Epidemiological Studies of Zoonotic Fascioliasis in Kalubia Province

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Abstract

200 animal fecal samples and 200 human stool samples were collected from endemic areas in Kalubia Province in order to determine fasciolia infectious rate to identify associated risk factors. The overall prevalence of fascioliasis in animal was 14% and in man in the same locality was 8%. Species isolated was F. hepatica. The infectious rates of animal in Kaha, Tukh, Kalub ,Shebein el-kanater, and Benha were 6.5%, 3%,2%,1.5% and 1% respectively. In man the infectious rate in Tukh, followed by Shebein el-kanater, Benha, Kalub, and Kaha were, 3.5%, 2.5%, 1.5%, 0.5%and 0% respectively.

14 out of 100 males examined were positive with infectious rate14%, 2 out of 100 females examined with infectious rate 2%. Infectious rate of human Fascioliasis in different seasons in Kalubia revealed that the summer season was the highest 6.5%, followed by spring 5%, then autumn 1.5%, and the lowest infectious rate was in winter 1%. A descriptive knowledge, attitude, practice, (KAP) survey pertaining to liver fluke infection was carried out in June 2006 to December 2007 using structured questionnaires.

Introduction

The rate of infection of fascioliasis is increased in many countries worldwide **(3)**. Diagnosis of the disease is achieved by locating the ova either in feces or in duodendal drainage or by imaging techniques proved to be the most useful method for confirming the diagnosis and also the follow-up of fascioliasis. Small, often peripheral, nonenhancing, hypodense nodules with tortuous, linear, branching tracts in CT scans, which decrease in size after successful therapy, are highly suggestive of the disease. Immature flukes can produce ectopic masses or abscesses in various locations and during the acute phase of the disease, other structures such as subcutaneous tissue, heart, lungs, pleura, abdominal wall, brain, cecum, epididymis, and stomach can be involved **(10).**

In a particularly unusual report, direct peritoneal involvement with granuloma formation has been reported; eosinophilic reactions can be exhibited in the body as pleuritis and pericarditis. The main strategies for liver fluke control comprise three interrelated approaches, namely stool examination and treatment of positive cases for eliminating human host reservoir, health education for a promotion of green salad consumption to prevent infection, and improvement of hygienic defecation for the interruption of disease transmission. The overall prevalence indicates a considerable decrease of liver fluke in the region. However, the positive rates for several provinces remain high **(11)**.

Published studies provide biology, disease, diagnosis and treatment but the survey related to knowledge, attitude and practice (KAP) on liver fluke infection is weak and inconclusive. KAP on prevention and control of liver fluke infection are essential for decreasing the disease and planning of government. Also, no recent and update study has shown the data on KAP in Kalubia Province by questionnaires obtaining the general data, knowledge, attitude, practice, and a history of participation in the prevention and control of this parasite.

The current study was carried out to throw light on the following:

1- Infectious rate of fascioliasis in random fecal samples of cattle in Kalubia Province.

2- Infectious rate of fascioliasis in random fecal samples of man in the same locality.

3-Epidemiological pattern of fascioliasis infection in Kalubia Province.

4- Questionnaires data were collected by consisting of general parameters, knowledge, attitude, practice, and a history of participation in the prevention and control of liver fluke infection.

Materials and Methods

200 fecal samples were collected from cattle in the different centers of Kalubia province according to **(1).** Also 200 stool samples were collected from individuals occupationally in contact with cattle in the same location (Shebein el-kanater, Kaha, Kalub, Kafr shukr, then Benha). Fecal samples were directly obtained from the rectum or immediately after defecation & placed in polyethylene bags, closed well labeled with a serial number,

locality & date of collection. Data recorded from each animal included: species, owner's name & the time of sampling. Closed fecal polyethylene bags were placed in ice bags, and then transported to the laboratory with a minimum of delay (2).

1- The direct wet mothod.

2-Zinic sulphate centrifugal flotation concentration technique. (5)

Study area:

The study was conducted in Kalubia Province which is situated 40 km from Cairo capital of Egypt. This province is located in the northeast broader line. The geographic area located in place called Delta which in-between two branches of Nile River, where many people habit at the sides of 2 main rivers.

Study design, study population and research instrument:

A descriptive KAP survey pertaining to liver fluke was carried out in June 2006 to October 2007 using structured questionnaires administered by the researcher and trained research assistants. Persons enrolled in this study were from Kaha , Kalub, Tukh ,Shebein el-kanater, and Benha which located in Kalubia Province . A total of 200 persons were included, persons were asked about their KAP of liver fluke by a structured questionnaire, KAP of liver fluke were measured by asking questions related to the disease, mode of disease transmission, treatment, personal hygiene, and a

history of participation in the prevention and control of Liver fluke. All questions related to KAP were multiple choices and open questions.

