Implementing Education to Reduce Neonatal Mortality in Low-Resource Environments

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Mortality among children under 5 years of age in developing countries has fallen dramatically in recent decades. Unfortunately, declines in neonatal mortality during this period have been less impressive. Neonatal mortality now accounts for >40% of under-5 mortality. About one-quarter of neonatal deaths result from intrapartum-related conditions and their consequences (e.g., birth asphyxia), with an estimated 10 million newborns requiring some level of intervention to establish breathing and circulation at the time of birth. One strategy for reducing neonatal mortality is to improve the care of babies at the time of birth by improving the knowledge and skills of providers. Helping Babies Breathe (HBB), a low-cost and low-tech simulation-based educational program on newborn resuscitation, was developed to support this strategy. In this issue of Pediatrics, Arlington et al report the evaluation of large-scale implementation of HBB in Tanzania as a strategy to reduce neonatal mortality.

This report is important for several reasons. Previous evaluations of HBB have been on a smaller scale and focused primarily on providers in hospital settings. The authors report implementation in nearly the entire country of Tanzania, in 15 of 25 mainland regions. Providers from all types of facilities in which births occurred, including those in hospitals, health centers and dispensaries, participated in the study. Beyond evaluating knowledge and skills, the authors document important confounders of the impact of education, such as the availability of equipment and the coverage of births by trained providers.

There are several noteworthy take-home messages from this publication. Educating providers at a single point in time improves knowledge and skills, but to sustain improvements, education must be supplemented by strategies to maintain knowledge and skills. Refresher training would be one such strategy, but an optimal interval for refresher training is not known, and, in fact, this may not be the ideal strategy. This publication supports the emerging evidence that repeated, small-dose simulated practice may be the preferred strategy for maintaining the complex skills required for neonatal resuscitation. Visits by supportive supervisors who can guide practice might also be critical to maintaining knowledge and skills. The authors provide limited information about this support. In future studies, the roles and responsibilities of supportive supervisors as well as their training should be explored.

Unfortunately, the authors were unable to assess the impact of improving knowledge and skills on health outcomes, most notably mortality. One could assume a reduction in mortality based on previous, smaller studies in Tanzania and Nepal. However, we advise caution in making this assumption because of differences in the context of care in the current study compared with previous...
Even when knowledge and skills of providers are adequate, gaps in the quality of care that influence mortality may remain. Barriers to inputs (such as staffing, supplies, and infrastructure) as well as performance (such as poorly organized processes or misaligned incentives) may interfere with the translation of education into practice. Addressing these barriers may require the use of continuous quality improvement (CQI) methods, in which gaps in quality and barriers that cause these gaps are identified and tailored solutions are tested. Although CQI has become a part of the fabric of medical care in developed countries, it remains an infrequent component of care in developing countries. Successful incorporation of CQI into practice in low-resource settings has required the assistance of external quality improvement experts, making it expensive and difficult to implement on a large scale. Creative ways to implement CQI in low-resource settings should be the focus of future research.

Beyond a one-time clinical training, providing the additional elements of successful translation of education into practice, such as repeated facility-based training, supportive supervision, monitoring, and evaluation of key indicators and CQI, can be extremely costly and may result in the most frequent barrier to successful implementation: lack of adequate funding. The authors report that the cost of their program was $4 million or about $600 per facility. This cost would appear to be modest, but it does not include key elements of implementation. Also, it is difficult to assign a value to this program without knowing the impact on mortality and other important outcomes. Analyses of value, that is, benefits in relation to costs, are critical because these analyses may be the ultimate determinant of decisions regarding expenditures on health care in resource-limited environments.

**ABBREVIATIONS**

CQI: continuous quality improvement  
HBB: Helping Babies Breathe

**REFERENCES**


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