Classification of Endemicity of Cystic Echinococcosis in Basra Governorate-Iraq

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The cystic Echinococcosis is a worldwide distribution zoonotic disease caused by *Echinococcus granulosus*. The disease is widespread in Iraq and sometimes referred to as cancer of Iraq, and it may represent the truth due to its high range of occurrence and secondly as a reason of non-diagnosed cases until late time or sudden discovery of infection via sonar, x-ray test or surgical treatment. The disease is endemic in all provinces of Iraq and particularly in Basra governorate. A total of 220 surgically confirmed cases of human hydatidosis were studied in Basra province during the period (2006-2007). The incidence of surgical cases estimated was 3.2 cases/100000 (medium incidence level) per year. A total of 16800 sheep slaughtered at Basra and Ashar abattoirs revealed an overall infection rate of about 22% (4356 sheep). The disease is diagnosed and distributed among liver 13%, Lung 61% and Liver and lung 3%. The investigation of 41 homeless dogs in Basra city revealed that the infestation rate of *Echinococcus granulosus* adult worm was 14.7% and the intensity of infestation was 30.9%. Furthermore, the study found that the area around Basra abattoir had a high infestation rate 80%.

**Keywords:** Basra, Cystic Echinococcosis, Endemicity, Hydatid Cyst.

**INTRODUCTION**

Classification of endemicity of cystic Echinococcosis (CE) due to *Echinococcus granulosus* according to baseline survey data is an important component of medical geography and is also the scientific basis for formulating control programs. In Iraq, cystic Echinococcosis is the major endemic disease and it affects both humans and livestock’s (Babero and Al-Dabbagh, 1963). Hydatidosis is an endemic disease in the southern part of Iraq, including Basra province and pulmonary Hydatidosis is an endemic and enzootic disease in southern Iraq (Benyan and Mahdi, 1987; Al-Mounasi, 1998).

Abu Tabeekh and Thuwaini (2015) studied several zoonotic diseases recorded in human beings by the health sector for 8 years (2008-2015) in Basra governorate. They found that the mean of maximum infections with Hydatid cyst were recorded at 2010 (13.08 + 4-44), while the minimum cases recorded at 2014 (2.91 + 1.88). Tarish et al., (1986) mentioned that geographical distribution of Hydatid disease in Iraq is specially recorded in the center region and low incidence of the disease in the south. Thamer and Awad, (2002) in their study about Hydatid disease in Basra province found about 240 surgical proven cases. From a community-based seroepidemiological study, the prevalence of Hydatidosis (9.0% - 35.5%) was relatively high in Basra region in Iraq (Yacoub et al., 2006).

Molan, (1993) reported about 96 cases of human in surgical hospitals in Theqar province south of Iraq. Human Hydatid disease was recorded in 290 cases in Babylon province, Molan and Baban, (1989) and about 54 cases were recorded in Kirkuk hospital during the year 1989 (Baban, 1990). In Baghdad, about 392 Hydatid disease cases were proved with an average of 3 per year (Al-Khalili et al., 1989). In Sulaimania province, Molan and Baban, (1988) reported the disease in 197 patients and the infection rate was higher in females 63.79% than in males 36.03%.

Jassim et al., (1993) found that 86.6% of dogs were infected in the Baghdad area with mature eggs of *E. granulosus*, in soil samples, 36.5% fecal sample carried eggs of the disease while dogs of northern Al-Tamim, central Diala region and the southern Dequar region showed an infection rate of about 20 , 38 , 56% respectively (Molan and Baban, 1992). The correlation makes it possible to classify Hydatid endemic areas into 3 different prevalence rates states based on high prevalence, medium prevalence and low prevalence (Chai et al., 1989).
A study on the occurrence and seasonal incidence of Hydatid cysts of sheep, goats and cattle was carried out during 2008 and 2009 by weekly regular visits to Mosul abattoir and other areas of 4800 sheep, 960 goats and 720 cattle were examined, 96 sheep, 5 goats and 4 cattle were found to harbor the cysts representing an infection rate of 2%, 0.52% and 0.55%, respectively. The lowest seasonal incidence was observed in winter for sheep (3.16%) and goats (1.25%). The lowest level of incidence was 0.16% for sheep and 0% for goats were noticed in summer. However, in cattle no infection took place in winter and autumn but 1.11% infection rate was equally seen in summer and spring (Jarjees and Al-Bakri, 2012).

