The Prevalence of Fascioliasis in Slaughtered Animals of the Industrial Slaughterhouse of Arak, Iran (2007-2010)

Mehran Sayadi¹ Mohammad Rezaei¹ Mahdi Jahanbakhsh¹ Mostafa Gholamrezaei² *Issa Mohammadpourfard¹ Mohammad Yahyaei³ Reyhaneh Esmaeili⁴

¹Department of Food Safety and Hygiene, School of Public Health, Tehran University of Medical Sciences, Tehran, Iran
²Department of Parasitology and Mycology, School of Public Health, Tehran University of Medical Sciences, Tehran, Iran
³Department of Life Science Engineering, School of New Sciences and Technologies, University of Tehran, Tehran, Iran
⁴Department of Microbiology, Saveh Branch, Islamic Azad University, Saveh, Iran

*ismohammadpour@yahoo.com
(Received: 1 Jan 2015; Revised: 26 Aug 2015; Accepted: 4 Sep 2015)

Abstract

Background and purpose: Fascioliasis is one of the zoonotic diseases in the world that has public health and economic perspectives. The aim of this study was to investigate the prevalence of Fascioliasis in slaughtered cattle in the industrial slaughterhouse of Arak, Iran (2007-2010).

Materials and Methods: This study sample was consisted of 648994 head of cattle including 292797 sheep, 81012 cows, and 275185 goats that were studied using a macroscopic method. Data analysis was performed by chi-square test and SAS software.

Results: The prevalence frequency of Fascioliasis in all slaughtered cattle was 7657 head that the most infected of animals was belong to sheep by 3280 head infection, and afterward 3037 and 1340 head of goats and cows were infected, respectively. There is a significant difference between seasons in each year (P < 0.05).

Conclusion: Although the prevalence of Fascioliasis infection is relatively low, but imposing economic losses due to the deleting of infested organs of animals and decrease in livestock products, indicates the existence of conditions for health risks for residents which requires more inclusive and comprehensive sanitary and control measures due to this parasite’s life cycle and transmission.

Key words: Arak (Iran), Zoonotic Disease, Fascioliasis, Meat Safety
1. Introduction

As the population grows, demands for high quality and healthy protein sources increase. Totally, 77250000 head of sheep and goats and 8588000 head of cows are raised in Iran (1). These folks of livestock are the main protein sources for the society. In spite of qualitative and quantitative improvement of health and disease prevention measures, there is still a great deal of financial loss sustained all around the world due to parasite caused diseases transmittable by food. Estimates show that the figure of losses hits a considerable amount annually. The losses are comprised of costs to diseases treatment, and prevention spread of diseases, economic losses due to increase in mortality rate of livestock, measures to dispose of livestock corps, and loss of profit (2,3). Fascioliasis is one of the most common zoonotic diseases in many countries that lead to reduction in livestock productions. The disease is transferable to human and brings in considerable economic and financial losses (4,5). Moreover, Fascioliasis is classified as emerging and re-emerging diseases by International Food Technology Institute (6). Fasciola hepatica occurs in temperate areas (7). The disease is epidemic in the most of countries with large stock raising sector. Fascioliasis is mainly endemic in mild and torrid zones so that it is usually found in Europe, The North/South America, Asia, Oceanic, and North and South of Africa (8). In addition to veterinary weight and economic losses caused by the disease; it is commonly regarded as a major challenge to public health. A human may infected accidentally by Fasciola (5,9).

The presence of the liver flukes, Fasciola spp. in bile duct and sack of human induces Fascioliasis and liver disorders (10). Infection of livestock with the parasite has been reported from all Iranian provinces. Usually, infection among livestock results in a considerable decrease in livestock production (meat, wool, and milk) and also removal of the liver in slaughterhouse. The presence of larvae in bile duct and sac is without symptoms, and most of the cases are diagnosed by inspection. Surveys in the slaughterhouses nationwide showed 8.57% of infection in Tabriz, 14.54% in Khorasan Razavi and 7.75% in Fars (11,12). In addition to economic losses, the parasite is a great threat to public health (13). This study determines spread of the diseases among livestock slaughtered in Arak city on the base of the year, season, and type of animal. The results will be helpful for health officials for adopting more effective preventive and controlling measures.

2. Materials and Methods

The study was conducted as descriptive and cross-sectional study with a statistic society of all livestock slaughtered in the industrial slaughterhouse of the city between 2007 and 2010. Sampling was conducted randomly by attending the site. According to the data, about 450 heads were slaughtered per day during a 4-year period, which comes of 648994 heads of livestock (54.11% sheep, 12.48% cow, 42.4% goat). Thus, 292797 heads of sheep, 81012 heads of cow, and 275185 heads of goats were adopted.

