

ASPECTS OF LEISHMANIASIS DISTRIBUTION

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This article mainly focuses on the distribution of Leishmaniasis around the world and associated studies in some non-endemic countries of the European regions. Specific statistics on the incidence of Leishmaniasis in Sri Lanka from 2018 to 2023 and global information from 2021 to 2024 are provided, as well as data on detected cases of Leishmaniasis in the Vitebsk region.

Keywords: Leishmaniasis; Vector-borne diseases; Parasitic disease; Tropical region; Subtropical region; Imported diseases; Epidemiology.

АСПЕКТЫ РАСПРОСТРАНЕНИЯ ЛЕЙШМАНИОЗА

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В статье представлена информация о распространении лейшманиоза в мире и в некоторых эндемичных по данному заболеванию странах европейского региона. Приведены конкретные статистические данные по заболеваемости лейшманиозом в Шри-Ланке с 2018 по 2023 год и информация со всего мира с 2021 по 2024 год, представлены данные о выявленных случаях лейшманиоза в Витебской области.

Ключевые слова: лейшманиоз; эпидемиология; трансмиссивные заболевания; паразитарные заболевания; завезенные заболевания; тропический регион; субтропический регион.

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Leishmaniasis is a vector-borne parasitic disease caused by a protozoan parasite *Leishmania* spp. It is categorized into more than 20 different species, mostly spread across tropical and subtropical regions. Countries such as Algeria in Africa, Brazil in the Americas, Iraq in the East Mediterranean Region, Somalia, Sudan, Yemen, and India and Sri Lanka in the South Asian region are some of the countries epidemics for this disease. It is a poorly reported and neglected disease in the European region according to the WHO. Considering the growth of migration, population relocation, expansion of tourist, educational and cultural ties the probability of disease importation to endemically non-dangerous countries including the Republic of Belarus is increasing. Particular attention is drawn to the annual increase in the number of young people coming to the Republic of Belarus for secondary and higher education from regions endemic to Leishmaniasis.

Due to the imported nature and rarity of occurrence, standards of treatment for Leishmaniasis in Belarus might be limited. Various drugs used to treat the disease abroad are often not registered in the country. Diagnostic difficulties of differentiating various forms of the disease also exist. Hence arises the need to study Leishmaniasis in Belarus. Highlighting information about the peculiarities of its spread in tropical countries and Europe particularly Belarus is crucial to determine the relevance of the chosen direction of our study. By focusing on this disease, we can gain a clear understanding of its transmission and develop targeted disease management and treatment methods. The aim of the work is to analyze the spread of Leishmaniasis in the world and reported cases in the Republic of Belarus.

Leishmaniasis is categorized into three major manifestations clinically. Cutaneous Leishmaniasis (CL), Visceral Leishmaniasis (VL) and Mucocutaneous Leishmaniasis (ML). Visceral Leishmaniasis also known as Kala Azar is ranked second after malaria as deadly tropical diseases worldwide [1]. In the post-Soviet countries, Leishmaniasis occurs most often in Uzbekistan and Turkmenistan. In the Russian Federation out of the 11 registered cases 10 of them were imported of which 3 were of Cutaneous manifestation and 8 Visceral manifestations from 2019 to 2021 [1]. 1 to 200 cases of Leishmaniasis were identified in the former Soviet Union countries from 2006 to 2013 most frequent from Georgia [2]. For a very long time Leishmaniasis in Belarus was a rare imported disease. In recent years due to the intensification of cooperation with countries near and far abroad as well as due to global warming, the area and fly distribution has expanded hence cases of imported Cutaneous Leishmaniasis from other countries especially from Turkmenistan, have become more frequent [3, 4]. According to the latest data, during recent years there's been a rise in tropical infections diagnosed in the Republic of Belarus [4]. Therefore, it's important for the physicians to be vigilant about these diseases and epidemiological histories. According to the data obtained from the "Vitebsk Regional Center of Hygiene Epidemiology and Public Health" there were two registered cases of Leishmaniasis in the Vitebsk region. The first case was reported in 2015 by a student at Vitebsk State Academy of Veterinary Medicine from Turkmenistan. The second case was reported in 2016 a student at Vitebsk State Medical University from India. The exact manifestation form is not known. A 2014 study mentions a case study about a 33-year-old male resident of Minsk who was clinically diagnosed with Cutaneous-Mucosal Leishmaniasis based on symptoms and travel history [4].