Cystic Echinococcosis is also endemic in the Gulf littoral states. The researcher recorded surgical cases with an annual incidence of 3.6 per 100,000 endemicity of disease has been reported in Kuwait and higher infection rate in dogs about 23.1% cases with Echinococcus granulosus were reported. In Al-Ain district in United Arab Emirates (UAE), 15 cases of Hydatid cyst 0.75 per 100,000 population were found (Hassounah, and Behbehani, 1976; Abdul Salam and MandFarah, 1988; Afzal. and Shakir, 1994).

In the south-west, Islamic Republic of Iran, cystic Echinococcosis is a widespread helminthes zoonosis, especially in rural areas, the prevalence of CE was 13.8% in Behbahan, 12.4%in Shoush, 17.3% in Masjed Suleiman and 18.2% in Zeh (Rafiei et al., 2007). Mehrabani et al., (2014) in his study about Hydatid cyst surgeons in patients referred to hospitals in East Azerbaijan province in Iran during 2009-2011, reported about 52 Hydatid cyst surgeries, 27 cases were females. Mean age of patients was 38.3 years. Liver was reported as the most involved organ. The most clinical symptoms were abdominal and liver pain.

Housewives comprised the most victims of the disease. Forty seven percent of patients had one cyst and 59% had the history of contact with dog. The majority of the patients were living in rural areas. Torgerson et al., (2003) indicated that the annual incidence of human cystic Echinococcosis in krygzstan was 5.4 cases per 100,000 in 1991 to 18 cases per 100,000 in 2000. Furthermore, in Kazakhstan, Kyrgyzstan and Tajikistan the incidence rates of the disease up to 13 cases /100,000, 20 cases /100,000 and 27 cases / 100,000 respectively (Torgerson et al., 2006).

A retrospective study to determine annual clinical incidence of human cystic Echinococcosis in 14 Egyptian hospitals between January 1997 and December 1999. Matrouh governorate had the highest annual clinical incidence (1.34-2.60 per 100.000) followed by Giza governorate (0.80-1.16 per 100.000) (Kandeel et al., 2004). For instance, until the end of the 1980s, E. multilocularis endemic areas in Europe were known to exist only in France, Switzerland, Germany, and Austria. But during the 1990s and early 2000s, there was a shift in the distribution of E. multilocularis as the infection rate of foxes escalated in certain parts of France and Germany. As a result, several new endemic areas were found in Switzerland, Germany, and Austria and surrounding countries such as the Netherlands, Belgium, Luxembourg, Poland, the Czech Republic, the Slovak Republic, and Italy (Sreter et al., 2003).

Abdu Wadood, (2007), evaluated the role of vaccination trial of sheep with different types of Hydatid cyst antigens. Serum antibody responded in vaccinated animals with different antigens studied during the period of study, the results revealed that the titer of antibody depend on indirect haemagglutination test test after 21 days and 6 months were 640 and 320 respectively, when Hydatid cyst fluid antigen was used, also it was 320 and 160 respectively, when protocolsicles and laminated layer antigen were used. The animals observed over a year after vaccination and the observation show reduction in the Hydatid cyst growth in the vaccinated groups, whereas, the control group shows growth of small cyst in the liver and lung.

Currently there are no human vaccines against any form of Echinococcosis. However, there are studies being conducted that are looking at possible vaccine candidates for an effective human vaccine against Echinococcosis (Dang, 2009). Most of methods try to prevent and control cystic Echinococcosis by targeting the major risk factors for the disease and the way it is transmitted. For instance, health education programs focused on cystic Echinococcosis and its agents, Furthermore, since humans often come into contact with Echinococcus eggs via touching contaminated soil, animal feces and animal hair, another prevention strategy is improved hygiene (Li et al., 2014). This study intended to evaluate the success of Hydatid control programs by analysis the trends of cystic disease in humans, sheep and dogs infestation.

MATERIALS AND METHODS

A total of 220 surgically confirmed cases of human hydatidosis were studied in Basra province during the period (2006-2007), these cases were registered according to age and sex. The annual distributions of surgical cases per 100,000 populations per year were estimated. The annual incidence of hospital cases rate was determined as number of cases / inhabitant region per 100,000 population. The patients records were classified according to sex (male, female) and age categories, as < 1, 1-4, 5 -14, 15-45, > 45 year. The geographical distribution (medical geography) of surgical cases scattered in the major districts of Basra province (Basra center, Shatt Al-Arab, Abul-Khassib, Al-Zubair, Al-Qurna and Al-Emdaina) were estimated in order to evaluate the endemicity of the disease in Basra. A survey on sheep Hydatidosis at Basra abattoirs was inspected monthly for diagnosis of infected cases.

