

Feasibility of training MSF clinical officers in point-of-care ultrasound for paediatric respiratory diseases in Aweil, South Sudan

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Introduction

Point-of-Care Ultrasound (POCUS) is a new diagnostic modality whereby non-radiologist clinicians follow simple pattern-recognition algorithms to answer various types of clinical questions in real-time. One promising application of POCUS involves diagnosis of lower respiratory tract infections (LRTIs), particularly in children. This is especially relevant as LRTIs are the leading cause of death in children <5 years worldwide. In low-resource settings, such as South Sudan, diagnosis can be difficult due to either overly sensitive algorithms, or lack of diagnostic equipment such as X-rays. We aimed to see if MSF clinical officers (COs) in Aweil, South Sudan, could learn this specific POCUS application.

Methods

Six COs without any prior ultrasound experience underwent 12 hours of didactic and practical training in lung POCUS. Subsequently, each CO performed 60 lung ultrasound examinations for hospitalized children <5yr fitting MSF criteria for LRTI (Ultrasound images, together with COs' interpretation, were subsequently evaluated by two expert reviewers (with an additional tiebreaker expert evaluating discordant results) using both a 5-point Likert scale and a binary yes/no system. Clinical decisions were not altered by the POCUS investigations.

Ethics

All caretakers gave written consent. Ethics approval was not obtained since this was an evaluation of a training project using established medical practices. The objective was to understand if MSF COs could learn an algorithm already described in the research, at an acceptable level. No clinical decision-making was altered during this training. The Ethical Committee of the Ministry of Health in South Sudan, gave approval for publication. The Medical Director, Clair Mills, Operational Centre Paris, MSF, assumes ethics responsibility for this project.

Results

COs completed 360 studies and the two expert reviewers evaluated 355 and 356 of these, respectively. A tiebreaker reviewer evaluated 85 studies, where the two experts were discordant. In the 5-point Likert scale, combined score average was 4.11. In the binary yes/no system, the combined average of the reviewers found that 99.1% of the images were acceptable and that 86.0% of the analyses were appropriate, according to best medical practices. However, variability was found for evaluations of different diseases. Inter-rater agreement (κ) between ratings of the two experts and each CO were 0.73 (95%CI 0.63-0.82) for pulmonary consolidation, 0.81 (95%CI 0.74-0.87) for bronchiolitis, and 0.49 (95%CI 0.32-0.67) for pulmonary interstitial disease.

Conclusion

In this pilot training project, we found that COs in South Sudan can effectively learn one POCUS application, (lung ultrasound), which can help to diagnose LRTIs and other pulmonary diseases in children <5 years. This application could improve the management of a leading cause of morbidity and mortality in this vulnerable group. The next step will be to train additional COs in lung ultrasound and undertake further research to simplify and improve clinical utility.

Conflicts of interest

None declared.