Extended Abstract

Using Lot Quality Assurance Sampling to Study the Coverage of Chlorhexidine 7% gel For Cord Application in Northern Nigeria

Moyosola Bamidele[1], Dele Abegunde[1], Nosa Orobaton[1], Masduk Adulkarim[1], Toyin Akomolafe[1]

[1]JSI Research & Training Institute, Inc., - Targeted States High Impact Project (TSHIP), Bauchi, Bauchi State Nigeria

Background

The World Health Organization recommends improving newborn care practices at birth in order to reduce morbidity and mortality. These have been described as essential newborn care (ENC) practices [1-3]. One of these essential practices is clean cord care which is very important in preventing early neonatal infections [2]. The basis of cord care, as we know it today, has evolved through many years of traditional and cultural customs. About a third (1.5 million) of all neonatal deaths worldwide that occur each year are due to infection and many of these infections begin as umbilical cord infection[1]. Umbilical cord infections can occur in all settings but are more likely to occur in low-income countries and in settings where the majority of births are not attended by a skilled attendant[1].

Data on the incidence of omphalitis in low-income countries is generally scarce, the available data estimate the risk to range between 2 and 77 per 1000 live births in hospital settings, with fatality rates of between 1% and 15% depending on the definition of omphalitis used [4]. Community-based data show even higher infection rates: for example, 105 per 1000 live births in Nepal, [4] 217 per 1000 live births in Pakistan and about 197 per 1000 live births in India [5]. According to a survey by World Health Organization (WHO) in 2008, approximately 39% of childbirths in Nigeria are attended by a Skilled Birth Attendant (SBA), it was also noted that 70% of all childbirth in the country occurs in rural areas with just 27% of these births assisted by a SBA [6]. Study has revealed that over one in five births in Nigeria was delivered with no one present (NOP) and 94% of those deliveries occurred in the Northern Nigeria [7].

The application of Chlorhexidine 4% to the cord stump, shortly after birth, has been shown to be effective in reducing neonatal deaths by between 20-30% [8] in various studies in Nepal and Bangladesh [9]. Daily application of 4% chlorhexidine gel to the umbilical cord stump immediately and during the first week of life is recommended for newborns who are delivered at home in settings with high neonatal mortality rate (greater than 30 per 1000 live births). This therefore reinforces the need of good umbilical care practice to help in reduction of neonatal infections and mortalities in Africa which accounts for more than 60% of the global burden of neonatal mortality [6]. The United States Agency for International Development (USAID) funded the Targeted States High Impact Project (TSHIP)—managed by a consortium led by JSI Research and Training Institute, Inc., and includes Jhpiego, Futures Group, PLAN

International and Management Sciences for Africa - in Bauchi and Sokoto States. Between 2009 and 2015, this project supported these states to reduce preventable maternal, newborn, infant, and child morbidity and mortality. The project components integrated included maternal, newborn and child health with family planning/reproductive health (MNCH/FP/RH) interventions. The goal of the newborn components of this project included the reduction of neonatal mortality through increasing the access of pregnant women to Chlorhexidine 7% gel cord application intended to reduce cord infection and the helping babies breathe program which aimed at reducing mortality from birth asphyxia.

Objective of the study

The purpose of this paper was to examine the coverage of Chlorhexidine 7% gel for cord application in Northern Nigeria using lot quality assurance sampling.

Methodology

Data from three waves of LQAS studies which were conducted to monitor progress and impact of TSHIP's programs were used for this exploration. These were a baseline, follow-up and endline LQAS surveys, conducted in November 2012, December 2013 (in Sokoto State)/March 2014 (in Bauchi State) and the third wave in February 2015 respectively. These surveys were originally conducted to monitor and ultimately evaluate impact of the TSHIP programs and the performances of the LGAs (SAs). The same set of pretested questionnaires was used to obtain data across the three waves. Responding households were sampled using a rigorous multistage random sampling of 19 LQAS locations (villages and hamlets) in each of the 20 and 23 LGAs comprising Bauchi and Sokoto states respectively. From a compiled list of households in the sampled locations, 19 households were selected through a systematic random sampling technique totaling of 817 and – households in Bauchi (380) and Sokoto (437) States respectively, in each of the three survey years. This totaled 1,140 and 1,311 samples in the Bauchi and Sokoto States' surveys. Data were collected following intensive and detailed 9-day training course of States' data collectors and field supervisors.

