



Perinatal Death Surveillance and Response (PDSR) vs Maternal and Perinatal Death Surveillance and Response (MPDSR) -the Zambian Scenario

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Received: 📅 July 06, 2023

Published: 📅 July 14, 2023

Abstract

The Neonatal mortality rate of 27 per 1000 live births in Zambia is one of the highest in Sub-Sahara Africa. Although these perinatal deaths are reviewed on a weekly basis, there are gaps that may be context specific. The inception of mortality audits and surveillance response meetings in Zambia were characterized by predominantly maternal death discussion. Perinatal deaths were discussed separately but it was noted that the emphasis and attendance of perinatal death audits was not as robust. WHO recommended joint discussion of perinatal and maternal deaths putting perinatal death discussion on the agenda but with very little change in the system. With more perinatal deaths than can be discussed in one meeting, cases would then be sampled, but the in-depth discussion that the cases warranted would be limited due to various factors. An attempt at detailed discussion of the perinatal deaths at separate time from the general Maternal and Perinatal Death Surveillance Response (MPDSR) meeting, with focus on cheap but impactful interventions, resulted in identification of healthcare provider knowledge gaps on danger signs and actions to warrant a favourable outcome. Effective perinatal audit review requires dedicated time but also the presence of medical staff with expertise in the care of neonates in order to help identify areas of knowledge gap and skills training. The quality of the audits is likely to improve once the healthcare providers have adequate knowledge regarding actions before danger signs are obvious. Implementation of the low-cost impactful interventions needs to be contextualized.

Keywords: Hypothermia; hypoglycaemia; perinatal deaths; maternal deaths; neonatal mortality

Introduction

This article addresses the process gaps in the analysis of perinatal deaths in the Zambian context. The inception of mortality audits and surveillance response meetings in Zambia were characterized by predominantly maternal death discussion. Perinatal deaths were discussed separately but it was noted that the emphasis and attendance of perinatal death audits was not as robust. As this might have been common practice in other countries, WHO recommended joint discussion of perinatal and maternal deaths [1]. Despite the fact that this approach undoubtedly put perinatal death discussion on the agenda, MPDSR meetings have been characterized by more detailed discussion of maternal mortality. Understandably, there

are more perinatal deaths than can be discussed in one meeting. Cases would then be sampled for discussion but the in-depth discussion that the cases warranted would still be limited due to various factors. There was a feeling of rushing through the cases as well as gaps in knowledge of the 'danger signs' and actions required in order to have a more favourable outcome.

Antenatal and birth history/resuscitation which contributes significantly to the condition of the neonate after birth is often not detailed and those involved in this part of the care are not in attendance during the discussions. In one Province, calls to have in-depth discussion of perinatal deaths resulted in creating a separate

time to discuss one case per delivery facility so as to learn and follow up on the gaps highlighted. The focus was on actions that could make a difference despite the limited resources and follow-up of the implementation of the recommendations. The first case that was discussed illustrated some gaps which would have been picked up and prevented if healthcare workers at the facility were more knowledgeable and given skills to accurately assess and manage the neonate at presentation. The case involved a woman presenting fully dilated in preterm labor expecting twins at a level one district hospital. The twins were delivered within 10 minutes of each other weighing 1500g and 1400g respectively. These babies were placed on a resuscitaire without close monitoring while awaiting the ambulance for referral to the nearby tertiary NICU. Twin II developed respiratory distress and was placed on nasal prong oxygen.

The ambulance nurse arrived within the hour but decided to leave the babies as the ambulance had no oxygen. Another ambulance with oxygen only arrived 3 hours later and the babies were then transferred. The twin who was not on oxygen was wrapped in a blanket and transported in this position. On arrival at the NICU, the twin was unwrapped and was found to be cold and apnoeic. Bag and mask ventilation was quickly initiated with good effect. However, the baby was also hypoglycaemic. Intravenous access was secured, and dextrose 10% infusion was commenced. The baby was then commenced on improvised CPAP with evidence of improvement. Post admission, the babies were reviewed 5 hours later as there was no dedicated doctor to run the NICU at night. The doctors on call were called to review the baby when the baby was noted to be desaturating on the CPAP. Unfortunately, the baby died within 10 hours of birth. On discussing this case, the delivery facility focused on the first delay of ensuring mothers are encouraged to report to the facility in good time, antenatal ultrasound, and the ambulance challenges.

The case highlights the knowledge gaps in basic management of preterm neonates, namely avoiding hypothermia, hypoglycaemia and providing adequate respiratory support. Hypothermia is shown to increase mortality [2-7] but can be prevented by simple interventions like wrapping of the baby in food grade plastic bag [8-10] and kangaroo care (reduction in mortality by 40% with immediate kangaroo care on the day of birth and going forward [11]). Hypoglycaemia could be avoided by giving small amounts of 10% dextrose orally where IV access was not secured. Adequate respiratory support was not provided. If the receiving NICU itself only had the improvised CPAP, could this CPAP not have been made and started post-delivery at the level one centre? Improvised CPAP nicknamed 'Pemani' is made from tubings immersed in a tightly sealed 500 ml bottle and may not provide adequate pressure on initial settings used on a lab based manufactured bubble CPAP.

