

Original article

A five years study of fascioliasis and dicrocoeliasis in Iran's slaughterhouses

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Abstract

Objective: Fascioliasis and dicrocoeliasis are the two endemic parasitic diseases of Iran that make lots of economical damages annually. This study has been performed to evaluate infection rate of domesticated animals to fascioliasis and dicrocoeliasis among of slaughtered animals in slaughterhouses of Iran. **Methods:** In this cross-sectional study infection rate of slaughtered animals has been analyzed in 28 provinces of Iran during 5 years period (2003-2007). **Results:** It is indicated that infection rate was 4.84% to fascioliasis and dicrocoeliasis in this five-year study period. Total removed livers were 815 807 and 771 026 numbers from consumption cycle for fascioliasis and dicrocoeliasis respectively from 32 714 926 slaughtered animals. The highest infection rate was Gilan (20.91%), Mazandaran (16.36%), and Esfahan (9.95%) respectively among studied provinces while the lowest infection rate was indicated in Ilam (0.76%), Boushehr (0.84%), and Yazd (1.51%) respectively. Our data proved the highest frequency rate were identified in summer and autumn for both fascioliasis and dicrocoeliasis. **Conclusion:** Fascioliasis and dicrocoeliasis are continuously increasing in slaughter animals of Iran. Therefore the results of current study can improve and move up activities against these zoonosis diseases.

Keywords: Fascioliasis; Dicrocoeliasis; Frequency rate; Slaughter animals; Iran

INTRODUCTION

Zoonotic infections are caused by a wide group of diseases that have major roles in hygiene and health of human. Amongst zoonosis diseases, parasitic ones have a unique role; which can make health and economical difficulties in those under developed countries^[1]. Fascioliasis and dicrocoeliasis are two hepatic and parasitic diseases that are endemic in Iran that reported frequently from all provinces of Iran^[2].

On the basis of FAO report economical damages

from parasitic contamination were 15%-20% and 30-40% in developed and underdeveloped countries respectively. These rates are much higher in those areas without effective efforts. As we know 75% of people are living in under developed countries with 65% of domestic animals, so we expect economical damages to be higher^[3].

The most important economical damages of parasitic diseases such as fascioliasis and dicrocoeliasis are removing organs of slaughtered animals especially liver from consumption cycle. It is reported 1.5 million pounds organ of animals are removing annually in New Zealand. In Uruguay, about 60% livers of slaughtered animals are destroyed for contaminating to fascioliasis and dicrocoeliasis. In sought America, 2 million cattle and 3.5 million sheep are destroyed annually that its economical damages are

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estimated to be about 6.3 \$ and 2.5 \$ for Argentina and Chili respectively. Economical damages cause reduction of products of milk, quality of meat, reduction of fertility rate and wool quantity, increasing diagnosis and treatment in those persons who are suspected and may infected to these diseases^[4].

Fasciola hepatica is a trematod worm with worldwide distribution. Its intermediate host is snails, while its definitive hosts are animals (cattle, sheep, goat...) as well as human. It lives in bile ducts; infection can transfer to the final host by ingestion metacercaria on the vegetables. Vegetables especially aquatic ones are the major source for human infection^[5]. Fascioliasis is one of the worldwide health problems that 2.4 to 17 million of people are estimated to be infected with it and 180 million people are at risk of infection^[6]. It is reported Gilan, Mazandaran, and Esfahan have high incidence rate in our country. Two recent important epidemics of fascioliasis have registered in 1989 and 1999 in Gilan province especially in Rasht and Bandar-Anzaly cities that 15 000 of people were infected^[7]. The disease is endemic in other countries like Bolivia, Ecuador, Egypt, Peru, and Portugal with several epidemic reports^[2].

Dicrocoelium dendriticum is a small fluke worm that lives in bile ducts of sheep, goat and cattle with lower level in other domestic and wild animals. This parasite needs two intermediate hosts; land snail and ants. Herbivore animals ingest the ants carrying metacercariae; the parasite will mature to adult form after two months^[8].

Iran has a huge animal population with traditionally husbandry that lack of hygienic points has caused lots of contaminations to parasitic diseases.

This study has been performed to indicate frequency rate of fascioliasis and dicrocoeliasis in slaughtered animals of Iran.

MATERIALS AND METHODS

In this cross sectional study, all data related to registered slaughtered sheep and goats collected and analyzed from 28 provinces of Iran from veterinary offices during 5 years period from April 2003 till March 2007. Total slaughtered animals and average of contaminated livers to fascioliasis and dicrocoeliasis have been indicated annually in each province.

Besides, the average of contaminated livers frequency rate of fascioliasis and dicrocoeliasis were also indicated on the basis separate seasons. Finally economical damages of these two parasites were estimated.

