Incidence and degree of hypoxaemia in Malawian infants under 2 months of age presenting to district hospitals and its correlation with mortality: a retrospective analysis

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Abstract

Background Pneumonia is a leading cause of death in Malawian infants under 2 months of age. Consensus defines hypoxaemia in infants as a peripheral capillary oxygen saturation (SpO_2) of less than 90%. We aimed to estimate the incidence and degree of hypoxaemia and its correlation with mortality in infants younger than 2 months presenting to district hospitals in Malawi.

Methods We retrospectively analysed a child pneumonia surveillance dataset prospectively collected during routine care at seven hospitals in Malawi between 2011 and 2014. Infants aged 0–2 months with pneumonia according to 2012 WHO case management guidelines were included. We used logistic regression to determine correlation between degree of hypoxaemia and in-hospital death.

Findings 1810 infant pneumonia admissions were analysed. The case fatality rate was 3·6% (n=65). SpO_2 could not be measured in 8·5% (n=154) of patients. Median SpO_2 was 96% (IQR 91–98). Infants for whom SpO2 measurement was successful versus unsuccessful had a similar prevalence of chest indrawing (85·6% vs 79·2%) and WHO danger signs (68·4% vs 61·0%; p=0·064), and the distribution of girls (40·9% vs 39·6%) was also comparable. Compared with infants with an SpO_2 of 93–100% (n=1160), infants with an SpO_2 of 90–92% (n=187) or <90% (n=309) had an increased adjusted odds of death (aOR 5·7, 95% CI 2·4–13·9 and 4·9, 2·2–11·0, respectively). Infants for whom SpO_2 was not measurable (n=154) had a greatly increased adjusted odds of death compared with infants with a SpO2 of 93–100% (aOR 17·5, 95% CI 7·5–40·8).

Interpretation The case definition of hypoxaemia in infants less than 2 months of age warrants re-evaluation. Infants with an SpO_2 of 90–92% have a higher odds of death than those with a SpO_2 of 93–100%. Infants for whom SpO_2 could not be measured, despite having similar demographic and physical examination findings, had a higher odds ratio for death than any other observed group. Interestingly, these infants had a lower rate of WHO danger signs, but probably had severe disease such as shock with diminished peripheral perfusion resulting in inability to measure SpO_2. WHO danger signs may not adequately capture such physiological derangements. The inability to measure pulse oximetry is clinically meaningful in our setting. Implementation of compulsory SpO_2 measurement could result in improved referral rates and recognition of severe disease in infants younger than 2 months of age with pneumonia.

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Declaration of interests
We declare no competing interests.