

Abstract

Background: Rabies is responsible for 20,000 deaths in India annually and children below 15 years of age contributes to 35% of these painful deaths. This study reports the costs and cost effectiveness of various Pre-Exposure Prophylaxis (PrEP) and Post-Exposure Prophylaxis (PEP) strategies to avert deaths due to rabies among children in India.

Methods: A decision tree model was developed for children in the age group of 0-5 years (U-5) and 5-15 years (U-15) to evaluate various PrEP + PEP and PEP only regimens recommended under WHO & National guidelines. The 2-site intradermal (ID) regimen administered on day 0 and 7 was considered as intervention [PrEP (I)]. The model was populated with the data inputs that were extracted from a systematic review, independent review of published and grey literature, national representative surveys, programmatic reports and national and state level databases. The model, data inputs and assumptions were validated by the field experts. All costs were converted to 2020 International Dollars' value using implicit price deflators for Purchasing Power Parities. ICER and cost of implementation at programmatic level was calculated for base case analysis along with one-way sensitivity, and scenario analyses for each regimen. The cost effectiveness was reported using WHO-GDP based threshold approach. The data was analysed in MS Excel and Plant-a-tree add-in MS-Excel.

Results: In 2020, the incremental DALYs averted per million population with implementation of PrEP (I) in U-5 and U-15 cohort range between 187 and 35,399; and 451 and 85,069 respectively. Per capita cost of implementation of PrEP (I) is 18.83 USD and 19.19 USD for first year of implementation is 33.9 times and 9.9 times higher than PEP regimens in U-5 and U-15 cohort respectively. PrEP (I) is reported to be very cost effective in comparison with PEP regimens from quasi-societal and quasi-health systems' perspectives and reduce U-5 and U-15 deaths up to 95.6% and 89.9% respectively. Implementation of local plus systemic infiltration of equine rabies immunoglobulins in PEP was reported to be cost-effective over other forms of rabies immunoglobulins in U-5 and U-15 cohorts.

Conclusion: Though the cost of implementation at programmatic level is higher in first year, PrEP (I) regimen is a cost-effective and life-saving strategy to avert painful deaths due to rabies in children in India.