

INCIDENCE OF LYME DISEASE IN BIHOR COUNTY IN 2018-2019 IN COMPARED WITH 2012-2014

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Abstract

In this paper we shall establish the incidence of Lyme Disease in the county of Bihor between January 2018 to June 2019 and compare the acquired data to previous results obtained in a published study from 01.01.2012-01.10.2014. During this period, a total of 696 patients were consulted for a tick bite, of those patients, 132 have had a positive diagnosis of Lyme Borreliosis (19%) from who 32 have been hospitalized for Lyme Disease (24% of the confirmed cases).

*An increase in Lyme Borreliosis:19% in comparison with 15% in 2014 is observed without significant differences in terms of rural/urban distribution as well as in gender one. Most patients were diagnosed in the summer month June – July – August. Distribution by age shows an increase in the number of patients from 0 to 10 years old and older section, 51 years old upwards. Early diagnosis of Lyme disease is important to resolve current signs and symptoms, eliminate *B. burgdorferi* infection, and prevent later complications; therefore, education is important in preventing or mitigating disease.*

Key words: *Borrelia burgdorferi*, Western Blot, ELISA, tick bite

INTRODUCTION

Lyme disease is an emerging infectious disease caused by at least three species of bacteria belonging to the genus *Borrelia*: *Borrelia burgdorferi sensu stricto*, *Borrelia afzeli* and *Borrelia garini*. It is transmitted to humans by the bite of infected ticks belonging to a few species of the genus *Ixodes*. (Hess A, Buchmann J, Zettl UK, *et al.* 1999), (Hu MD, Linden 2009), (Mulleger RR, 2004), (Rapini, Ronald P. Bologna *et al.* 2007), (Puius YA, Kalish RA, June 2008), (Ryan KJ, Ray CG (editors), 2004). After inoculation of the bacteria at the skin level, following a tick bite, Lyme Borreliosis evolves schematically in three phases: The primary phase is essentially expressed through a cutaneous lesion spreading from the point of inoculation: the *Erythema Migrans*.

Typical symptoms include headache, fever and fatigue and a skin rash called erythema migrans. (Stanek G, Strle F, 2008). From the point of inoculation, *Borrelia* may also disseminate hematogenously and settle in several organs such as the heart, the brain, the articulations, which may in turn be areas of secondary clinical manifestations, observed a couple of

weeks following the initial contamination. In some cases the infection can spread to nervous system. (Samuels DS;Radolf, JD (editors), 2010), (Seltzer EG, Gerber MA, Cartter ML et al,2000). Various acute neurological problems, termed *Neuroborreliosis*, appear in 10-15% of untreated patients. These include facial palsy, which is the loss of muscle tone on one or both sides of the face, as well as meningitis, which involves severe headaches, neck stiffness, and sensitivity to light. Radiculoneuritis causes shooting pains that may interfere with sleep, as well as abnormal skin sensations. (Wang G, van Dam AP, Schwartz I et al, 1999). Mild encephalitis may lead to memory loss, sleep disturbances, or mood changes. (Steere AC, Sikand VK, Schoen RT et al, 2003).

Later, chronic clinical manifestations constitute the third phase of the disease, that appears generally after several years: *Acrodermatitis chronica atrophicans* (ACA); can occur in any age group but it is most common in adults, mainly those in their 40s or 50s., usually do not remember tick bite in their past. Patients who have had prior erythema migrans can be reinfected (meaning that the first infection has been successfully treated and they have a new infection with *B burgdorferi*). (Stricker RB,L. et al 2008).

The human contamination is superposed to the period of maximal activity of ticks, depending on the climatic conditions. It therefore occurs mostly between the beginning of spring and the end of fall.

It has been suggested in the recent years that the variations in climatic conditions subsequent to climate change (increase in global temperatures, shorter winters) may lead to an increase of activity and reproduction of ticks, leading to an increase in contamination.