Beginning with 2020 year 98 out of 200 countries which reported to WHO those were endemic to leishmaniasis. 89 of them were endemic for Cutaneous Leishmaniasis, 79 for Visceral Leishmaniasis and 71 for both forms [5]. According to the WHO regional endemicity records for 2020, for both Cutaneous and Visceral leishmaniasis, the Eastern Mediterranean Region was the leading country, accounting for 82% of both forms of the disease. Cutaneous Leishmaniasis was endemic in 58 % of the Americas, 47% of the European Region, 45 % of South-East Asia and 40% of the African Region. For Visceral Leishmaniasis, the figures were 36 % of the Americas, 51 % of the European Region, 55 % of the South-East Asia and 30% of the African Region. The Western Pacific Region had only one country, China, accounting for 3% of both visceral and cutaneous forms of the disease [5].

208,357 Cutaneous Leishmaniasis cases were reported generally this year with 207,477 autochthonous and 880 imported cases. The highest number of cases (16,2371 together) were reported from the Eastern Mediterranean Region and Algeria. It is to be noted that seven countries Afghanistan, Algeria, Brazil, Colombia, Iraq, Pakistan and the Syrian Arab Republic reported more than 6000 Cutaneous Leishmaniasis cases each. 12,838 Visceral Leishmaniasis cases were reported the same year: 12,739 autochthonous cases and 99 imported cases. 34% of visceral leishmaniasis cases were reported from the African Region followed by the Eastern Mediterranean Region with 29 % of reports. The Americas reported 16% and the South-East Asia Region reported 18% of cases, while the European Region and the Western Pacific Region each reported only 2%. Six countries Brazil, Ethiopia, Eritrea, Kenya, India, and Sudan each reported more than 1000 cases which made up about 79 % of global cases. Along with this Chad, Iraq, Nepal, Somalia, South Sudan, and Yemen, cumulatively reported 96 % of cases globally [5]. Additional VL outbreaks were reported in Chad and Kenya in 2020. The global trend for the number of new Cutaneous Leishmaniasis cases every year showed an increase between 1998 and 2019, but a sharp decrease in 2020. Similarly, the number of reported Visceral Leishmaniasis cases has consistently decreased since 2011, reaching the lowest number in 2020 as per the 2020 records [5].

When we consider 2020 it was a critical year for the world due to the COVID 19 Pandemic which spread across the globe. It significantly impacted essential health services worldwide, including leishmaniasis management. According to The Global Pulse Survey on the continuity of essential health services it was found that 46% of countries in the first quarter of 2021 and 49 % in the second quarter

of 2021 experienced disruptions to tracer services for neglected tropical diseases due to the pandemic [5]. This led to uncertain data interpretation and caused difficulties in obtaining and calculating actual epidemiological data. This could be the reason for the sharp decrease in the number of Cutaneous leishmaniasis cases in 2020 [5].

Analyzing globally in 2021, 61 countries reported 12076 cases where 12016 were autochthonous and 60 were imported. This was the lowest reported since 1998. In 2022 the number of countries reporting the disease dropped to 53, while the number of detected cases increased till 13081 where 13012 were autochthonous and 69 were imported. In 2012, 64 countries reported 222784 cases where 222395 were autochthonous and 389 were imported. 58 countries reported Cutaneous Leishmaniasis in 2022 with a decrease in the total number of identified cases to 205990 where 205653 were autochthonous and 337 were imported [6]. The proportion of cases detected and treated of Post-Kala-Azar Dermal Leishmaniasis (PKDL) in 2021 was 96% and in 2022 was 87%. The Case fatality rate of 2022 was less than 1% in 16 countries out of 80 countries reporting at least one death [6]. If we pay attention to the territorial distribution of leishmaniasis 94% Cutaneous Leishmaniasis cases in the Eastern Mediterranean Region in 2022, were reported from Afghanistan, Iran, Iraq, and the Syrian Arab Republic [6]. In the African Region in 2022, 8813 new Cutaneous Leishmaniasis cases were reported from 14 out of 19 endemic countries in the region where 65% of cases were reported from Algeria. As for Visceral Leishmaniasis, 4234 new cases of this disease have been reported from 12 out of 15 countries endemic in this region [6].

