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Popular Article

One-Health Approach: A Best Possible Way to Control Rabies

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Every year, rabies is believed to claim the lives of about 55,000 individuals worldwide and roughly 36% of the world's deaths by rabies occur in India each year, most of those when children come into contact with infected dogs. Despite being a viral zoonotic disease that affects mammals, rabies has a significant impact on public health. Although rabies is a disease that may be prevented, its influence is growing daily, which is a worrying problem in both developed and developing nations.

World Health Organization (WHO) recommendations for post-exposure treatment divide rabies exposure into three categories: category-I and least serious: when the victim has been touching or feeding infected animals, but shows no skin lesions; category-II: when the victim has received minor scratches without bleeding or has been licked by an infected animal on broken skin and category-III: when the victim has received one or more bites, scratches or licks on broken skin or has had other contact with infected mucus. Exposure to bats, whatever the nature of the contact, falls under category-III and the victim is treated accordingly. Anti-rabies vaccine is recommended for category-II and III, while anti-rabies Immunoglobin-A liquid or freeze-dried preparation containing rabies antibodies extracted from plasma, should be given for category-III or to people with weakened immune systems. Thus, it requires a comprehensive, strategic and targeted control and prevention approach with collaboration from human, animal and environmental health disciplines at local, national and global levels to a make more effectual control program.

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Different government and non-government agencies are involved in rabies control and prevention programs mostly through implementation of vaccination and domestic and community dog and cat population management. Additionally, post exposure prophylaxis (PEP) and awareness campaigns have been used to address dog bite cases. However, due to a lack of multi-sectoral management strategies, the number of rabies cases has not decreased as a result of these programmes. In this situation, leveraging successful lessons and tactics from other nations, the "One Health Approach" is the most efficient way to reduce rabies.

Global situation of rabies

Except for islands like Australia and Antarctica, where no instances of dog-mediated rabies have been documented, rabies is an endemic illness in almost all land masses. Although rabies has been proclaimed eradicated in many Asian, European and North and South American nations, many Asian and African nations continue struggle with the disease. Particularly widespread cases of rabies may be found in Bangladesh and India, whereas cases are only slightly more common in Nepal, Myanmar, Bhutan, Thailand and Indonesia. It is estimated that 0 to 55% of all canine rabies cases worldwide occur in the nations of the Asian subcontinent.

Rabies in India

Every year, 36% of rabies deaths worldwide, mostly in youngsters who come into touch with rabid dogs, occur in India. The virus that causes rabies infects a variety of animals, including humans, through their saliva. However, the majority of human fatalities occur after being bitten by or coming into contact with an infected dog. In nations where rabies is widespread (endemic), children under the age of 15 account for between 30 and 60 percent of dog bite casualties.

The National Centre for Disease Control (NCDC), previously the National Institute of Communicable Disease, has initiated a pilot project to reduce human rabies fatalities as part of the government's ongoing efforts to raise awareness of the disease. In the trial, health professionals will receive training in managing animal bites, and posters will be posted on buses and in other public areas to remind people to seek post-exposure therapy. The pilot programme, run in collaboration with WHO, also seeks to improve the ability of hospitals and health facilities to diagnose cases and to guarantee the availability of anti-rabies vaccinations and anti-rabies serum. Working closely with partners in other industries and the national animal husbandry agency is a key component of the pilot. In particular, the Rabies in Asia Foundation, the Association for Prevention and Control of Rabies in India and the Animal Welfare Board of India, which is

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promoting the Animal Birth Control, Anti-Rabies Programme in major metropolitan cities, have all made a significant contribution to the improvement of the situation.

Way forward

Programmes promoting "One Health" acknowledge the relationship between human health, animal health and the environment we all share. Adopting a One Health strategy focuses on controlling rabies outbreaks in both humans and animals. Controlling the spread of rabies from animals to people lessens the need for post-exposure vaccines as well as the financial burden associated with rabies management in humans. A One Health strategy is also well recognised to be an affordable way to control rabies in low-income developing nations. Before implementing the programme on a bigger scale, it may be good to conduct a pilot study that includes both urban and rural communities from various regions in order to assess the success metrics of this method. All residents' access to and affordability of the PEP rabies vaccination would rise if it were made more widely available in all district hospitals, either directly by the GoN or via cooperative efforts of the GoN, NGOs, INGOs and the business sectors.