The infection rate and the distribution of infection in different organs were encountered. Samples of stray dogs were killed with strychnine sulphate tablets Bp. The abdominal cavity was opened along the medial line. The pyloric and ileocecal end of the intestine were ligated. The intestine was slit open along its entire length and then submerged in a tap water in a suitable container and left for 3 hours to remove large particles. Large adult worm such as ascarid and large taeniids were removed and stored in 10% formalin for further identification. Intestinal contents were washed with normal saline (0.85% Nacl) or tap water in a cylindrical glass container and then allowed to settle. Sediment was poured into Petri dishes and examine under strong illumination using dissecting microscope. Minute Echinococcus worms were washed and collected in 10% formalin (Soulsby, 1982).

RESULTS AND DISCUSSION

A total of 220 surgically proven hydatidosis has been studied. The distribution of these cases, according to the sex and age is shown in Table 1. 2. The results showed a higher infection rate in females in 131 (60%) cases than that of males 89 (40%). The results of the present study are in agreement with the findings of (Al-Mounasi, 1998; Thamer and Awad, 2002). The sex difference in the present study may be attributed to the epidemiological factor such as socio-cultural and occupational risk or due to the fact that the females are more closely associated with the infection sources rather than intrinsic factors.
The majority of cystic Echinococcosis was found between (15-45) years of age. The highest cases of the disease were found at age group (15-45) year in both sexes. The infection rate recorded was 138 (63%) in both male and female patients. Females showed a high rate 60% at age group 15-45 years more than males 40% at the same age group. The high risk of adult human infection seems to be most important of acquiring Echinococcus infection by children in contact with infected dogs by playing or increasing movement on polluted environmental with eggs and other characterized unhygienic places. In general the average rate of surgical cases in Basra province was 3.2 per 100000 populations, similar result was reported in Kuwait with surgical incidence rate 3.6 per 100,000 populations (Shweiki, et al., 1990).

The geographical distribution of surgical cases in Basra shown in Table 3. The average rate of entire Basra province during (2006-2007) was 3.2 cases per 100000 populations (medium incidence level). The annual case rate of Shatt-Al-Arab was 3.4 per 100000 followed by Basra center, Abu-Alkhassib, Al-Zubeir and Al-Qurna and Al-Madaina, 3.3, 3.18, 2.95 and 2.7 respectively.

Table 4 shows the number of sheep examined for Hydatidosis and levels of infection at Basra abattoirs during the period 2006-2007. A total of 19800 slaughtered sheep was inspected for infection. The overall infection rate of the sheep was 22%. The organ mostly infected with Hydatid cyst is shown in Table 4. The infection rate of liver, lung and liver and lung was 25%, 13% and 65% respectively. The high infection rate of

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sheep found in the present study 22% may be due to eating of large mass of grass and vegetable materials and remain close proximately the household and the presence of dogs at the same site specially in the rural villages as well as, sheep are considered to be potential source of canine infection, as its harbor the most fertile Hydatid cyst (Tarish et al., 1986; Baban, 1990; Molan, 1993; Al-Mounasi, 1998).

The present study revealed that the liver and lung in sheep are the most infected organs. Larval localization occurs in liver sinusoids (capillaries) as first organ faced by on echosources. Moreover, liver is considered as a good media for nutrient and growth due to protein synthesis, albumin, prothrombin and fibrinogen of the blood plasma.

From 1998 to 2002, Forty one stray dogs were investigated for presence of E.granulosus and other parasites. As The prevalence of parasites in dog's intestine is summarized in Table 5. The infestation rate of E.granulosus was 6(14.7%), the intensity infestation of the E.granulosus 185(30.9%) which was higher than those of the other taenid 5(1.6%), Nematoda 24(2.5%) and Trematoda 520(27.36%). The infection rate and intensity infestation of E.granulosus in stray dogs recorded in the present study was 12.9% and 28.9 respectively. Infestation rate of the adult worm's E.granulosus in stray dogs between 18-85% in Baghdad, Theqar, Dyala, Mosul and Erbil (Babero and Al-Dabbagh, 1983; Al-Mounasi, 1998; Tarish, 1986, Baban, 1990; Molan and Baban, 1992). A high infestation rate 80% of dog was around Basra abbatoir which is due to exposure of stray dogs to a continuous Hydatid cyst discarded.

CONCLUSION

The results showed a higher infection rate in females than in males with Hydatidosis. The highest cases of the disease were found at age group (15-45) year in both sexes. The annual case rate was higher in Shatt-Al-Arab compared with other regions of Basra. The overall infection rate of the sheep was 22% and the high infection rate was in the liver. The infestation rate of E. granulosus was higher compared with other parasites of stray dog's intestine.

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REFERENCES