Statistical analysis:

Data from structured interviews were analyzed using SPSS/PC version 5. Knowledge variables were summed up into a composite score and ranked as poor and good scores (lower or higher than the median score) with a range of 17 to 23. Attitudinal questions were structured in a 3 point Likert scale responses comprising agreement, disagreement and unawareness. The resulting score ranged from 1 to 3. The measure of internal consistency showed an acceptable level of reliability.

Results

Table (1): Infectious rate of Fasciolia hepatica in random fecal samples of cattle in Kalubia Province:

(n = 200) (40 samples from each region)

	Tukh	Shebein el-kanater	**Kaha**	Kalub	Benha
Number of infected cattle	6	3	13	4	2
Infectious rate	3%	1.5%	6.5%	2%	1%

Table (2): Seasonal infectious rate of Fasciolia hepatica in cattle in Kalubia Province:

Season	**No. examined**	**+ve**	**Infectious rate**
Winter	**50**	**2**	**1%**
Spring	**50**	**3**	**1.5%**
Summer	**50**	**13**	**6.5%**
Autumn	**50**	**10**	**5%**
Total	**200**	**28**	**14%**

Table (3): infectious rate of Fasciolia hepatica in random stool samples of humans in contact with cattle in Kalubia Province: (n = 200) (40 samples from each region)

	Tukh	Shebein el-kanater	**Kaha**	Kalub	Benha
Number of infected human	7	5	0	1	3
Infections rate	3.5%	2.5%	0 %	0.5%	1.5%

Table (4): infectious rate of Fasciolia hepatica in relation to sex in Kalubia Province:

Sex	**No. examined**	**No. of positives**	**Infectious rate**
Males	**100**	**14**	**14%**
Females	**100**	**2**	**2%**
Total	**200**	**16**	**8%**

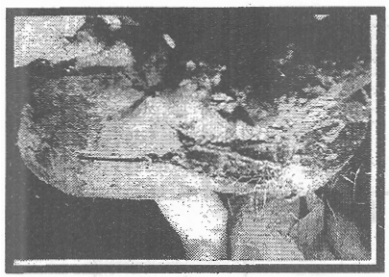

Fig.1 Liver of cattle infected with Fasciola worms.

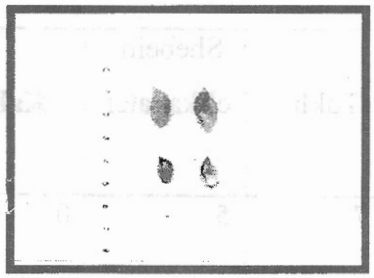

Fig.2 Lymnaea species snails.

Questionnaires data results revealed that 200 persons who were interviewed participated in the study and completed the questionnaires, the age of the majority persons was 20-60 years; and most of the persons were farmers (43%) and students (38%), then public health officers (8 %), doctors and nurses (9%), and others (2%). Regarding the educational level, 75% completed primary school, middle and higher school education and could read and write. 63% had a good level of prevention and control knowledge with regards to defecation and consumption. Generally, the majority of the persons studied had a positive attitude towards liver fluke prevention and control. A good level of liver fluke prevention and control knowledge was found in 41% of the persons studied with a positive awareness, and satisfaction. Hygienic defecation was found in 68% of the persons studied, unhygienic defecation in 32% of the persons studied.

Discussion

The morphological character of the adult worms measure 20 to 75 millimeters in length and 8 to 10 millimeters in width. A cephalic cone is a feature that helps distinguish the worms of Fasciola species from those of Fasciolopsis buski. Being a hermaphrodite, the parasite commonly infects the bile ducts of cattle, man, it has branched testes as well as an ovary and a uterus also it need inter mediate host call Lymnaea species which is aquatic snail ***Fig.1*** and ***Fig. 2***. Eggs of F. hepatica are the largest operculated eggs, and they have an indistinct operculum and are filled with yolk cells. The operculated eggs, which measure 130 to 140 by 80to 85 micrometers, are unembryonated when passed in feces.

From Table (1) the coprologic examinations of *F. hepatica*, infections among cattle in Kalubia Province revealed that out of 200 examined cattle, 28 gave positive results, with infectious rate 14%. A finding that agrees with that what were reported by **(8).** High infectious rate was in Kaha(6.5%) followed by Tukh(3%), Kalub(2%), then Shebein el-kanater(1.5%) respectively the low rate in Benha(1%).

From Table (2) illustrated seasonal infectious rates of cattle *F. hepatica* in Kalubia Province. The summer season was the high infectious rate 6.5%, followed by autumn 5%, then spring 1.5%, and the lowest infectious rate was in winter 1%. From these results it may safely conclude that days and months of hight temprature are of high infectious rate. High temprature is always associated with increased relative humidity; this condition favors the

survival and maintenance of parasitic infectious agent. A finding that agrees with what were reported by **(4)**.