Analyzing globally for the 2023 annual year, Leishmaniasis was a major health problem in America, East Africa, North Africa, and West and Southeast Asia [7]. As at 2023 out of 200 countries and territories studied by WHO, 99 (49 %) of them were considered endemic, of which 6 with previously reported cases. 90 (45 %) countries were reported endemic for Cutaneous Leishmaniasis, 80 (40%) of them endemic for Visceral Leishmaniasis and 71 (36 %) of them endemic for both forms of diseases. According to the 2023 WHO report. 272098 new Cutaneous Leishmaniasis cases were reported out of which 271705 cases were autochthonous and 393 imported. 11 922 new Visceral Leishmaniasis cases were reported out of which 11762 cases were autochthonous and 160 imported. Considering the geographical distribution, countries like Afghanistan, Algeria, Brazil, Colombia, Iran, Iraq, Pakistan, Peru, Sri Lanka, Syria, and Yemen reported more than 4000 Cutaneous Leishmaniasis cases each totaling 247216 (91 % of global cases). Eastern Africa, Brazil and the Indian subcontinent reported the most Visceral Leishmaniasis cases where four countries Brazil, Ethiopia, Kenya, and Sudan reported more than 1,000 Visceral Leishmaniasis cases each totaling 60 % of global Visceral Leishmaniasis cases as at year 2023. A total of 393 imported cases of Cutaneous Leishmaniasis was reported with 52 % from Eastern Mediterranean Region, 31% from Europe, and 17 % from Americas. 60 imported cases of Visceral Leishmaniasis were reported with 68% from Sudan and Uganda. A total of 4830 relapse cases were reported of Cutaneous Leishmaniasis and 399 for Visceral Leishmaniasis. 374 deaths were reported among Visceral Leishmaniasis with Case Fatality Rates >2 % in countries like Bangladesh, Brazil, and Djibouti. Out of these deaths information for 270 were readily available. Studying it was found 168 (62%) were due to Visceral Leishmaniasis as of 2023 [7].

During 2024 in the European Region, 60 new autochthonous cases and 79 imported cases of Cutaneous Leishmaniasis were reported [6]. 77 % of Visceral Leishmaniasis cases were reported from Sudan in 2024 where 48 autochthonous cases and 14 imported cases of Visceral Leishmaniasis were reported. In the South-East Asia Region, there is a significant reduction in Visceral Leishmaniasis cases over the past decade. A very good example is Bangladesh being Validated by WHO for eliminating Visceral Leishmaniasis as a public health problem. It is to be noted that not all incident cases were detected. Epidemiological information is missing for some high-burden countries like Algeria, Iran, Pakistan, Saudi Arabia & Tunisia. Approximately three quarters of all the cases detected are from the Eastern Mediterranean region, with Syrian Arab Republic and Afghanistan accounting for more than 50 % of the global burden as at 2024 WHO report [6].

Leishmaniasis as a disease was noticed in Sri Lanka in 2008. The first case in the country was reported in 1978 which was an imported case hence it wasn't considered as an epidemiologically threatening situation. In 1992 the first autochthonous case was reported in the country which marked the beginning of leishmania as an epidemiological situation in the country. Cutaneous form of Leishmaniasis caused by *L.donovani* is the most spread type in Sri Lanka. There were only a very few cases of Visceral Leishmaniasis and Mucosal Leishmaniasis reported in the country hence those are least considered. The first Visceral Leishmaniasis case was reported in 2010 and Mucocutaneous in 2005, ever since cases occur rarely [8]. It was found that *L. donovani* is the causative agent for both Cutaneous Leishmaniasis and Visceral Leishmaniasis in Sri Lanka. Studies suggest that *L. donovani* responsible for causing Cutaneous Leishmaniasis is more severely attenuated than that causing Visceral Leishmaniasis. For survival in visceral organs genetic variation and protein level are manifested. Expression of Rag C and A2 genes influence pathologies [9]. The species responsible for the carriage of vectors is *Phlebotomus argentipes*, other species such as *Ph. stantoni* and *Ph. salehi* are considered to spread the disease in the jungle. The potential reservoir hosts are often Cutaneous Leishmaniasis patients with active lesions [9].

Studies suppose that almost 90% of the cases are reported in the endemic districts Anuradhapura, Polonnaruwa, Hambantota, Matara and Kurunegala while Anuradhapura and Hambantota are the regions with the highest number of reports [8]. Areas such as Mullaitivu, Monaragala, Matale and Kandy are at high risk to report. Spread of Leishmaniasis obeys a seasonal pattern in the country with a higher case of infection reported in dry seasons and negative correlation with rainfall. Its optimal spread occurs at low altitudes (<100 m above sea level) [8]. People with high risk are often young adults in endemic regions, people engaged in agriculture and armed personnels who were active during the civil war. Unmonitored cattle breeding, poor clothing, and living conditions are more likely to induce the disease. It is to be noted that males are affected more than females.

According to the Weekly Epidemiological Reports published by the Epidemiological Unit of the Ministry of Health of Sri Lanka we can get the numerical data on the cases reported around the country. The number of cases reported in Sri Lanka from the years 2018 to 2023 varied according to the figure 1 [10].