Higher pressures are unlikely to cause pneumothorax. The question arises as to whether this CPAP works? [12]. In an audit conducted in one hospital [13], 9 (80%) of the 11 patients who were put on this type of CPAP survived. This included neonates and infants. The range of conditions included respiratory distress with grunting respirations (Transient Tachypnoea of the newborn, severe bronchiolitis, asphyxia, presumed sepsis and persistent pulmonary hypertension). WHO-UNICEF Expert and Country Consultation on Small and/or Sick Newborn Care Group proposes simple but impactful interventions including thermal control, use of CPAP for respiratory support, intravenous antibiotics, infection prevention to mention but a few [14]. These are low or no cost interventions and should be started at the point of delivery. Are these things common practice? Does the healthcare worker at the point of delivery recognize the danger signs and act to prevent mortality? (Figures 1 & 2) What then can we do in our settings which are low resource as spending on neonatal care still requires planning and support?

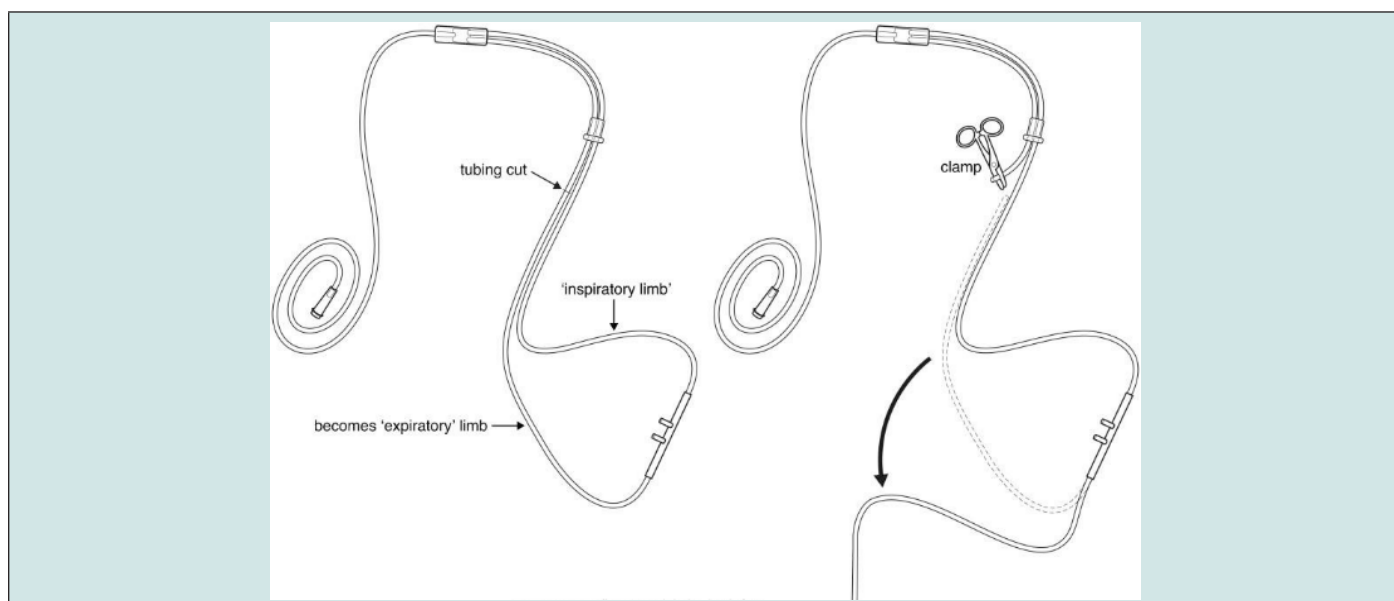
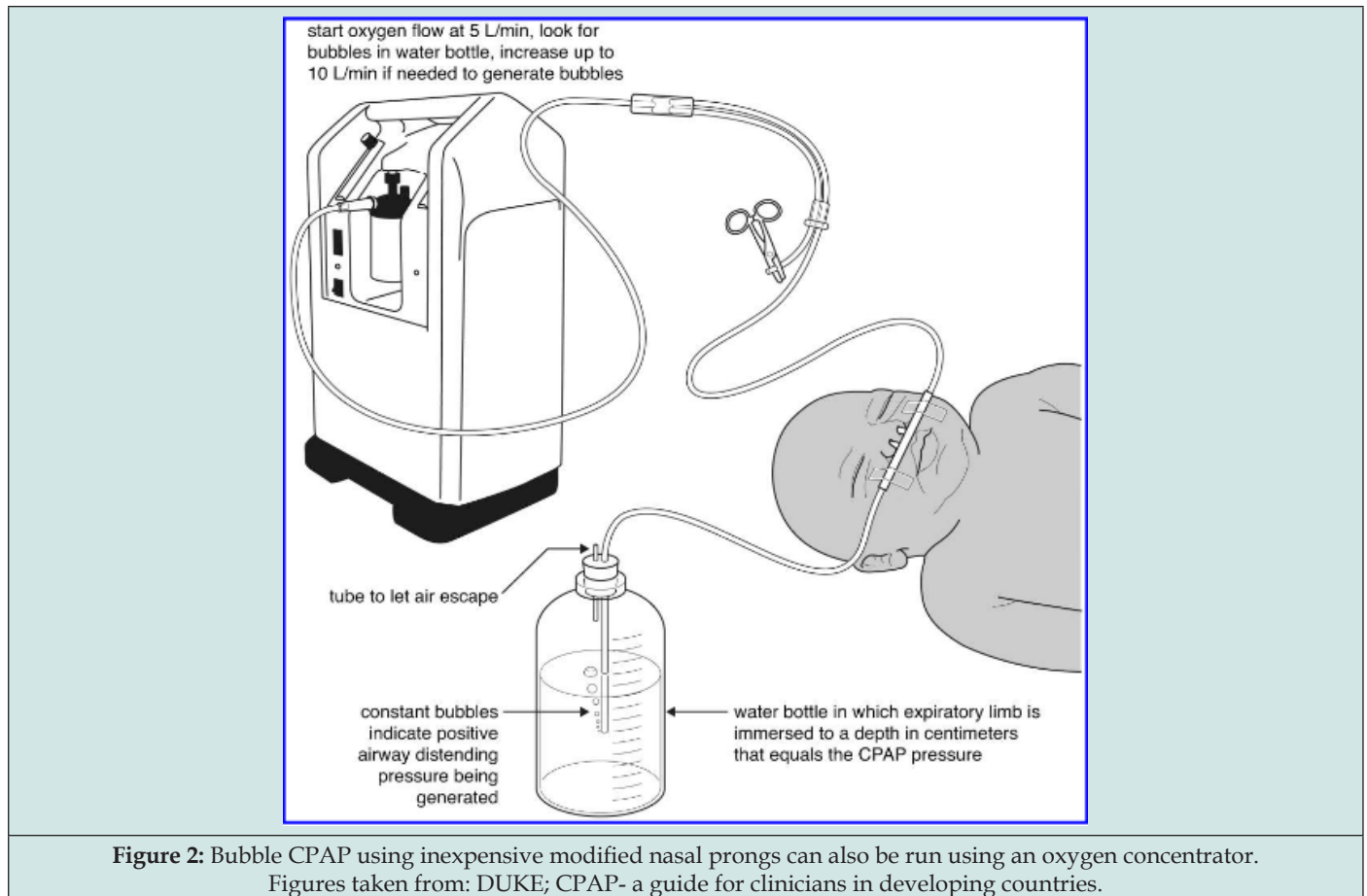


