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Rabies Day Special: Bridging the Gap between Science and Safety

Popular Article

## The Role of Community Engagement in Rabies Prevention

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### Introduction:

Rabies or hydrophobia is a fatal yet preventable zoonotic disease of viral origin. It mainly attacks the central nervous system and causes progressive inflammation of the brain and spinal cord. It is caused by a RNA virus belonging to genus Lyssavirus in Rhabdoviridae family. It mainly affects mammals, including humans, and is usually spread by the bite of infected animals. The transmission of up to 90% of human rabies cases is attributed to dogs.

The virus spreads from peripheral nerves to the central nervous system, causing inflammation in the brain and spinal cord. Rabies is a zoonotic disease and once the symptoms start to appear, it is completely. The virus persists due to a dearth of awareness in communities where the disease is present, as well as a cycle of transmission between wildlife and dogs. Rabies is not only a public health concern, but it also has social consequences such as poverty and a lack of access to better health and emergency services.

A multisectoral national approach is required, with the communities affected and the knowledge and experience they bring. It must be fully integrated with the authorities, as well as tangentially affected organizations, either by implication or chance, that are working to combat rabies.

### Transmission and Symptoms:

Rabies virus infects mammals, including dogs, cats, livestock and wildlife. Rabies is transmitted to humans and animals through saliva, usually through scratches, bites or direct contact with mucosa (e.g., eyes, mouth, or open wounds). The virus cannot penetrate through intact skin. Once clinical symptoms appear, rabies is almost always fatal. Following entry, the virus binds to cell receptors.

Viruses can replicate within striated muscle cells or directly infect nerve cells. The virus then enters the central nervous system through retrograde axoplasmatic transport mechanisms. Depending on the infected animal, both motor and sensory fibers may be affected. Upon reaching the central nervous system (CNS), the virus

propagates quickly, leading to detrimental impacts on the physiology of nerve cells. The virus subsequently migrates to peripheral neurons by anterograde axoplasmic flow, where it infects some neighbouring non-nervous tissues, including the secretory tissues of salivary gland. When clinical symptoms appear, the virus has already spread throughout the body.

The rabies infection cycle is completed with the shedding of the infectious virus in saliva. The incubation period of rabies may range from one week to one year depending on the location of virus entry and viral load. The preliminary manifestations of rabies encompass pyrexia, discomfort, paresthesia, and atypical or unaccounted-for tingling or burning sensations localized at the site of injury.

As the virus reaches the central nervous system, progressive inflammation of the brain and spinal cord occurs. Clinical rabies in humans can be managed, but it is rarely cured, especially without severe neurological deficits. There are two forms of rabies:

**i. Furious form:** this form of rabies seen in 80% of humans characterized by hyperactivity, hydrophobia, and severe or uncontrollable excitability and impulsive behavior. Death occurs after a few days due to heart failure and respiratory arrest.

**ii. Paralytic form:** this form accounts for about 20% of all human cases. It is also called dumb form and usually lasts longer than the aggressive type. The patient is calm and lucid throughout. Muscles from the wound site become paralyzed. The coma slowly progresses, eventually leading to death. The paralyzing nature of rabies is often misunderstood and involves underdiagnosis.

### Prevalence and Impact:

There are notable regional differences in the prevalence of rabies. Rabies is still a serious public health concern worldwide, especially in some regions of Asia and Africa. According to the World Health Organization (WHO), rabies virus accounts for approximately 59,000 human deaths annually, with the majority of these cases occurring in developing countries. In India, rabies is endemic and accounts for 18,000–20,000 deaths annually. The major reservoir for rabies is unvaccinated dogs. Other reservoirs include bats, mongoose, skunks, wolves, antelopes and raccoons. Rabies is endemic in India, contributing to 36% of global rabies fatalities. The complete extent of the rabies problem in India remains unclear. However, based on current data, it results in 18,000-20,000 deaths annually. Children below the age of 15 years old account for 30-60% of documented rabies cases and fatalities in India since bites in children are frequently overlooked and unreported.

Rabies has a profound impact on human health, animal welfare, and public health systems, with effects that can be both immediate and long-lasting. Rabies is nearly 100% fatal once clinical symptoms appear and for those who do survive rabies which is exceedingly rare, the disease can result in severe long-term neurological damage, leading to significant disabilities and diminished quality of life. Delays in Post-Exposure Prophylaxis (PEP) can lead to fatal outcome thus immediate medical intervention is of utmost importance. The cost of PEP can be a significant barrier in low-income regions. Even when vaccines are available, the need for timely administration and the number of doses required can strain health resources. In endemic areas, management of rabies and providing PEP can put strain in health services.

