

SUMMARY

Maternal morbidity and mortality in low-resource settings remain high, despite global efforts to reduce it. Delay in deciding to seek care, reaching an adequately functioning health facility, and receiving adequate care once arrived at health facilities are the most important contributing factors. Although many areas will need improvement in order to substantially reduce maternal morbidity and mortality, this thesis focuses on hospital-based interventions.

In the first part of this thesis the quality of obstetric care in a rural hospital in Tanzania is described using the WHO near miss approach and areas for improvement of care are highlighted (chapter 2-3). In the second part of this thesis low-cost low-tech obstetric simulation-based training in preventing and managing postpartum haemorrhage is evaluated as intervention to improve obstetric care in a low-resource setting (chapter 4-6).

In **chapter 2** the WHO near miss approach was used to measure the prevalence of severe maternal morbidity and mortality in Haydom Lutheran Hospital in Tanzania. From November 2009 to November 2011 a cross-sectional study was performed. It showed a hospital-based maternal mortality ratio of 350 maternal deaths per 100,000 live births. The prevalence of severe maternal morbidity was 23.6 women per 1,000 live births. For every maternal death there were nearly seven women with severe maternal morbidity. The three commonest causes of maternal morbidity and mortality were postpartum haemorrhage, abortion related complications, and obstructed labour. Opportunities to improve care were identified and included up scaling timely prevention and treatment interventions for postpartum haemorrhage, eclampsia, and sepsis.

Chapter 3 reports on the poor applicability of the WHO near miss criteria in a low-resource setting. The near miss criteria were created in order to uniformly identify severe maternal morbidity. They exist of a subset of clinical criteria, laboratory-based criteria, and management-based criteria. In Haydom Lutheran Hospital all clinical criteria could be applied, but only 25% of the laboratory-based criteria and 50% of the management-based criteria could be used. As a result, severe maternal

morbidity in settings that cannot apply all criteria will be lower and case fatality rates will be higher when compared to settings than can apply all criteria.

In March 2012 the low-cost low-tech obstetric simulation-based training programme "Helping Mothers Survive Bleeding After Birth" was introduced in Haydom Lutheran Hospital. The training programme was delivered by local facilitators and covered a half-day training regarding basic delivery care, active management of third stage of labour, and treatment of postpartum haemorrhage. The training programme was evaluated according to the four-level Kirkpatrick model, which is commonly used for assessing training programmes. **Chapter 4** covers the evaluation of "Helping Mothers Survive Bleeding After Birth" regarding Kirkpatrick level 1 and 2. It shows that the training programme is acceptable and feasible in a low-resource setting. Knowledge, skills, and confidence of participants increased after training, however pass rates for skills test were generally low. In addition, a clear need for in-house training was identified.

Retention of knowledge, skills, and confidence was tested nine months after initial training. **Chapter 5** shows that knowledge decayed to pre-training levels, and skills and confidence were largely retained. Based on the above results we would recommend training at least twice per year.

In **chapter 6** the training programme was evaluated at Kirkpatrick level 3 and 4 by means of an educational intervention study. From May 2011 to June 2013 research assistants observed all deliveries in Haydom Lutheran Hospital. The incidence of postpartum haemorrhage (500-1,000ml) significantly reduced from 2.1% before training to 1.3% after training and clinical performance of basic delivery skills and management of postpartum haemorrhage improved after the introduction of the training programme.

Concluding, we have identified several areas for improvement which may benefit the quality of obstetric care in Haydom Lutheran Hospital. These areas should become integrated and form one well-functioning comprehensive care system. The WHO near miss criteria were difficult to apply in this low-resource setting. The

obstetric simulation-based training programme "Helping Mothers Survive Bleeding After Birth" could address the lack of in-house training that was identified. Evaluation of this training programme on all four levels of the Kirkpatrick model indicates that this could be an effective way to educate health care workers in low-resource settings.