Enhancing knowledge and skills through the delivery of a bespoke neonatal resuscitation training programme in a developing country

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Introduction

It is estimated that 23% of the 4 million neonatal deaths globally are related to neonatal hypoxia at birth (Lawn et al., 2010). 98% of the 4 million neonatal deaths are in the developing world of which Zambia is one country (Lawn et al., 2007; Carlo et al., 2009). Zambia currently records a neonatal mortality rate of 24:1000 births which is more than ten times higher than the UK (Mothers and Babies: Reducing Risk through Audits and Confidential Enquiries across the UK (MBRRACE-UK) 2017; Office for National Statistics (ONS) 2018).

Unfortunately most of these deaths are due to lack of knowledge and skills in the appropriate management of the neonate at birth (Disu et al., 2015). Global priorities and targets for improving the newborn experience have been encapsulated in various forms including the United Nations (UN) Millennium Development Goals 4 & 5 which focused on reducing neonatal morbidity and mortality (UN 2015). More recently this has been accentuated in the United Nations Development Programme (UNDP) Sustainable Development Goal 3 which has amongst its targets to reduce neonatal mortality to less than 12:1000 live births by 2030 (UNDP 2016).

Background

A scoping exercise was undertaken in 2015 with the intention of informing the development of a neonatal course in Zambia. This revealed the need to develop health care professional knowledge and skills in the management of the neonate at birth including neonatal resuscitation skills (Kayembe 2016).There are a number of educational interventions aimed at reducing neonatal mortality in many developing country settings.

These include Helping Babies Breathe (HBB), an adaptation of the American Neonatal Resuscitation Programme (American Academy of Pediatrics (AAP) 2017; Odidja 2017), and the World Health Organisation (WHO) Essential Newborn Care (ENC) programme (World Health Organisation 2015; Carlo et al., 2010; Gouda et al 2012) which is the largest form of intervention aimed at low resource settings (Bang et al. 2014). However most of these interventions do not proceed beyond airway support and ventilation breaths (American Academy of Pediatrics (AAP) 2017). In Zambia paediatric life support training, which originates from the UK, has been delivered (Tyndall et al., 2013). However

the particular training that was documented in this package focused on the paediatric patient (from one month to 2 years of age) rather than the newborn (from birth to one month) (United States Food and Drug Administration (US FDA) 1998). In the current model the intervention provided an opportunity to address these apparent limitations. Importantly not only did the model add other interventions such as cardiac compressions and drugs, it also focused on the newborn rather than the paediatric patient.

Within midwifery education it is important that midwives are competent in the provision of effective care of the neonate which includes resuscitation and management at birth (International Confederation of Midwives (ICM) 2013). It is also essential that this knowledge and skill is maintained through the provision of continuing professional development (CPD) (Thomson 2017). CPD is only just starting to be addressed within Zambia. Therefore the programme presents a useful, bespoke addition to existing education provision which should facilitate and support the development of relevant practical skills (Crisp 2007).

Midwives are in a unique position to lead health promotion particularly in relation to the reduction of neonatal morbidity and mortality globally (ICM 2013; UNFPA ICM WHO 2015). The provision of midwifery education in the area of neonatal life support therefore provides an opportunity to influence global health care challenges as a result of partnership working (Crisp 2007). This paper therefore aims to share the development, implementation and immediate evaluation of a bespoke programme of neonatal resuscitation, which has as its intention the improvement of knowledge and skills of midwives and other professionals attending births in Zambia.

Model and methods

Content and strategy of the educational model

This programme was driven and developed by the author who is a midwifery educationalist as a result of discussions with clinicians and other stakeholders and partners in the UK and the local area where the programme was to be delivered. The training employed a "train the trainer" (TTT) approach to facilitate continuation of the programme (Disu et al., 2015). Four staff from the UK: the author, Senior Resuscitation Officer, Clinical Education Nurse Specialist and a Consultant Neonatologist, delivered the training programme over the course of a week.

