



Retrospective study of several zoonotic diseases affected human being in Basra governorate

Mudhar A. S. Abu Tabeekh ^{1*} and Mahdi Morshed Thuwaini ²

¹ Veterinary Hospital, Basra, Iraq

² College of Nursing, Thi-Qar University, Thi-Qar, Iraq

ARTICLE INFO

Received: 10.06.2015

Revised: 25. 07.2015

Accepted: 27.07.2015

Publish online: 30. 07.2015

***Corresponding author:**

Email address:

mudhar_64@yahoo.com

Abstract

Zoonotic diseases are a big group of diseases that affect

human being or animal, and transfer from each to another, such as Tuberculosis, Brucellosis, Leishmaniasis, Toxoplasmosis, Hydatid cyst and Rabies.

The control of these diseases needs a cooperation and coordination between veterinary and human health sectors. This study intends to analyze several zoonotic diseases recorded in human being by health sector for 8 years (2008-2015) in Basra governorate using a comparison statistical methods. The results of this study reported the occurrence of the following zoonotic diseases: Hydatid cyst, Toxoplasmosis, Leishmaniasis, Rabies, Malta fever and Tuberculosis. Moreover, the tuberculosis was appeared as the most spreading zoonotic disease in human being. Meanwhile, the rabies revealed the less occurrence mean.

To cite this article: Mudhar A. S. Abu Tabeekh and Mahdi Morshed Thuwaini, (2015). Retrospective study of several zoonotic diseases affected human being in Basra governorate. MRVSA. 4 (2), 8-16.

DOI: [10.22428/mrvsa.2307-8073.2015.00422.x](https://doi.org/10.22428/mrvsa.2307-8073.2015.00422.x)

Keywords: Basra, Human being, Iraq, Rabies, Tuberculosis, zoonotic diseases.

Introduction

Any disease or infection that is naturally transmissible from vertebrate animals to humans and vice-versa is classified as a zoonosis. Over 200 zoonosis have been described and they have been known for many centuries. They are caused by all types of agents: such as: bacteria, parasites, fungi, viruses and unconventional agents. A strong relationship between livestock health and production and zoonotic diseases have developed over thousands of years. The domestication of animals led them into close contact with human populations. The livestock are providing the human meat, eggs and milk. In addition the animals are also used for other purposes such as transportation, draught power, fuel and clothing. As the livestock populations were growing denser as agriculture allowed local inhabitants growth resulting in higher circumstances for transmission and steadfastness

of diseases across humans and domestic and wild animals (Diamond, 2002; Wolfe *et al.*, 2007). These zoonosis diseases may lead to a serious risk to public health, in addition to the severe economic outcomes, worldwide. This risk is increased in the people working closely to the animals.

Veterinary medicine has a long and distinguished history of contributing to the maintenance and promotion of public health. At least 61% of all human pathogens are zoonotic, about 75% of the new diseases that have affected humans over the past 10 years have been caused by pathogens originating from an animal or from products of animal origin. Many of these diseases have the potential to spread through various means over long distances and to become global problems. In addition a number of well-known and preventable animal diseases that can be transmitted to humans such as Rabies, Brucellosis, Leishmaniasis and Echinococcosis continue to occur in many countries especially in the developing world, where they mostly affect the poorest segment of the human population. They cause a serious amount of deaths and millions of affected people every year (WHO, 2011).

Veterinary health is an essential part of public health and includes various types of cooperation between the disciplines that link the health triad, people-animals-environment, and all of its interactions. Many factors lead to the emergence of zoonotic diseases. Environmental changes, human and animal demography, pathogen changes and changes in farming practice are a few of them. Social and cultural factors such as food habits and religious beliefs play a role too.

The world health organization (WHO) has been closely linked with various aspects of the work of the Food and Agriculture Organization of the United Nations (FAO) and the World Organization for Animal Health (OIE) in relation to zoonosis, food safety, and the public health aspects of trade in animals and animal products. The Veterinary Directorate in Iraq plays an important role by identifying and evaluating microbiological hazards to human health of animal origin, contributing to field and laboratory investigations of zoonotic diseases, supervising the work of the zoonosis control programs and providing technical and scientific assistance to member states for their surveillance and control programs, when requested.

Review of literature showed the shortage in the studies regarding the zoonotic diseases in Iraq, so this study was designed to analyze several zoonotic diseases recorded in human being for 8 years (2008-2015) in Basra governorate.