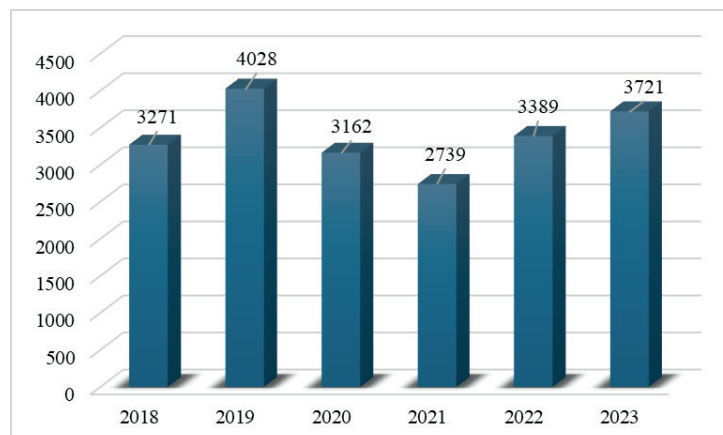


Fig. 1. Reported Cases of Leishmaniasis in Sri Lanka per annum from 2018 to 2023

The highest number of cases was registered in 2019, where 4028 cases were reported, followed by a decrease to 2739 cases by 2021 and an increase to 3721 by 2023. The sharp decline in the number of cases in 2020–2021 can presumably be explained by the COVID–19 pandemics, when attention to other diseases, including leishmaniasis, has significantly decreased. It is also to be noted according to the latest obtained as at 6th of December 3702 cases have been recorded in Sri Lanka for the year 2024 [10].

Conclusion. Based on the above, studying about Leishmaniasis is not only important in endemic tropical countries like Sri Lanka, India, but also for counties like Belarus where the real risk of disease increase last time not only due to imported cases by tourists, students, abroad business trips but also because of global warming and the spread of insects' carriers of the disease in the northern direction. All this highlights the need for doctors in the Republic of Belarus and other European countries to have full knowledge of the epidemiology, life cycle of the parasite, methods of diagnosis, treatment, prevention of the disease it causes and the formation of diagnostic vigilance in relation to it.

Bibliographic references

1. Clinical and pharmacological aspects of leishmaniasis / R. Al Mahfoud [et al.] // Modern problems of science and education. 2023. № 3. URL: <https://science-education.ru/ru/article/view?id=32596> (date of access 30.12.2024).
2. Modern aspects of Leishmaniasis / N. M. Belyaeva [et al.] // Medical alphabet. 2017. Vol. 2, № 18. URL: <https://www.med-alphabet.com/jour/article/viewFile/219/219>
3. Cluster of zoonotic Cutaneous Leishmaniasis (*Leishmania major*) in European travelers returning from Turkmenistan / S. Larréché [et al.] // J. Travel. Travel. Med. 2013. Vol. 20, № 6. P. 400–402.
4. Stoma, I. O., Gutsaliuk, I. Ya., Pankratov, V. G. Mucosal Leishmaniasis: a case report of effective treatment in Belarus // Clinical infectology and parasitology. 2014. Vol. 1. P. 93–98.
5. Global Leishmaniasis surveillance: 2021, assessing the impact of the covid – 19 pandemic // J. A. Ruiz Postigo [et al.] // Weekly epidemiological record. №. 45. 2022. P. 575–590.
6. Global Report on neglected tropical diseases 2024 // World Health Organization (2024). URL: <https://www.who.int/teams/control-of-neglected-tropical-diseases/global-report-on-neglected-tropical-diseases-2024> / (date of access 30.12.2024)
7. Global Leishmaniasis surveillance updates 2023: 3 years of the NTD road map / S. Jain [et al.] // Weekly epidemiological record. № 45, 2024. P. 653–669.
8. Amarasinghe, A., Wickramasinghe, S. A Comprehensive Review of Cutaneous Leishmaniasis in Sri Lanka and Identification of Existing Knowledge Gaps / A. Amarasinghe, S. Wickramasinghe // Acta Parasitologica. 2020. Vol. 65. P. 300–309.
9. Wijerathna, T., Gunathilaka, N. Time series analysis of Leishmaniasis incidence in Sri Lanka: evidence for humidity associated fluctuations / T. Wijerathna, N. Gunathilaka // International Journal of Biometeorology. 2023. Vol. 67. P. 275 – 284.
10. Weekly Epidemiological Report: A publication of the Epidemiology Unit Ministry of Health, Nutrition & Indigenous Medicine. Ministry of Health, the epidemiological unit. Vol. 46–51. URL: <https://www.epid.gov.lk/> (date of access 30.12.2024)