

## **Short communication**

# **Prevalence of Hydatidosis, Fasciolosis, and Dicrocoeliasis in slaughtered animals in slaughterhouses of West Azerbaijan province, Iran**

**Aghkhan Kheiri<sup>1\*</sup>, Ata Kaboudari<sup>2</sup>, Mohammad Shiri<sup>3</sup>**

- 1- Deputy of Food and Drug, Urmia University of Medical Sciences, Urmia, Iran
  - 2- Department of Food Hygiene and Quality Control, Urmia University, Urmia, Iran
  - 3- General Veterinary Office of West Azerbaijan Province
- \* **Corresponding Author:** *dvmkheiri@yahoo.com*

(Received 21 July 2020, Accepted 12 August 2020)

## **Summary**

Zoonotic parasitic diseases are one of the main causes of human infections. Among the parasitic zoonotic diseases, hydatidosis is very important in worldwide. In Iran, the disease is common in domestic animals, and human infection has been found from various regions. In this study, the frequency of parasitic diseases consisting of hydatidosis, fasciolosis, and dicrocoeliasis was investigated in sheep, goats, and cattle that slaughtered in slaughterhouses of West Azerbaijan province (northwestern of Iran) between 2014- 2019. Touch and incision methods were used to investigate hydatidosis and liver parasites. According to the results, the prevalence in 2018-2019 in sheep, goats, and cattle was lower than in other years. Considering the importance of these diseases in human and public health, it is very important to study the methods of reducing the prevalence of these factors in slaughter animals.

**Keywords:** Cattle, Sheep, Dicrocoeliasis, Fasciolosis, Hydatidosis, Iran.

## **Introduction**

Hydatidosis is a zoonotic disease caused by infection with the cestode of *Echinococcus granulosus* and *Echinococcus multilocularis* (Brunetti et al., 2010). Human is an accidental intermediate host that has infected by contaminated water and vegetables with parasite's eggs or direct contact with infected

dogs. In addition to the risks and harms of human pathogenicity, this disease also causes considerable economic losses to herbivores (Ghsemian et al., 2018).

Due to the difficulty of diagnosing and treating hydatidosis and the risks of this disease for humans, controlling the disease and preventing its occurrence around the world is very

important. Many countries are well aware of this importance and have designed and implemented comprehensive programs to combat the disease (Moazeni, 2008). In Iran, the disease is common in domestic animals, and human infection has been reported from different regions (Rokni, 2009). Hydatidosis in humans usually affects the liver and lungs, and the severity of clinical symptoms and pathology of the disease depend on the formation of cysts in the body, size, and locations (Sadjjadi, 2006).

Dicrocoeliasis and fasciolosis are common bile duct trematodes isolated from various animals, such as cattle, hogs, buffaloes, camels, sheep, goats, donkeys, and wild rabbits. Changes in the liver include severe biliary edema and the destruction of the liver parenchyma (Eslami, 2006). Care should be taken in recording and eradicating infectious diseases, such as dicrocoeliasis and fasciolosis because if these cases are not recorded and eradicated in slaughterhouses and consumed in the community, it will create enormous problems for the country (Craig et al., 2007). Dicrocoeliasis and fasciolosis diseases are animal diseases with no specific clinical signs in livestock, so slaughterhouses are one of the important centers of these infections (Ghasemian Karyak and Abbasi-Hormozi, 2013).

According to the previous studies (Moazeni, 2008; Ghasemian Karyak and Abbasi-Hormozi, 2013; Eslami, 2006) and the need for a comprehensive study, as well as the growing importance of zoonosis diseases and strategies to reduce their prevalence, in this study the incidence of hydatidosis, fasciolosis and dicrocoeliasis in the province was examined.

### **Material and Methods**

For this purpose, the target population of slaughterhouses in West Azerbaijan province in northwestern Iran was studied. The statistical population for this study is all livestock (sheep, goat, and cattle) slaughtered in slaughterhouses in this province (Table 1). From the beginning of 2014 (1393) to the end of 2019 (1398), all lungs and livers of slaughtered animals (sheep, goat, and cattle) in the slaughterhouses of the province were examined and gross observation recorded daily. Also, touch and incision methods were used to investigate hydatidosis and liver parasites. Data recorded in the slaughterhouse were also used for the retrospective study. For statistical analysis, SPSS software version 24 and one-way ANOVA were used to determine the significance of data differences. The differences were considered significant with  $p < 0.05$ .

**Table 1.** Number of slaughtered animals

Year	Livestock species	
	Cattle	Sheep and goat
2014-2015 (1393)	44904	80318
2015-2016 (1394)	49041	95400
2016-2017 (1395)	47950	89715
2017-2018 (1396)	47185	78630
2018-2019 (1397)	39099	61366
Total	228179	405429

## Results

The frequency of hydatidosis, fasciolosis, and dicrocoeliasis in slaughtered sheep and goats is shown in Table 2. According to the present results, the prevalence of hydatidosis,

fasciolosis, and dicrocoeliasis in 1397 (2018-2019) is significantly lower than in previous years ( $P < 0.05$ ). We think that the decrease in 1397 could be due to the smaller number of slaughtered livestock in that year.