The study used direct microscopic observations so that samples were examined visually and under the microscope at the site. To test infection by Fascioliasis, the appearance of liver and bile ducts were examined. The prevalence of Fascioliasis was calculated as the number of livers found to be untrimmed with parasites, expressed as a percentage of the total number of cattle, sheep, and goat slaughtered. A percentage to measure prevalence was the statistical tools applied.

The differences between frequencies of Fascioliasis infection in the different seasons in each year and between the years was analyzed with statistical software SAS (version 9.1, SAS Institute, Inc., Cary, NC, USA) by chi-square method with 5% level of significance.
3. Results

The results showed 1.18% (7657 cases) infection by Fascioliasis, so that cattle with (1.65%) contaminated cases were at top, followed by sheep (1.12%) and cows (1.10%). The variation in the prevalence of Fascioliasis among species may be explained by the fact that species have a different type of grazing behavior (Table 1). On the seasonal bases, the surveys showed that maximum and minimum spread of the disease were in autumn and winter, respectively (P < 0.05) (Figure 1). In general, 2008 was the most contaminated years (2.04%), while 2007 won as the year with minimum contamination (0.69%) (Figure 2). As the results showed, the rate of infection with Fasciola among livestock in years from 2007 to 2010 was 0.69, 2.04, 1.49, and 0.84 percent respectively. There is a significant difference between seasons in each year (P < 0.05) (Table 1). However, these differences did not show a clear procedure among the years. The prevalence of Fascioliasis between the years in any type of animal had significant difference (P < 0.05) (Table 2). These different could be due to a variety of weather condition in each year. The greatest Fascioliasis for all years was found for cattle, except 2008 years.

Table 1. Prevalence of Fascioliasis infection in slaughtered animals in the Arak, Iran (2007-2010)

<table>
<thead>
<tr>
<th>Season</th>
<th>Cattle Total slaughter</th>
<th>Fasciolosis (%)</th>
<th>Season</th>
<th>Sheep Total slaughter</th>
<th>Fasciolosis (%)</th>
<th>Season</th>
<th>Goat Total slaughter</th>
<th>Fasciolosis (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2007</td>
<td>2007</td>
<td>21532</td>
<td>Winter</td>
<td>0.41</td>
<td>82394</td>
<td>0.20</td>
<td>Winter</td>
<td>85342</td>
</tr>
<tr>
<td>Winter</td>
<td>3967</td>
<td>5162</td>
<td>Spring</td>
<td>3.02</td>
<td>14773</td>
<td>1.30</td>
<td>Spring</td>
<td>14854</td>
</tr>
<tr>
<td>Summer</td>
<td>4250</td>
<td>2.28</td>
<td>Autumn</td>
<td>14181</td>
<td>0.92</td>
<td>Summer</td>
<td>16879</td>
<td>0.82</td>
</tr>
<tr>
<td>Autumn</td>
<td>2.28</td>
<td>Total 34911</td>
<td>Season</td>
<td>Total 130519</td>
<td>0.58</td>
<td>Total</td>
<td>132542</td>
<td>0.64</td>
</tr>
<tr>
<td>2008</td>
<td>2008</td>
<td>4697</td>
<td>Winter</td>
<td>1.41</td>
<td>15068</td>
<td>1.46</td>
<td>Winter</td>
<td>10164</td>
</tr>
<tr>
<td>Winter</td>
<td>3567</td>
<td>5296</td>
<td>Spring</td>
<td>1.57</td>
<td>18357</td>
<td>1.02</td>
<td>Spring</td>
<td>12248</td>
</tr>
<tr>
<td>Summer</td>
<td>4428</td>
<td>2.87</td>
<td>Autumn</td>
<td>14959</td>
<td>2.29</td>
<td>Autumn</td>
<td>15982</td>
<td>2.93</td>
</tr>
<tr>
<td>Autumn</td>
<td>2.87</td>
<td>Total 17988</td>
<td>Season</td>
<td>Total 87325</td>
<td>1.92</td>
<td>Total</td>
<td>53704</td>
<td>2.29</td>
</tr>
<tr>
<td>2009</td>
<td>2009</td>
<td>4141</td>
<td>Winter</td>
<td>1.59</td>
<td>11229</td>
<td>2.54</td>
<td>Winter</td>
<td>12155</td>
</tr>
<tr>
<td>Winter</td>
<td>3047</td>
<td>4423</td>
<td>Spring</td>
<td>4.79</td>
<td>10268</td>
<td>1.11</td>
<td>Spring</td>
<td>12630</td>
</tr>
<tr>
<td>Summer</td>
<td>3405</td>
<td>2.67</td>
<td>Summer</td>
<td>19282</td>
<td>0.42</td>
<td>Summer</td>
<td>16975</td>
<td>1.56</td>
</tr>
<tr>
<td>Autumn</td>
<td>2.67</td>
<td>Total 15016</td>
<td>Season</td>
<td>Total 49439</td>
<td>1.29</td>
<td>Total</td>
<td>52517</td>
<td>1.41</td>
</tr>
<tr>
<td>2010</td>
<td>2010</td>
<td>3460</td>
<td>Winter</td>
<td>1.94</td>
<td>7991</td>
<td>0.88</td>
<td>Winter</td>
<td>6791</td>
</tr>
<tr>
<td>Winter</td>
<td>3326</td>
<td>3347</td>
<td>Spring</td>
<td>1.56</td>
<td>8496</td>
<td>0.55</td>
<td>Spring</td>
<td>8420</td>
</tr>
<tr>
<td>Summer</td>
<td>2964</td>
<td>0.78</td>
<td>Summer</td>
<td>3170</td>
<td>1.29</td>
<td>Summer</td>
<td>10770</td>
<td>0.37</td>
</tr>
<tr>
<td>autumn</td>
<td>1.92</td>
<td>Autumn 5857</td>
<td>Autumn</td>
<td>10441</td>
<td>0.85</td>
<td>Autumn</td>
<td>36422</td>
<td>0.61</td>
</tr>
<tr>
<td>Total</td>
<td>13097</td>
<td>1.54</td>
<td>Total</td>
<td>25514</td>
<td>0.82</td>
<td>Total</td>
<td>275185</td>
<td>1.10</td>
</tr>
<tr>
<td>(2007-2010)</td>
<td>81012</td>
<td>1.65</td>
<td>Total</td>
<td>292797</td>
<td>1.12</td>
<td>Total</td>
<td>275185</td>
<td>1.10</td>
</tr>
</tbody>
</table>
4. Discussion
The issue of Fascioliasis has been subject to numerous works. In study that was performed by Mahami-Oskouei et al. (11) rate of Fascioliasis infection in six provinces of Iran (East Azerbaijan, Khorasan Razavi, Fars, Markazi, Khuzestan, Mazandaran) among the sheep and the cow was reported 1.1% and the figure obtained for Markazi province was 1%, which is consistent with our result.

