

# Overview of Leptospirosis in Albania 2010 -2013

Luljeta Alla<sup>1</sup>, Erjona Abazi<sup>2</sup>, Xhelil Koleci<sup>3</sup>

<sup>1,2</sup>Institute of Public Health, Tirana, Albania

<sup>3</sup>Agriculture University, Tirana, Albania

**Abstract:** *Leptospirosis is a worldwide zoonotic infection with a much greater incidence in tropical regions and has now been identified as one of the emerging infectious diseases. The aim of this study is to assess the epidemiological features of human leptospirosis in Shkodra district during a period characterized by significant changes in the natural environment, especially floods the years 2010-2013. Epidemiological data for the period 2010-2013 were collected based on active and passive surveillance with individual forms for zoonoses, according. Sociodemographic characteristics include location of residence, age, gender, occupation. Overall 78 cases of Leptospirosis were reported over the period 2010 - 2013 throughout the country. Shkodra occupies 41% of reported cases of leptospirosis at national level for this period with 32 cases. Most of cases were reported during 2010-2011. According to profession 46.6% are fishermen, 16.7% farmers, 6.7% in retirement and 6.7% other professions. The prominent clinical features were icterus (100%), fever (98%), headache (78%), muscle ache (96%) and urine with dark colour (88%). Rats are an important reservoir and source for spreading infection of Leptospirosis in humans.*

**Keywords:** leptospirosis, outbreak, flooding, zoonosis, reservoir

## 1. Introduction

Leptospirosis is a worldwide zoonotic infection with a much greater incidence in tropical regions and has now been identified as one of the emerging infectious diseases. The epidemiology of leptospirosis has been modified by changes in animal husbandry, climate, and human behaviour. Resurgent interest in leptospirosis has resulted from large outbreaks that have received significant publicity. Leptospirosis is the most common bacterial infection transmitted from animals to humans, and has been identified by the World Health Organisation as a neglected tropical disease, requiring further research into its epidemiology and global disease burden. It is geographically widespread, with an estimated 300-500,000 severe cases each year and fatality rates of up to 30% (1,2). The epidemiology of leptospirosis has been modified by changes in animal husbandry, climate, and human behaviour (3,4). The natural reservoirs for leptospirosis are wild animals, particularly rodents, and domestic animals, commonly bovines and pigs, which, after infection, can become chronic renal carriers. Individuals can get infected accidentally with direct or indirect contact through lacerated mucous membranes and skin in contact with urine of rodents or through contaminated food products. This is the most common way of infection of humans (5,6). Incubation period: the incubation period is usually 5–14 days, with a range of 2–30 days. Leptospirosis is a zoonosis of ubiquitous distribution, caused by infection with pathogenic *Leptospira* species. The spectrum of human disease caused by leptospires is extremely wide, ranging from subclinical infection to a severe syndrome of multiorgan infection with high mortality. Leptospirosis infection in humans causes a range of symptoms, and some infected persons may have no symptoms at all. Leptospirosis is a biphasic disease that begins with flu-like symptoms (fever, chills, myalgia, intense headache and jaundice (7-10). There is a correlation between the amount of rain and incidence of leptospirosis. Thus, the disease has a seasonal character in mild climate areas and throughout the year in tropical climate. Albania is an endemic country with regard to leptospirosis. The first human cases were detected

during the period 1949-1955 mainly in south-west part of the country, but also in Shkodra district. The first cases with Leptospirosis in Shkodra were identified in animals in the year 1953. Most affected areas were Mjeda and Gur i zi village and municipality of Vau i Dejes. During the period 2005-2013 there was an increase in cases of Leptospirosis in Shkodra. The district of Shkodra is located in north-western Albania. It has a surface of 1302.96 km<sup>2</sup>, divided administratively into two municipalities: Shkodra and Vau Dejes which are surrounded by three rivers. This aim of this study is to assess the epidemiological features of human leptospirosis in Shkodra district during a period characterized by significant changes in the natural environment, especially floods the years 2010-2013.

## 2. Material and Methods

Epidemiological data for the period 2010-2013 were collected based on active and passive surveillance with individual forms for zoonoses, according to sociodemographic characteristics including location of residence, age, gender, occupation. Data were also collected regarding the clinical picture, exposure to animals and laboratory diagnosis. Field investigations were conducted in collaboration with veterinary service of Shkodra district. Serum specimens were collected from suspected individuals and submitted for serological testing at Institute of Public Health. Data were analysed according to time-place-person using EpiInfo 7 software.

## 3. Results and Discussion

Overall 78 cases of Leptospirosis were reported over the period 2010 – 2013 throughout the country. Shkodra occupies 41% of reported cases of leptospirosis at national level for this period with 32 cases. Most of cases were reported during 2010-2011 (fig 1). The incidence of leptospirosis in Shkodra presented a stable trend from 0.5 to 0.3 cases/10,000 population from 2010 to 2013. 85% of the total cases were males. The time from the onset of first symptoms until they presented to the hospital were  $7.2 \pm 3.6$

days. The mean time of hospital stay was 12.2 (3.8) days. The most affected was the age group 45-59 years old (40%) and >60 years old (27%) (fig. 2). According to profession 46.6% are fishermen, 16.7% farmers, 6.7% in retirement and 6.7% other professions. The prominent clinical features were icterus (100%), fever (98%), headache (78%), muscle ache (96%) and urine with dark colour (88%).