Materials and Methods

This study was conducted at Basra governorate, Basra is located in south of Iraq. Records of zoonotic diseases including Tuberculosis, Brucellosis, Leishmaniasis, Toxoplasmosis, Hydatid cyst and Rabies in Basra governorate between 2008-2015 were obtained from health sector. In addition, the monthly technical reports of Basra veterinary hospital and reports of the eradication of homeless dogs and the campaigns of vaccination against Malta fever (brucellosis) had also been studied. Data were compiled, and comparison and analysis were done according to ANOVA by used Graph Pad's analysis. This study reported most spreading zoonotic disease in human who lives in Basra city and the less effected diseases, as well as a comparison analysis of the two types of tuberculosis

(pneumonic and visceral tuberculosis) and two types of Leishmaniasis (visceral and cutaneous) were also investigated.

Results and Discussion

The results of this study revealed the presence of six zoonotic diseases during the eight years of study 2008-2015. The data (means and standard deviation) of this study revealed that the cases of Hydatid cyst were differed significantly at 2009-2012 ($p > 0.05$) in compare with other years. The maximum infections with Hydatid cyst were recorded at 2010 (13.08 + 4.44), while the minimum cases recorded at 2014 (2.91 + 1.88) (Table. 1). Echinococcosis (Hydatid disease) or Echinococcal disease (*Echinococcus granulosus*), is a parasitic disease that affects both humans and other mammals, such as sheep, dogs, rodents and horses (Berger and Marr, 2006). The Echinococcus is spread by eating the food or water that contains the parasite's eggs or by close contact with an infected animal. While, the disease are transmitted to definitive hosts by means of eating infected, cyst-containing organs (Eckert and Peter, 2004). The results of this study is compatible with previous studies (Molan, 1993), that reported the occurrence of hydatidosis caused by *Echinococcus granulosus* in ninety-six cases of human. These cases were diagnosed from surgical records of hospitals in Thi-Qar Province, Southern Iraq during 1989.

Table (1): Zoonotic diseases of eight years in Basrah governorate (Mean+ SD)

Disease	2008	2009	2010	2011	2012	2013	2014	2015
Hydatid cyst	6.50 ± 4.62 ^{ab}	10.25 ± 5.01 ^a	13.08 ± 4.44 ^a	12.91 ± 5.82 ^a	9.58 ± 4.20 ^a	3.66 ± 2.77 ^b	2.91 ± 1.88 ^b	4.75 ± 2.50 ^b
Toxoplasmosis	6.17 ± 3.81	7.58 ± 5.79	10.00 ± 7.94	6.83 ± 4.13	8.33 ± 5.51	11.83 ± 3.95	6.25 ± 4.71	6.00 ± 3.74
Leishmaniasis	9.5 ± 2.53 ^b	9.0 ± 3.82 ^b	2 6.0 ± 4.63 ^a	1.66 ± 1.01 ^c	1.16 ± 1.06 ^c	1.75 ± 1.05 ^c	14.50 ± 5.50 ^{ab}	0.00 ± 0.00 ^c
Rabies	0.33 ± 0.49	0.25 ± 0.62	0.42 ± 0.67	0.00 ± 0.00	0.25 ± 0.13	0.00 ± 0.00	0.00 ± 0.00	0.00 ± 0.00
Malta fever	1.00 ± 0.76 ^b	0.58 ± 0.09 ^b	2.50 ± 1.50 ^{ab}	5.16 ± 2.55 ^a	0.16 ± 0.11 ^b	1.08 ± 0.05 ^b	0.16 ± 0.07 ^b	1.25 ± 0.46 ^b
Tuberculosis	46.58 ± 21.40	53.42 ± 11.38	49.83 ± 11.46	54.32 ± 8.90	51.16 ± 8.75	46.08 ± 6.63	50.16 ± 6.01	43.25 ± 15.49

a, b, c Means in horizontal rows with different superscripts were significantly different at ($p < 0.05$). Mean value of 12 months except for 2015 for 4 months. SD = standard deviation.

The disease is widespread in Iraq and sometimes referred as cancer of Iraq and it may represent the true due to high range of occurrence and secondly as a reason of non-diagnosed cases until late time or sudden discover of infection via ultrasound, x-ray test or surgical treatment (Veterinary directorate, 2011). 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).

