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Frailty modeling for family level clustering of infant mortality in empowered action group states in India

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Objectives: In India, the focused intervention policies led to a decline in mortality among children younger than five years, yet some of the states in India are having very high mortality rates. We explored the effects of distal and proximate determinants on infant mortality by accounting for family level clustering using Cox frailty model in Empowered Action Group states (EAG) in India and compared the results with standard models.

Methods: Analysis included 20,126 live births that occurred five years preceding the National Family Health Survey-3 (2005-06). The Cox frailty model was used to account for the family level clustering.

Results: Of the 20126 live births, 1223 babies died before reaching their first birthday. The Cox frailty model showed that mother's age at birth, composite variable of birth order and birth interval, size of the baby at birth and breastfeeding among proximate determinants were significant determinants of infant mortality after adjusting for familial effect. The hazard ratio was 1.31 (95% CI=1.07−1.61) for children born to mothers aged 12-19 years compared to mothers aged 20-30 years, 1.59 (95% CI=1.35−1.87) for small-sized than average-sized babies at birth, and 97 (95% CI=81−116) for non-breastfed than breastfed babies.The familial frailty effect was 2.52 in the EAG states. The region, mother's education, total number of children and wealth index were significant distal determinants. The inferences on the determinants for all the three models were similar except the death of a previous child and mother's age at birth in the Cox frailty model, which had the highest R2 and lowest log-likelihood.

Public Health Implications: While planning for the child survival program in EAG states, parental competence which explains the unobserved familial effect needs to be considered along with significant proximate/programmable determinants.

Biography

Kalaivani Mani has been involved in design and analysis of research carried out in medicine at All India Institute of Medical Sciences (AIIMS) from 2003. She has been awarded Doctorate degree in 2013 on the topic titled "Trends, differentials and determinants of neonatal, infant and under-five mortality in empowered action group states in India".

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