HUMAN RESOURCES FOR HEALTH (HRH) MIDWIVES MENTORING PROGRAM AND EPISIOTOMY RATES AT MUHIMA HOSPITAL, RWANDA: A RETROSPECTIVE CROSS-SECTIONAL STUDY

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ABSTRACT

BACKGROUND: Despite strong evidence against routine episiotomies, numerous unnecessary episiotomies occur each year in Rwanda and other countries leading to long-term maternal complications. The Ministry of Health-led Human Resources for Health (HRH) program in Rwanda aims to improve the quality of health care delivery by increasing the capacity of doctors, nurses, and midwives. HRH pairs international and domestic doctors, nurses, and midwives to provide in-service training and daily bed-side mentorship, and to exchange best practices. This study evaluates the effect of the HRH midwifery in-service mentoring program on change of episiotomy rates at Muhima Hospital in Kigali, Rwanda.

METHODS: This retrospective pre-post intervention study of episiotomy rates used data from vaginal births sequentially sampled from the hospital birth register during six-month periods before (2012, n=264) and after (2014, n=394) the intervention was implemented. Percentages and chi-squared tests were used to compare episiotomy rates before and after the intervention, including in subgroups of women. Logistic regression was used to test for any differences between groups.

RESULTS: Pre-intervention and post-intervention populations were similar in terms of age (p=0.488), parity (p=0.080), shift of birth (p=0.280), and baby weight (p=0.190). The change in episiotomy rate from 35.6% in 2012 to 11.7% in 2014 was statistically significant (p<0.001), after adjusting for other characteristics.

DISCUSSION: This study found a substantial decrease in episiotomy rates at Muhima Hospital following implementation of a two-year in-service mentoring program. More research is needed to separate the effects of general health system strengthening versus the intervention on episiotomy rate, but initial findings are positive.

Key words (MeSH): Evidence-based practice; Episiotomy; Delivery, Obstetric; Midwifery; Africa; Education, medical

INTRODUCTION

Episiotomy is the surgical enlargement of the vaginal orifice by an incision of the perineum during the last part of the second stage of labor or delivery [1]. The rate of episiotomy varies globally between 9.7% and 100% [2].Although current evidence supports a restrictive episiotomy policy, many obstetricians and midwives still consider episiotomy an important intervention to protect the mother and fetus from injury during delivery, particularly primiparous women [3]. The risks of episiotomy include severe perineal ulceration, pain, urinary incontinence, infections, difficulty breastfeeding and painful intercourse [4]. Restricted use of episiotomy is recommended because patients require less suturing, have fewer post vaginal delivery complications, and have an intact perineum for any future delivery [5]. In spite of evidence against the routine use of episiotomy, reducing episiotomy rates has had mixed success globally, notably in low resourced countries [6,7].

In the past, many obstetricians and midwives considered episiotomy the best way to protect the mother from delivery injuries of the perineum and pelvic floor [3].

Episiotomy was performed routinely as a short cut to facilitate quick delivery of the baby, especially for primiparous women [1]. In 1979, with 90% of primiparous women receiving episiotomies [8],this procedure was perhaps the most routine obstetric procedure ever performed [9]. Currently the WHO recommends an episiotomy rate of 10%, and most countries are challenged to meet this goal [10].

Examples of partial successes in reducing episiotomy rates in high-income countries include the United States where the number of episiotomies has gradually decreased from 64% in 1980 to 25% in 2004 [4]; and the United Kingdom where the episiotomy rate is 12% [8]. However, studies from low-income countries find episiotomy rates as high as 61% [11]. Research from a major teaching hospital in Rwanda in 2011 found episiotomy rates were 80% in primiparous and 7% in multiparous women, with an overall rate of 39% [12]. Up to 13% of episiotomies in one Rwanda hospital were done without any medical indication [13].

A review of nine studies that evaluated the response of episiotomy rates to an intervention found that barriers to change included lack of participant's awareness, lack of self-efficacy, staff shortage, poor interactions between staff and women, as well as lack of time [14]. Mentoring is a basic component of both in-service and pre service clinical education. Mentoring, also known as workplace training, ideally begins immediately after classroom sessions, and allows participants to apply what they have learned, and thus introduce new routines. Mentorship is typically performed by a health care provider skilled in the practice that is being mentored. An example of mentoring would be to follow a newborn resuscitation training with a skilled midwife or doctor mentoring maternity staff while they are performing newborn resuscitation until proficiency is achieved and routines have been upgraded. Global examples of successful staff capacity building through workplace mentoring in the areas of HIV care, family planning, and maternal, newborn and child health [14].