Sixteen percent of cases were not tested in laboratory and the treated was started based upon clinical diagnosis. The most affected resulted the rural area Berdise Vau i Dejes, Ana e Malit, Dajc, Bushat, Velipoje, Gur i zi. No correlation was found between cases in animals and in humans ( $p=0.2$ ). There was flooding last years in these municipalities, nevertheless most of cases were found in urban areas with 61.5% of the total cases.

Field investigation was done to assess the extent of the destruction of habitat and resting the mice. Rats were caught and examined at laboratory of rodentology at Institute of Public Health but tested negative for *Leptospira* spp (11). Rats are an important reservoir and source for spreading infection of *Leptospira* in humans. Shkodra is a region with a rich background in terms of presence in animals leptospires. The increase number of human cases in 2011 was related to outbreak caused by flooding in district of Shkodra, and epizootic situation (12,13). The highest amount of rainfall, presence numerous rodents which colonize especially the area of Shkoder and higher density of livestock for  $\text{km}^2$  influenced the increase of number of cases leading to the outbreak of leptospirosis. During floods, the infectious agent spreads and reaches distant areas under the impact of water (14,15). Male were more infected than females due to occupational character of the disease. Data from the meteorological station in Shkodra showed a sharp increase of rainfalls in last five years. The cases are shown at any time of year but predominate in summer and autumn. Exposure to animals could be a potential risk factor for the disease, contact with contaminated soil with rat's urine surrounding home were found to be highly associated as an independent factor (16,17). Prevention strategies of human leptospirosis include wearing protective clothing for people at occupational risk and avoidance of swimming in water that may be contaminated. Leptospirosis control in animals is dependent on the serovar and animal species but may be either vaccination, a testing a culling programme, rodent control or a combination of these strategies.

#### 4. Conclusion

A potential risk factor for spreading the disease was the contamination of the lake Shkodra from the sewages. Rats are an important reservoir and source for spreading infection of *Leptospira* in humans. Outdoor and agricultural workers are particularly at risk but it is also a recreational hazard to those who swim or wade in contaminated waters. In endemic areas the number of leptospirosis cases may peak during the rainy season and even may reach epidemic proportions in case of flooding because the floods cause rodents to move into the city.

#### References

- [1] Mills JN, Childs JE. Ecologic studies of rodent reservoirs: their relevance for human health. *Emerging Infectious Disease*. 2014;529-537
- [2] Institute for International Cooperation in Animal Biologics, Center for Food Security and Public Health. Leptospirosis. Institute for International Cooperation in Animal Biologics, Center for Food Security and Public Health. 2015 May 1.
- [3] *Clin Microbiol Rev*, 14 (2001), pp. 296-326 P. Levett
- [4] E. Meites, M.T. Jay, S. Deresinski, W.J. Shieh, S.R. Zaki, L. Tompkins et al. Reemerging leptospirosis, *California Emerg Infect Dis*, 10 (2004), pp. 406-413
- [5] World Health Organization. Human leptospirosis: guidance for diagnosis, surveillance and control. Geneva: The Organization; 2003.
- [6] Centers for disease control and prevention. Leptospirosis. Centers for disease control and prevention. 2011 Jul 1. Available from: <http://www.cdc.gov/leptospirosis/pdf/fact->
- [7] Dushku N. *Leptospira* në Shqipëri Shendetesia Popullore 1956,5,8
- [8] Dushku N. *Kerkime Epidemiologjike mbi leptospirozat Sh. Popullore* 1959 4,18
- [9] BEGO, F., 2003. Të dhëna mbi komunitetet e gjitarëve të vegjël (Mammalia: Rodentia dhe Insectivora) të fushës së Vurgut (Mesopotam) dhe Myzeqesë (Apolloni). *Akademia e Shkencave: Studime Biologjike* No.7: pp 123-131.
- [10] Leptospirosis 56. Edwards GA, Domm BM. *Leptospirosis*. II. *Med Times*. 1966;94:1086-1095.
- [11] Animal paza project Isuv. 2006-2009. 56+BEGO, F., 1997. Kontribut në njohjen e gjitarëve të vegjël (Mammalia: Insectivora, Chiroptera, Rodentia) të Shqipërisë; të dhëna taksonomike, biogjeografike dhe bioekologjike. University of Tirana, Ph.D Thesis, pp 162.
- [12] National Health Emergency Response Plan – final draft for final revision by the MoH, 2013
- [13] Saunders JP. Clinical features and management of Leptospirosis in Malaysia. *Malaysian J Pathol*. 1979 Aug; 2: 7-9
- [14] World Health Organization. Human Leptospirosis: Guidance for diagnosis, surveillance and control. 2013
- [15] The Leptospirosis Information Center [homepage on the Internet]. Survival of leptospires in the environment. The Leptospirosis Information Center; [updated 2010 May 28; cited 2011 Nov 15]. Available from: <http://www.leptospirosis.org/topic.php>
- [16] Madhu S, Aparna Y. Leptospirosis: Epidemiology, diagnosis and control. *J Infect Dis Antimicrob Agents*. 2008; 25(4): 93-101
- [17] Judith GM, Rick K. Leptospirosis in emergency medicine [Internet]. *Medscape* 1994-2014 [updated 2010 Jan 13; cited 2014 Nov 20].

