Strengthening Primary Healthcare Workforce Capacity for Hypoxemia Management: Insights from a Multi-State Assessment and Impact of a Targeted Training Intervention in Nigeria

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Background:
Hypoxemia, a serious complication of pneumonia and other respiratory conditions, remains underdiagnosed and inadequately managed at the primary healthcare (PHC) level in Nigeria. Despite the strategic positioning of comprehensive PHCs as frontline providers of essential child health services, systemic limitations in equipment availability and health care worker (HCW) capacity continue to hinder effective service delivery. This study assessed the readiness of PHC workers to diagnose and manage hypoxemia and evaluated the impact of a targeted training intervention aimed at strengthening HCW capacity in oxygen therapy.

Methods:
In 2023, an assessment was conducted across 146 PHCs in five Nigerian states (Imo, Lagos, Rivers, Kano & Kaduna), selected for geographic diversity and health system capacity. 146 PHC HCWs were evaluated through structured questionnaires to assess clinical knowledge and perceptions of the feasibility, acceptability, and appropriateness of oxygen therapy. In 2024, Clinton Health Access Initiative (CHAI) implemented a standardized training program for over 500 PHC HCWs from the same states. The curriculum, delivered by master trainers, focused on hypoxemia case management and oxygen therapy, and practical application of oxygen delivery systems, including concentrators, flowmeters, and cylinders.

Results:
The baseline assessment revealed that 33% of PHCs had functional pulse oximeters, and fewer than 50% of HCWs had received formal training on pulse oximetry or oxygen therapy. HCWs also expressed low confidence in using oxygen equipment due to insufficient hands-on experience and support.

Post-training assessments demonstrated substantial improvements with average knowledge scores rising from 40% at pre-test to 63% post-test, a 23-percentage point gain. HCWs also reported increased confidence in identifying and managing hypoxemia.

Conclusion:
Despite initial gaps, this study demonstrates that targeted, context-specific training significantly enhances healthcare worker capacity and PHC readiness for hypoxemia management. These findings underscore the critical role of workforce development in scaling effective oxygen therapy services in low-resource settings.

Keywords: PHC, HCW, hypoxemia, CHAI, case management, Oxygen