The ticks that transmit Lyme disease usually transmit other tickborne diseases. (Auwaerter PG, Aucott J, Dumler JS, 2004), (Cairns V, Godwin J, 2005), (Chabria SB, Lawrason J, 2007), (Dandache P, Nadelman RB, 2008), (Edlow JA, 2007), (Fallon BA, Niels JA, 1994), (Fahrer H, Sauvain MJ, Zhioua E, Van Hoecke C, Gern LE, 1998), (Johnson RC, 1996).

The diagnosis of Lyme Disease is mostly based upon the clinical examination, Enzyme-linked immunoabsorbent assay (ELISA) test confirmed by Western blot test.

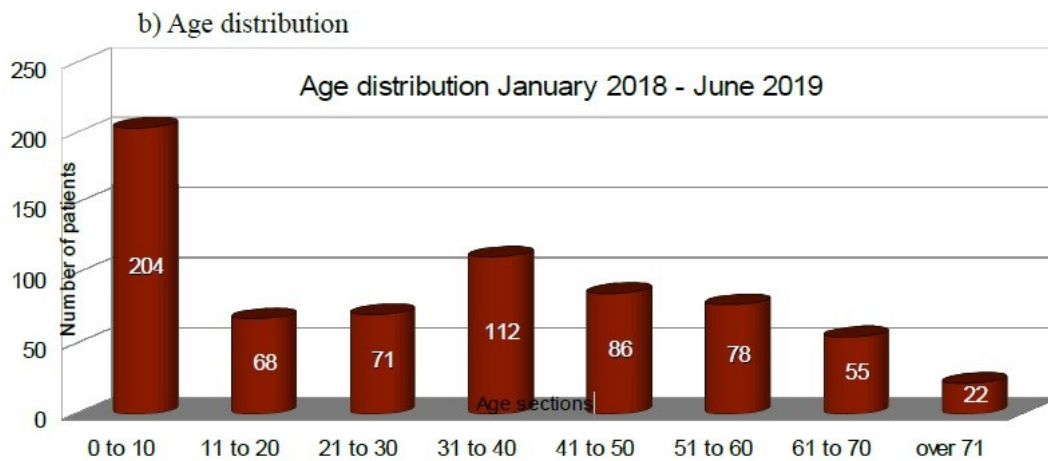
MATERIAL AND METHOD

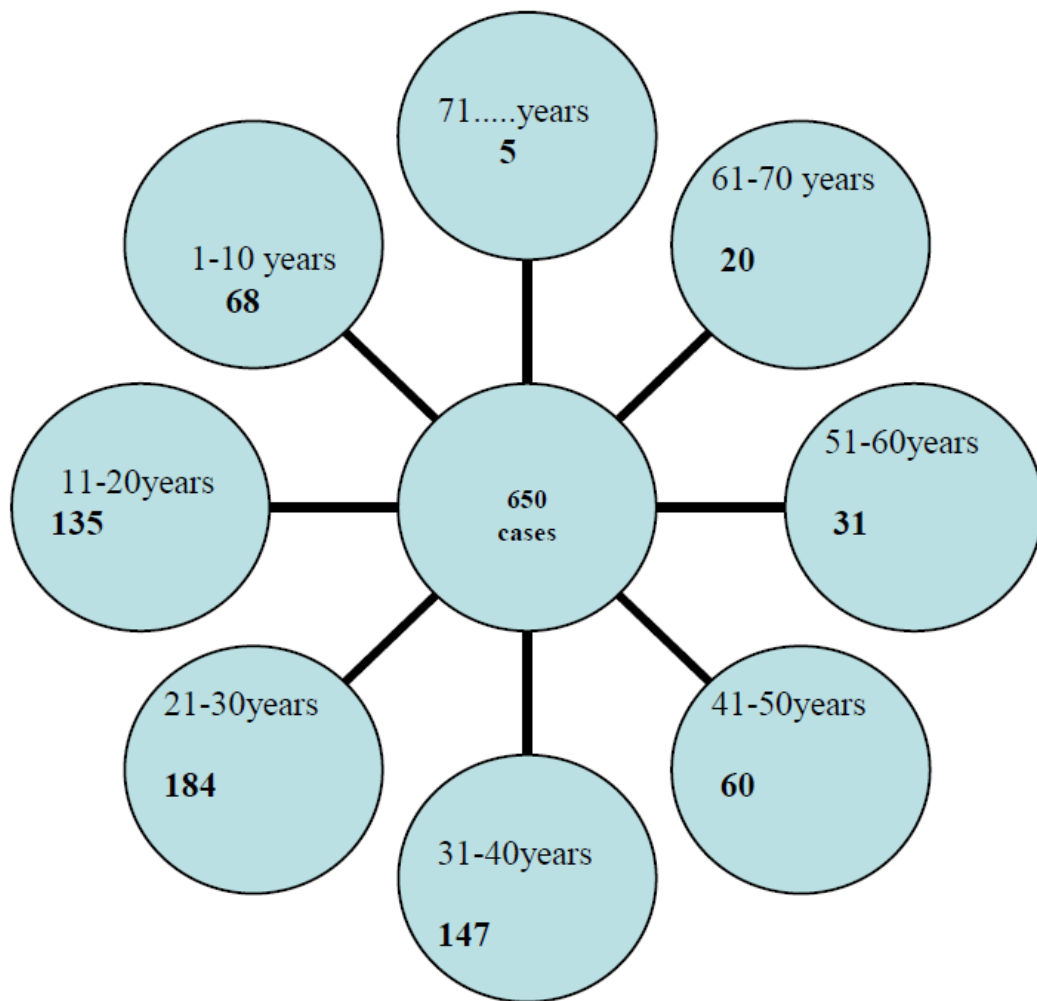
