Improving infection prevention practice in traditional birth attendants in Chongwe District, Zambia

By Dorothy O Chanda, Seter Siziya and Kumar Sridutt Baboo

Abstract

Background: Traditional birth attendants' (TBAs') practice is a source of public health concern due to high rates of infection among women and babies. This study was undertaken in Chongwe district, prompted by an earlier study that revealed poor infection prevention practices among community-based TBAs in Lusaka province.

Aims: The study aimed to assess the impact of a modified Ministry of Health TBA training curriculum on the infection-prevention knowledge, practice and attitude of TBAs in Chongwe district.

Methods: A six-phased quasi-experimental study design using a structured interview schedule was administered to 238 participants aged between 22–81 years during the needs assessment, and 207 during the intervention stage.

Findings: Infection-prevention knowledge levels were generally low during the needs assessment compared to the post-course phase, which showed a statistically significant impact resulting in lower infant and maternal morbidity rates ($P=0.001$).

Conclusions: The study had three outputs: the training of 207 TBAs, the production of a modified TBA training curriculum, and the creation of a monitoring and evaluation tool with performance indicators to be used in documenting the impact of the varied role of TBAs. Further research is recommended in the form of a randomised controlled trial.

Keywords: Traditional birth attendants, Infection, Childbirth, Prevention, Knowledge, Training

In women attended by traditional birth attendants (TBAs), infection is a very common occurrence in medically and geographically isolated rural communities. These infections are associated with poor quality of life for both women and babies and, in extreme cases, death. Therefore, mainstreaming infection-prevention measures in TBAs' practices would advance the primary health-care approach in safe motherhood initiatives in Chongwe District, Zambia. It has been reported that 53% of women in Zambia give birth at home (Republic of Zambia Ministry of Health, 2008).

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Statement of the problem

According to inpatient records from 2006 (unpublished), the maternal and infant morbidity rates stood at 21% and 27%, respectively, in Chongwe District. The authors propose that many maternal and infant morbidities could be prevented if the TBAs are well-trained in infection prevention practices, supervised and monitored.

Aims

The general objective of this study was to determine the infection-prevention knowledge, practices and attitudes of TBAs after training them using a modified Ministry of Health (MoH) TBA training curriculum in Chongwe District. Specific objectives were:

- To develop a modified MoH TBA training curriculum and a monitoring and evaluation tool.
- To compare the TBAs' infection-prevention knowledge, practices and attitude levels between Mpanshya and Chongwe before and after training the intervention group with the modified MoH TBA training curriculum.

Hypothesis and research questions

The null hypothesis is: there is no relationship between the infection rates among women and infants delivered by the control TBAs, trained using the old MoH TBA training curriculum, and the intervention TBAs, who were trained using the modified MoH TBA training curriculum.

The research questions are:

- Would the training of the TBAs using the modified national TBA training curriculum improve the infection-prevention knowledge, practice and attitude of TBAs and thus reduce the maternal and infant morbidity rates due to poor infection-prevention practices in Chongwe District?
- To what extent are age and level of education factors that affect the knowledge, attitude and practice of TBAs in Chongwe District?

Methods

A quasi-experimental study design using a structured interview schedule was administered to 238 study participants aged

Table 1. Infections in babies in Chongwe District, before and after intervention

	Mpanshya (control)			Chongwe (intervention)		
	Total number of babies	Babies with infections		Total number of babies	Babies with infections	
		n	%		*n*	%
Pre-intervention (births assisted by both trained and untrained TBAs, March–October 2006)	120	32	26.7	66	18	27.3
Post-intervention (births assisted by trained TBAs, January–December 2010)	131	2	1.5	147	0	0.0

TBA–traditional birth attendant

Table 2. Infections in women in Chongwe District, before and after intervention

	Mpanshya (control)			Chongwe (intervention)		
	Total number of women	Women who developed puerperal infections		Total number of women	Women who developed puerperal infections	
		n	%		*n*	%
Pre-intervention (births assisted by both trained and untrained TBAs, March–October 2006)	120	25	20.8	66	13	19.7
Post-intervention (births assisted by trained TBAs, January–December 2010)	131	23	17.6	147	9	6.1

TBA–traditional birth attendant

between 22 and 81 years during the needs assessment and 207 during the intervention stages. The intervention took place between 31 January 2008 and 6 March 2009, during which 207 TBAs were trained between St Luke's Mission Hospital in Mpanshya and Chongwe District Health Management Team venues. This study compared the TBAs' infection prevention knowledge, practice and attitude in Mpanshya and Chongwe before and after training both groups.

