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Incidence and risk factors of neonatal infections in a rural Bangladeshi population: a community-based prospective study

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ABSTRACT

Background: Infections cause about one fifth of the estimated 2.7 million annual neonatal deaths worldwide. Population-based data on burden and risk factors of neonatal infections are lacking in developing countries, which are required for the appropriate design of effective preventive and therapeutic interventions in resource-poor settings.

Methods: We used data from a community-based cluster-randomized trial conducted to evaluate the impact of two umbilical cord cleansing regimens with chlorhexidine solution on neonatal mortality and morbidity in a rural area of Sylhet District in Bangladesh. Newborns were assessed four times in the first 9 days of life by trained community health workers (CHWs) using a WHO IMCI-like clinical algorithm. Cumulative incidence of the first episode of infections in the first 9 days of life was estimated using survival analysis technique accounting for survival bias and competing risk of death before the occurrence of infection. A multivariable generalized estimating equation log-binomial regression model was used to identify factors independently associated with infections.

Results: Between 2007 and 2009, 30,267 newborns who received at least one postnatal assessment visit by a CHW within the first 9 days of life were included in this study. Cumulative incidence of infections in the first 9 days of life was 14.5% (95% CI 14.1–14.9%). Significant risk factors included previous child death in the family [RR 1.10 (95% CI 1.02–1.19)]; overcrowding [RR 1.14 (95% CI 1.04–1.25)]; home delivery [RR 1.86 (95% CI 1.58–2.19)]; unclean cord care [RR 1.15 (95% CI 1.03–1.28)]; multiple births [RR 1.34 (95% CI 1.15–1.56)]; low birth weight [reference: ≥ 2500 g, RR (95% CI) for < 1500 , 1500–1999, and 2000–2499 g were 4.69 (4.01–5.48), 2.15 (1.92–2.42), and 1.15 (1.07–1.25) respectively]; and birth asphyxia [RR 1.65 (1.51–1.81)]. Higher pregnancy order lowered the risk of infections in the study population [compared to first pregnancy, RR (95% CI) for second, third, and \geq fourth pregnancy babies were 0.93 (0.85–1.02), 0.88 (0.79–0.97), and 0.79 (0.71–0.87), respectively].

Conclusion: Neonatal infections and associated deaths can be reduced by identifying and following up high-risk mothers and newborns and promoting facility delivery and clean cord care in resource-poor countries like Bangladesh where the burden of clinically ascertained neonatal infections is high. Further research is needed to measure the burden of infections in the entire neonatal period, particularly in the second fortnight and its association with essential newborn care.

Trial registration: NCT00434408. Registered February 9, 2007.

KEYWORDS

Neonatal infections; Risk factors; Bangladesh; Prospective study

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