RESULTS

32 714 926 numbers of sheep and goats were slaughtered in this five years period. 1 586 834 contaminated livers to fascioliasis and dicrocoeliasis were removed from consumption cycle that it is expected to be 2.49% and 2.35% for fascioliasis and dicrocoeliasis respectively. Contamination rate was being increased annually during this period. It was 4.92% in 2002 that increased to 5.01% and 5.11% in 2005 and 2006 respectively (Table 1). The highest contamination rate among 28 studied provinces were Gilan (20.91%), Mazandaran (16.36%), and Esfahan (9.95%) respectively. The lowest contamination rate was also from Ilam (0.76%), Boushehr (0.84%), and Yazd (1.51%) respectively (Table 2). Our data proved the highest frequency rate of the observed fascioliasis and dicrocoeliasis were identified in summer and winter (Figure 1). Economical damages were 96 billion rials for removing contaminated liver in this 5 years period.

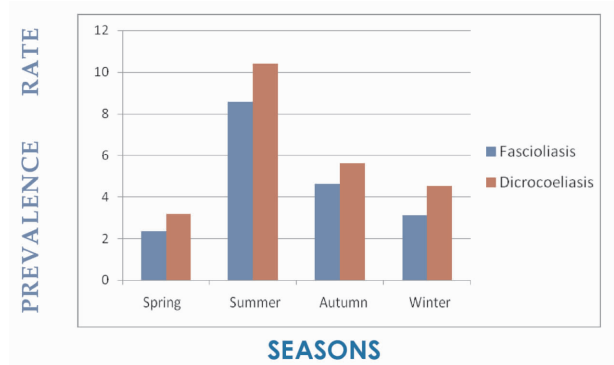


Figure 1: The seasonal prevalence rate (Percentage) of fascioliasis and dicrocoeliasis during study period

DISCUSSION

Evaluating hygienic and economical importance of each disease is the first step to design a controlling and prevention program that needs suitable epidemiological information in endemic area. Zoonotic para-

sitic diseases such as hydatidosis, fascioliasis and microcoeliasis can cause huge economical damages as well as its threatening for human health. Therefore epidemiological studies are necessary to indicate frequency rate of diseases in human and animal populations as well as transferring route of disease in endemic area to introduce necessary efforts for control and prevention of the disease in any countries^[9]. Necessary information have been collected and analyzed from veterinary offices and veterinary organization^[10]. Colon^[11] believes released data of slaughterhouse although is not enough reliable, but still is the best source to estimate the frequency rate of contamination. Removing contaminated animal organs is possible because those diseases such as hydatidosis, fascioliasis and microcoeliasis can be objectively observed and diagnosed. Animal population is one of the major economic sources of each country. It is possible to prevent economical damages with apply proper hygienic efforts for rapid diagnosis and treatment of disease and prevent human population from these infections and their economical damages^[3].

Fascioliasis has a worldwide distribution and 180 millions domestic animals are at risk of the infection while 17 millions are contaminated on the contrary to microcoeliasis infection that is seldom infecting human^[6]. At the present time, fascioliasis is the most frequent observed trematod in humans that is endemic in north part of Iran causing dangerous epidemic cases. The two most frequent outbreaks occurred in Gilan province (1989 and 1999) caused infection in 15 000 of population. The causative sources were believed consumption of contaminated vegetables to metacercariae specially preserved olive^[7].

In our study the most frequent rate was indicated in Mazandaran and Gilan provinces that were in agreement with Ashrafi report^[7]. Eslami believes trematods can cause weight reduction and decreasing of animal products because of destroying the liver. He underlined in experimental study those sheep group contaminated to fasciola receiving treatment had 2 kilogram higher weight compared with test group^[2].

Economic damages due to parasitic contaminations are divided to two forms: "direct and indirect

damages". Direct damages are more important than contaminated organs, while indirect damages are less concentrated. These are reduction of milk, weight, fertility rate, wool production and quality of the milk. In an experimental study, 2-3 numbers of metacercariae were put in a daily food to infect a group of lambs. These lambs had weight increasing just 30% after 22 weeks while muscle proteins reduced to 20%^[12].

In Sought America, contaminated organs of 2 millions cows and 3.5 millions sheep are destroyed annually that are estimated about 6.3 and 2.5 million dollars for Argentina and Chili respectively. Economical damages of parasitic contaminations are estimated to be 3.5, 2.2, 10, 8.7 and 1.2 million dollars in Algeria, Bulgaria, Greek, Italy and Spain respectively. In our study, economic damages rate were 96 billion rials equal to near 10 million dollars that is 2 million dollars annually in a study period.

Analyzed data proved also contamination rate to fascioliasis and microcoeliasis has increasing rate in these studied years. It was 4.92% in 2002 while increased to 5.01% and 5.11% in 2005 and 2006 respectively. Our data proved the highest frequency rate of the observed fascioliasis and microcoeliasis were identified in summer and winter, that is justifiable with applied animal feeding and cattle breeding and also intermediate hosts of parasite in Iran. Incidence of fascioliasis is higher in summer and early of autumn because cercariae moved from snail and changed to metacercariae on vegetables. Therefore animals are contaminated to these metacercariae under these conditions, causing hepatic damages after 6-8 weeks^[5,7]. In provinces of Iran animals are moved to summering place in winter and spring and will be returned at the end of spring and summer that may be the cause of higher contamination rate in this period that animal slaughtering are at the lowest rate.