The results of this study revealed human infections with Toxoplasmosis. The infections were not significant ($p>0.05$) among all years of the study, however, high numbers of patients with this parasitic disease was found at 2013 ($11.83 + 3.95$) and less patients at 2015 ($6.00 + 3.74$). The result of study is in agreement with previous study (Al Se'adawy, 2010). Toxoplasmosis is one of the important zoonotic diseases caused by protozoan called *Toxoplasma gondii*. Animals are infected by eating infected meat and ingestion of feces of a cat. Although cats are often blamed for spreading toxoplasmosis, contact with raw meat is a more significant source of human infections in many countries, and fecal contamination of hands is a greater risk factor (Torda, 2001). The disease characterized by abortion of pregnant female, the parasite can cause encephalitis (inflammation of the brain) and neurologic diseases, and can affect the heart, liver, inner ears and eyes chorioretinitis (Paul, 1999). The results of this study revealed that the Leishmania was occurred at the mean of ($26.0 + 4.63$) at 2010 which was significant ($p<0.05$) in compare with other years, however less incidence of the disease was reported at 2015 (0.00). This result may be related with the improvement of social education and health services due to the cooperation between veterinary and health sectors. In Iraq, Leishmania infection was first recorded at 1916 in 9 patients; the disease has an important value in Iraq and specially affected the rural areas. Childs less than 5 years of age are more susceptible to the infection (AL-Alak, 2008). In this study the two types of Leishmaniasis were studied, the visceral and cutaneous Leishmaniasis as shown in Figures (1-8).

Visceral Leishmaniasis or kalaazar, Hindi term of "Black fever", is caused by several species of flagellated protozoan parasites of the genus *Leishmania*. It is found in many areas of the world and characterized by high fever, substantial weight loss, swelling of the spleen and liver, and anemia (WHO, 2008a). In addition, to visceral Leishmaniasis which is characterized by organ failure and death (WHO, 2008b). The disease transmitted by the sand fly from an infected human host, which included 600 species with 70 carrier species (Sukkar, 1974). Cutaneous Leishmaniasis, also known as Baghdad boil disease with incubation period is up to six months, so thousands could have the disease without knowing it. It is a dangerous disease, which hits mostly children and could lead to death or leave skin deformities if no treatment is available (WHO, 2008a).

The result of this study also showed that infections with rabies in Basra governorate during 2008-2015 were not differed statistically ($p>0.05$), in addition no cases were recorded in the last 3 years. Several reasons are played important roles in the decreases of rabies in the recent years in Iraq, and rabies should be consider at critical point. Thus, the collaboration between the veterinary and health sectors in Basra led to reduce the risk of exposure to rabies by human being vaccination. In addition, the vaccination of pets, eradication of homeless dogs, and other control managements such as the eradication of the random slaughter. The veterinary hospital in Basra implemented the campaigns program to reduce the homeless dogs in the governorate. The homeless dogs were killed to reduce its number and about 1062, 18193, 18818, 2511 , 19253, 22123, 29359 , 32027, 33304 and 4988 were killed in 2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014 and in the first 4th months of 2015 respectively (Basra veterinary hospital, 2015).

The term of rabies is derived from the Latin rabies, "madness" (Simpson, 1979). All human cases of rabies were fatal until a vaccine was developed in 1885 by Louis Pasteur and Emile Roux (Geison, 1978). Rabies is viral disease that causes acute encephalitis (inflammation of the brain) in warm-blooded animals (Drew, 2004). A big list of zoonotic diseases, which differs in their risk, but rabies stand in front of them because the mortality rate may reach 100%. Some countries regarded two infections of rabies at same geographic area as outbreak (Veterinary directorate, 2011).

The results of this study also reported the occurrence of brucellosis. The incidence of Malta fever were showed highly significant difference ($p > 0.05$) at 2011 ($5.16 + 2.55$). Whereas, less incidence were appeared at 2012 and 2014 ($0.16 + 0.11$ and $0.16 + 0.07$) respectively. The veterinary hospital in Basra supported by veterinary sector in Baghdad worked together for many years and implemented a vaccination program. All sheep and goats between 3- 8 months of age in Basra city were vaccinated against *Brucella* using Rev 1, vaccine. The Basra veterinary hospital reported about 20555, 21907 (19207 sheep and 2700 goats), 26655 (23547 sheep and 3108 goats), 26822, 48960 and 29768 were vaccinated in 2009, 2010, 2011, 2012, 2013 and 2014 respectively.

