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# MAISHA QUALITY OF MATERNAL AND NEWBORN CARE STUDY

## KEY FINDINGS: ESSENTIAL NEWBORN CARE

## 2010–2012

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# Key Findings:
# Immediate Essential Newborn Care and Resuscitation

## BACKGROUND

Every year, more than a million of the world's newborns die on their first day of life [1]. Helping babies survive the first day is a priority in Tanzania's efforts to accelerate its progress toward Millennium Development Goal 5 (improve maternal health). Newborn deaths, most of which are attributed to preventable or treatable causes, account for approximately 40% of all under-five mortality [2]. One of the leading killers is birth asphyxia, which causes an estimated 23% of newborn deaths [3]. As many as two-thirds of these newborns could be saved with essential care at birth and throughout the postpartum period [1].

Despite interventions by various stakeholders, led by the Ministry of Health and Social Welfare, early neonatal mortality has not improved in Tanzania over the past 15 years [4]. While some deaths could be prevented by improving antenatal and intrapartum care, about 3–6% of newborns need to receive the three Helping Babies Breathe steps: stimulation, suction of mucus/ secretions, and assisted ventilation with a bag and mask. Helping babies breathe with ventilation can reduce mortality among neonates by up to 30% [5]. A 2013 study by Msemo et al. showed that provision of Helping Babies Breathe steps at birth by skilled birth attendants in nine Tanzanian hospitals reduced neonatal mortality by 47% [4].

Other key interventions at birth include cord care, thermal protection through warming, and early and exclusive breastfeeding [6].

## THE MAISHA PROGRAM

The Mothers and Infants, Safe, Healthy, Alive (MAISHA) program in Tanzania is a USAID-funded program led by Jhpiego, an affiliate of Johns Hopkins University. The program works with the Ministry of Health and Social Welfare (MOHSW) to improve the quality of maternal and newborn care in Tanzania. Since 2008, MAISHA has trained health care providers in basic emergency obstetric and newborn care (BEmONC), promoted supportive supervision to health care facilities in BEmONC, facilitated quality improvement for maternal and newborn health in facilities, and supported improvements to national health information systems for maternal and newborn health. MAISHA has trained and provided quality improvement support to more than 1,593 providers and supervisors from 251 facilities nationwide.

In 2010, the MAISHA program conducted a Quality of Care (QoC) study to gather baseline information on the quality of maternal and newborn care in the facilities that MAISHA supported in the first two years of the program. The study, conducted in 12 regions of Tanzania, used direct observations of maternity and antenatal care clients to assess the quality of services provided to women delivering in the facilities and their newborns. In 2012, after roughly two years of intervention in these facilities, the assessment was conducted again to document changes in the quality of care due to the MAISHA program.

## MAISHA Program in the QoC Facilities

The MAISHA program was active in all facilities in the two-year intervention period, and program components included training of health care providers in BEmONC (one to two providers trained per facility), quality improvement (assessed annually), and supportive supervision from MAISHA and district health management teams (one to four visits per year, with an average of two). The mean length of implementation of the MAISHA program in these facilities was 25 months, with a range of 17 to 41 months.

# METHODOLOGY OF THE QOC STUDY

The QoC study used the same methodology and sampling approach in 2010 and 2012, combining observations of women in the maternity ward during labor and delivery, observations of antenatal care consultations, inventories and record reviews, and health worker knowledge assessments. The numbers of facilities and observations made in each year of the study are shown in Table 1. Specific methods included the following:

- A team of national maternal and newborn health experts underwent clinical updates, training, and orientation to the study tools.
- Data collection teams visited the facilities and observed all deliveries occurring during the two- to three-day period (or as many as possible at regional hospitals).
- Data was entered into smartphones (2010) and tablets (2012).
- Essential newborn care was assessed using a standardized checklist.
- For the health worker knowledge assessment, providers were asked to perform newborn resuscitation using models.
- Actual cases of newborn resuscitation were observed using a standardized checklist (with intervention to save the life of newborn if necessary).

Table 1. Numbers of facilities and observations in the QoC study, 2010 and 2012

| | Regional hospitals assessed | Health centers/ dispensaries assessed | Labor and delivery observations | Newborn care observations | Resuscitations observed | Health worker skill assessments using newborn model |
|---|---|---|---|---|---|---|
| 2010 | 12 | 40 | 489 | 419 | 18 | 216 |
| 2012 | 12 | 38 | 555 | 504 | 40 | 218 |

# RESULTS

## Essential Newborn Care

Overall, 419 newborns were observed in the immediate postpartum period in 2010 and 504 newborns were observed in 2012. Table 2 below details achievements in immediate essential newborn care in the two studies.