In the hospital of Infectious Diseases of Oradea and the department of infectious diseases of Polyclinic hospital, we consulted the archives and registers from January 2018 to June 2019 included.

During this period, a total of 696 patients consulted for a tick bite and/or Lyme disease, and of those patients, 132 have had a positive

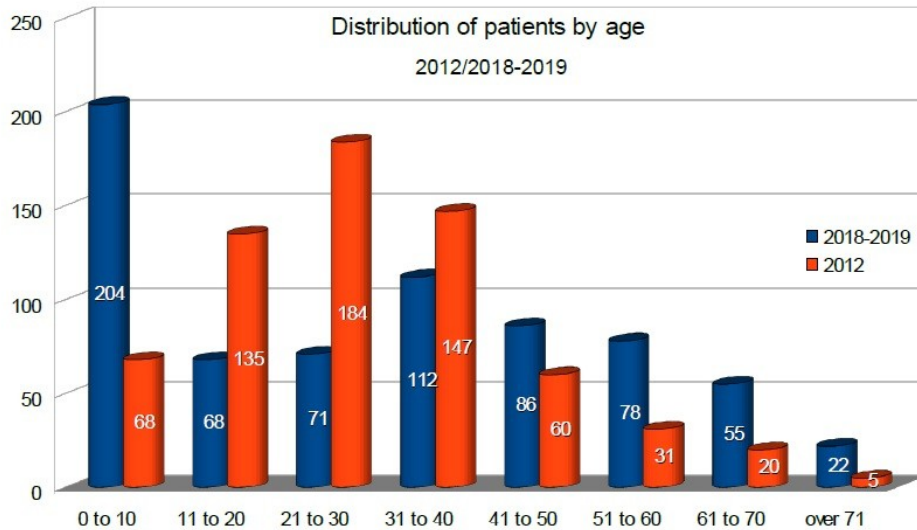
diagnosis of Lyme Borreliosis (19% of the total pool), and of those 132 patients, 32 have been hospitalized for Lyme Disease (24% of the confirmed cases).

Out of the 696 patients that consulted, 343 are men, and 353 are women. 272 of them are young patients, less than or up to 20 years old (39% of the total pool).