The workload at the Central Reference Laboratory would decrease if there were rabies diagnostic centres in each regional laboratory. The quality and efficacy of the monitoring programme would be guaranteed by competent medical specialists at the local laboratories. Furthermore, a key factor in the overall effectiveness of the rabies control and prevention programme is the collaboration and communication of medical experts.

To assess the disease, active surveillance of the disease would be beneficial. Therefore, to carry out a successful strategy, an integrated approach as well as cooperation across each of these components, namely the human, animal and environmental sectors, is equally necessary. The control of the dog population and the focus on mass vaccination of animals is crucial, although the latter should adhere to animal welfare standards. Government measures must firmly forbid the death and torture of animals, and if euthanasia is the only alternative, then legal euthanasia should be used in place of horrific slaughter of animals. Similarly, with a legal need for mandatory registration, pet ownership and public safety records can be made available.

Animal birth control methods like castration and spaying can also be used to regulate the population of communal or street dogs. An efficient data collecting and reporting system is needed before these actions. The success of the programme is largely dependent on public involvement. A series of awareness efforts can help increase participation. Additionally, how a programme is

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implemented will depend on the accessibility of fundamental infrastructures like roads, power, hospitals, and veterinary clinics. Participation in mass vaccination campaigns, post-exposure vaccination campaigns and animal birth control programmes may be influenced by people's levels of literacy and income.

Some critical, but not necessarily exclusive, factors to consider are socio-economic, environmental, animal, and human factors. Therefore, a "Multi-sectoral One Health Approach" could be a strong strategy to make justifiable progress towards rabies control and prevention. A One Health approach has proven successful in several neighbouring countries such as Bhutan, Bangladesh and Sri Lanka. Most notably, India has recently completed a trial of this management approach in five different cities across the nation and has come to the conclusion that consideration of both human and animal component is critically important in this approach. A strong political commitment along with a rigid governmental action could be crucial in making it successful. Here is a conceptual framework on how to control or manage rabies using a One Health approach.

Rabies can be prevented/managed efficiently by "One Health Approach" which involves inter-sectoral collaboration among animal, human and environmental health. Considering specific national geopolitical situation, following measures could be helpful to make program successful.

Systematic data collection and compilation

A routine reporting system that permits periodic progress review, endemic and sporadic illness status, and their socioeconomic effect are best suited for a One Health strategy. The development of national policies or control programmes will benefit from this knowledge. The fact that rabies cases can go unreported and become a more serious issue when registration facilities at tertiary care clinics and hospitals are unable to access clinical care and diagnostic confirmation databases is not surprising given that the symptoms of rabies are non-specific or common to illnesses of the nervous system. Therefore, a system that gives precise data on the number of dogs, suspected or confirmed rabies cases and the overall population infected with rabies at a specific location and time would be useful in formulating control roadmaps. The efficiency of rabies control programmes also depends on the estimation of human-dog population densities, statistics on vaccination in humans and animals, thorough management, and data analysis.

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Co-ordination and data sharing among animal, human and environmental health sectors

In projects requiring multi-sectoral coordination, a prevalent problem is a lack of coordination and data exchange among the parties involved. Primary data collection, reporting, and storage in national and international databases will make it easier to spot problem areas and develop management plans. Rabies is not a prevalent illness in many nations. As a result, in these nations, the only official monitoring methods are used to gather rabies data. Due to operational challenges in sample submission to laboratories and non-compliance with direct data reporting to line ministries, rabies surveillance may become more challenging. The chance of incomplete and erroneous data creation will rise as a result.

Efficient and effective surveillance

Animal Health Sector is mainly concerned with economically important diseases of livestock. Rabies is not on that list. Including rabies under the diseases monitored by the Animal Health Sector would help in the collection of reliable data that can be used in strategic mass vaccination and population management. A functional surveillance system that generates primary data is vital to reach protective immune status of susceptible animal population and transmission, as suggested by Banyard and his colleagues. Controlling rabies in wildlife, and wildlife-domestic animal interface could be vital to control rabies as humans, domestic animals and wildlife territories lie in close proximity. Thus, rabies surveillance and control programs require extension to include wildlife so that any spillover of rabies from wildlife to domestic animals and humans could be checked effectively. One possible way to control wildlife rabies could be large scale oral vaccination campaigns with at least 70% coverage considering ecological and epidemiological features of rabies and wildlife species, which was successfully practiced in foxes in Europe, raccoons in Canada and coyotes in Unites States. The oral rabies vaccine (ORV) containing bait can be deposited throughout natural habitat: near buffer zone and inside national parks and wildlife reserves, community forests, and suburban regions. It may be helpful to reduce possible spillover of rabies from wildlife to livestock to humans and vice-versa.