Table 2. Immediate essential newborn care in 2010 and 2012

| | Regional hospitals | | Health centers/dispensaries | | All | |
|---|---|---|---|---|---|---|
| | 2010 | 2012 | 2010 | 2012 | 2010 | 2012 |
| Immediately places newborn on the mother's abdomen | 43% | 76% | 37% | 77% | 42% | 77% |
| Immediately dries baby with towel | 94% | 95% | 84% | 97% | 91% | 95% |
| Discards wet towel and covers with dry towel | 94% | 96% | 85% | 97% | 93% | 93% |

| | Regional hospitals | | Health centers/dispensaries | | All | |
|---|---|---|---|---|---|---|
| | 2010 | 2012 | 2010 | 2012 | 2010 | 2012 |
| Cuts cord with clean blade | 100% | 100% | 100% | 100% | 100% | 100% |
| Helps initiate breastfeeding within one hour | 40% | 83% | 55% | 87% | 44% | 86% |

High achievement in cord care and wrapping and drying of the infant was found at both baseline and follow-up. The areas that showed the most improvement were placing the newborn on the mother's abdomen immediately after birth to dry/stimulate and warm the baby (35% increase overall, $p = 0.0001$) and helping to initiate breastfeeding (42% increase overall, $p = 0.000$). There was not very much difference by level of health facility in all of the immediate essential newborn care steps.

Universal adherence to cord cutting with a clean blade (sterile pair of scissors) was seen in both 2010 and 2012. Delayed cord clamping increased over the two years, by 12% in regional hospitals ($p = 0.0001$) and 8% in lower level health facilities ($p = 0.03$).

Endline performance on the immediate essential newborn care steps was similar across levels of health care facility. However, in both years of the assessment, lower-level health facilities were more likely than regional hospitals to promote immediate breastfeeding (2010, $p = 0.0002$; 2012, $p = 0.08$).

Although the practice of placing the newborn skin-to-skin on the mother's abdomen immediately following delivery increased from baseline to endline, mothers and newborns often were separated in the hour following birth. While this study did not allow for a quantification of this practice, newborns were often placed on the same bed with the mother but not skin-to-skin, or were taken away from the mother.

## Newborn Resuscitation

Within the QoC studies, skills assessments of health care providers were conducted using a newborn training model. Providers demonstrated how to conduct a newborn resuscitation while an observer used a checklist to assess their performance. In 2010, 199 providers' skills in newborn resuscitation were assessed; in 2012, 210 providers were assessed (an average of six per hospital and four per lower-level health facility).

### Skills Assessment Scores

Overall, scores for newborn resuscitation were low, with only one-third of the providers able to correctly perform the stimulation and ventilation steps using the model at endline. Not only were the scores relatively stagnant between years, performance actually declined between baseline and endline.

**Table 3: Health worker skills assessments on newborn resuscitation procedures**

| | 2010 | | 2012 | |
|---|---|---|---|---|
| | N=199 | % | N=210 | % |
| Stimulation: Clears airway; stimulates baby; places newborn on warm and clean surface, head in slightly extended position (all tasks correctly performed) | 89 | 45 | 78 | 37 |
| Ventilation: Places correct size mask covering chin, mouth, and nose; checks seal by ventilating twice and observes chest rise, ventilating at 30–50 breathes/minute (all tasks correctly performed) | 56 | 28 | 67 | 32 |
| Mean score (all tasks correctly performed) | 96 | 48 | 59 | 28 |

## Observations of Actual Newborn Resuscitation

During the course of this study, actual cases of newborn resuscitation were observed on a very infrequent basis. The number of cases observed in 2012 (40 cases out of 504 newborns observed) was higher than the number observed in 2010 (18 cases out of 419 newborns observed). Although the numbers observed were too small for statistical comparison, it is encouraging to note that proportionally more resuscitations were observed, which may be due in part to the newborn resuscitation training and follow-up support occurring at the facilities through the MAISHA program. Table 4 presents data from the resuscitations observed in 2012.

