

HUMAN AND WILDLIFE CONFLICT AND SPILLOVER OF ZOONOTIC DISEASE

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Abstract

The term human wild animal conflict is traditionally used for the negative interactions among people and wild animals, where man realizes the unwanted deliberate actions of wild life in term of damaging property, threatening or destroying human or animal life, raiding of agricultural commodities etc. Thus the wild life moving towards the human's inhabitation is posing a direct threat to the livelihood, food safety, health and wellbeing of people. The wild life and human conflicts are increasing day by day not only in our union territory of Jammu & Kashmir but also in other parts of India and globally. There are number of factors associated with this conflict such as deforestation, urbanization, industrialization, population expansion, increasing demand of agricultural commodities, climate induced environmental changes etc. All these associated factors lead to increase interaction and spillover of zoonotic diseases. In this manuscript detail of factors of spillover are enlighten and simultaneously the remedial measures had been discussed to overcome this problem.

Introduction

The unwanted deliberate actions of wild life in term of damaging property, threatening or destroying human or animal life, raiding of agricultural commodities, raise the important issues in respect of emergence of new zoonotic diseases or increasing the prevalence of certain zoonotic diseases originated from the wildlife. So the wild life moving towards the human's inhabited areas is posing a direct threat to the livelihood, food safety, health and wellbeing of people. The wild life and human conflicts are increasing day by day globally. (Soulsbury and white, 2015). Let us discuss and understand them one by one.

Habitat loss leading to increased interaction and exchange of zoonotic diseases: The deforestation, urbanization, industrialization, population expansion, increasing demand of agricultural commodities, lead to reduce wild life habitat and forcing them to move human settlement, leading to conflict and spill of zoonoses. As consequence wildlife bites, or

direct contact with the saliva, urine, stool or other secretion or excretions the diseases like rabies, tuberculosis, leptospirosis, influenza, brucellosis, zikavirus, CCHF, and some parasites are exchanged and incidence is increased. Beside the disease transmission, wild life and human conflict leads to injuries, fatalities, crop raiding, livestock depredation, property damage etc.

Interaction between human and wildlife: Since the history of mankind there is a sort of competition between man and animals. Landscape conversion, recreational use of green space, waste and pollution system, reproduction of domestic species have also contributed in disease spill and transmission. Coming of close to human inhabitation of wild life also increase the chances of disease transmission through bite of vectors, such as mosquitoes, ticks, mites or through the contaminated food and water (Richardson, et.al.2020).

Ecological factors: These are the amalgam of number of influences that directly or indirectly contribute to wild life and human conflicts.

Increase in Roads network and collision of animals: Under the influence of population explosion, urbanization and industrialization, the roads network has drastically increased leading to habitation loss and disturbance to wildlife, leading to insecurity to wildlife, moving aimlessly under hunting pressure, fright and terror and colliding with vehicle causing injuries and mortalities. Industrialization elevated the problem by climate change, or causing air, soil, water, light, and noise pollution. Similarly biotic interactions such as predation, hunting for bush meat as a source of energy increase chances of conflict.

Loss of property and infrastructure: The nocturnal movement of wildlife to avoid human interference and vehicle traffic has increased as a consequence crop raiding, took place during night hours. The multistoried buildings pose significant risks especially to birds by striking with windows causing injuries and mortality to birds and damage of window glasses (Loss, et.al.2014, Kahle, et.al. 2016).

Providing foods to wild animals and change of behaviour: Certain sections of people feed the wild animals on roads sides or at religious places that lead in change of behavior leading to docile and tameness (parrots, crows, rabbits) in some animals, while increase in boldness and aggressive behavior (monkeys) among others leading to snatching of food, fruits or biting of people are the sum of contributory factors in zoonoses spread (Kumar, et.al. 2019, Cox and Gaston 2018).