The researcher conducted a pilot study in Chibombo district health management board catchment area before the main study, after which minor changes were made. Pocock's formula was used to determine the sample size. The study interviewed the respondents individually after consenting.

The scope of the study consisted of five phases:

- **Phase 1:** Situation analysis was done to collect infection rates among infants and mothers (March–October 2006)
- **Phase 2:** The researcher conducted a desk review of TBA training curricula used by World Vision International, Zambia Integrated Health Programme and the MoH. **Specimen 1 of phase 2:** This activity involved taking specimens of swabs from razor blades from the clean delivery kits for laboratory analysis on 26 September 2007 and 2 October 2007
- **Phase 3:** This phase saw the modification of the old MoH TBA training curriculum by mainstreaming infection-prevention topics into the curriculum. **Specimen 2 of phase 3:** This activity involved swabbing the right hands of 78 TBAs and taking them for laboratory analysis during the training on 26 May 2008, 7 June 2008, 2 February 2009, 14 Feburary 2009 and 6 March 2009
- **Phase 4a:** Training of the control group in Mpanshya and the intervention group in Chongwe
- **Phase 4b:** The comparative analysis of the pre- and post-course interview schedules
- **Phase 4c:** The focus group discussions
- **Phase 5:** Designing and developing the monitoring and evaluation tool.

The research assistants ensured that responses from the data collected during each phase were consistent before they were entered into the computer and analysed using SPSS software version (GradPack 17.0). Bivariate analysis of the data was done using Pearson's chi-squared test to compute any relationships between the study variables during the pre- and post-course phases. The level of statistical significance was set at 5%.

Findings

The results of the study were based on a sample of 238 TBAs from both Chongwe and Mpanshya during the pre-course and 207 TBAs at the intervention stage, which included 107 from Mpanshya and 100 from Chongwe who formed the control and intervention groups, respectively.

During the pre-intervention situation analysis (*Table 1*), 32/120 (26.7%) babies born in Mpanshya and 18/66 (27.3%) born in Chongwe had infections. However, post intervention, just 2/131 (1.5%) babies in Mpanshya had infections ($P<0.001$), while no infections were recorded among 147 babies in Chongwe ($P<0.001$) (*Table 1*). This showed a 27% reduction in infant morbidity in the intervention group and 25.5% reduction in the control group in Mpanshya.

About a fifth of mothers in both sites had infections before the intervention; 25/120 (20.8%) in Mpanshya and 13/66 (19.7%) in Chongwe (*Table 2*). However, during the monitoring and evaluation phase following the intervention, the maternal infection rates reduced to 23/131 (17.6%) mothers in Mpanshya ($P=0.618$), and 9/147 (6.1%) in Chongwe ($P=0.006$) (*Table 2*). This showed a 14% reduction in maternal morbidity in the intervention group and a 3.5% reduction in the control group in Mpanshya. The reduction in the intervention group answers the research question affirmatively. These reductions could be a result of the infection prevention knowledge and improved practice acquired from the evidence provided after six razor blades from the TBAs' kits went for laboratory analysis and showed

Table 3. A total of 107 isolates cultured from the hands of 78 traditional birth attendants

Micro-organism isolated	Total number of 36 isolates from 22 TBAs	Total number of 20 isolates from 14 TBAs	Total number of 29 isolates from 20 TBAs	Total number of 22 isolates from 22 TBAs	Total *n*=107 Isolates from 78 TBAs
Coagulase-negative staphylococci	15	8	15	0	**33 (30.8%)**
Staphylococcus aureus	4	2	3	8	**16 (15.0%)**
Streptococcus spp	5	1	2	1	**7 (6.5%)**
Enterobacter spp	3	1	2	0	**6 (5.6%)**
Pseudomonas aeruginosa	0	0	0	5	**5 (4.7%)**
Micrococci	2	2	0	0	**4 (3.7%)**
Escherichia coli	2	2	0	0	**4 (3.7%)**
Proteus mirabilis	0	0	0	3	**3 (2.8%)**
Enterococcus	0	0	3	0	**3 (2.8%)**
Bacillus spp	0	0	3	0	**3 (2.8%)**
Klebsiella	1	1	0	0	**2 (1.9%)**
Acinetobacter	1	1	0	0	**2 (1.9%)**
Burkholderia	1	1	0	0	**2 (1.9%)**
Diphtheroids	1	1	0	0	**2 (1.9%)**
Klebsiella pneumoniae	0	0	0	1	**1 (0.9%)**
Streptococcus pneumoniae	0	0	0	1	**1 (0.9%)**
No growth	1	0	0	3	**1 (0.9%)**
Citrobacter spp	0	0	1	0	**1 (0.9%)**