Overwhelmingly, the evidence supports restricting the use of routine episiotomy and the need for addressing barriers to change. In-service education focused on evidence based routine care followed by mentoring from a midwife skilled in conducting births without episiotomy has the potential to improve awareness and self-efficacy in enacting evidence-based practices such as restricting use of episiotomy [15].

Program

To promote evidence-based practice, the Rwanda Ministry of Health (MoH) in collaboration with US-staffed Human Resources for Health (HRH) Program deployed a multidisciplinary health team of academic and clinical mentors in different health disciplines, including midwifery. The program contributed in developing health workforce policies and strategies; maintaining appropriate skill mix of health workers with competencies relevant to the needs of the population; ensuring equitable redeployment and distribution of the health workforce; and attracting and retaining health professionals in careers [16]. At the time of this writing in 2016, the HRH Program was training 67 midwives via the University of Rwanda - College of Medicine and Health Sciences - School of Nursing and Midwifery at the Advanced Diploma, Bachelor's level. During training rotations and in practice after graduation, students were expected to extend evidence-based practices to health centers and hospitals across the country.

Midwifery mentoring model

HRH started midwifery mentoring in August 2012 at Muhima Hospital in Kigali. Mentoring was done by experienced midwives having at least a master's degree and employed by an American University as part of the HRH Program. A variety of methods were used by the HRH midwife mentors, including supporting the School of Nursing and Midwifery Bachelor of Nursing upgrade at the University of Rwanda, promoting the Rwandan midwives to participate in collaborative in-services, aand providing individual bedside teaching. Rwandan nursing and midwifery students and staff were exposed and/or re-exposed to theories and gained mentored experience implementing best-practices. The program was implemented across several hospitals including Central University Hospital of Kigali (CHUK), Byumba Hospital, Kabgayi Hospital, Masaka Hospital, Ramagana Hospital and Muhima Hospital. The mentorship was extended to the respective schools of nursing and midwifery and to some health centers.

The effects of medical education interventions are often difficult to measure well. The modified Kirkpatrick hierarchy places "impact" on care as the highest level of evaluation [17]. This study therefore adds significantly to the evidence supporting mentorship interventions such the HRH program.

The aim of this study was to estimate the effect of the HRH midwifery in-service mentorship model on episiotomy rates at Muhima Hospital over the first 22 months of the intervention. We hypothesized that the mentorship model contributed to a decrease in the rate of episiotomies performed at Muhima Hospital.

METHODS

Study setting

Muhima Hospital is a secondary district hospital located in Kigali, Rwanda's capital city, and it is the largest maternity specialty hospital in the country.

Study setting

TTo estimate the potential effect of the HRH midwifery in-service mentoring model on episiotomy rates, we analyzed secondary data from Muhima Hospital's birth register using a cross-sectional retrospective study design. A random probability sample of vaginal births was drawn from the Muhima Hospital birth register in the six-month period before the intervention (February to July 2012) and in a six-month period after the start of the intervention (July to December, 2014). Every 10th birth from the birth register book was sampled resulting in a dataset of 264 births in the pre-intervention period and 394 births in the post-intervention period. This study is powered to detect a 12%, or greater, change in vaginal birth episiotomy rates between the measured periods at the α=0.05 and β=0.80 levels. Audits found no other formal interventions that might influence the reduction of episiotomy rate at Muhima Hospital during this time frame.

Data management

No patient names or other identifying information were collected. Anonymized secondary data from the birth register were entered into an Excel spreadsheet located on a password-protected computer. Patient records were not accessed for this study.

Variables

The outcome of interest was receipt of an episiotomy by women delivering at Muhima Hospital. The predictor was a two-category variable indicating year of measurement before or after implementation of the HRH midwifery in-service mentoring. Other variables collected about each birth included: age group of mother (in years), multiparous or primiparous birth, whether the delivery occurred during the day shift (6h00-18h00) or night shift (18h00-6h00), the infant weight (<2.5kg, 2.5-3.5kg, 3.5-4.0kg, and >4.0kg), and whether it was a vaginal or surgical birth. These were among the only variables available in the birth register, and were included in this study because their relationship with receiving an episiotomy could change over time as training and clinical practices changed, and were thus considered as potential confounders. Only vaginal births were included in this study.