**Table 2.** Frequency and percentage of hydatidosis, fasciolosis, and dicrocoeliasis in slaughtered sheep and goats

Year \ Disease	2014-2015 (1393)	2015-2016 (1394)	2016-2017 (1395)	2017-2018 (1396)	2018-2019 (1397)
Hydatidosis	13814 <sup>a</sup> (17.19%)	15750 <sup>a</sup> (16.50%)	15517 <sup>a</sup> (17.29%)	12633 <sup>a</sup> (16.06%)	9387 <sup>b</sup> (15.29%)
Fasciolosis	2197 <sup>a</sup> (2.73%)	2852 <sup>a</sup> (2.98%)	2241 <sup>a</sup> (2.49%)	2173 <sup>a</sup> (2.76%)	359 <sup>b</sup> (0.58%)
Dicrocoeliasis	6045 <sup>a</sup> (7.52%)	8649 <sup>b</sup> (9.06%)	9544 <sup>b</sup> (10.63%)	6350 <sup>a</sup> (8.07%)	4432 <sup>a</sup> (7.22%)

\*Different small letters in each row indicate significant statistical differences ( $P < 0.05$ ).

The frequency of hydatidosis, fasciolosis, and dicrocoeliasis in slaughtered cattle is shown in Table 3. According to the current results, the prevalence of hydatidosis in 1397 (2018-2019)

is significantly higher than in other years. Also, the prevalence of fasciolosis and dicrocoeliasis in 1397 (2018-2019) is substantially lower than in other years ( $P < 0.05$ ).

**Table 3.** Frequency of hydatidosis, fasciolosis, and dicrocoeliasis in slaughtered cattle

Year \ Disease	2014-2015 (1393)	2015-2016 (1394)	2016-2017 (1395)	2017-2018 (1396)	2018-2019 (1397)
Hydatidosis	6565 <sup>a</sup> (14.62%)	8513 <sup>b</sup> (17.35%)	7430 <sup>a</sup> (15.49%)	6859 <sup>a</sup> (14.53%)	6874 <sup>b</sup> (17.58%)
Fasciolosis	2281 <sup>a</sup> (5.07%)	2860 <sup>a</sup> (5.83%)	2049 <sup>a</sup> (4.27%)	2385 <sup>a</sup> (5.05%)	1265 <sup>b</sup> (3.23%)
Dicrocoeliasis	1050 <sup>a</sup> (2.33%)	1511 <sup>b</sup> (3.08%)	1385 <sup>b</sup> (2.88%)	1079 <sup>a</sup> (2.28%)	711 <sup>c</sup> (1.81%)

\*Different small letters in each row indicate significant statistical differences ( $P < 0.05$ ).

## Discussion

Numerous studies have described the health and economic importance of hydatidosis, fasciolosis, and dicrocoeliasis in the world (Brunetti et al., 2010). In Iran, various studies have been conducted in different provinces on the prevalence of hydatidosis, fasciolosis, and dicrocoeliasis. In Hamzavi et al. study on the incidence of hydatidosis in Asadabad (Hamadan, Iran), the infection rate in livestock was 10.7%, which was higher in sheep (16.38%) (Hamzavi et al., 2016). In another study in Hamadan province, the prevalence of hydatidosis was 27.5% in sheep and 25.9% in cattle (Dalimi et al., 2002). The results of an older study in Fars province showed that the rate of hydatidosis infection in the liver and lungs of cattle is higher than sheep (Mehrabani et al., 1999). The different results obtained from various studies can be related to the

livestock conditions of the region, control methods of parasitic diseases (including hydatidosis), and also the study season. Due to the presence of intermediate hosts in the life cycle of parasitic diseases and considering that these intermediate hosts grow in the certain temperature and humidity conditions, so that seasonal changes can have a direct effect on the prevalence of the disease (Koohdar et al., 2010).

The difference between the prevalence of hydatidosis in cattle and sheep can be related to the free grazing of sheep in pastures and the greater relationship between sheep and herding dogs (Daryani et al., 2009). In the present study, a general review of the level of hydatidosis was investigated. In different studies, the amount of contamination in different seasons has also been studied, and the amount of contamination in spring was more

than other seasons (Hamzavi et al., 2016). According to the results of various researches in this field, sheep and cows are considered as potential intermediate hosts in establishing the life cycle of the parasite and disease control programs should be focused more sensitively on these animals (Koohdar et al., 2010).

