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Editorial Open Access

# Risk Factors Associated With Leishmaniasis

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## Editorial

Leishmaniasis is a neglected endemic disease with public health importance in 88 countries worldwide especially tropical and subtropical ones with prevalence of 12 million people and an incidence of 2 million new cases each year [1-3]. Leishmaniasis is caused by species of parasites of the genus Leishmania and transmitted by vectors family Psychodidae, Phlebotomus or Lutzomyia genera [3].Human leishmaniasis can be divided into four main forms namely cutaneous, mucosal, muco-cutaneous and visceral leishmaniasis [4-7]. Cutaneous leishmaniasis (CL) makes up approximately three quarters of these new cases [3]. CL is caused by Leishmania major, L. tropica, L. infantum and L. aethiopica in the old world and by L. Mexicana, L. braziliensis, and L. guyanensis in the new world [8-12]. Cutaneous leishmaniasis exists in two epidemiological forms namely zoonotic (or wet form, in rural areas, by L. major), and arthroponotic CL (or dry form, in urban areas, by L. tropica). Rodents such as gerbils and humans are the main reservoir hosts with Phlebotomus papatasi and P. sergenti as the main vector in zoonotic CL and arthroponotic CL, respectively [8, 13, 14]. Visceral leishmaniasis (VL), also known kala azar, is caused by L. tropica transmitted by P.argentipes in an arthroponotic cycle [15-17]. Nowadays, especially CL and VL forms have undoubtedly a wider geographical distribution than before. The increase in leishmaniasis incidence is mainly attributed to several risk factors that will be mentioned here. Generally, factors including environmental conditions, human behavior, socioeconomic status, immunogenic profile, and genetic factors pose a major risk to human populations [3,18]. Important environmental risk factors including living in houses with cracked mud or thatched plastered house walls, damp earthen floors, sleeping on floor or outside, and vegetation near house can facilitate sand fly survival and enhance vector abundance via providing diurnal resting places, breeding sites, and humidity [19,20]. It should be noted that sand flies can hide in cracks and fissures in the un-plastered house walls, ceiling or floor [20]. Additionally, living close to a previous case of leishmaniasis strongly increases infection risk [19]. Lack of insecticide spraying in the houses is associated with increased risk [20]. Sleeping outside especially during summer months without bed nets can place people at risk of sand fly exposure. So, the use of bed nets impregnated with insecticide is often very important for people in protecting against leishmaniasis transmission [18]. Migration from rural to urban areas due to low quality of life and social facilities or socioeconomic conditions and improper climate or even migration into villages can increase cases of leishmaniasis [19, 21]. High prevalence of zoonotic VL observed in urban areas may be attributed to high population density, increased migration, environmental changes, inadequate living condition, and the presence of vectors and reservoirs in the domestic environment [20]. Factors such as low educational level, lack of land, and socioeconomic concerns all reflect the increased risk related to poverty. Poverty in many ways increases the risk of leishmaniasis, for example it can increase sand fly access into poorly built houses, and human exposure to infected flies [21]. Moreover, poor housing and sanitary conditions such as lack of waste management and open sewerage can increase breeding of sand flies, and their access to people [22]. Other environmental factors including elevation, forest coverage, proximity to woodland, new agricultural projects, irrigation, the storage of waste products close to the city and increase in sand flies population all are associated with risk of CL or VL [14,23,24]. On the one hand, global warming, changes in temperature, rainfall and humidity, via influencing survival and population size of vectors and reservoir hosts and altering their distribution, exert strong effects on their ecology. On the other hand, situations such as drought, famine and flood may result in extensive displacement and migration of people to endemic areas [22]. In addition, natural disasters like earthquakes can exert dramatic effects on creation a breeding place for sand flies, the abundance and propagation of the vectors, and transmission of the parasite [25]. Presence of dogs and rodents are regarded as the most important risk factors for CL reflecting their role in the transmission cycle of Leishmania [26]. Susceptibility of dogs, the main reservoirs for L. infantum in human beings, to canine VL is associated with their fur length, the presence of manure or dry leaves in the backyard as a food source for sand fly larvae and housing conditions reflecting socioeconomic status [20,26]. Dogs with short hair have a higher likelihood of being seropositive than those with long hair. Purebred dogs are more likely to be infected compared with mixed-breed dogs. Sleeping in the backyard in symptomatic dogs is considered as a risk factor for VL [20]. Cohabitation of dogs with other mammals such as foxes, pigs, horses, cows, chickens or other domestic fowls has been shown to be associated with high prevalence of canine VL [26]. Presence of these animals, mostly cows, can increase the prevalence of leishmaniasis cases via increasing the density of sand flies around houses, as their dung provides a rich environment for the sand flies, drawing the vectors into closer association with humans and increasing the risk of their being bitten [26,27]. Immunosuppression is one of the major factors responsible for reactivation of a silent Leishmania infection or for increased susceptibility to the primary infection [16,28]. Immunosuppressed peoples and graft and renal transplant recipients who live with dogs and cats and in VL endemic areas are at high risk for VL after transplantation [28]. Intestinal parasitic infections causing malnutrition and HIV are other risk factors sensitizing people to leishmaniasis [16]. HIV/VL co-infections exist in countries in which leishmaniasis is endemic and the increase in cases of leishmaniasis is widely associated with the spread of HIV [16,28]. In addition to HIV itself, severe malnutrition due to HIV is involved in the increased prevalence of VL [16]. Malnutrition, low dietary protein, energy, iron, vitamin A, and zinc levels increase the risk of VL and

mucocutaneous leishmaniasis. This effect has been shown to be related to functional failure of the lymph node barrier and increased early visceralization of the Leishmania [22]. Genetic factors also involve in incidence of leishmaniasis, so that specific genes coding associated with the immune response to Leishmania in animal models and human beings have been discovered [29]. Men seem to be at higher risk of VL compared with women probably due to the role of sex hormones in modulating the response to Leishmania [16, 17]. In addition, men have increased tendency to spend most of the time outside home for agricultural activities and thus, they may be bitten by sand flies particularly in rural areas [16]. It should be mentioned that resistance of Leishmania species in some regions to antimonial drugs can be a novel risk factor for the increased incidence of the disease [30]. In order to develop strategies to improve the management and control of the disease and design the surveillance programs for the early detection and reduction of lethality, it is necessary to understand the risk factors associated with leishmaniasis. Therefore, there is hope that the identification of risk factors for leishmaniasis could greatly help in designing preventive strategies.

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