Analysis

We summarized key characteristics in the study population in the pre and post-intervention phases using percentages, and compared characteristics of the population across the two periods using chi-square tests at the α=0.05 level to identify if the sampled populations were similar. After the pre- and post-intervention populations were deemed interchangeable, we directly calculated percent change in episiotomy rates in the full sample, and in sub-groups. Additional multivariate logistic regression models were used to ensure that the observed changes in episiotomy rate before and after the intervention was not confounded by other measured characteristics. Pearson's R correlation coefficients were used to ensure that covariates in the multivariate models were not collinear at r>0.5. We fit a final logistic regression model using a manual backward stepwise approach, and we report results as odds ratios and p-values at the α=0.05 level.

Ethics

Ethical approvals for this study were obtained from the University of Rwanda College of Medical and Health Sciences Institutional Review Board (Ref: CMHS/IRB/122/2015) which is recognized by the Rwanda National Ethics Committee; and the Muhima Hospital Ethics Committee.

RESULTS

The overall episiotomy rate fell significantly from 35.6% in the pre-intervention period to 11.7% in the post-intervention period (p<.001) (Table 1). There were not any statistically significant differences between measured characteristics in the pre-intervention and post-intervention study populations in terms of age (p=0.488), parity (p=0.080), shift of delivery (p=0.280), or infant weight (p=0.190) (Table 1). The overall percent change in episiotomy rate was -67.1% which ranged from -57.9% to -80.0% in sub-groups (Table 2). None of the covariates were collinear at Pearson's R>0.5 (Table 3.). In multivariate models that controlled for potential confounders, women with vaginal births in 2014 had 0.16 the odds of an episiotomy as women with vaginal births in 2012 (p<0.001) (Table 4).

Table 1. Comparison of the study population characteristics before and after the intervention, Muhima hospital

Characteristics	2012		2014		Chi-square p-value	df
	n	%	N	%		
Episiotomy	94	35.6	46	11.7	<0.001	1
Mother's age					0.488	3
<20	19	7.2	19	4.8		
20-29	180	68.4	286	72.6		
30-34	44	16.8	63	16.0		
35+	21	8.0	26	6.6		
Parity					0.080	1
Primiparous	104	39.4	129	32.7		
Multiparous	160	60.6	265	67.3		
Shift					0.280	1
Day	148	43.9	204	48.2		
Night	116	56.1	190	51.8		
Baby weight					0.190	3
<2.5 kg	28	10.6	33	8.4		
2.5-3.5 kg	191	72.3	285	72.3		
3.6-4.0 kg	41	15.5	59	15.0		
>4.0 kg	4	1.5	17	4.3		
Total	264		394			

Table 2: Percentage change in episiotomy rates before and after intervention, by group, Muhima Hospital

Characteristic	Episiotomy 2012 N (%)	Episiotomy 2014 N (%)	% change 2012-2014
Overall	264 (35.6)	394 (11.7)	-67.1
Mother's age			
<20	19 (78.9)	19 (31.6)	-59.9
20-29	180 (38.9)	286 (12.6)	-67.6
30-34	44 (11.4)	63 (4.8)	-57.9
35+	21 (19.0)	26 (3.8)	-80.0
Parity			
Primiparous	104 (73.1)	129 (29.5)	-59.6
Multiparous	160 (11.3)	265 (3.0)	-73.5
Shift			
Day	148 (35.1)	204 (10.8)	-69.2
Night	116 (36.2)	190 (12.6)	-65.2
Baby weight			
<2.5 kg	28 (25.0)	33 (6.1)	-75.6
2.5-3.5 kg	191 (38.7)	285 (13.7)	-64.6
3.6-4.0 kg	41 (31.7)	59 (6.8)	-78.5
>4.0 kg	4 (0.0)	17 (5.9)	n/a

Table 3. Pearson's R correlation coefficients between multivariate model covariates

Variable	Year	Mother's age	Parity	Shift	Baby weight
Year	1.000	-0.007	0.068	0.042	0.060
Mother's age		1.000	0.342	-0.045	0.057
Parity			1.000	-0.081	0.126
Shift				1.000	0.007
Baby weight					1.000

Table 4. Odds ratios and p-values testing the association between the intervention period and episiotomy rate adjusting for potential confounders