**Table 4: Number of newborn resuscitations observed**

| Number of newborn resuscitations observed | N=40 |
|---|---|
| Suctions and/or rubs back | 32 |
| Newborn starts to breathe/cry spontaneously | 17 |
| Newborn not breathing | 23 |
| Ventilates correctly: first attempt | 12 |
| Ventilates correctly: second attempt | 7 |
| Ventilates correctly: third attempt | 1 |
| Ventilates at rate of 30–50 breaths/minute | 9 |
| Outcome of resuscitation: unsuccessful* | 5 |
| Outcome of resuscitation: successful | 35 |

*3 of 5 of the unsuccessful resuscitations were fresh stillbirths

In 17 resuscitation cases, the baby began breathing and responded to drying and/or stimulation and/or suction. Ventilation was performed correctly on the first attempt in less than half of the cases where resuscitation was needed. Only 45% of newborns received ventilation at the correct rate of 30–50 breaths per minute.

Other persistent problems included poor ability to distinguish between babies born not breathing (i.e., needing ventilation) and stillborn babies (i.e., not in need of ventilation); poor communication with the mother; and delaying the initiation of resuscitation. Strengths and weaknesses in the performance of newborn resuscitation are outlined below.

**Provider Strengths and Weaknesses in Performing Newborn Resuscitation**

**Best-Case Scenario** (from observer notes from a resuscitation attempt):

> "Mother treated with respect, informed about the condition of the baby after baby cried; suctioning done in front of the mother; no delays observed."

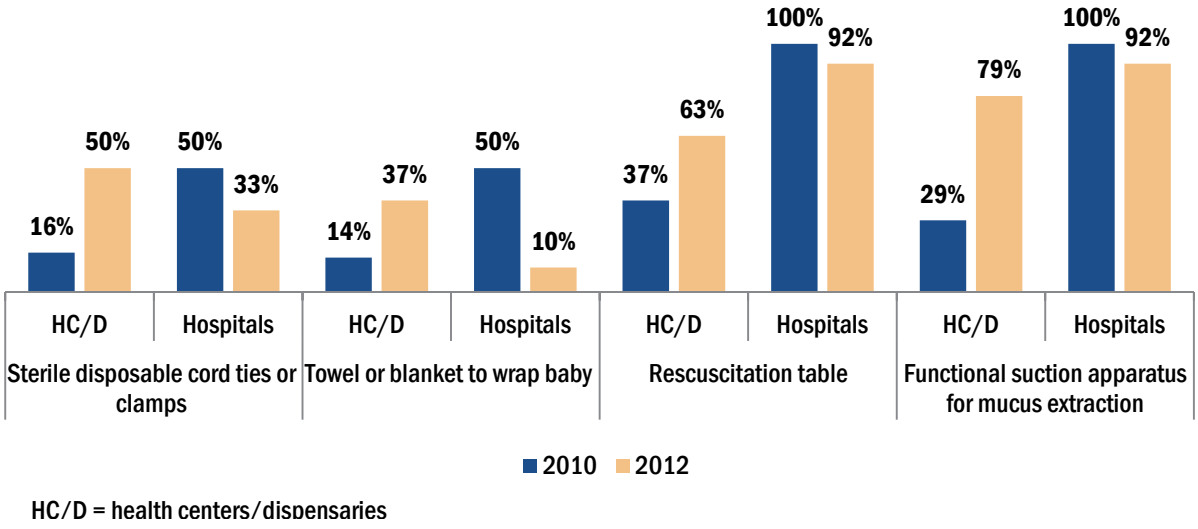
**Worst-Case Scenario** (from observer notes from a resuscitation attempt in which the newborn died):

> "The mother was treated disrespectfully and not informed of resuscitation procedure of her baby. There was a delay on initiation of resuscitation and the provider demonstrated inadequate knowledge; and there was no suction tube or penguin' suction available. After death, the mother was counseled about the death of newborn."

## Availability of Supplies for Newborn Resuscitation

Suction bags and masks and a designated area for resuscitation are critical for newborns who need help breathing. The QoC studies assessed availability of supplies using inventories. Results of the inventories are shown in Figure 1.

Figure 1: Availability of supplies and equipment for newborn care, by facility type




HC/D = health centers/dispensaries

Lower-level health facilities were very poorly equipped for newborn resuscitation at baseline but showed dramatic improvements by the end of the intervention and the greatest overall improvement between assessments. Specifically, in lower-level health facilities there was a 50% ($p$ = 0.0001) increase in availability of simple suction equipment (i.e., easy-to-use "penguin" sucker) in MAISHA facilities. Regional hospitals had near-universal availability of resuscitation equipment, and this was more or less sustained until the end of the program.