The chart above is the “Distribution of patients by age” of 2012 (Turda C., Csep A., 2012)

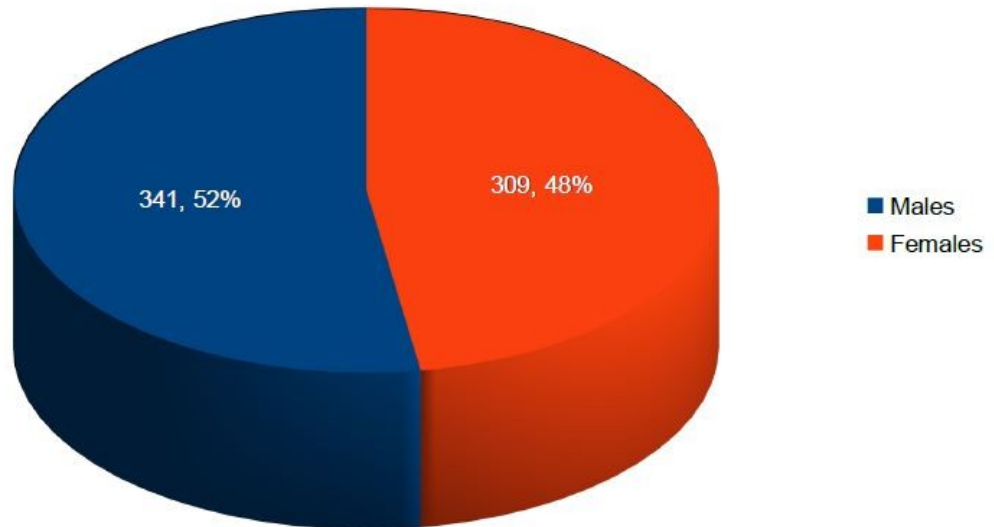


We can observe that the number of consults from young patients (up to 30 years old) between those two time periods is relatively close to one another (387 patients in 2012, versus 343 patients in 2018-2019).

Yet the number of patients from 0 to 10 years old has dramatically increased in 2018-2019 (204 patients versus 68 patients in 2012).

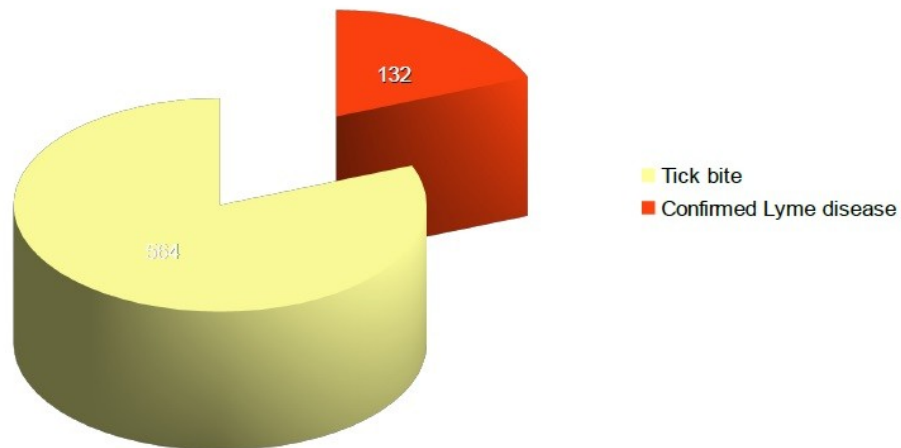
It is important to note that the older sections of patients (from 51 years old upwards) present an increase in 2018-2019 (155 patients), by comparison with 2012 (56 patients), whereas patients from 21 to 30 years old seem to have significantly reduced (71 patients in 2018-2019 versus 184 patients in 2012).