Variable	Model 0 – unadjusted		Model 1 - adjusted		Model 2 - adjusted		Model 3 – adjusted	
	Odds Ratio	p-value	Odds Ratio	p-value	Odds Ratio	p-value	Odds Ratio	p-value
Year								
2012	Ref		Ref		Ref		Ref	
2014	0.24	<0.001	0.16	<0.001	0.16	<0.001	0.16	<0.001
Mother's age								
<20			Ref		Ref			
20-29			0.60	0.217	0.60	0.212		
30-34			0.35	0.072	0.35	0.072		
35+			0.55	0.387	0.55	0.381		
Parity								
Primiparous			Ref		Ref		Ref	
Multiparous			0.06	<0.001	0.06	<0.001	0.06	<0.001
Shift								
Day			Ref					
Night			0.95	0.818				
Baby weight								
<2.5 kg			Ref		Ref		Ref	
2.5-3.5 kg			4.04	0.003	4.06	0.003	4.00	0.003
3.6-4.0 kg			5.12	0.004	5.12	0.004	5.10	0.003
>4.0 kg			1.23	0.857	1.26	0.866	1.17	0.893
Constant	0.55	<0.001	1.27	<0.001	1.24	0.703	0.79	0.571
-2 Log Likelihood	628		446		447		450	

DISCUSSION

This study demonstrated that there was a significant decrease in the episiotomy rate after an in-service mentoring intervention was implemented by the MoH in Rwanda. We considered the pre- and post-intervention groups as sufficiently similar to compare because no differences were found in their characteristics. The episiotomy rate at this large maternity specialty hospital post-intervention is very close to the 10% rate recommended by the WHO [10], and slightly less than the rate in the United Kingdom which has instituted a national policy of selective episiotomy [8,18]. Given the previously high frequency of episiotomies and evidence that mentorship by midwives experienced in evidenced-based care was a key difference between the 2012 and the 2014 measurements, the decrease in episiotomy rates may be interpreted as a litmus test for intervention impact [1]. While causality cannot be determined, this does provide positive support for such mentorship programs.

Limitations

The study had several limitations. First, there was no comparison group to estimate change in episiotomy rates that might have occurred in the absence of this intervention due to general health system strengthening efforts in Rwanda. Other variables may have influenced the decrease in episiotomy rates such as changes in staffing such that more midwives or residents were available and so the desire to hasten births may have been less. There also may have been changes in teaching, retiring of midwives with older practices and replacement with new graduates who had more recent evidence-based knowledge. Second, some variables could not be accessed such as information on education, practice experience, and number of the staff attending each birth which could have influenced decisions to perform episiotomy. Third, this study was done at one specialty referral hospital in Rwanda, and so these findings may not be generalized to other hospitals in Rwanda or in other countries.

Recommendations

Suggestions for future research include collection of national data on episiotomy rates and the study of other evidence-based practices within midwifery on decreased episiotomy rates. The results in this paper are very encouraging and supportive of initiatives such as the HRH program. As programs like this improve the quality of care and the skills of practitioners, policy makers will have to make concerted efforts to not lose these well-trained staff. A 2016 article in the RMJ demonstrated that many clinicians already consider leaving the health force to seek opportunities out of the country or within Non-governmental organizations [19], which is a historical trend in healthcare workers including midwives and nurses over the past 15 years [20, 21].

Recommendations

Today's medicine is led by evidence-based practice to reduce routine harmful procedures. The episiotomy is the most common obstetric harmful routine procedure, and clinical in-service mentoring may contribute substantially to a reduction of this routine practice. This study found a significant decrease in unnecessary episiotomies at Muhima hospital over a two-year period with a decrease of episiotomy rate from 35.6% to 11.7% in relationship with HRH's midwifery in-service mentoring program at Muhima Hospital. This study provides important information for policy makers regarding the use of this type of mentoring program to improve evidence-based practice. The mentoring program warrants further research to more closely associate the impact of nurse mentoring on practice, but initial findings are positive.

Competing Interests

The authors declare that they have no competing interests.

Authors' Contributions

AN and RA conceptualized the study. AN and CMY oversaw data entry. DRT provided statistical guidance to Felix Hagenimana, AN, and CMY to analyze, interpret, and present the findings. AN, RA, CMY, HE, and DRT wrote the first draft of the manuscript, provided expert advice on interpreting the data and contributed to writing the final draft of the manuscript. All authors read and approved the final version of the manuscript.

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