A Comparative Evaluation and Cost-effectiveness Analysis of Collaborative Improvement for Maternal and Newborn Care Services in Uganda

The USAID Health Care Improvement Project implemented a collaborative improvement intervention in Luwero and Masaka districts, Uganda, from November 2010 to November 2012. Its aim was to improve maternal and newborn health services including active management of third stage of labor (AMTSL), prevention of mother-to-child transmission of HIV (PMTCT), essential newborn care, newborn resuscitation, and post-natal care. In this intervention, teams from different facilities worked on a common improvement aim and came together for structured exchange of ideas and changes. Successful improvement ideas developed through the approach were then spread to additional sites. This study evaluated the impact and cost-effectiveness of the collaborative improvement intervention by comparing pre- and post-implementation quality of care indicators for samples of patients from participating and non-participating sites.

This cluster-randomized, controlled evaluation compared health facilities that received clinical training and participated in the improvement collaborative to control sites that received only clinical training and not the improvement intervention. Clinical training in essential maternal and newborn care was provided at 44 facilities allocated to either intervention or control arms by randomization at the sub-county level. The 22 health center (HC) II and HC III facilities in the intervention arm received clinical training plus orientation to improvement approaches.

All study sites received clinical training and were provided basic inputs needed for care of mothers and newborns, including newborn resuscitation bag and masks, resuscitation tables and other accessories. Both control and intervention groups were provided with registers to document indicators, and both were given clear instructions to maintain accurate and complete records throughout the study. Intervention sites were also involved in the improvement collaborative that included basic training in improvement methods, coaching visits, and learning sessions.

Data on indicators of processes of care were collected from health facility registers that were routinely recorded. Baseline data on clinical indicators were collected for facility deliveries between February and May 2011. End line data were collected in July 2012 for deliveries from June to July 2012. Patient information and performance indicator data were also collected. The incremental cost of implementing the intervention was obtained from the accounting records of HCI. Costs were divided by the number of deliveries attended in the clinic during the intervention.

Quantitative data were analyzed using logistic regression with the dependent variables being the care performance indicators and the independent variables of interest being group (intervention or control) and time period (pre- or post-intervention). Potential confounders such as maternal age and parity were controlled for in the regressions.

Difference-in-difference regression was conducted controlling for potential confounders of age, parity, risk age, and risk parity, with p-values calculated to account for clustering. There was a 32% to 59% improvement in compliance with the 10 measures of quality of delivery care attributable to the intervention. The highest improvements were in compliance with AMTSL (59%), umbilical cord care (58%), and eye care (58%). Considering the odds ratio results, there were statistically significant improvements in five of the 10 performance indicators and substantial (but not significant at alpha=0.05 level) improvements in four of the others. The only performance indicator for which the improvement was lower than five times the likelihood compared to the unexposed group was for breastfeeding within the first hour. The greatest improvement was seen in compliance with AMTSL.

The overall cost of the program was $6.39 per delivery attended during the intervention. Considering the entire expenditure for the program which totaled $193,000, approximately 18,907 more women received care during childbirth compliant with AMTSL, 11,150 more infants received breast-feeding
within the first hour after delivery, 15,173 more infants were wrapped and dried appropriately according to evidence-based recommendations, 17,498 more infants were provided with sterile umbilical cord care, 17,642 more infants received appropriate eye care after delivery, 13,601 more mothers were able to articulate their knowledge on the importance of breast-feeding the infant, 13,265 more mothers were able to articulate the danger signs that indicate health problems with the infant that require attention, 14,382 more infants attended the clinic for a health check in the first 24 hours of life, 14,382 more infants received a health check in the first three days, and 9,550 more infants receive a health check within four to seven days. These numbers are based on the very conservative assumption that improvements in the intervention sites would last for the 24 month duration of the intervention and no longer.

If we treat missing data from the registers on the compliance with the 10 maternal and newborn health performance indicators as non-compliance, then this study shows that there was a statistically significant improvement in half of the indicators that can be attributed to the intervention. However, this is based on a weak assumption that all missing data means non-compliance on all indicators for which data are missing.

Given this positive result based on the assumption about missing data, we recommend further implementation of collaborative improvement to increase uptake of evidence-based standards of care for mothers and newborns during and after delivery. However, given the poor data collection, particularly in the control sites, further study is recommended before a more confident determination of the effectiveness and efficiency of the improvement collaborative approach applied to maternal and newborn care can be made.

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