carried out to eliminate transmission in the region.

**Key words:** Zoonotic disease, helminthes, prevalence, abattoir.

### INTRODUCTION

Protein is one of the largest components of diet and has a special place in human nutrition. Several infectious diseases are classified as zoonotic parasitic diseases that can be transmitted from animals to humans by eating animal meat (Rokni, 2008). Due to lack of right surveillance systems, accurate estimation of economic losses, as a result of food-borne zoonotic parasitic diseases is not possible in the world.

One of the zoonotic parasitic diseases is hydatid cyst. It is the larval stage of *Echinococcus granulosus*; it does not only affect humans, but because of its dangerous nature and being difficult to treat, is considered as a major health problem in many countries (Heidari et al., 2011; Abdi et al., 2010). Infection in dogs has been reported from 2.2 to 63.2%, and more than 20% has been reported in wild carnivores in some areas of Iran (Sadjjadi, 2006; Rokni, 2009; Sadjjadi et al., 2009;

Sarkari et al., 2009). Animal infection for hydatidosis has been reported from 1 to 70% by several slaughtered based studies in Iran (Sadjjadi, 2006).

On the other hand, liver trematodes, *Fasciola hepatica* and *Dicrocoelium dendriticum* are zoonotic parasites of human and ruminant and infection in domestic animals can led to enormous economic losses and health problems in the society (Movassagh et al., 2008; Zuko and Hodžić, 2011). For example, economic losses due to infection with *F. hepatica* were estimated as 5.5 million dollars in USA; also infection with *F. hepatica* was reported as 32% in cattle in Puerto Rico (Marquardt et al., 2000).

*Cysticercus* is the larval stage of taenidae cestodes. Adult worms have been found in small intestine of human, dog, cat, mice and wild carnivores, such as wolf and fox. Economic damage caused by infection with

**Table 1.** Personal incidence of infected animals to parasitic diseases encountered in slaughtered animals.

Parasite	Positive in sheep	Positive in goat	Positive in cattle	Total parasite positive
Liver hydatid cyst	1272	206	480	1958 (3.18%)
Lung hydatid cyst	1401	112	702	2215 (3.6%)
<i>F. hepatica</i>	221	45	389	655 (1.06%)
<i>D. dendriticum</i>	261	85	24	370 (.6%)
<i>Cysticercus</i>	91	42	8	141 (.22%)
Total infection	3246	490	1603	5339 (8.69%)

**Table 2.** Seasonal incidence of parasitic infections in animals slaughtered in industrial slaughterhouse of Ilam.

Season	No. of inspected animal	<i>F. hepatica</i> positive	<i>D. dendriticum</i> positive	Liver hydatid cyst positive	Lung hydatid cyst positive	<i>Cysticercus</i> positive	Total positive
Spring	23470	221	68	606	680	40	1615(6.94%)
Summer	11560	178	81	470	620	30	1379(11.92%)
Autumn	12211	126	103	463	501	41	1234(10.10%)
Winter	14201	130	118	419	414	30	1211(8.52%)
Total	61442	655	370	1958	2215	141	5339(8.69%)

*Cysticercus* is high due to condemnation of infected carcasses (Abidi et al., 1989). There is no information on the zoonotic parasitic diseases in Ilam. Therefore, there is always the danger of spreading zoonotic diseases, considering the geographic location of Ilam City and the nomadic lifestyle in this area. Due to lack of awareness of these diseases in this region, this study reviewed the status of parasites of animals slaughtered in the industrial abattoir of Ilam, Western Iran.

## MATERIALS AND METHODS

### Geographical area

Ilam Province is nearly 23,666 square kilometers and located in the West of Iran. This area is located South of Kermanshah, North of Khuzestan, East of Iraq and West of Lorestan. Most areas of this province, especially in the North, comprise hill and mountainous lands and pastoralist is one of the most important jobs there. According to Census, Statistical Center of Iran, Ilam Province's population in 2006 was equal to 545,787, 13% of the population is nomads and Ilam has nearly 400000 animals including cattle, goat and sheep.

### Data collection

Meat inspection records were used to determine the prevalence of parasites in sheep, cattle and goats in abattoir of Ilam. This study is a descriptive-retrospective one; the population of the study is animals slaughtered at industrial slaughterhouse of Ilam. This study was conducted on 61442 indigenous animals including 37167 sheep, 13421 goats and 10854 cattle. Required information, such as number of animal, type of livestock, season and infected organs was extracted from the records by the researcher. Contamination of selected cases with parasites was proven by veterinary technician

and veterinarian. No diagnostic method was used to identify them. Inspection, including careful observation of all members and touching of all the members, was carried out in slaughterhouse. Most parasitic infections were diagnosed by macroscopic diagnosis.

