Chlorhexidine cleansing of the umbilical cord in Nepal: leading by example and saving lives

Luke C. Mullany

Department of International Health. Johns Hopkins Bloomberg School of Public Health.615 N. Wolfe Street, W5009. Baltimore, MD, 21228 United States.

Each year, approximately 3 million newborn babies die before their first month of life, and almost all of these occur in low resource settings[1]; in Nepal alone, more than 20,000 newborns die annually. While Nepal has made great strides in reducing under-five mortality and is on track to meet Millennium Development Goal4 (reduction of under-five mortality by two-thirds between 1990 and 2015), progress in further reducing neonatal deaths requires greater efforts. In fact, the national neonatal mortality rate has declined more slowly than the infant and under-five mortality rates, and both the 2006 and 2011 Nepal Demographic and Health Survey, estimated approximately 33 neonatal deaths for every 1000 births in the 5 years period prior to each survey[2-3].

Nepal has established a well-deserved reputation as a leader in the global effort to improve maternal, fetal, neonatal, infant, and child survival. The Nepal Newborn Change and Analysis Group hasrecently offered an excellent analysis of the progress made, programs initiated, and collaborative local, national, and international efforts extended to move relevant and appropriate research evidence into policies and programs[4]. Two examples from their analysis include 1) the issuance of the 2004 National Neonatal Health Strategy, the first such comprehensive plan for neonatal health among low resource countries, and 2) the continued leveraging of the national FCHV Program, which has become a model for the efficient community-based delivery of high-impact, low-cost interventions to improve survival.

Similarly, Nepal has been leading efforts to increase access to and coverage of one of the most exciting and promising new life-saving interventions: chlorhexidine cleansing of the umbilical cord. In recent years, three community-based randomized trials[5,6,7] conducted in Nepal (by the Nepal Nutrition Intervention Project, Sarlahi), Bangladesh, and Pakistan have demonstrated that mortality risk can be reduced substantially by applying 7.1% chlorhexidinedigluconate w/v to the freshly cut umbilical cord as soon as possible after birth. These studies have answered the WHO callfor research to help formulate evidencebased recommendations for optimal cord care; updated guidelines are expected soon. A recent meta-analysis[8] of the three South Asian trials estimates that the risk of death within the first month of life was 23% lower among babies receiving chlorhexidine applications to the cord. Some babies born alive but dying early from intrapartum events (i.e. asphyxia) or complications of prematurity were not included in these trials. If all live births are included in the analysis, almost one-fifth (18%) of neonatal deaths were averted. **These analyses indicate that widespread use of chlorhexidine cord cleansing could save approximately 4,000 babies per year in Nepal and up to 500,000 babies worldwide each year [9].**

Nepal has responded vigorously to these data by conducting operations research and pilot testing, endorsing the use of chlorhexidine cleansing as a national program in 2011, and now rolling out wide-scale provision of chlorhexidine cleansing for both home and facility births. For the past few years, a local manufacturerhas been producing a gel-based chlorhexidine product ("Kawach"), which has been shown in a facility study to be as effective as the aqueous products used in the trials[10]. Chlorhexidine cleansing of the cord costs just a few rupees per application, is heat stable, is easily delivered by health care providers and mothers alike, has an excellent safety record from over 50 years of usage[11], is widely available throughout the region, and both aqueous and gel formulations are included in the Nepal and WHO Essential Medicines Lists[12].

One question occasionally raised by some is: Should chlorhexidine cord cleansing be recommended for both acility and home births? I believe the answer is unequivocally "Yes". In our trials in Nepal and Bangladesh, we enrolled ALL eligible babies, whether born in a facility or at home, and thus our analyses included more than 3,000 facility births; among these babies chlorhexidine lowered mortality risk to the same degree or greater[8], indicating that this intervention has substantial benefit beyond just babies born at home. This is not a surprising result: we know that Nepal is rapidly increasing the rate of facility delivery, but we also know that mothers and babies are almost immediately discharged into the same environment that home-born babies experience. Furthermore, we recognize that achieving hygienic delivery and keeping the cut umbilical cord unexposed to pathogens is nearly impossible in the vast majority of these facilities, where

basic necessities such as running water and electricity are often lacking. Even in tertiary care hospitals in large cities we know that exposure to invasive organisms is frequent, and nosocomial infections in babies are hard to prevent without active interventions. Earlier this year, a study of chlorhexidine cord cleansing in babies in a tertiary care hospital in Haryana, India also showed that the intervention could reduce sepsis and mortality in facilities[13]. Finally, this emerging interest in chlorhexidine in facilities is not limited to Nepal or other countries in the region; recent studies in pediatric intensive care units in the United States have demonstrated substantial benefit to the use of chlorhexidine full-body cleansing in helping to prevent nosocomial infection[14].