Brucellosis, also called Bang's disease, Malta fever, Maltese fever, Mediterranean fever, Rock fever, or undulant fever. Brucellosis is came at first to the attention of British medical officers in the 1850s in Malta during the Crimean War (Wilkinson, 1993). Malta fever is highly contagious zoonosis caused by ingestion of unsterilized milk or meat from infected animals or close contact with their secretions. Transmission from human to human, through sexual contact or from mother to child, is rare but possible (Northern Ireland Regional Zoonosis Group, 2004). In cattle, this disease is also known as contagious abortion and infectious abortion (Malhotra, 2004; Basra veterinary hospital, 2014).

The results of this study also revealed the incidence of the visceral and pneumonic tuberculosis (Figures 1-8). However, no significant differences ($p > 0.05$) was recognized between tuberculosis cases from 2008-2015. The disease is wide spread in Iraq, thus, to control the infection of human being, BCG is given obligatory after birth since 1973. Tuberculosis disease in cattle (known as bovine TB) is caused by *Mycobacterium bovis*. It is a slow-growing aerobic bacterium and the causative agent can also jump the species barrier and cause tuberculosis in humans (Grange *et al.*, 1996). It has been estimated that, during the first half of the 20th century, *M. bovis* was responsible for more losses among farm animals than all other infectious diseases. *M. bovis* is usually transmitted to humans via infected milk, although it can also spread via aerosol droplets.

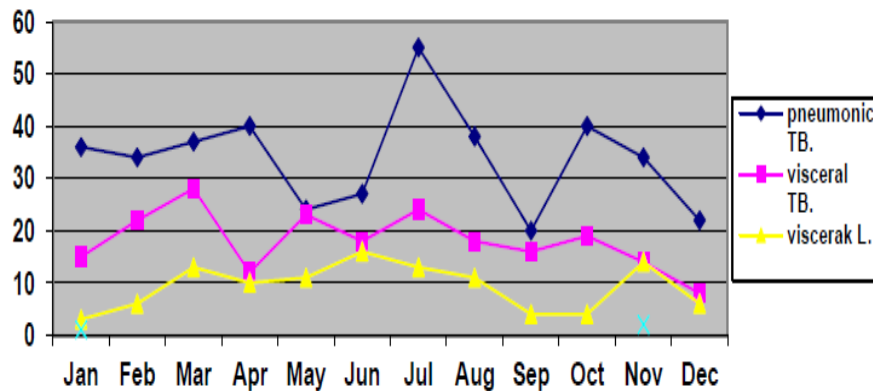


Figure 1: Infection of Tuberculosis (pneumonic and visceral) and Leishmaniasis (visceral and cutaneous) at 2008

Actual infections in humans are rare, mostly due to pasteurization killing any bacteria in infected milk. *M. bovis* can be transmitted from human to human and from human to cattle, but such occurrences are rare (O'Reilly and Daborn, 1995). In conclusion, this study revealed the occurrence of the following zoonotic diseases Hydatid cyst, Toxoplasmosis, Leishmaniasis, Rabies, Malta fever and Tuberculosis in Basra

governorate from 2008-2015. Moreover, tuberculosis was appeared as the most spreading zoonotic disease in human being with 4653 reported cases. Meanwhile, the rabies revealed the less occurrence with reported 15 cases.

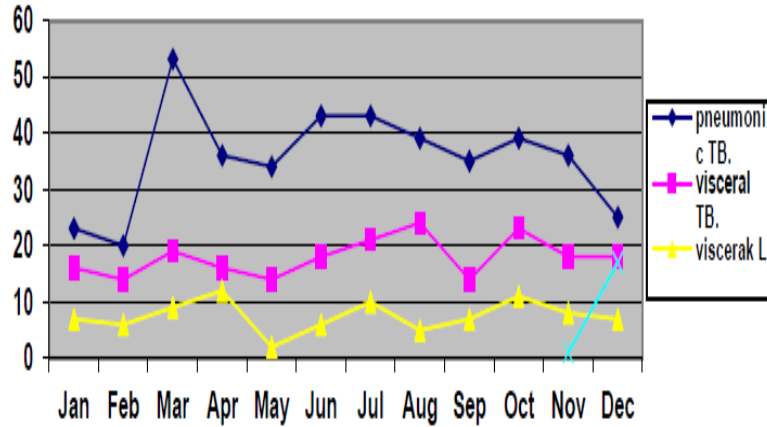


Figure 2: Infection of Tuberculosis (pneumonic and visceral) and Leishmaniasis (visceral and cutaneous) at 2009

