

Rogulska Karolina, Piątek Patrycja, Grzeszczak Konrad. The impact of Pandemic COVID-19 on cases of Borreliosis infection in 2020. Journal of Education, Health and Sport. 2021;11(9):232-237. eISSN 2391-8306. DOI <http://dx.doi.org/10.12775/JEHS.2021.11.09.029>
<https://apcz.umk.pl/czasopisma/index.php/JEHS/article/view/JEHS.2021.11.09.029>
<https://zenodo.org/record/5512699>

The journal has had 5 points in Ministry of Science and Higher Education parametric evaluation. § 8. 2) and § 12. 1. 2) 22.02.2019.

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The authors declare that there is no conflict of interests regarding the publication of this paper.

Received: 05.09.2021. Revised: 12.09.2021. Accepted: 16.09.2021.

The impact of Pandemic COVID-19 on cases of Borreliosis infection in 2020

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Abstract

Borreliosis (Lyme borreliosis; Lyme disease) is a zoonotic disease caused by spirochetes from the genus *Borrelia*. In humans, the accidental host of ticks, the infection is transmitted by the bite of the tick - the spirochetes are present in the salivary glands of the tick. Any of the three forms of tick: larva, nymph and adult can be responsible for infection. The most common threats to humans are *Borrelia burgdorferii sensu stricto*, *Borrelia garinii* and *Borrelia afzelii* occurring mainly in Europe. Lyme disease is a complex, multi-stage disease and progresses in 3 stages. The targeted treatment of Lyme disease is based on the administration of antibiotics. The introduction of antibiotics in the early stages of Lyme borreliosis offers a good chance of a complete cure. Lyme disease is a major epidemiological problem in the world. In Europe, the average number of cases per year remains at 65,400. In Poland, the number of infections annually reaches several tens of thousands. According to the National Institute of Hygiene of Poland, which keeps statistics of epidemiological reports, a

total of 83,495 people fell sick with Lyme disease in Poland between 2016 and 2019. Whereas in 2020, the number of cases of Lyme disease decreased to 12933. The reason for this is undoubtedly the COVID-19 pandemic, which has dominated health care and focused all the attention of medical workers. This review shows that Lyme borreliosis is a dangerous disease with a high risk of complications. A quick diagnosis is crucial in the therapeutic process. An algorithm should be developed in order to distinguish other diseases from Lyme disease and thus enable an early reaction and treatment.

Key words: Lyme borreliosis; Lyme disease; Poland; epidemiology

Borreliosis (Lyme borreliosis; Lyme disease) is a zoonotic disease caused by spirochetes from the genus *Borrelia* (Liang et al. 2020). The reservoir of *Borrelia* is wild game and domestic animals. The vector of transmission is ticks of the genus *Ixodes* and, in the case of *Borrelia recurrentis* – body louse (*Pediculus humanus humanus*) (Felsenweld 1971). In humans, the accidental host of ticks, the infection is transmitted by the bite of the tick - the spirochetes are present in the salivary glands of the tick. Any of the three forms of tick: larva, nymph and adult can be responsible for infection. The risk of transmission increases the longer the tick is attached to the skin (Stanisławska 2006). The most common threats to humans are *Borrelia burgdorferi* sensu stricto, *Borrelia garinii* and *Borrelia afzelii* occurring mainly in Europe (Borchers et al. 2015). Lyme disease is a complex, multi-stage disease. In the first phase of infection, which starts a few days after contact with the parasite - uncharacteristic flu-like symptoms such as fever, muscle and joint aches, and fatigue occur. The most characteristic symptom indicating a spirochete infection is erythema migrans, occurring at the site of the tick bite (Wormser 2006). After a few weeks or months, joint symptoms may appear (Sprong et al. 2018). Skin changes such as chronic atrophic dermatitis are also characteristic (Vasudevan and Chatterjee 2013). The last stage of Lyme borreliosis is neuroborreliosis which occurs even several years after contact with a tick. It is characterised by symptoms of the neurological system such as meningitis or nerve paralysis (Garcia-Monco and Benach 2020). In addition to the ailments previously mentioned, Lyme

disease can also manifest with cardiac symptoms, so often the diagnosis is not obvious (Steere et al. 2016). Active prophylaxis against Lyme disease is not currently available. In exceptional cases, post-exposure prophylaxis can be given by administering a single dose of doxycycline. However, the targeted treatment of Lyme borreliosis is based on the administration of antibiotics. The introduction of antibiotics in the early stages of Lyme borreliosis offers a good chance of a complete cure (Cameron et al. 2014).

Lyme disease is a major epidemiological problem in the world. In Europe, the average number of cases per year remains at 65,400 (Rizzoli et al. 2011). In Poland, the number of infections annually reaches several tens of thousands. The increase in incidence is observed particularly in the period April-May and September-October, although in the last few years, due to mild winters, the exposure to a tick bite occurs throughout the year (Aucott and Seifert 2011). In Poland, Lyme borreliosis is a disease which is obligatorily reported in accordance with Art. 27. par. 1. of the Act of 5 December 2008 on preventing and combating infections and infectious diseases in humans. Unfortunately, not all cases are reported by medical workers, which may result in underestimation of the number of people suffering from borreliosis. According to the National Institute of Hygiene of Poland (NIH), which keeps statistics of epidemiological reports, a total of 83,495 people fell sick with Lyme disease in Poland between 2016 and 2019. In 2016, the number of infections was 21,201, a year later it was 21,514. In 2018, the number decreased slightly and amounted to 20150, and in 2019 it was 20630 cases. As for the number of hospitalisations, it is not high and varies between 10-15%. The data presented show that between 2016 and 2019, the average annual number of infections was 20873. In contrast, in 2020, the number of cases of Lyme disease decreased to 12933. This is a decrease of 38% in relation to the average number of cases per year (Table 1).

Table 1.: Number of cases of Lyme borreliosis in Poland in the years 2016-2020 (NIH).

Poland	Number of cases per quarter				Number of cases per year	Incidence per 100,000 inhabitants	Hospitalization	
	I	II	III	IV			Number	%
2016r.	2202	3571	8323	7105	21 201	55,2	2666	12,6
2017r.	3638	3945	7548	6383	21 514	56	2324	10,8
2018r.	3261	4088	7413	5388	20 150	52,5	2124	10,5
2019r.	2953	3732	7603	6342	20 630	53,7	1701	8,2
2020r.	2253	2064	5406	3210	12 933	33,7	457	3,5

The reason for this is undoubtedly the COVID-19 pandemic, which has dominated health care and focused all the attention of medical workers. The initial symptoms of Lyme borreliosis are flu-like, which could be mistaken for symptoms of infection with a coronavirus or influenza (Belongia et al. 2001). In addition, during the pandemic period, many clinics and GPs provided telemedicine services, which involved a lack of physical examination, which is extremely important in the case of Lyme disease (Tibbles and Edlow 2007). A delay in diagnosis for a patient can lead to serious complications. Untreated Lyme borreliosis leads to the dissemination of the *Borrelia* spirochetes and can affect further organs, including the nervous system, with irreversible consequences for the patient (Cuvelier et al. 2008).

This review shows that Lyme borreliosis is a dangerous disease with a high risk of complications. A quick diagnosis is crucial in the therapeutic process in order not to miss other diseases with similar symptoms, e.g. COVID-19. An algorithm should be developed in order to distinguish other diseases from Lyme disease and thus enable an early reaction and treatment.

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