Analysis

Epidata was utilized for electronic data capture. Descriptive analyses were performed using purposefully preprogrammed Microsoft Excel worksheet and STATA© (Version 12). For the baseline, follow-up and end-line surveys, we estimated and compared the average coverage of the indicator for the LGAs with an acceptable level of statistical errors of $\alpha \leq 5\%$, and $\beta \leq 20\%$ [10-11]. Performance classification of the LGA was done using a statistically determined decision rule determined by the SA sample size of 19 households and pre-determined coverage benchmarks (or targets). The LGA estimates from all the LGAs in each state were aggregated and weighted by the proportional contribution of population of each LGA, to estimate the coverage for the entire State. Consistent with LQAS methodology, confidence intervals of the estimated coverage were calculated with finite sample correction weighing samples relative to the respective LGA population.

Ethical Consideration

Ethical clearances for this study were obtained from the Bauchi and Sokoto states' Health Research Ethics Review Committees following the submission of the study protocols including the survey questionnaires and the details of the consent procedure and the consent form.

Findings

On the use of Chlorhexdine for cord care in Bauchi State, the result shows a significant increase in the number of women who mentioned that chlorhexidine was used for their child's umbilical cord, 0.7% (95%, CI: 0.7%, 0.7%) in 2012, 2.4% (95%, CI: 2.3%, 2.5%) in 2013 and 21.5% (95%, CI: 20.4%, 22.6%) coverage in 2015 (Fig 1). There was also a steady significant increase in the use of Chlorhexdine for cord care in Sokoto State. The coverage in 2012 was 0.7% (95%, CI: 0.67%, 0.75%) to 9.2% (95%, CI: 8.68%, 9.72%) in 2013 and rose significantly to 17% (95%, CI: 16.16%, 17.84%) coverage in 2015 (Fig 2). Using this methodology, findings have shown a significant increase in the uptake of chlorhexidine in these two states.

Conclusion

We have used data from the three waves of LQAS surveys conducted between 2012 and 2015 to examine the coverage of Chlorhexidine 7% gel for cord application to prevent neonatal sepsis in Bauchi and Sokoto States, Nigeria. Our findings have direct implications for future policy and interventions for upscaling the distribution and use of chlorhexidine 7% gel to prevent cord infection, especially in the culturally homogeneous northern regions of Nigeria.

Figure 1:

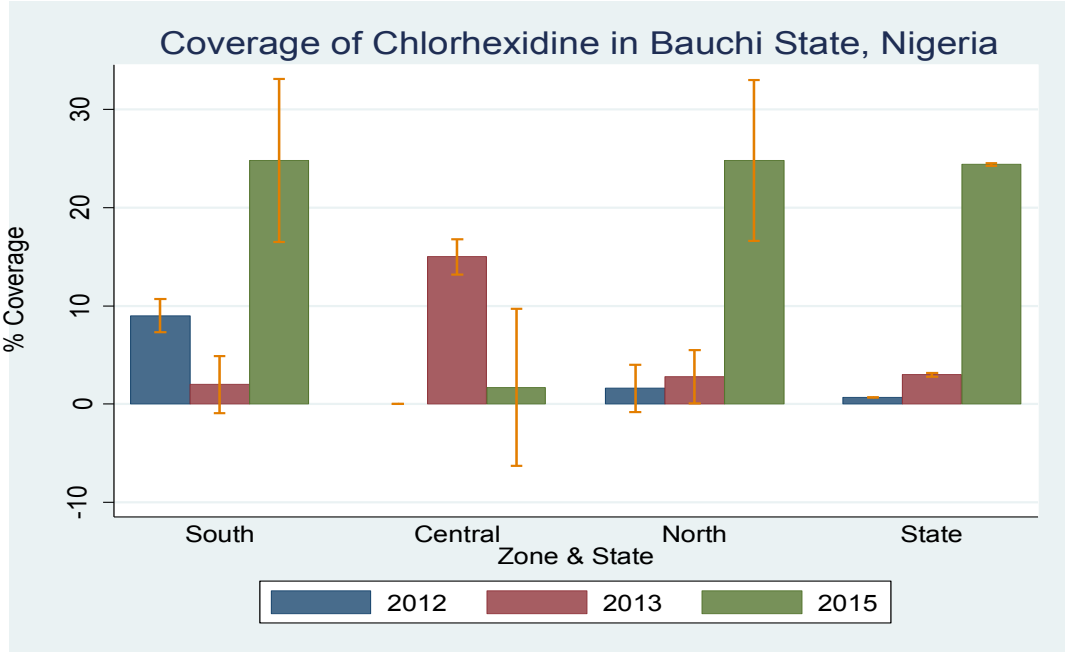
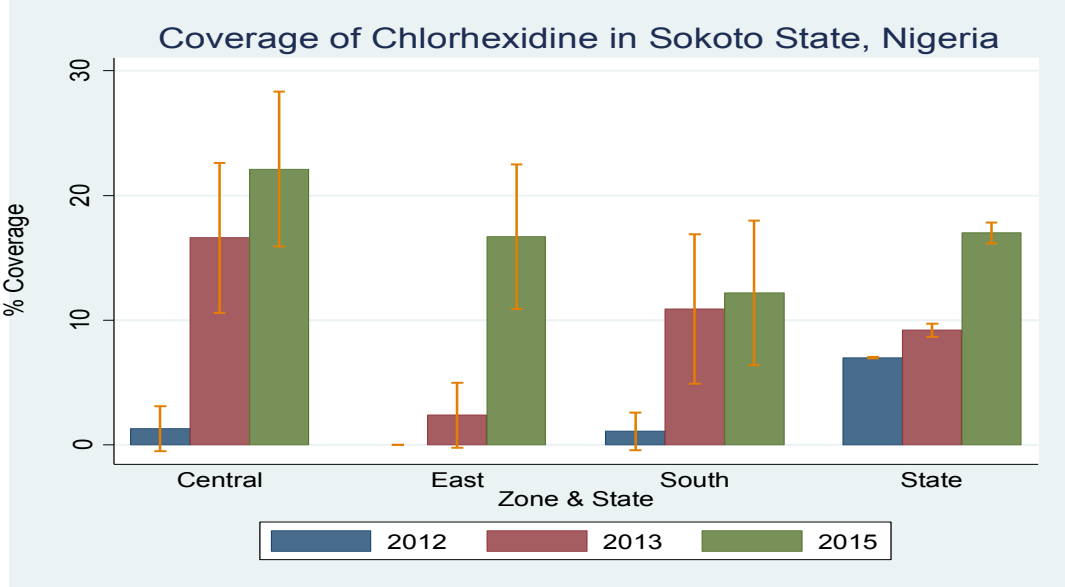