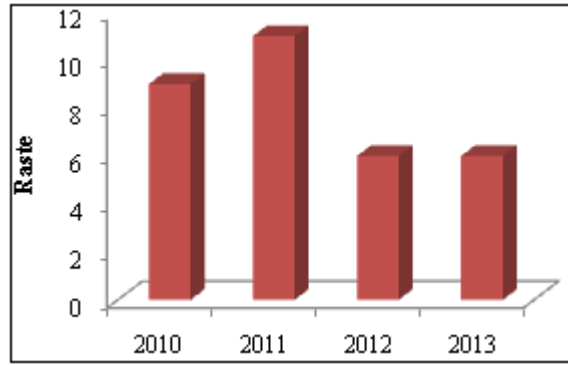


Figure 1: Number of cases of leptospirosis by year

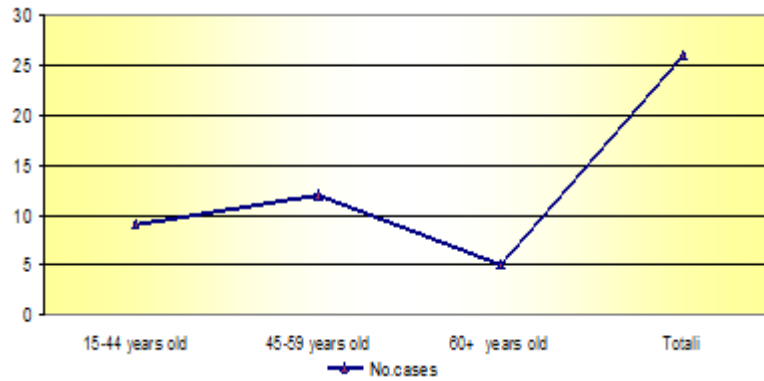


Figure 2: Distribution of cases leptospirosis according to age-group

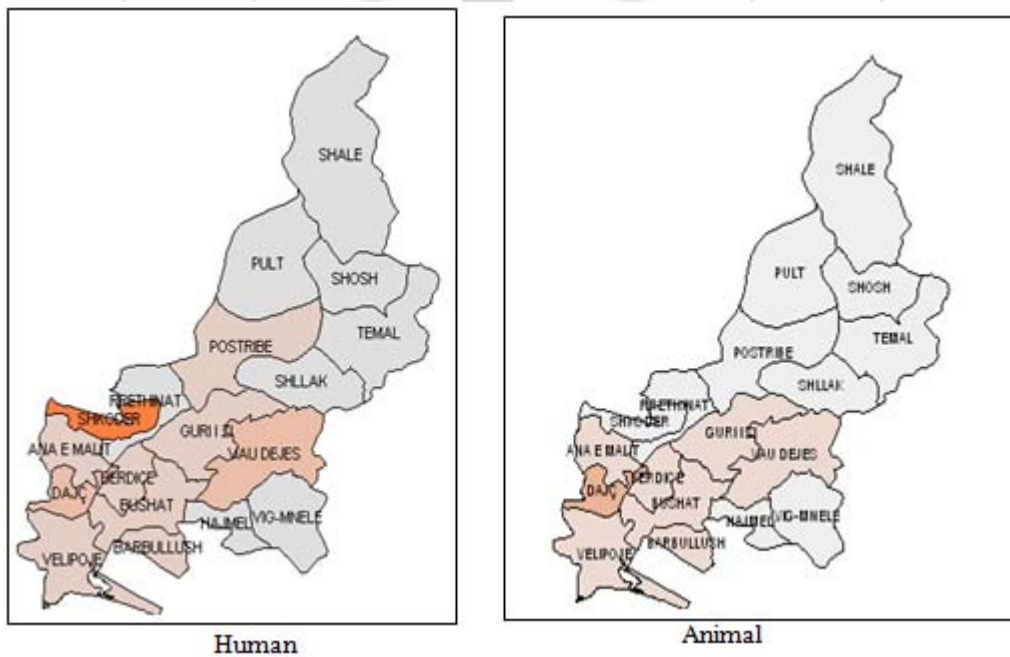


Figure 3: Areas with Leptospirosis in humans and in animals in Shkodra district