TBA–traditional birth attendant

Table 4. Categorisation of knowledge levels pre- and post-intervention

Knowledge level	Pre-intervention					Post-intervention				
	Mupanshya (*n*=119)		Chongwe (*n*=119)		*P* value	Mupanshya (*n*=107)		Chongwe (*n*=100)		*P* value
	n	%	*n*	%		*n*	%	*n*	%	
Excellent	–	–	–	–		0	0	76	76	0.001
Good	0	0	1	0.8	0.001	73	68.2	24	24	
Satisfactory	117	98.3	80	67.2		34	31.8	0	0	
Inadequate	2	1.7	38	31.9		–	–	–	–	

Excellent=62–82 correct responses, Good=41–61 correct responses, Satisfactory=20–40 correct responses, Inadequate=<20 correct responses

no growth. This exercise assured the TBAs that it is safe to use the razor blades in their clean delivery kits rather than 'ulushishi' tree barks, other sharp equipments or even unboiled, used razor blades to cut the umbilical cord during the birthing process. This exercise also provided documented scientific evidence of the sterility of the razor blades.

Table 3 shows that 30.8% out of 107 isolates of micro-organisms from the hands of the TBAs was coagulase-negative staphylococci. These are among the most common resident micro-organisms (World Health Organization, 2009) which cause omphalitis and puerperal sepsis. This information demonstrated to TBAs the importance of handwashing and wearing gloves before assisting births. Knowledge levels of TBAs pre- and post-training are shown in *Table 4*.

Discussion

The focus group discussion revealed that the role of TBAs includes providing direct care to women during pregnancy, labour, birth and postpartum, during which the TBAs apply infection-prevention measures. This has seen a reduction in maternal and infant morbidity rates in Chongwe District.

Another interesting finding was that the infection-prevention knowledge levels were generally low during the pre-course compared to the post-course phase, which showed statistically significant ($P=0.001$) improvements at post-course, as 76 (76%) of the intervention TBAs had excellent knowledge, compared to none among the control TBAs.

Comparative analysis showed that there was no difference in the knowledge acquired between the age groups 20–51 years and 52–83 years (*Table 5*). Respondents with up to primary education were 1.74 times more likely to have had acquired excellent to adequate knowledge compared to respondents with higher education (95% CI 1.38, 2.19). Respondents in Chongwe were 1.45 times more likely than those in Mpanshya to have had excellent to adequate knowledge after adjusting for age and education (95% CI 1.16, 1.81). This shows that age is not significant in relation to the acquisition of knowledge among TBAs, so those of any age can take the training.

As education and age did not play a role in the acquisition of knowledge by the TBAs, it can be concluded that the curriculum content used in the training does not require prior education. This has an implication for future training,

as it means this curriculum can be used at another site for purposes of replication using a randomised controlled study method.

Some authorities (Goodburn et al, 1995) state that TBAs do not reduce infant and maternal morbidity and mortality rates, while others (Sibley and Sipe, 2004; Gill et all, 2011) provide evidence to support the TBA training programme as long as TBAs are trained to prevent infections in their clients (Bello et al, 2008). Sharan et al (2011) noted that TBA training was associated with a 6% decrease in perinatal mortality and an 11% decrease in mortality from birth asphyxia. Based on their findings, the authors argued that TBAs should be trained due to the current unavailability of skilled care in low-resource countries. So there is a need for effective community-based strategies to train the TBAs to participate effectively in safe motherhood initiatives, particularly in areas with high infant and maternal mortality rates. Sharan et al (2011) also emphasised that the training should be properly monitored and evaluated in order to develop a strong evidence base needed for effective policyformulation. In rural areas in a country like Zambia, there is a critical shortage of clinics and skilled birth attendants (SBAs). As a result, untrained personnel, general nurse-trained staff or environmental health technicians, and even classified daily employees run these health centres (Maimbolwa et al, 1997; Maimbolwa, 2004). In such areas, TBAs are used to fill in the gaps by providing safe motherhood services to isolated rural communities until such time as there are sufficient numbers of SBAs to supervise the antenatal care and births of all women. Therefore, it is important to put up a transitional plan which would ensure that TBAs receive appropriate training in infection-prevention measures (Hazemba and Siziya, 2007) so they can conduct safe and clean births—even if on an emergency basis—so that no woman dies while giving birth. It is important to monitor and evaluate their practices.