From Table (3) the coprologic examinations of *F. hepatica* infections among human in Kalubia Province revealed that out of 200 examined humans in both sexes, 16 were positives with infectious rate 8 %. High infectious rate was in Tukh (3.5%) followed by Shebein el-kanater (2.5%), Benha (1.5%), then Kalub (0.5%) respectively the low rate in Kaha (0%), the discrepancy between infectious rates may be due to developed sewerage system, socio-economic level and education. Eating raw vegetable salads is a significant risk factor through which families may acquire the infection in endemic areas. A finding that agrees with that what were reported by **(7)**.

From Table (4) it is evident out of 200 examined individuals of both sexes from different age groups, 16 were positives with infectious rate 8%, and 14out of 100 males examined were positives with infectious rate 14% and 2 out of 100 females examined were positives with infectious rate 2%. A finding that agrees with that what were reported by **(6)**.

The Questionnaires data results revealed that the majority of the people in Kalubia Province have no clear-cut knowledge on transmission of liver fluke. These findings are consistent with the study of risk food consumption. It might be one of the possible explanations for the failure to decrease liver fluke infection in the risk areas. Moreover, they also have incorrect knowledge about the fact that liver fluke infection is associated with cholangiocarcinoma. Those with misbelieve should be considered as the important target group that needs to promote their knowledge on

transmission of liver fluke and related diseases so as to remove the potential barriers in control of liver fluke in the community. A positive attitude towards liver fluke prevention and control was found in 63% of the persons studied with a positive awareness. However, 38% of the persons studied still had a poor attitude towards liver fluke prevention and control, suggesting that personal hygiene specifically with the consumption of food containing encysted metacercaria of the liver fluke should be improved. The result also showed that, it is necessary to increase the community awareness of the transmission of the disease in people who lack the knowledge about liver fluke. Local public health services with health education and mobile stool examination should be strengthened. A finding that agrees with that what were reported by

We can conclude that human fascioliasis is found in a high proportion to the relatives of index cases, and this should be taken into account when fascioliasis is detected; it is usually present in most members of a family. Eating raw vegetable salads is a significant risk factor through which families may acquire the infection in endemic areas. It is recommended that patients presenting abdominal pain and low to high eosinophilia, who have recently visited an area endemic for *F. hepatica*, should be carefully studied so as to rule out this parasitosis and the study could be expanded to include other travel companions or family members as well. In endemic areas, adult are the most affected age-group, and the adult groups usually present the highest infection rates, which is consistent with our results. Apparently, good hygienic habits decrease the risk of acquiring

fascioliasis. People with good hygienic habits may be less likely to contract the infection, may having less contact with the contaminated environment than those with poor hygienic habits. In conclusion, the population has a good level of liver fluke knowledge and positive attitude towards liver fluke prevention and control. However, improvement is required regarding personal hygiene specifically with hygienic defecation.

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دِراسات وبائية عن مرض الفاشيولا المشترك في محافظة القليوبية

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الملخّص

جُمِعتْ ٢٠٠ عينة برازية حيوانية و ٢٠٠ عينة برازية إنسانيةٍ مِنْ المناطق المستوطنةِ في محافظةِ القليوبية لتحديدَ نسبة الإصابة بمرض الفاشيولا لتعيين عواملَ الخطر المرتبطةِ. فكانتَ نسبة الإصابة بمرض الفاشيولا في الحيوانَ ١٤ % وفي الإنسان في نفس المنطقة ٨ %.

و كانت نسبة الإصابة بالدودة الكبدية فى الحيوان في مناطق قها، طوخ، قليوب ،شبين القناطرثم بنها هى ٦,٥ %، ٣%،٢%،١,٥% و ١ % على التوالى، وكذالك كانت نسبة الإصابة بالدودة الكبدية في الإنسان في مناطق طوخ ،شبين القناطر، بنها، قها ثم قليوب هي ٣,٥ %، ٢,٥%، ١,٥%، ٠,٥% و ٠ % على التوالي.

١٤ من ١٠٠ ذكر الذين فحصوا كانوا إيجابيون بنسبةِ إصابة ١٤ %، وكذلك ٢ من ١٠٠ أنثى فحصتْ كانوا إيجابيون بالنسبةِ إصابة ٢ %. وقد كشفتْ نسبة الإصابة بمرض الدودة الكبدية في الإنسان في فصول السنةِ المختلفةِ في محافظةِ القليوبية بأنّ فصلَ الصيف كانَ الأعلى ٦,٥ %، فالربيع ٥ %، فالخريف ١,٥ %، ثم الشتاء ١ %. على التوالي. وقد اجري نظامَ المسح الاستفتائى (كي أي بي) للدودة الكبديةِ من يونيو ٢٠٠٦ إلى أول ديسمبر ٢٠٠٧.