## DISCUSSION

Recent findings by Ajaari et al. confirm that, compared with delivery in a health facility, delivery outside a health facility in Tanzania is more likely to lead to neonatal death [7]. Findings from the QoC studies show that improvements can be achieved in newborn care in health facilities, but there are areas of persistent problems. As Tanzania continues to promote facility-based births with skilled attendants, investment in competent human resources and necessary infrastructure and supplies is urgently needed to support improved newborn survival.

### Immediate Newborn Care

Achievements in newborn care were encouraging in some areas (e.g., placing the newborn immediately on the mother's abdomen and helping to initiate breastfeeding within one hour) and disappointing in others (e.g., conducting resuscitation on a model). Generally, **improvements were more pronounced in lower-level health facilities than in regional hospitals, reflecting the fact that lower-level health facilities had much lower baseline scores.**

While improvements were seen in initiation of breastfeeding, particularly in lower-level health facilities, we feel that the level of achievement is not high enough. Lower-level facilities improved their practice of initiating breastfeeding by 22%, but at endline this critical intervention was still not universal (87% of mothers received assistance with immediate breastfeeding). Breastfeeding of newborns within one hour is among the interventions with the greatest potential impact on child survival, making it the closest thing to a "silver bullet" in the fight against malnutrition [1].

One limitation of this study is that our data only measure whether the provider *encouraged* the woman to initiate breastfeeding. This can be interpreted broadly and is not as informative as

looking specifically at whether the woman was assisted with latching on or positioning the baby. Observations in the hour following delivery were more focused on immediate postpartum care. Anecdotal feedback from observers indicated that the encouragement that the providers gave was generally not helpful enough to change mothers' behavior in initiating breastfeeding. Thus, the results reported here may not yet reflect optimal provider support to mothers for immediate breastfeeding.

According to WHO, skin-to-skin contact for at least an hour immediately following birth and breastfeeding during this period is a high-impact intervention that supports establishment of exclusive breastfeeding, assists with appropriate thermal care, and promotes bonding between mother and baby [6]. While the improvements in the practice were notable, with the practice almost doubling overall and increasing by 40% in lower-level health facilities alone, in the end only 77% of newborns were being provided with this important, no-cost practice.

Separating mothers and newborns, which was noted but not quantified in this study, is a particularly dangerous practice that may lead to newborns being left unobserved and unmonitored in the first critical few hours of life. This is particularly pertinent in light of critical shortages of providers at all levels of health facilities in Tanzania.

### Newborn Resuscitation

Observation of providers performing both actual and simulated newborn resuscitation identified enormous gaps in provider knowledge and practice. A recent study of newborn resuscitation in Tanzania demonstrated impressive improvements in newborn outcomes when resuscitation was performed correctly, signaling the need to scale up Helping Babies Breathe practices throughout the health system [4].

In our study, provider performance on simulated resuscitations using the model was notably poor and showed no improvement after the MAISHA program intervention. It may be that the methodology of being assessed using a model is unfamiliar to providers. However, providers were supposed to be exposed to the model as part of MAISHA's supportive supervision for quality assurance. **The low performance and lack of improvement in newborn resuscitation raises the question of what needs to be done to improve providers' skills in newborn resuscitation**, especially at lower-level health facilities with low delivery volume, where providers may not have the occasion to perform resuscitation frequently.

Although newborn resuscitation equipment was almost universally available at regional hospitals at both baseline and endline, this was not the case in the lower-level health facilities, where only one-third had the necessary equipment. Lower-level health facilities saw an increase in the availability of equipment—up to 70%—which is dramatic but not enough. The importance of having newborn resuscitation equipment cannot be overstated. The United Nations Commission on Life-Saving Commodities for Women and Children includes a bag and mask for newborn resuscitation on its list of 13 affordable and effective but underutilized lifesaving commodities [8].

## RECOMMENDATIONS

Based on the findings from the QoC study, the MOHSW and other key stakeholders are encouraged to:

- Continue supporting improved preparedness of providers by ensuring that resuscitation space and equipment are available for intervention during the "golden minute after birth";
- Increase the emphasis on placing the newborn skin-to-skin within the first hour after birth, by demonstrating the proper procedure and sharing evidence to support this practice;

- Sustain and strengthen improvements in initiation of breastfeeding within the first hour and consider implementing the UNICEF Baby-Friendly Hospital Initiative [9];
- Scale up programs to improve competency in newborn resuscitation, with a focus on lower-level health facilities;
- Expand the *Helping Babies Breathe* program with a greater focus on the golden minute after birth, including periodic refresher training and regular practice with training models as part of supportive supervision; and
- Ensure 100% availability of simple suction bags and masks at all levels of the health system.

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