Prevention and controlling of the disease can be affected by taking following attempts: health educational efforts for cattlemen and those high risk groups of people, basic planning to campaign against parasitic diseases, no using of contaminated water and vegetables, properly informing and finally performing supplementary studies.

Table1 The prevalence rate of fascioliasis and dicrocoeliasis according of animals number in Iran (2002 -2007)

Year	No. of slaughtered animals	Prevalence rate of fascioliasis	Prevalence rate of dicrocoeliasis	Total(percent)
2003	5 390 712	139 941(2.59)	125 923(2.33)	265 864(4.92)
2004	7 251 624	154 330(2.12)	154 567(2.13)	309 897(4.25)
2005	5 873 317	143 861(2.45)	147 078(2.50)	290 939(4.95)
2006	5 527 400	141 232(2.55)	135 563(2.45)	276 796(5.01)
2007	8 671 873	236 443(2.72)	207 895(2.39)	444 338(5.11)
Total	32 714 926	815 807(2.49)	771 026(2.35)	1 586 834(4.84)

Table2 The contamination rate of slaughtered animals (sheep and goat) to fasciolaand dicrocoelium in Iranian different provinces (2002 -2007)

Province	2002		2003		2004		2005		2006		Mean	
	D	F	D	F	D	F	D	F	D	F	D	F
East Azarbayjan	7.81	2.02	7.30	4.43	8.07	4.07	2.80	1.47	7.43	4.05	6.68	3.22
West. Azarbayjan	3.83	3.06	4.51	3.82	5.73	3.39	7.63	4.06	4.54	2.37	5.15	3.34
Ardebil	4.43	3.97	1.84	1.71	2.88	2.64	3.12	2.41	2.67	3.28	2.98	3.76
Esfahan	6.39	5.11	6.11	2.96	6.92	4.41	5.58	4.06	4.52	3.65	5.92	4.03
Ilam	0.18	0.38	0.28	0.52	0.19	0.63	0.09	0.93	0.20	0.44	0.18	0.58
Boshehr	0.02	0.25	0.15	0.56	0.35	0.94	0.26	0.53	0.19	1.01	0.19	0.65
Tehran	3.73	2.47	3.75	2.29	3.42	2.16	2.13	1.42	3.64	2.05	4.08	2.07
Charmahal	0.52	2.37	0.45	3.01	0.49	3.73	0.61	3.38	0.51	2.08	0.51	2.91
Khorasan	2.12	0.78	2.17	0.61	2.60	0.63	2.58	0.65	2.52	0.75	2.39	0.68
Khozestan	0.27	4.11	0.27	3.91	0.07	3.15	0.13	3.79	0.02	2.31	0.15	3.45
Zanjan	0.19	1.06	0.41	1.38	0.68	1.32	2.24	1.24	3.15	4.82	1.33	1.96
Semnan	1.63	0.04	1.83	0.04	1.59	0.08	1.76	0.22	1.45	0.13	1.65	0.10
Systan	0.33	6.67	0.36	3.51	0.08	0.37	0.01	0.02	0.01	1.14	0.15	2.34
Fars	0.44	2.16	0.27	1.49	0.49	2.04	0.53	2.22	0.63	2.61	0.47	2.10
Qazvin	1.94	1.74	1.63	1.03	2.35	0.95	2.51	1.12	1.22	0.72	1.93	1.14
Qom	1.27	1.39	2.60	3.80	1.52	1.44	1.02	1.15	0.93	0.96	1.46	1.74
Kordestan	2.39	5.75	2.11	2.69	1.73	2.01	1.54	2.10	1.41	2.04	1.83	2.91
Kerman	0.47	3.19	0.29	3.07	0.44	3.11	0.41	2.49	0.27	2.36	0.37	2.84
Kermanshah	1.18	2.28	1.04	2.35	0.79	1.94	0.95	2.57	0.85	2.97	0.96	2.42
Kohkiloyeh	0.55	8.01	0.38	8.20	0.31	6.97	0.76	6.38	0.49	4.75	0.50	6.86
Golestan	2.45	0.41	2.71	0.59	2.15	0.65	3.27	0.44	2.90	0.37	2.69	0.49
Gilan	1.45	5.47	21.4	6.52	18.32	8.58	15.38	8.14	12.94	6.15	13.82	7.09
Lorestan	2.99	6.65	1.97	5.63	1.90	5.78	1.41	3.95	1.62	3.70	1.97	5.14
Mazandaran	2.97	7.77	5.48	14.37	4.63	9.95	6.98	12.9	7.21	10.01	5.45	10.91
Markazi	0.94	1.46	1.41	1.55	1.20	1.54	2.42	2.72	2.13	1.51	1.62	1.73
Hormozgan	3.28	2.97	0.31	2.57	0.27	2.84	0.09	2.06	0.03	3.09	0.79	2.49
Hamedan	2.31	5.08	2.44	4.72	2.70	4.14	3.07	3.65	3.03	3.09	2.71	4.13
Yazd	0.21	0.69	0.19	2.06	0.08	1.33	0.10	1.40	0.14	1.37	0.14	1.37
Total(percent)	2.33	2.59	2.45	2.55	2.50	2.45	2.13	2.12	2.39	2.72	2.35	2.49

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