Iran J Health Sci 2015; 3(4): 62
Abdulhakim and Addis outspread of Fascioliasis among the sheep, the cow, and the goat in Utopia were reported 21% (14). In addition, Khan and Maqbool focused on outspread of Fascioliasis among the cow under different raising conditions in Punjab-Pakistan. The study reported infection with Fasciola in slaughterhouse (22.6%), cattle at livestock farm (17.5%), veterinary hospitals (10.82%), and household cattle (8.76%) (15). Prevalence of Fasciola infections of sheep in Middle Awash River Basin was studied and overall Fascioliasis infection 13.2% was reported by Ahmed et al. (16). The present finding was found to be lower than the result of the previous study conducted by Ahmadi and Meshkehkar (17) who reported prevalence of 35.5% in Khuzestan. The finding of the present research was slightly lower than previous study conducted by Jahed Khaniki et al. (18) in slaughtered animals of Iran who reported the infection rate of Fasciola spp. with 4.32% in cattle, 1.85% in sheep, and 1.56% in. In Punjab province, rate of infection among the in slaughtered buffaloes, buffaloes at livestock farms, veterinary hospitals and in household buffaloes were reported 25.59%, 26.16%, 13.7%, and 10.5%, respectively (19). Hussien et al. (20), showed that 24.29% of male cattle were infected with Fascioliasis. The prevalence of Fascioliasis in sheep and goats of Amol Abattoir, Iran, were 7.7% and 5.4%, respectively (21). Jahed Khaniki et al (18). carried out a study in slaughtered animals of Iran and reported the infection rate of Fasciola spp. with 4.32% in cattle, 1.85% in sheep, 1.56% in goats, 1.31% in camel, and 9.31% in buffalo. Furthermore, reported that the most contributing parasites to marketable liver condemnation were hydatid cyst in sheep, goat and camel, and Fasciola spp. in cattle and buffalo, and the average annual cost for condemned livers was 8.2 million USD. In terms of contamination with Fasciola, our results lower than when compared to the values in literature. The inconsistency between our results and those by other studies might be due to climate and health condition differences that resulted in a higher rate of infection. Fascioliasis is one of the zoonotic diseases in the world that has public health and economic perspectives. Many factors can be effective on the prevalence of Fascioliasis. This study showed that the type of species, maintenance condition, and weather condition can be effective on the prevalence of Fascioliasis.

Conflict of Interests
The Authors have no conflict of interest.

Acknowledgement
Authors thank the authorities of slaughterhouses Arak (Iran) for assistance in collecting samples.

References