It can be a financial challenge for governments and organizations to invest substantially in implementing and maintaining vaccination and control programs for animals. Surveillance of rabies requires huge tracking and monitoring system posing epidemiological challenges. Rabies has a greater impact in low-income countries,

where there may be limited access to vaccines and healthcare services. This unequal situation emphasizes the importance of global assistance and collaboration in tackling rabies.

### Community Engagement in Rabies Prevention:

Even though rabies is a fatal zoonotic disease affecting millions of human and animal population, the impact of this disease can be reduced significantly through community engagement and awareness programs. Initiatives like educational campaigns play a crucial role in enhancing the role of community for rabies prevention. Educating the public about the severity of the disease, its implication, symptoms and importance of vaccination including pets can have a huge impact in controlling the deadly virus.

The following steps can be taken up as community engagement programs:

- i. **Educational Programs:** Dissemination of information with educational campaigns about the health hazard of rabies, its transmission and post exposure prophylaxis in an important part of community engagement. Further, workshops, seminars, and public talks can be organized to provide such valuable information on rabies prevention and treatment options.
- ii. **Media Campaigns:** Community-based media campaigns using local radio, television, and newspapers to broadcast information about rabies can highlight preventive measures and available resources to wide audience. Utilizing social media platforms to raise awareness can involve younger demographics and enable the fast distribution of information. Programs should be directed to encourage reporting and prompt medical care. Bite awareness, importance of reporting and complete guidance to where the medical guidance can be sought for can lead to early intervention. Setting up local hotlines or support services for reporting suspected cases of rabies or seeking advice can expedite responses and aid in controlling outbreaks.
- iii. **Pet care education** to promote responsible pet ownership: Education about pet care plays a very important role in preventing rabies. Ensuring that pet owners are properly educated helps them understand their duties, identify potential risks, and take necessary steps to safeguard their pets, their loved ones, and their neighborhood. Informing pet owners about the importance of regular rabies vaccinations and how they can access these services is essential.
- iv. **Collaboration:** Collaboration with the government veterinary establishments, NGOs, and other local organization to set up free vaccination drive and health check - ups can ensure prevention of the spread of rabies to a great extent. Veterinarians should be encouraged to discuss rabies prevention during routine visits and emphasize the importance of regular vaccinations.
- v. **Training and monitoring:** Providing training to local residents on how to identify and communicate about cases of rabies in animals can improve monitoring activities and help manage outbreaks. Engaging community members in surveillance efforts aids in collecting precise information and pinpointing high-risk zones. Encouraging community members to volunteer in rabies prevention programs, such as vaccination drives or educational initiatives, strengthens community involvement.
- vi. **Policy making and advocacy:** community should be encouraged to participate in policy making and regulations that promote rabies control, such as mandatory pet vaccinations and animal control measures. Such policies and their advocacy can lead to systemic changes. Community engagement can help attract funding and resources for rabies prevention programs by demonstrating local support and need.

Promoting community-led efforts and empowering local leaders in rabies prevention can help cultivate a feeling of ownership and accountability in neighborhoods.

- vii. **Evaluation and feedback mechanism:** Collecting input from community members regarding the effectiveness of rabies prevention programs and making necessary changes according to their feedback can enhance program results. When community is engaged in assessing and refining control and prevention strategies, the local needs can be addressed effectively.
- viii. **One Health Approach:** The One Health approach for managing rabies involves incorporating human, animal, and environmental health to develop a thorough plan for prevention and treatment. This approach underscores the importance of working together in surveillance, vaccination, and education due to their interconnectedness. This includes immunizing pets, controlling wildlife populations, and providing prompt medical treatment for human contact. Also, it deals with environmental issues by lowering the number of stray animals and raising public awareness. This comprehensive view promotes cooperation between veterinarians, healthcare professionals, and environmental specialists, ultimately improving rabies control efforts and benefiting the overall ecosystem's health.

### Conclusion:

Community involvement is crucial in preventing rabies by increasing awareness, advocating for responsible pet ownership, promoting timely medical treatment, and backing public health efforts. By engaging with local residents in these initiatives, public health initiatives can improve their ability to address rabies more widely and effectively over time. Rabies continues to be a significant worldwide health concern, especially in regions where preventative measures are scarce. Combining vaccination, public education, and surveillance efforts is necessary for effective control in reducing and ultimately eradicating the disease.

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