Comparative analysis of immune aging and susceptibility to tropical infections in the elderly: Insights from Malaysia and regional counterparts

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ABSTRACT

Introduction: Southeast Asia's aging population is increasingly vulnerable to tropical infections due to immune aging processes such as immunosenescence and inflammaging. Malaysia, in particular, faces rising rates of dengue, leptospirosis, tuberculosis, and pneumonia among individuals aged 60 and above. **Materials and Methods:** This comparative analysis synthesizes epidemiological data from Malaysia and regional counterparts including Thailand, Vietnam, Indonesia, and Singapore. It integrates findings from national health surveys, ministry reports, and peer-reviewed immunological studies to assess disease burden and immune aging markers. **Results:** In Malaysia, dengue case fatality rates among the elderly reached 1.8% in 2023, compared to a national average of 0.3%. Leptospirosis incidence was 35.2 per 100,000 with a 12.5% mortality rate, and tuberculosis affected 30% of individuals over 60. Pneumonia accounted for 15.2% of medically certified deaths in 2023. Regional comparisons show Thailand's integrated elder care reduces dengue mortality below 1%, while Singapore maintains a dengue fatality rate under 0.1% due to targeted interventions. Immunological findings across the region reveal consistent patterns of T-cell senescence, elevated IL-6 and TNF-α levels, and reduced vaccine responsiveness. **Conclusion:** The study highlights the urgent need for age-specific public health strategies, improved diagnostic access, and regional collaboration to mitigate the impact of tropical infections on aging populations in Southeast Asia.

Keywords: Aging, immunosenescence, inflammaging, dengue, leptospirosis, tuberculosis