

## Cutting Edge Strategies to Control Rabies

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A virus named Rabies is spread via bite or scratch of animal. The most common vector of this virus is dog. This vector is responsible for 99% cases of fatalities all over the world. More or less it causes 60,000 deaths per year in more than 150 countries. Higher incidence of disease is found in Africa and Asia with 95% cases. In Pakistan it ranges from 7.0 to 9.8 cases per million. World's rabies day is also celebrated on 28<sup>th</sup> of September with more promising objectives each year. Though post-exposure prophylactic treatment and vaccination exist but still rabies remains neglected disease in developing countries. The control system of rabies is complicated due to multifarious nature of zoonotic disease thus a multi-sectorial approach named "One Health Approach" could be the best way to cope with it. A tool called "The Stepwise Approach towards Rabies Elimination (SARE)" was developed via combined effort of FAO and GARC to give a benchmark mechanism to all countries to appraise their rabies condition and also gauge their progress in eradicating the disease. The WHO has targeted zero death due to dog-mediated human rabies by 2030 via mass dog vaccination. One Health Approach (OHA) involves inter-sectorial cooperation among human, animal and environmental health. OHA works effectively with a routine reporting system that evaluates the periodic progress and sporadic status of disease and their socioeconomic impact. This all stuff is significant to create strategies and control programs. Determination of data on vaccination in animal and human, human-dog population densities data are important to devise effective control systems for rabies. Availability of (PrEP) and PEP must be ensured in both urban and remote areas. Mass vaccination is also an effective way to control rabies. One of the principal methods to control rabies in human and animal population is mass immunization of dog. Vaccination of stray and domesticated dogs should be compulsory. Efficacy and quality of vaccination should also be enhanced to control rabies because immunity can't be invoked when below standard vaccines are administered. Diagnostic laboratories must be well equipped to ensure diagnosis in time and not relying merely on clinical symptoms to avoid fatalities. Accessibility of cost-effective and easy diagnostic tests should be assured. Advance research in epidemiology field may identify related risk factors, vicinity based dynamics and dominant mode of transmission. As an upshot there is possibility to formulate good integrated multi-sectorial rabies management approaches. Innovations in manufacturing tools to gauge degree of rabies infections should be done. Further research should be done in studies which focus on "soft" population control parameters for instance dog population control and environmental facets of rabies management. A digital system must be introduced to overcome long standing issue of rabies biologics availability. Advanced vaccine manufacturing methods must be a hub of thought for rabies-endemic countries to meet their need by their own to fight against rabies. Areas of routes administration and ID delivery devices just as microneedle patches require more heed to give better outcomes. There is also increased garnering consideration regarding PrEP and RIG requires new practices and technologies to generate large quantities of cocktails of specific monoclonal antibodies to give as an alternative source to curb disease with lesser burden. Research on single injection method requires more innovations for simplified population control in both males and females. Accelerated vaccines should be manufactured. Comorbidities due to rabies should be addressed via devising multiple treating methods to lessen severities and fatalities. Multifarious contraceptive methods must be developed in both genders of dog population for instance GnRH could be used as an immunocontraceptive along with rabies vaccine in dual immunocontraceptive. As an upshot dog population can be contained and disease risk

is highly minimized. Some antiviral drugs require more research which are being suggested against disease. The major issue confronted in these drugs is being functional in vitro but not accessible across BBB acutely resulting in being useless in animal models and humans. In female dogs ovariectomy or ovariohysterectomy are performed which can also be coined as Spaying. Neutring or castrating of males is also done to reduce population. Vasectomy is another sterilizing procedure in male dogs but isn't followed in usual practice. In 2019, an international workshop was held in South Asian Association for Regional Cooperation (SAARC) and it was concluded with two major objectives: First, to devise and execute regional road maps and national plans to dismiss dog mediated rabies in SAARC regions. Second, to put rabies disease in limelight with high degree of advocacy at national level along with strong political commitments to achieve the target of 'zero rabies b 2030'. Furthermore, in January 2020 Nepal Government signed a "One Health Strategy 2020" to encourage "One Health Approach" and to make rabies disease a hot potato topic in Health and Disease world.

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