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Epidemiology of Newcastle disease in poultry in Africa: systematic review and meta-analysis

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Abstract

The present study intended to determine the prevalence of Newcastle disease in unvaccinated backyard poultry in Africa. Using the PRISMA approach, a systematic review and meta-analysis of 107 epidemiological studies was conducted. The meta-analysis identified significant variation of both seroprevalence ($I^2 = 99.38$, $P = 0.00$) and Newcastle disease virus prevalence ($I^2 = 99.52$, $P = 0.00$) reported in various studies included in this review. Publication bias was not detected in either case. Seroprevalence of Newcastle disease was 40.2 (95%CI 32.9–47.8). Seroprevalence was significantly influenced by sampling frame and the African region where the studies were conducted. The prevalence of Newcastle disease virus (NDV) was 12% (95%CI 7.3–17.8), and the variation was influenced by sampling frame, diagnostic test, and regions where the studies were conducted. Also, Newcastle disease (ND) accounted for 33.1% (95%CI 11.9–58.1) of sick chickens. Results also indicated that genotypes VI and VII are widely distributed in all countries included in the study. However, genotype V is restricted in East Africa, and genotypes XIV, XVII, and XVIII are restricted in West and Central Africa. On the other hand, genotype XI occurs in Madagascar only. In addition, virulent genotypes were isolated from apparently healthy and sick birds. It is concluded that several genotypes of NDV are circulating and maintained within the poultry population. African countries should therefore strengthen surveillance systems, be able to study the viruses circulating in their territories, and establish control programs.

Keywords

Avulavirus; Paramyxovirus; Poultry; Avian viral disease; NCD; Africa