



A Systematic Review of the Impact of Solar-Powered Oxygen Delivery on Paediatric Pneumonia Mortality in Sierra Leonean District Hospitals, 2017

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Abstract

Pneumonia is a leading cause of paediatric mortality in low-resource settings. In Sierra Leone, district hospitals frequently experience unreliable electricity, which disrupts the consistent supply of medical oxygen, a critical treatment for severe pneumonia. Solar-powered oxygen systems have been suggested to mitigate this infrastructure deficit. This systematic review aimed to synthesise and critically appraise existing evidence on the effect of introducing solar-powered oxygen delivery systems on case-fatality rates for childhood pneumonia in district hospitals in Sierra Leone. A systematic search of multiple academic databases and grey literature sources was undertaken. Studies were included if they reported on the implementation and health outcomes of solar-powered oxygen for paediatric pneumonia in the relevant hospital setting. Data extraction and quality assessment were conducted independently by two reviewers using standardised tools. The review identified a limited number of relevant studies. The available evidence, though not extensive, consistently indicated a reduction in case-fatality rates following the installation of solar-powered oxygen systems. A key study reported a halving of the mortality rate among hypoxaemic paediatric pneumonia patients after implementation. The introduction of solar-powered oxygen delivery appears to be associated with decreased paediatric pneumonia mortality in the studied settings. This suggests the technology can effectively circumvent oxygen supply interruptions caused by an unstable electrical grid. Further robust, controlled studies are required to strengthen the evidence base. Policymakers should consider piloting and evaluating solar-powered oxygen as a component of integrated respiratory care strategies in comparable low-resource, high-burden settings. solar power, medical oxygen, paediatric pneumonia, case-fatality rate, district hospitals, Sierra Leone, global health This review consolidates initial evidence on a pragmatic

intervention for improving oxygen therapy in resource-constrained environments, providing a foundation for future research and policy consideration.

Keywords: *paediatric pneumonia, solar-powered oxygen, case-fatality rate, district hospitals, Sierra Leone, low-resource settings, medical oxygen delivery*

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