Gender distribution in 2012



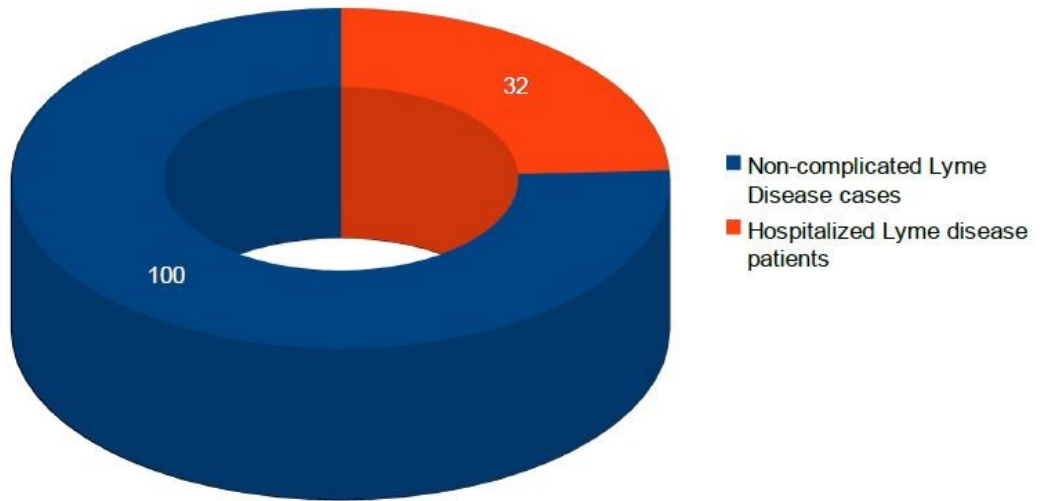
During the study period of January 2018 to June 2019, out of the 696 consults at the Hospital of Infectious diseases of Oradea, 132 received a positive diagnosis for Lyme disease (around 19% of the total pool).

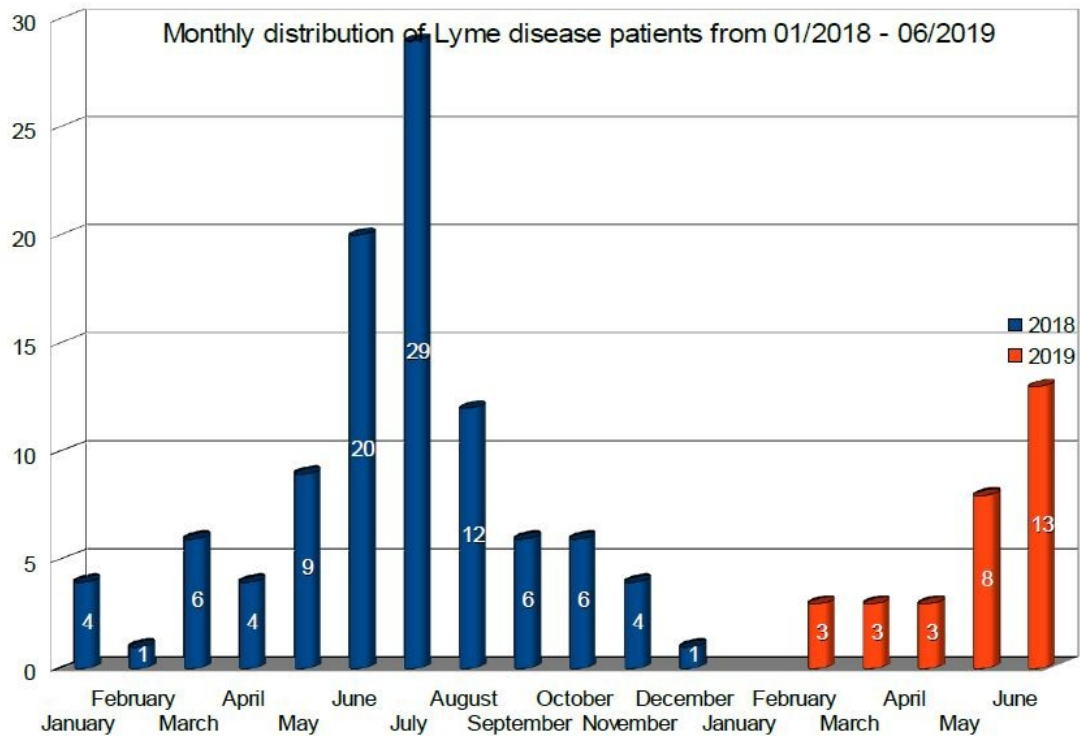
Distribution of Lyme disease 01/2018 - 06/2019



Out of those 132 confirmed cases, 32 patients were hospitalized (around 24% of the confirmed cases).