The evidence is clear. The cost is low. The impact is high. The public health benefit is substantial. Thousands of babies whether born in facility or home can be saved through this intervention. Nepal has led and should continue to lead the world by example, when it comes to the rapid promotion of high-impact interventions to improve neonatal survival. By implementing widespread use of this simple intervention for all facility and home born babies, we can help accelerate reductions in neonatal mortality across the country, and propel Nepal well beyond the targets set through Millennium Development Goal 4.

References

1. Oestergaard MZ, Inoue M, Yoshida S, et al. Neonatal mortality levels for 193 countries in 2009 with trends since 1990: A systematic analysis of progress, projections, and priorities
2. Nepal Demographic and Health Survey 2006. Kathmandu, Nepal: Ministry of Health and Population, Nepal; New ERA; Macro International, Inc; 2007
3. Nepal Demographic and Health Survey 2011. Kathmandu, Nepal: Ministry of Health and Population, Nepal; New ERA; Macro International, Inc; 2012
4. Pradhan YV, Upreti SR, Pratap KCN et al. Newborn Survival in Nepal: a decade of change and future implications. Health Policy and Planning. 2012; 27(Suppl. 3): iii57-71.
5. Mullany LC, Darmstadt GL, Khatry SK et al. Topical applications of chlorhexidine to the umbilical cord for prevention of omphalitis and neonatal mortality in southern Nepal: a community-based, cluster randomised trial. Lancet. 2006; 367(9514):910-918.
6. Arifeen SE, Mullany LC, Shah R, et al. The effect of cord cleansing with chlorhexidine on neonatal mortality in rural Bangladesh: a community-based, cluster-randomised trial. *Lancet*. 2012; 379(9820):1022-1028.
7. Soofi S, Cousens S, Imdad A, et al. Topical application of chlorhexidine to neonatal umbilical cords for prevention of omphalitis and neonatal mortality in a rural district of Pakistan: a community-based, cluster-randomised trial. Lancet. 2012; 379(9820):1029-36.
8. Imdad A, Mullany LC, Baqui AH, et al.The effect of umbilical cord cleansing with chlorhexidine on omphalitis and neonatal mortality in developing country communities: A meta-analysis. *BMC Pregnancy & Childbirth*. 2013.
9. Hodgins S, Thapa K, Khanal L, et al. Chlorhexidine gel versus aqueous for preventive use on umbilical stump: a randomized noninferiority trial. Pediatr Infect Dis J. 2010; 29(11): 999-1003.
10. Hodgins S, Pradhan YV, Khanal L, et al. Chlorhexidine for umbilical cord care: game-changer for newborn survival? Glob Health: SciPract. 2013; 1(1):5-10.
11. Mullany LC, Darmstadt GL, Tielsch JM. Safety and impact of chlorhexidine antisepsis interventions for improving neonatal health in developing countries. Pediatr Infect Dis J. 2006; 25(8): 665-75.
12. WHO Model List of Essential Medicines for Children. April 2013. Available at: http://www.who.int/medicines/publications/essentialmedicines/en/index.html
13. Gathwala G, Sharma D, Bhakhri B. Effect of topical application of chlorhexidine for umbilical cord care in comparison with conventional dry cord care on the risk of neonatal sepsis: a randomized controlled trial. J Trop Pediatr. 2013; 59(3):209-13.
14. Milstone AM, Elward A, Song X, et al. Daily chlorhexidine bathing to reduce bacteraemia in critically ill children: a multicenter, cluster-randomized, crossover trial. Lancet. 2013; 381(9872):1099-106.