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A Systematic Review of Point-of-Care Ultrasound Diagnostic Accuracy for Paediatric Pneumonia in Rural African Primary Care Settings

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Abstract

Pneumonia remains a leading cause of paediatric mortality in sub-Saharan Africa. In rural primary care settings, clinical diagnosis reliant on World Health Organisation Integrated Management of Childhood Illness criteria lacks specificity, potentially contributing to antibiotic overuse. Point-of-care ultrasound presents a possible diagnostic adjunct, but its accuracy and feasibility when operated by mid-level clinicians in low-resource African settings require systematic evaluation. This systematic review aimed to synthesise existing evidence on the diagnostic accuracy of point-of-care ultrasound for paediatric pneumonia in rural African primary care settings. The objective was to determine its sensitivity and specificity against a reference standard, such as chest radiography, when used by non-physician clinicians. A systematic search was conducted across multiple electronic databases. Studies were included if they reported primary data on point-of-care ultrasound diagnostic accuracy for paediatric pneumonia in primary or first-referral level healthcare facilities in Africa. Two reviewers independently screened titles, abstracts, and full texts, extracted data, and assessed study quality using the QUADAS-2 tool. Of the 1,247 records identified, three studies met the inclusion criteria. All were conducted in East Africa. The limited evidence suggested point-of-care ultrasound had high specificity (85% to 96%) but variable sensitivity (62% to 89%) for detecting consolidations compared to radiography. No studies evaluated a protocol operated solely by clinical officers in rural West Africa. Evidence on point-of-care ultrasound for paediatric pneumonia in relevant African primary care settings is scarce. Available data indicate promising specificity, which could help reduce unnecessary antibiotic prescriptions. Significant gaps exist regarding its performance when integrated into clinical workflows managed by mid-level clinicians in rural West Africa. Further high-quality diagnostic accuracy studies are urgently needed. Research should specifically evaluate protocols operated by clinical officers in rural West African settings to determine real-world utility and integration into existing clinical algorithms. point-of-care ultrasound, paediatric pneumonia, diagnostic accuracy, primary health care, rural health services, Africa, clinical officers. This review consolidates the limited available evidence and clearly identifies a critical geographical and

clinical practice gap, guiding future research priorities for implementing point-of-care ultrasound in under-resourced African primary care systems.

Keywords: *Point-of-care ultrasound, Diagnostic accuracy, Paediatric pneumonia, Sub-Saharan Africa, Primary health care, Clinical officers, Liberia*

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