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Diagnostic Accuracy of Rapid Antigen Tests for COVID-19 Detection: A Systematic Review With Meta-analysis

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Introduction: Reverse transcription-polymerase chain reaction (RT-PCR) to detect SARS-CoV-2 is time-consuming and sometimes not feasible in developing nations. Rapid antigen test (RAT) could decrease the load of diagnosis. However, the efficacy of RAT is yet to be investigated comprehensively. Thus, the current systematic review and meta-analysis were conducted to evaluate the diagnostic accuracy of RAT against RT-PCR methods as the reference standard.

Methods: We searched the MEDLINE/Pubmed and Embase databases for the relevant records. The QUADAS-2 tool was used to assess the quality of the studies. Diagnostic accuracy measures [i.e., sensitivity, specificity, diagnostic odds ratio (DOR), positive likelihood ratios (PLR), negative likelihood ratios (NLR), and the area under the curve (AUC)] were pooled with a random-effects model. All statistical analyses were performed with Meta-DiSc (Version 1.4, Cochrane Colloquium, Barcelona, Spain).

Results: After reviewing retrieved records, we identified 60 studies that met the inclusion criteria. The pooled sensitivity and specificity of the rapid antigen tests against the reference test (the real-time PCR) were 69% (95% CI: 68–70) and 99% (95% CI: 99–99). The PLR, NLR, DOR and the AUC estimates were found to be 72 (95% CI: 44–119), 0.30 (95% CI: 0.26–0.36), 316 (95% CI: 167–590) and 97%, respectively.

Conclusion: The present study indicated that using RAT kits is primarily recommended for the early detection of patients suspected of having COVID-19, particularly in countries with limited resources and laboratory equipment. However, the negative RAT samples may need to be confirmed using molecular tests, mainly when the symptoms of COVID-19 are present.

Keywords: COVID-19, SARS-CoV-2, rapid antigen test, specificity, sensitivity, meta-analysis