The monitoring and evaluation phase demonstrated the relevance, efficiency, effectiveness, accessibility, acceptability and impact of the study. The sustainability of the TBA training should be based on the benefits and satisfaction experienced by the service users. One of the outputs of this study is the production of the monitoring and evaluation tool.

Study outputs

- Human resources: Trained 238 TBAs in both Mpanshya and Chongwe
- Reference material: The modified MoH TBA training curriculum
- Developed a TBA monitoring and evaluation tool.

Conclusions and recommendations

The study has shown that training TBAs with the modified MoH TBA training curriculum has answered the research question affirmatively. This study recommends a randomised controlled study to determine whether age and education levels can influence the knowledge, practice and attitudes of TBAs in other settings. It is hoped that the study outputs would be used as a mechanism to document the impact of TBAs and thus provide scientific evidence for policy formulation, following policy briefing and dialogue.

Table 5. Comparable analysis between knowledge and site adjusting for age and education

Factor	Odds ratio	95% CI
Site	15	8
Chongwe (intervention)	1.45	1.16, 1.81
Mpanshya (control)	1	
Age	3	1
20–51	0.77	0.56, 1.05
52–83	1	
Education	2	2
Up to primary	1.74	1.38, 2.19
Secondary/higher	1	

The researchers recommend the use of the monitoring and evaluation tool to provide information to be used in considering sustaining the practices of the TBAs by updating their practices through refresher courses for knowledge update. It is also recommended that the District Health Management Team evaluates the integration of TBAs in the formal health care system and considers the need to expand their role through training, as noted by Walraven and Weeks (1999) and Sambo (2005). This study has demonstrated the motto of the MoH which is to provide quality, equitable, acceptable and affordable health care provision as close to the family as possible. **AJM**

Acknowledgements: *Professor S Siziya, Professor K Baboo, Center for Infectious Disease Research in Zambia; Professor (Dr.) Lynda Wilson, School of Nursing, University of Alabama in Birmingham; Professor Mutale W Chanda, Dr P Mweemba, Dr Lonia Mwape and the entire faculty in the Department of Nursing Sciences of the School of Medicine.*

Bello M, Ambe J, Yahaya S, Omotara B (2008) Traditional Birth Attendants: Practices and problems in Konduga Local Government Area of Borno State; North Eastern Nigeria. *Internet Journal of Tropical Medicine* **6**(1) http://ispub.com/IJTM/6/1/9869 (accessed 5 April 2016)

Gill CJ, Phiri-Mazala G, Guerina NG et al (2011) Effect of training traditional birth attendants on neonatal mortality (Lufwanyama Neonatal Survival Project): randomised controlled study. *BMJ* **342** doi: 10.1136/bmj.d346

Goodburn EA, Gazi R, Chowdhury M (1995) Beliefs and practices regarding delivery and postpartum maternal morbidity in rural Bangladesh. *Stud Fam Plann* **26**(1): 22–32

Hazemba A, Siziya R (2007) Utilisation of maternity care services offered by traditional birth attendants in Chongwe Rural District. *Medical Journal of Zambia* **34**(3): 125–9

Maimbolwa MC, Ransjö-Arvidson AB, Ng'andu N, Sikazwe N, Diwan VK (1997) Routine care of women experiencing normal deliveries in Zambian maternity wards: a pilot study. *Midwifery* **13**(3): 125–31

Maimbolwa MC (2004) Maternity Care in Zambia: with special reference to social support. http://tinyurl.com/gu9wweo (accessed 5 April 2016)

Republic of Zambia Ministry of Health (2008) *National Health Strategic Plan 2011–2015*. http://tinyurl.com/zzq2454 (accessed 21 March 2016)

Sambo LG (2005) African traditional medicine: Contributing to preventing HIV infection. http://tinyurl.com/j93haw3 (accessed 5 April 2016)

Sharan M, Ahmed S, Ghebrehiwet M, Rogo K (2011) The quality of the maternal health system in Eritrea. *Int J Gynaecol Obstet* **115**(3): 244–50

Sibley L, Sipe TA (2004) What can a meta-analysis tell us about traditional birth attendant training and pregnancy outcomes? *Midwifery* **20**(1): 51–60

Walraven G, Weeks A (1999) The role of (traditional) birth attendants with midwifery skills in the reduction of maternal mortality. *Trop Med Int Health* **4**(8): 527–9

World Health Organization (2009) *WHO Guidelines on Hand Hygiene in Health Care*. WHO, Geneva

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