Figure 1: CPAP equipment: Delivery via nasal prongs (PEMANI).



Recommendations

There should be mandatory targeted didactic (online or in person) and hands on orientation package for all healthcare workers delivering and looking after neonates. This should include neonatal resuscitation to include prevention of hypothermia (Use of plastic wraps and/or immediate KMC) and hypoglycaemia. Post resuscitation care includes assembling and putting babies on CPAP as most delivery facilities have a portable oxygen source which can be utilised in the ambulance with close monitoring of vital signs and their interpretation. Dextrose 10% can be administered orally if IV access is not available. Meticulous temperature checks should be done to reinforce warming when required. Protocols and algorithms should be stuck on the walls for guidance. Reverse mentorship between the referring and receiving facility should be instituted at least once a month. Mentorship works best when there's a baseline knowledge in the receiving team.

Conclusion

Effective perinatal audit review requires dedicated time but also the presence of medical staff with expertise in the care of neonates alongside the facility that was caring for the infant in order to help identify areas of knowledge gap and skills training. The quality of the audits will improve once the health care workers have adequate knowledge regarding actions before danger signs are obvious.

Implementation of the low cost and impactful interventions need to be contextualised.

Acknowledgments

We thank the Copperbelt Provincial Health Office for the collaboration.

Author contributions

- Dr. Kunda Mutesu-Kapembwa and Kenneth Kapembwa conceptualized and drafted the initial manuscript, and critically reviewed and revised the manuscript.
- Dr. Leah Seaman and Dr. Muleya Inambao critically reviewed and revised the manuscript.

Conflict of Interest

None

Funding

None

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DOI: [10.32474/PAPN.2023.04.000191](https://doi.org/10.32474/PAPN.2023.04.000191)



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