Sufficiency and availability of post exposure prophylaxis (PEP)

PEP is the only means available for human rabies prevention after the dog bite. Obviously, rabies' burden will be higher when there is inaccessibility of PEP immediately after bite of a suspected rabid animal. In urban areas, pre-exposure prophylaxis (PrEP) and PEP is available in government and non-government hospitals. However, in remote areas, PrEP and PEP are not easily

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available for many reasons. So far, health care facilities are mostly concentrated in urban centers making it difficult for the rural public to receive treatment when bitten. To achieve zero human deaths from rabies by 2030, ensuring adequate availability of PEP is necessary. An integrated dog bite case management (IBCM) approach that involves rabies surveillance linking workers in public health and veterinary sectors to assess the risk of rabies among animal bite patients and biting animals is another option to save more lives in short term. Long-term sustainable control of rabies is possible with strong interventions at local, national, and international level jointly.

Increasing vaccine coverage

A low-cost method of preventing rabies is mass vaccination of dogs. The World Organisation for Animal Health (OIE) and World Health Organisation (WHO) claim that vaccinating 70% or more of the dog population can significantly reduce the incidence of rabies. In turn, this will immediately reduce human exposure. Mass vaccination of dogs, in particular, is an investment that will pay off over time and be more cost-effective. Therefore, one of the main strategies we advise using to reduce rabies in both the human and animal populations is widespread vaccination of dogs. The correct registration, confinement, and mandatory vaccination of domesticated and stray dogs are required to maximise the effectiveness of this strategy. Following up with booster injections is also advised since dogs that skip them risk having insufficient immunity. In this instance, rabies infections following immunisation are still conceivable.

Increasing efficacy of vaccination

One of the most crucial methods of preventing rabies is vaccination. Low-quality vaccination administration might result in the absence of immunity. Along with production flaws, improper handling, storage, and transportation are the most frequent causes of vaccination failure. Thus, for rabies control programmes to be effective, both vaccination quality and effectiveness are crucial.

Increasing awareness

Any outbreak of disease, including rabies, would require intensive public education campaigns aimed at-risk populations. Indian communities are somewhat unaware of rabies. Numerous factors like, socioeconomic problems, and the inability of rabies to receive a priority disease designation, may be blamed for this. However, information about dog vaccination, the availability of PEP, and defences against dog bites could assist to improve the situation.

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Strengthening laboratory capacity

Well-equipped laboratories can increase the diagnostic capacity. It is crucial to implement preventative measures and a conceptual framework for managing human rabies. In this sense, utilising diagnostic services that are close by might help with targeted immunisation coverage and evaluation. There are several laboratories in large cities that are well furnished and satisfy the OIE standard, but there is need for development to boost accessibility. Although adopting fast test kits for initial screening might reduce the burden for these laboratories, there are no other options if the necessary laboratory facilities are not available. Poor accuracy is predicted when less clinical symptoms are used to diagnose a disease and affordable service costs are critical for improved detection and reporting as the availability of reliable diagnoses.

Research activities

Epidemiology field research on rabies might be helpful to identify associated risk factors, dominant mode of transmission, socio-economic implications and locality-based disease dynamics. Thus, conducting this research could be a very good starting point for formulation of integrated multi-sectoral rabies management strategies. Some key areas of research interventions and innovations are: (1) Development of tools to assess magnitude of rabies infections. (2) Accessibility of easy and economical diagnostic tests. (3) Studies focusing on promotion of "soft" population control measures such as dog population control, responsible dog ownership, and environmental aspects of rabies management. (4) Periodic data collection of basic population parameters of relevant animal species such as dog populations (size, turnover, accessibility, and ownership status) in different settings. (5) Public awareness campaigns to promote knowledge of PEP, first aid and animal bite management. (6) Raising awareness on the disease and responsible dog ownership with active mobilization of NGOs, community-based organizations, animal welfare societies, media, leaders, and other influential groups.

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