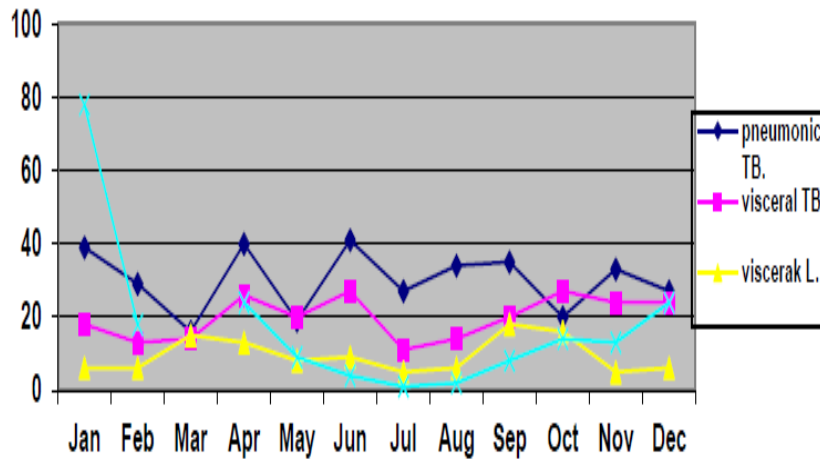


Figure 3: Infection of Tuberculosis (pneumonic and visceral) and Leishmaniasis (visceral and cutaneous) at 2010

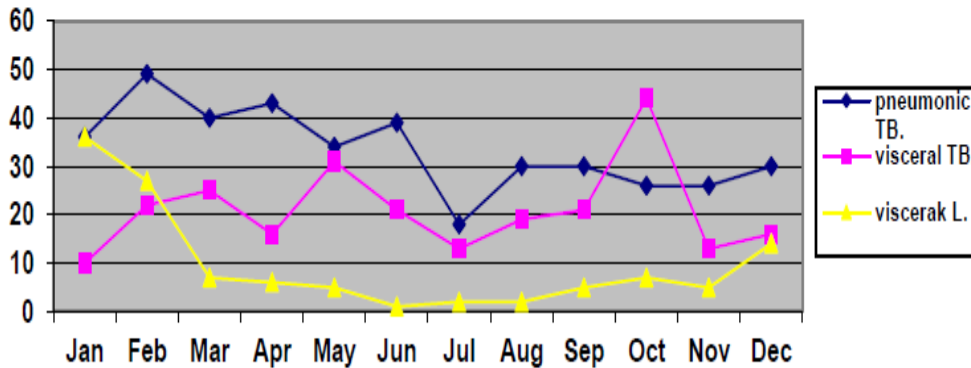


Figure 4: Infection of Tuberculosis (pneumonic and visceral) and Leishmaniasis (Visceral and cutaneous) at 2011

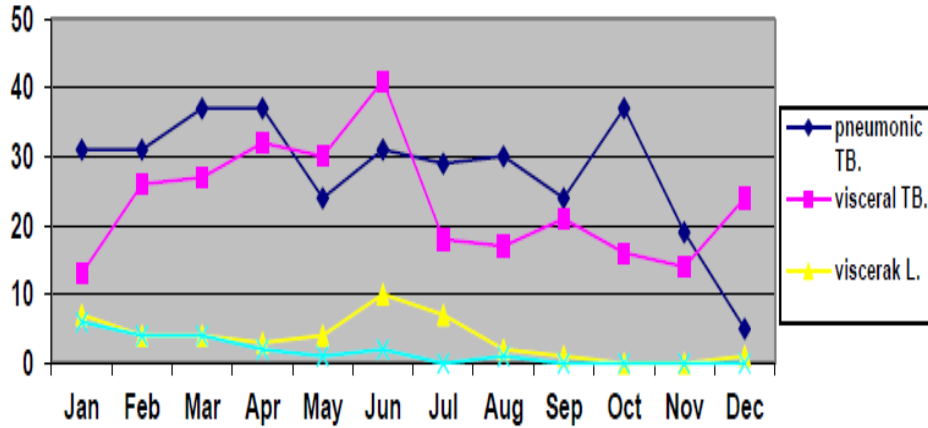


Figure 5: Infection of Tuberculosis (pneumonic and visceral) and Leishmaniasis (Visceral and cutaneous) at 2012

