

# Co-infections of *Schistosoma* spp. and malaria with hepatitis viruses from endemic countries: A systematic review and meta-analysis

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## Abstract:

Co-infection of schistosomiasis and malaria with hepatitis B virus (HBV) and hepatitis C virus (HCV) are common in countries where schistosomiasis and malaria are endemic. The present systematic review and meta-analysis was conducted to assess the prevalence of malaria/hepatitis viruses and *Schistosoma*/hepatitis viruses' co-infections. Relevant published studies on the co-infection of malaria and *Schistosoma* spp. with HBV and HCV were retrieved via international databases (PubMed, Scopus, Web of Science, and Google Scholar). Regarding meta-analysis, the random-effect model was employed by forest plot with 95% of confidence interval (CI). A total of 22 studies, including 15 studies with malaria/hepatitis viruses' co-infection and 7 studies with *Schistosoma*/hepatitis viruses' co-infection met the eligibility criteria. The co-infection of malaria/HCV and malaria/HBV in different populations were 15% (95% CI, 0-77%) and 5% (95% CI, 1-10%), respectively. Moreover, *Schistosoma*/HCV and *Schistosoma*/HBV co-infection were detected in 7% (95% CI, 0-54%) and 2% (95% CI, 0-7%), respectively. The overlaps between *Schistosoma* spp. and malaria with hepatitis B and C viruses in endemic countries with lower income levels were high, which deserve further attention.

**Keywords:** Co-infection, Malaria, *Schistosoma* spp., hepatitis B virus, hepatitis C virus, subtropical areas.