Zambia Newborn Resuscitation programme

ITEM	ACTIVITY/APPROX. TIME	TEACHING FACULTY	CANDIDATES	ADDITIONAL ACTIVITY
COURSE DAY 1	Opening by Zambia Ministry of Health officials Registration of all candidates and division into groups 09.00- 16.00	4	50 (for opening ceremony) 12 remain for the day (Core pre-selected future trainers)	First Half of pre-selected potential Trainers to observe teaching next session
COURSE DAY 2	09.00-16.00	4	13 (+ 6 TTT)	Second Half of pre-selected potential Trainers to observe teaching next session
COURSE DAY 3	09.00-16.00	4	13 (+ 6 TTT)	All potential trainers prepare to attend TTT next day (equipped with relevant pre-reading)
COURSE DAY 4	Train the trainers (TTT) 09.00-16.00	4	12 (potential trainers)	Trainers prepare to teach next day with Faculty support
COURSE DAY 5	Trainer led/supported by faculty **CLOSE OF TRAINING** 09.00-16.00	4	12 + (12 TTT who supported the teaching)	
	TEAM DINNER (UK & Lusaka TTT leaders) Discuss next steps & rollout			

Fig. 1. Adapted from the original to provide a clearer overview of the week.

Training was adapted with kind permission for use of material from the Newborn Life Support (NLS) - UK (Wyllie et al., 2015) and was offered using interactive didactic lectures, skills and scenario sessions. Altogether the programme was delivered several times in a week; each session was evaluated and contributed to the overall evaluation of the programme. Fig. 1 below is a copy of the timetable for the week.

The session topics included the following: immediate care at birth, newborn physiology, resuscitation at birth, prematurity and meconium, teamwork, communication and documentation, and post resuscitation care. Additionally, each attending practitioner was supplied with a stethoscope, fob watch and memo card containing the resuscitation algorithm and key points from the training. This was intended to facilitate application of knowledge to clinical practice, which was a strategy similar to that employed by Disu et al's study in Nigeria (2015). A copy of the presentation and algorithm was also given to each participant together with a section that was envisioned would facilitate reflection on practice that could be collated and used as part of the evaluation later. The use of reflection in this way has been shown to enhance the development of skills and knowledge in the clinical setting (Ghaye, 2005).

Setting and participants

The bespoke programme was delivered at the Chainama School of Anaesthesia in Lusaka, Zambia in the summer of 2016. The participants included: 50 health care professionals. The participants were midwives and other members of staff including: nurses, paediatricians and some anaesthetists. An outreach approach was used (Disu et al., 2015) involving staff attending from district health centres which surrounded and made patient referrals to the main hospital.

Evaluation

The role of neonatal resuscitation programmes in terms of enhancing staff knowledge and skills and ultimately reducing neonatal morbidity and mortality rates through the transfer of knowledge and skills is clearly articulated by Pammi et al., (2016) in their systematic review and meta-analysis of new-born resuscitation training programmes. Both qualitative and quantitative evaluation from the initial training was undertaken before and after each session to provide feedback to facilitators about the effectiveness of the teaching (La Duke 2017) as well as to inform future training. This data was collated to form overall pre- and post-session evaluation. This feedback was very positive. Quantitative assessment was by pre- and post training questions which required a true/false answer together with three free text questions. For example: '*When a baby is born, you would perform an initial assessment to decide on whether they needed any resuscitation. What four things would you look at to help you decide? (4) Marks)'* .

This was useful in gaining feedback on the effectiveness of the programme with regards to the impact on knowledge levels (Kirkpatrick & Kirkpatrick 2006). In this assessment there was no pass/fail limit, as the focus was to provide feed-forward advice for learning (Duncan 2007). The score was calculated out of a maximum total of 30. The total average pre-test score was 63.5% whilst the total average post-test score was 83.8%. There was a demonstrable increase in knowledge by every individual except for two where no increase in knowledge was evident. The reason for the lack of increase in knowledge in the two participants was unknown. Additionally verbal and written feedback was provided to participants about the practical skills sessions. Using feedback in this way is recognised within the literature as being advantageous to the improvement of performance whilst supporting the provision of quality care (Flottorp et al., 2010) and as such was considered an important element of the training strategy.

Sustainability and future practice implications

It was anticipated that the project would create a rolling programme of neonatal resuscitation training in the country, which would ultimately contribute towards the improvement of neonatal morbidity and mortality rates in the capital and its surrounding districts (Disu et al., 2015). It is however acknowledged that measuring neonatal morbidity