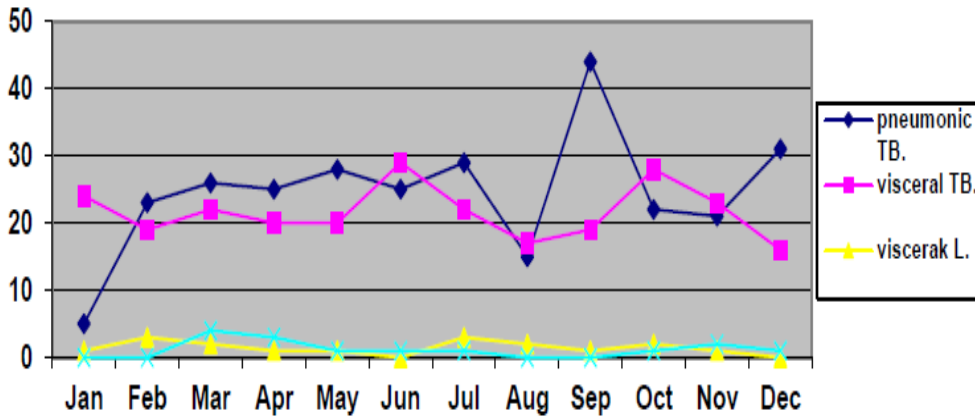


Figure 6: Infection of Tuberculosis (pneumonic and visceral) and Leishmaniasis (Visceral and cutaneous) at 2013

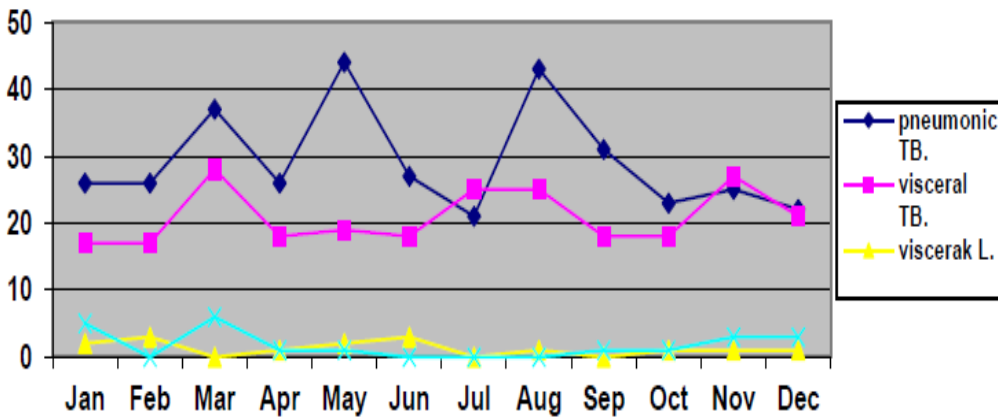


Figure 7: Infection of Tuberculosis (pneumonic and visceral) and Leishmaniasis (Visceral and cutaneous) at 2014

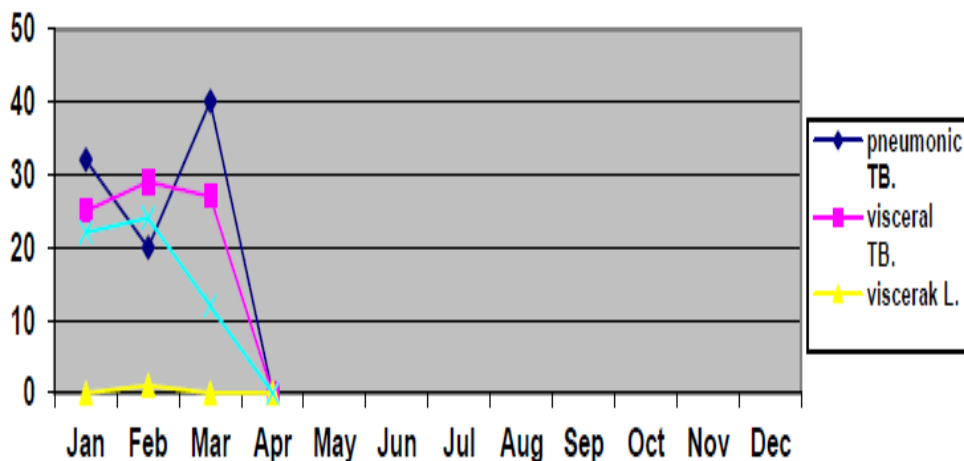


Figure 8: Infection of Tuberculosis (pneumonic and visceral) and Leishmaniasis (Visceral and cutaneous) at 2015

