Prevalence of Yellow fever in Africa: a systematic review

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Background: Although yellow fever is known to be endemic in most parts of Africa, its occurrence can result in high rates of morbidity and mortality. Over 180, 000 cases of yellow fever and 30,000 deaths are recorded each year in Africa despite the availability of an effective yellow fever vaccine. The overall burden in Africa is heavily underestimated due to the lack of reporting of yellow fever cases. Understanding the recurrence of yellow fever epidemics is critical to help invigorate targeted interventions and control efforts for reducing the burden of the disease. We assessed the trend of yellow fever incidence, case fatality rate and mortality in Africa. The objective of the study was to estimate the overall burden of yellow fever in African regions where yellow fever is endemic.

Methods: We comprehensively searched the Cochrane Library, MEDLINE, CINAHL (EBSCOhost), Africa-wide (EBSCOhost) and Web of science (SCI-EXPANDED) databases, irrespective of language, using appropriate adaptations of the African search filters to identify yellow fever incidence studies, published and unpublished from 1 January 1975 to 28 February 2019, in Africa. Outbreak reports, cross sectional studies and other observational studies were eligible for this systematic review. Two review authors independently and in duplicate screened studies, extracted data, and appraised the quality of studies. Due to significant heterogeneity, we did not pool studies in meta-analysis but reported the results narratively.

Main findings: We included 12 epidemiological studies reporting on the incidence of yellow fever. Yellow fever incidence per 100,000 population ranged from less than one case in Nigeria, less than 3 cases in Uganda, 13 cases in DRC, 27 cases in Kenya, 40 cases in Ethiopia, 46 cases in Gambia, 1,267 cases in Senegal, to a maximum of 10,350 cases in Ghana. Case fatality rate (CFR) associated with yellow fever outbreaks according to the different African countries, ranged from 10% in Ghana to 86% in Nigeria. The mortality rate ranges from0.1/100,000 in Nigeria to 2,200/100,000 in Ghana. Out of the 12 included studies, 10 (83.3%) had a low risk of bias, 2 (16.7%) had a moderate risk of bias.

Conclusion: This systematic review shows lack of reliable epidemiological data on yellow fever in Africa. Most of the studies lacked both prevalence and incidence data to truly reflect the burden of the disease in Africa. Providing standardized demographic health surveys and surveillance and accurate diagnostic measures will be essential for early recognition, diagnosis and treatment of yellow fever.