Increase in domestic pets and feral: With the increase in number of domestic pets and feral trophic structure has disrupted through predation, disease transmission and wildlife disturbance. The street cats are threat to birds and rodents in urban areas (Kays, et.al.2015). Outdoor cats are reservoirs of number of zoonotic diseases eg. Cat scratch fever, toxoplasmosis, leptospirosis, toxocara cati. Street dogs are the major contributor of

conflict with leopards, jackals, foxes, leading to spill of zoonotic diseases.

Changing behavior of wild animals in diseases: Some diseases such as rabies when occur in wild carnivores (fox, jackal, wolf, wild black boar etc) changes their behavior typically aggressive in nature causing bite and injuries to street dogs, domestic animals and even in humans beings. Such changes in wild life lead to conflict and spillover of zoonotic diseases.

Urbanization and spillover of diseases: Continuous expansion of human activities leading to urbanization has also affected the wild life behavior. It resulted movement of wildlife towards rural habitation and urban habitation and getting the shelter in school buildings, vacant buildings, old structures like forts, and historical monuments etc bringing wildlife closure to human habitation and further spillover of zoonotic diseases. The most commonly occurring are the novel Coronavirus, SARS Covid-2, Covid -19, Leptospirosis, Lyme disease, rabies.

Socio-cultural factors of human wildlife conflict

Socio-economic factors of conflict: 3 Unequal distribution of wealth and luxury effect suggests emergent of urban biodiversity that attracts proximity of man and animal (Kuras, et.al. 2020). The low income communities have less access to green spaces. The reduction in green vegetation and green spaces in low income communities causes great abundance of pest (eg. *Rattus norvegicus*, *Aedes aegypti*), that cause damage to crops and act as vector of number of zoonotic diseases such as Japanese encephalitis, chickengunya virus, dengue fever.

Religious, traditional, cultural factors Tribal lifestyle of human population in India particularly, in Union Territory of Jammu & Kashmir, Himachal Pradesh and some other parts is an important factor human wildlife conflict. The tribal communities move along with their livestock, horses and pet dogs to high altitude pastures during summer from plain areas. During this journey they come

across wildlife conflict that results in terms of bite, injuries, depredation of livestock by predator carnivores. So biting of wild carnivorous increases the risk of rabies (Wang, *et.al.* 2010), Coyotes have high incidence rate of Echinococcoses and can spread the disease through environmental contaminations.

Wong, *et.al.*2015). Similarly religious sentiments and beliefs, traditional perceptions such as feeding of monkeys, crows, pigeons, parrots and to other wildlife increase the conflict and transmission of diseases to humans. For instance rhesus macaques in Dehradun, India cause property damage and injury to humans but are honored in Hinduism (Anand, *et.al.* 2018). Traditional and ritualized feeding of black kites, crows, white owls in some parts of India leading to wastes accumulation and spread of zoonotic diseases. Residence of Jodhpur Rajasthan India feed urban Hanuman langurs in reverence to the monkey god (Waite, *et.al.*2007, Kumar, *et.al.* 2018, 2019, Sharma, *et.al.*2010). Some cultural trends have interacted certain individuals rearing of wild birds or mammals as pets, for instance rearing of parrots, monkeys in India and owls in some areas have interacted human and wildlife interactions and spill of diseases.

Management Induced Factors of human wildlife conflict:

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Warfarin was introduced as rodenticide in 1948 and since then it has been used in pest control. The intense use of the pesticide developed the resistance in rats and increased the incidence both in urban and rural habitations. Similar resistance was developed in mosquitoes, ticks, mites, etc. The transmission cycles of diseases are facilitated due to increase in number of carriers, vectors and reservoir. As a consequence spillover of diseases increased and chances of spread of outbreaks are taking the opportunities.

Conclusion

The world is day by day becoming urbanized and industrialized under the impact of population explosion, increased socioeconomic status forcing the organisms to adjust themselves in the existing global space. Such adjustments are leading to human and wildlife conflict. As a consequence spillover of wildlife zoonotic diseases to human population occurs. Moreover, domestication of wild animals as pets be avoided and with one health approach, education of public must be considered. Diagnoses of grievances of tribal migratory population who also become vagaries of wildlife conflict must be understood to sort out the solution of disease control.

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