Acknowledgments

We acknowledge scientific support and contributions by the staff at Basra Veterinary Hospital specially Dr. Ali Rasheed, Dr. Hamed Abdul Majeed and Dr. Amel Abdul

References

- AL-Alak SF. (2008).** Study in the epidemiology of visceral Leishmaniasis (Kala-azar). AL-Sader General Hospital in Amara, Directorate of Health in Missan.
- Al Se'adawy, Mohenned A Hemza. (2010).** Prevalence of Toxoplasmosis in pregnant women in Al Muthana province / Iraq. Kufa Journal For Veterinary Medical Sciences .1; (1): 166-173.
- Berger SA and Marr JS. (2006).** Human Parasitic Diseases Sourcebook. Jones and Bartlett Publishers: Sudbury, Massachusetts.
- Basrah veterinary hospital.** reports of homeless dogs eradication (2006 – 2015).
- Basrah veterinary hospital.** reports of vaccination against brucellosis (2009-2014).
- Dang Z. (2009).** Evaluation of *Echinococcus multilocularis* Tetraspanins as Vaccine Candidates against Primary Alveolar Echinococcosis. Vaccine 27(52): 7339-7345.
- Diamond J. (2002).** Evolution, consequences and future of plant and animal domestication. Nature 418:700–707.
- Drew WL. (2004).** Chapter 41: Rabies. In Ryan, K.J. and Ray CG (editors). Sherri's Medical Microbiology (4th ed.). McGraw Hill. pp. 597–600.
- Eckert J and Peter D. (2004).** Biological, Epidemiological, and Clinical Aspects of Echinococcosis, a Zoonosis of Increasing Concern. Clinical Microbiology Reviews 17.1: 107-135.

Geison G L. (1978). Pastuer's work on rabies: Reexamining the ethical issues diagnosis for developing countries. Hastings Center Report 8 (April): 26.

Grange J M, Malcolm DY and Isabel N DK. (1996). Guidelines for speciation within the *Mycobacterium tuberculosis* complex. Second edition.

Malhotra R. (2004). "Saudi Arabia". *Practical Neurology* (4): 184–5.

Molan AL. (1993). Epidemiology of hydatidosis and echinococcosis in Theqar Province, southern Iraq. *Jpn J Med Sci Biol.* 46;(1):29-35.

Northern Ireland Regional Zoonosis Group. (2004). Diagnosis and Management of Acute Brucellosis in Primary Care, *Brucella* Subgroup.

OReilly LM and Daborn CJ. (1995). The epidemiology of *Mycobacterium bovis* infections in animals and man: a review. *Tuber Lung Dis.* 76 (1): 1– 46.

Paul M. (1999). Immunoglobulin G avidity in diagnosis of toxoplasma lymphadenopathy and ocular toxoplasmosis. *Clin. Diagn. Lab. Immunol.* 6 (4): 514–518.

Simpson DP. (1979). Cassell's Latin Dictionary (5 ed.). London, Cassell Ltd. Pp 883.

Sukkar F. (1974). Study on sand flies as vectors of kala-azar in Iraq. *Bull.End.Dis.Baghd.*15 (2): 85-104.

Torda A. (2001). Toxoplasmosis: Are cats really the source. *Aust. Fam. Physician* 30 (8): 743– 747. **Veterinary directorate. (2011).** Strategy plan of 2011-2020, 51-54.

World Health Organization (WHO). (2011). Zoonosis and veterinary public health (VPH), WHO 2011 report.

World Health Organization (WHO). (2008a). IRAQ: Leishmaniasis continues to spread in southern province, 2008 report.

WHO World Health Organization (WHO). (2008b). IRAQ: Leishmaniasis affecting children in south, 2008 report.

Wilkinson L. (1993). **Brucellosis.** In Kiple, Kenneth F. (ed.). *The Cambridge World*

History of Human Disease. Cambridge University Press.

Wolfe ND, Dunavan CP, Diamond J. (2007). Origins of major human infectious diseases. *Nature* 447:279–283.