Hospitalized Lyme disease cases 01/2018 - 06/2019





RESULTS AND DISCUSSION

During the study period of January 2018 to June 2019, out of the 696 consults at the Hospital of Infectious diseases of Oradea for tick bites 132 received a positive diagnosis for Lyme disease (19% of the total pool); it is worth noticing the increase in percentage of positive cases of Lyme disease.

The previous study from 01/01/2012 to the 01/10/2014 included 615 patients and revealed that 92 patients (15%) were positively diagnosed for Lyme Disease (Csep A., Turda C., 2014).

When comparing the values obtained in 2012-2014 with 2018- 2019 we may notice an increase in the total percentage of confirmed cases.

We can observe that the number of consults from young patients (up to 30 years old) between those two time periods is relatively similar, yet the number of patients from 0 to 10 years old has dramatically increased in 2018-2019, by comparison with 2012. It is important to note that the older sections of patients (from 51 years old upwards) present an increase in 2018-2019, by comparison with 2012, whereas patients from 21 to 30 years old seem to have significantly reduced in 2018-2019.

There are several hypothesis to explain those increases: there likely is a better triage and screening; secondly, it is important to notice the

important amount of younger patients, which could spend more time outdoors and might be more frequently screened, and have less knowledge about the first signs and symptoms of Lyme Borreliosis. Moreover, the elderly patients also have increased in proportion, which could be explained by a better understanding and knowledge about the disease, and therefore more frequent consults; or supposedly because grand-parents would accompany children in higher-risk areas (parcs, playgrounds...etc).

The monthly distribution of the disease remains similar from 2012-2014 to 2018-2019, with higher incidence within the late months of spring, and the summer months (with a special emphasis on June, July and August).

As it was expected, there are more cases of Lyme Borreliosis in patients from rural areas, than from urban areas (though rather subtle), this is easily explained by more frequent exposure to the outdoors (fields, animals, forests).

CONCLUSIONS

Through this comparative study, we have demonstrated an increase in Lyme disease over the course of a few years in the county of Bihor, even though the general education of patients about the disease is likely to have increased.

We know that insect repellents and pesticides hardly work on ticks, which could be a potential explanation for this increase. The absence of vaccine is also a likely cause. Some literature suggests that another cause for it is climate change: ticks thrive in warmer environments, and as proven over and over again, the planet is undergoing a dramatic warming for the past several decades, and is likely to continue.

Moreover, Lyme Borreliosis remains an under-diagnosed pathology, since the first stage of the disease isn't a constant (the ECM potentially being absent or unnoticed in about 30% to 50% of cases), and the second phase presents signs and symptoms which aren't specific, leading to a high rate of misdiagnosis. On top of it all, when the diagnosis is made, it isn't always reported (even though in many countries it is compulsory to do so) by a lot of general practitioners (since they often are the first ones exposed to Lyme disease patients). It is important to continue educating the general population, and medical professionals, about this pathology, as well as insisting with doctors about the importance of reporting it, narrowing down endemic areas, frequently examining pets and farm animals for ticks and their proper removal, in the hopes of reducing the zoonotic transmission.

Early diagnosis of Lyme disease is important to resolve current signs and symptoms, eliminate *B. burgdorferi* infection, and prevent later complications; therefore, education is important in preventing or mitigating

disease. Landscape and host management practices combined with the judicious use of an acaricide can provide excellent tick control with minimal risk or impact to the environment or other wildlife.

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