Figure 2:



References

1 G. L. Darmstardt, Z.A.B., S. Cousens, T. Adam, N. Walker, L. Bernis, et al., *Evidence Based Cost Effective Interventions; How Many Newborns Can We Save?* Lancet, 2005. **365**(9463): p. 977-988.

2. D. R. Marsh, G.L.D., J. Moore, P. Daly and D. Oot, A. Tinker, *Advancing Newborn Health and Survival in Developing Countries: A Conceptual Framework.* Journal of Perinatology, 2002. **22**(7): p. 572-576.

3. P. Waiswa, S.P., G. Tomson and G. W. Pariyo, *Poor Newborn Care Practices-A population Based Survey in Eastern Uganda.* BMC Pregnancy and Childbirth, 2010. **10**(9).

4. Mir F, Tikmani SS, Shakoor S, et al. *Incidence and etiology of omphalitis in Pakistan: a community-based cohort study*. J Infect Dev Ctries. 2011;5:828–833.

5. Mullany LC, Darmstadt GL, Khatry SK, et al. *Impact of umbilical cord cleansing with 4.0% chlorhexidine on time to cord separation among newborns in southern Nepal: a cluster-randomized, community-based trial*. Pediatrics. 2006;118:1864–1871.

6. UNICEF, *The State of the World's children*, in 2008.

7. Orobaton, B.M.F.a.N.G., *When Women Deliver with No One Present in Nigeria: Who, What, Where and So What?* PloS One, 2013. **8**(7): p. 48.

8. McClure, E., et al., *The use of chlorhexidine to reduce maternal and neonatal mortality and morbidity in low-resource settings.* Int J Gynaecol Obstet, 2007. **97**(2): p. 89 - 94.

9. Mullany, L., et al., *Risk of mortality subsequent to umbilical cord infection among newborns of southern Nepal: cord infection and mortality.* Pediatr Infect Dis J, 2009. **28**(1): p. 17 - 20.

10. Pagano M, Valadez JJ. *Commentary: Understanding practical lot quality assurance sampling*. International journal of epidemiology. 2010;39(1):69-71.

11. Lemeshow S, Robinson D. *Surveys to measure programme coverage and impact: a review of the methodology used by the expanded programme on immunization.* World Health Stat Q. 1985;38(1):65-75.