## RESULTS AND DISCUSSION

Overall prevalence of parasitic infections was 8.69% in slaughtered animals in the region. Table 1 shows the personal incidence and Table 2 shows the seasonal incidence of parasites. Prevalence of liver and lung hydatid cyst was 3.18% (1958 cases including 1272 sheep, 206 goats and 480 cattle) and 3.6% (2215 cases including 1401 sheep, 112 goats and 702 cattle), respectively. Prevalence of *F. hepatica* and *D. dendriticum* was 1.06% (655 cases including 221 sheep, 45 goats and 389 cattle) and 0.6% (370 cases including 271 sheep, 85 goats, and 14 cattle), respectively. Prevalence of 0.22% was found for *Cysticercus*. Infection of macroscopic cysts of *Sarcocystis* was not seen. The prevalence rate of parasites is 11.92, 10.10, 8.92, and 6.54% in summer, autumn, winter and spring, respectively (Table 2).

The data obtained in this article gives valuable information about prevalence of parasitic diseases in indigenous slaughtered sheep, goats and cattle in Ilam Province. So, zoonotic parasitic diseases such as hydatid cyst, fascioliasis, dicerceliasis and cysticercosis play a major role in human and animal health in the region. Other finding of this study is about life cycle of these parasites. It seems that the main host of *F. hepatica* in Ilam is cattle and other animals such as sheep and goat

are rarely infected with this parasite. This may be due to resistance of sheep and goat to *F. hepatica*.

Prevalence of 12.3, 4.9 and 6.5% was reported for hydatid cyst, fasciolosis and dicroceliosis in Hamadan, Iran, respectively (Fallah et al., 1992). Incidences of 34 (0.07%), 318 (8.97%), 23 (0.14%) and 4 (0.03%) were found for cattle, camel, sheep and goats for hydatid cyst, respectively, in Sokoto State, Nigeria (Abdullahi et al., 2011). 9% infection of *F. hepatica* was reported for animals slaughtered in Yasuj industrial abattoir (Moshfe et al., 2000). Despite the similar weather in Ilam and Yasuj, the pattern of infection is not the same. This may be due to the nomadic lifestyle of Yasuj people.

The number of infected people with helminths is estimated to be 4.5 million throughout the world and 55 million in USA, in particular (Schmidt and Roberts, 2005). The overall prevalence of hydatidosis was the highest (26.01%) followed by fascioliasis (20.74%) and amphistomiasis (19.62%) among 3510 animals slaughtered in different abattoirs of Comilla and Brahman, Baria Region, Bangladesh (Hazzaz et al., 2010). From a total of 4,481 slaughtered cattle inspected at Mekelle Industrial Slaughterhouse, 357 (8%) of them have been infected with hydatidosis and fascioliasis (Gebretsadik et al., 2010), while persons with the prevalence of hydatidosis and fascioliasis was 32.11 and 24.32%, respectively (Gebretsadik et al., 2010).

Looking at the results of the studies mentioned above and comparing them to the present study, it was found that prevalence of helminthic parasites varies both between and within countries and can cause significant economic losses in domestic animals due to condemnation of organs. These variations of the infection rates could be due to the variations in temperature, environmental conditions, the nature of the pasture and the way these animals rise and graze. Based on slaughterhouse studies, the prevalence of hydatidosis in sheep, cattle and goat was reported as 8.1, 12 and 6.5% in various parts of Iran, respectively (Dalimi et al., 2002). These results are very close to the present study.

Prevalence of *Cysticercus* in the present study was 0.22. About another zoonotic disease, cysticercosis, animal prevalence was reported as 4.4% in Jimma town (Tolosa et al., 2009). Incidence of infection due to *Cysticercus bovis* was 315 (2.67%) in Kano Abattoir, Local Government Area (LGA) of Kano State, Nigeria (Rabi and Jegede, 2010). In comparison, the infection rate of cysticercus is very low in the present study. About seasonal incidence, spreading of these parasites is considerable in all seasons in Ilam area, but the highest (11.92%) and lowest (6.94%) incidence rate of infections is reported in summer and spring, respectively. Authors' opinion is that rain during spring might wash the parasites from the vegetables. While, the highest prevalence rate of *F. hepatica* was reported in winter in Yasuj, Iran (Moshfe et al., 2000). However, same as personal prevalence, seasonal prevalence does not follow same

pattern across the world as well as in Iran.

About economic losses, based on the result of this present study, in abattoir of Ilam, 1958 livers and 2215 lungs were destroyed due to parasitic infection in a two year periods. At present year 2013, market price of liver and lung is 20 and 10 US dollars in Iran, respectively. Therefore, economic losses caused by omitting infected organs in a tow-year period in Ilam are estimated at about 61310 US dollars. In conclusion, despite economic losses, results of this study show that parasitic diseases are hidden health threat for people of Ilam Province and control programs must be carried out towards eliminating transmission in the region.