In the present study, the prevalence of fascioliasis in cattle was higher than sheep and goats. Dicrocoeliasis is also more prevalent in sheep and goats. In a study by Ashrafi about human and animal fascioliasis, during the period of the study, the infection rates of 0.1% to 91.4% were noted in various livestock (Ashrafi, 2015). Ghasemian Karyak and Abbasi-Hormozi investigated the reasons for confiscating the livers and lungs of sheep in the Gachsaran slaughterhouse, Iran. The results showed that 99.9% of the livers were recorded because of Fasciolosis (Ghasemian Karyak and Abbasi-Hormozi, 2013). In another study, Sayari et al. reported a prevalence of fasciolosis in the livers of sheep and goats slaughtered in Ahvaz at 10% (Sayari et al., 2008).

The difference between the prevalence of hydatidosis in cattle and sheep can be related to the free grazing of sheep in pastures and the greater relationship between sheep and herding dogs (Daryani et al., 2009). According to the results of various researches in this field, sheep

and cows are considered as potential intermediate hosts in establishing the life cycle of the parasite and disease control programs should be focused more sensitively on these animals (Koohdar et al., 2010).

### **Conclusion**

Analysis of the results of this study shows that there is a conflict with hydatidosis, fasciolosis, and dicrocoeliasis in this province of Iran. Given that these diseases have zoonotic importance, further investigation, and solutions to reduce the prevalence are necessary.

### **Ethical approval**

Not applicable.

### **Acknowledgment**

The colleagues of the General Veterinary Administration of West Azerbaijan Province are appreciated.

### **Conflict of Interest Statements**

The authors declare that they have no conflict of interests.

### **References**

- Ashrafi K. (2015). The Status of Human and Animal Fascioliasis in Iran: A Narrative Review Article. *Iranian Journal of Parasitology*, 10, pp. 306-328.

- Brunetti E., Kern P., Vuitton A., Dominique V. and Writing Panel for the WHO-IWGE. (2010). Expert consensus for the diagnosis and treatment of cystic and alveolar echinococcosis in humans. *Acta Tropica*, 114, pp. 1–16.
- Craig P.S., McManus M.W., Lightowers J.A., Chabalgoity H.H., Garcia C.M., Gavidia R.H., Gilman A.E., Gonzalez M., Lorca C., Naquira A., Nieto P. and Schantz M. (2007). Prevention and control of cystic Echinococcosis. *Lancet Infectious Diseases*, 7, pp. 385–394.
- Dalimi A., Motamedi G., Hosseini M., Mohammadian B., Malaki H., Ghamari Z. and Ghaffari Far F. (2002). Echinococcosis/hydatidosis in Western Iran. *Veterinary Parasitology*, 105, pp. 161–171.
- Daryani M., Sharif A., Amouei A. and Nasrolahei M. (2009). Fertility and viability rates of hydatid cysts in slaughtered animals in the Mazandaran Province, Northern Iran. *Tropical Animal Health and Production*, 48, pp. 1701-1705.
- Eslami A. (2006). Veterinary helminthology. 3rd (ed.) Trematoda. Publication of Tehran University, pp. 103-111.
- Ghasemian O., Hoseini G., Soleimani M., Mahmoudi R. and Kaboudari A. (2018). The prevalence study of hydatid cyst in domesticated slaughtered animals in industrial abattoirs in Iran. *Journal of Bacteriology and Mycology*, 6, pp. 96–100.
- Ghasemian Karyak O. and Abbasi-Hormozi A. (2013). The study of the reasons of the keeping the liver and lungs of slaughtered sheep and goats in Ghachsaran slaughterhouse. *Journal of Veterinary Clinical Research*, 4, pp. 199-211.
- Hamzavi Y., Nazari N., Mikaeili A., Parandin F., Faizi F. and Sardari M. (2016). Prevalence of Hydatid Cyst in slaughtered livestock in Asadabad Slaughterhouse during 2014-2015. *Pajouhan Scientific Journal*, 14, pp. 58-66.
- Koohdar V., Shojaei S.R., Radmehr B. and Pakbaz F. (2010). Abattoir Study of Hydatid Cyst Infestation in Sheep from Different Regions of Iran. *Journal of Veterinary Clinical Research*, 1, pp. 65-74.
- Mehrabani D., Oryan A. and Sadjjadi S.M. (1999). Prevalence of Echinococcus granulosus infection in stray dogs and herbivorous in Shiraz, Iran. *Veterinary Parasitology*, 86, pp. 217-220.
-

Moazeni M. (2008). Hydatid cyst control: A glance at the experiences of other countries. *Payavard Salamat*, 1, pp. 9-11.

Rokni M. (2009). Echinococcosis/hydatidosis in Iran. *Iranian Journal of Parasitology*, 4, pp. 1-16.

Sadjjadi S.M. (2006). Present situation of echinococcosis in the Middle East and Arabic North Africa. *Parasitology International*, 55, pp. 197–202.

Sayyari M., Paknejad M. and Pourebrahim M.R. (2008). Prevalence of hydatid cyst and *Fasciola* in native ruminants of Ahwaz. *Iranian Veterinary Journal*, 3, pp. 89-95.

---