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## REFERENCES

- Abdi J, Kazemi B, Mohebbali M, Bandehpour M, Rahimi MT, Rokni MB (2010). Gene cloning, expression and serological evaluation of the 12-kDa antigen-B subunit from *Echinococcus granulosus*. *Ann Trop. Med. Parasitol.* 104(5):399-407.
- Abdullahi AM, Oboegbulem SI, Daneji AI, Garba HS, Saliyu MD, Junaidu AU, Mohammed AA, Lawal S, Aminu Y (2011). Incidence of Hydatid cyst disease in food animals slaughtered at Sokoto Central Abattoir, Sokoto State, Nigeria. *Vet. World.* 4(5): 197-200.
- Abidi SM, Nizami WA, Khan P, Ahmad M, Irshadullah M (1989). Biochemical characterization of *Taenia hydatigena* cysticerci from goats and pigs. *J. Helminthol.* 63:333-337.
- Dalimi A, Motamedi G, Hosseini M, Mohammadian B, Malaki H, Ghamari Z, Ghaffari Far F (2002). *Echinococcosis/hydatidosis* in western Iran. *Vet. Parasitol.* 105(2): 161-171.
- Fallah M, Valadan M, Fashan-daki F (1992). Survey of hydatid cyst in last 10 years in Hamadan. *Daro va Dar-man* 9:27-31.
- Gebretsadik B, Gebrehiwot T, Habtom K, Negus A (2010). Concurrent Infection of Hydatidosis and Fasciolosis in Cattle Slaughtered at Mekelle Municipal Abattoir, Tigray Region. *Ethiop. Vet. J.* 14(2):39-49.
- Hazzaz BK, Mohammad E, Md Abul H, Mohiuddin M, Omar FM (2010). Prevalence of zoonotic parasitic diseases of domestic animals in different abattoir of Comilla and Brahman Baria region in Bangladesh. *Zoonotic parasitic dis.* 28:21-25.
- Heidari Z, Mohebbali M, Zarei Z, Aryayipour M, Eshraghian MR, Kia EB, Shodajei S, Abdi J, Rakhshanpour A (2011). Seroepidemiological Study of Human Hydatidosis in Meshkinshahr District, Ardabil Province, Iran. *Iran J. Parasitol.* 6(3):19-25.
- Marquardt WC, Demaree RS, Grieve RB (2000). *Parasitology*. San Diego, Harcourt Academic Press. pp. 180-190.
- Moshfe AA, Bagheri M, Mohebi NZ (2000). Prevalence of *Fasciola hepatica* in animal slaughtered in abattoir of Yasouj. *Armaghane Danesh.* 30:25-30.
- Movassagh GMH, Valilou MR, Bagherian KF, Zirak K (2008). Prevalence of sheep liver hydatid cyst in the northwest rgion of Iran. *Asian J. Anim. Vet. Adv.* 3:30-35.
- Rabi BM, Jegede OC (2010). Incidence of bovine cysticercosis in Kano state, northwestern, Nigeria. *Bayero J. Pure Appl. Sci.* 3(1): 100-103.
- Rokni MB (2008). The present status of human helminthic diseases in Iran. *Annals Trop. Med. Parasitol.* 102: 283-295.
- Rokni MB (2009). *Echinococcosis /hydatidosis* in Iran. *Iranian J Parasitol.* 4(1): 1-16.
- Sadjjadi SM (2006). Present situation of echinococcosis in the Middle

- East and Arabic North Africa. *Parasitol. Int.* 55:197-202.
- Seyed MS, Farzaneh S, Seyed VH, BS (2009). Serum antigen and antibody detection in echinococcosis: application in serodiagnosis of human hydatidosis. *Korean J. Parasitol.* 47(2):153-7.
- Sarkari B, Sadjjadi SM, Beheshtian MM, Aghaee M, Sedaghat F (2009). Human Cystic Echinococcosis in Yasuj District in Southwest of Iran: an Epidemiological Study of Seroprevalence and Surgical Cases Over a Ten-year Period. *Zoonoses Pub Health* 57(2):146-50.
- Schmidt GD, Roberts LS (2005). *Foundations of parasitology*. New York, McGraw-Hill. pp. 110-115.
- Tolosa T, Tigre W, Teka G, Dorny P (2009). Prevalence of bovine cysticercosis and hydatidosis in Jimma municipal abattoir, South West Ethiopia. *Onderstepoort J. Vet. Res.* 76: 323-326.
- Zuko A, Hodžić A (2011). A slaughterhouse study on prevalence of sheep liver helminths in region of Sarajevo. *MESO.* 13:102-104.