CAPACITY BUILDING OF KENYAN HEALTH WORKERS IN PPH PREVENTION AND MANAGEMENT: SAVING MORE PARTURIENT LIVES

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ABSTRACT

Introduction: Despite being largely preventable, postpartum hemorrhage (PPH) is the modal cause of maternal mortality globally and in Kenya.

Methodology: During the 44th Annual Scientific Congress of the Kenya Obstetrical and Gynecological Society, a 2-day PPH workshop was held in Msambweni Sub-District Hospital in Kwale County to identify addressable gaps and to build local capacity. The participants sat a uniform pre- and post- test and evaluated the course.

Results: The modal cadres present were clinical officer interns (8) and midwives (7). Out of the 28 participant responses analyzed, the pretest revealed low average level of knowledge (43.8%), with devascularization (31.8%) and resuscitation (39.7%) showing the lowest levels. The post-test revealed substantial improvement in overall average knowledge that was attributable to the training (75.2%, p=0.001). Three quarters of the participants rated the training as excellent, while a fifth rated the training as good.

Discussion: PPH is known to be the most significant cause of maternal mortality. However, knowledge of its prevention, diagnosis and management were poor. The training resulted in significant improvement in knowledge, while the use of high-fidelity simulation drills enhanced emergency preparedness.

Conclusion: Overall, there is a significant role for capacity building through in-service trainings. There is therefore a need to scale-up such trainings in order to further reduce contribution of PPH to maternal mortality in Kenya.

INTRODUCTION

Postpartum hemorrhage (PPH) is the commonest cause of maternal mortality globally including Kenya[1,2]. PPH is largely preventable with concerted efforts being made by professional bodies, academic Institutions and private sector conducting research, guideline development and training offered to both pre-service and in-service health cadres[3]. During the 44th Kenya Obstetrical and Gynecological Society Congress an inaugural Pre-Congress Workshop was run daily for two days in Kwale County, Msambweni Sub-District Hospital amongst various health cadres providing maternity and newborn services. The primary aim of this workshop was to build the capacity of health care workers in PPH prevention and management. The secondary aim was to identify gaps that can be addressed to save more parturient lives.

METHODOLOGY

Study design: This was a quasi-experimental study of the responses of participants based on a pre- and post-intervention design.

Study site: Data were collected from voluntary consenting participants who opted in to attend the PPH prevention and management workshop being provided at the Msambweni Sub-District Hospital as part of the 44th Kenya Obstetrical and Gynecological Society (KOGS) Annual Scientific Pre-Congress workshops over a period of two days.

Study population: The participants comprised health care providers and congress participants. The participants were divided into two groups, each with the stipulated 15 participants of various cadres. The ceiling of participants in each group was intended to ensure the ability to optimize individualized attention to the participants by ensuring favorable trainer/student ratios.

Study faculty: There were 7 facilitators who trained the participants. Four of these were consultant obstetrician/ gynaecologists drawn from the national leadership of KOGS, teaching faculty of The University of Nairobi, Moi University and Technical University of Mombasa and the private sector. The remaining 3 facilitators were final year post-graduate students of Obstetrics and Gynaecology in the University of Nairobi.

Training delivery: The training was divided into morning didactic sessions and afternoon practical sessions using high-fidelity simulation with humanistic models based on case studies and real-life experiences. The training modules addressed the various aspects of PPH care: prevention; recognition; use of uterotonics; medical management; devascularization procedures; as well as maternal and perinatal death and surveillance review. The favorable trainer/participant ratio allowed for practical demonstrations, individualized mentorship and debriefs.

Data collection: Before the course began, the participants sat a pre-course evaluation. They were also provided the opportunity to state their expectations and desired learning outcomes. After the training, they sat a post-course evaluation and were provided the opportunity to evaluate the training in relation to their stated learning objectives. The congruence of the pre-and post-tests were intended to facilitate objective quantification and comparison of knowledge and skills levels in the continuum of PPH prevention and management acquired as a result of the training. After the course was completed, the facilitators availed digital and physical resource materials and protocols that could be used to sustain knowledge translation and scale up amongst health personnel at the health facility.

Quality assurance: The pre-and post-tests were directly invigilated by the trainers in order to ensure that there was no sharing of responses, which would have invalidated the data. The scripts were marked the same evening and the results were transcribed immediately in order to minimize transcriptional errors. Since the tests over the two days were identical, the results and marking schemes were witheld from the participants until the close of the second day in order to prevent the second group from acquiring foreknowledge of the correct responses, which would have also invalidated the data.

Data management: Data were collated, cleaned and entered into a restricted access Excel Spreadsheet. They were then exported to the Statistical Package for Social Sciences (SPSS) version 20 for summary and analysis, including univariate frequency and proportions and bivariate analysis using the paired student's t-test. A p-value of <0.05 was considered statistically significant.

RESULTS

The inaugural training on PPH Prevention and management targeted health care workers had a total of 30 participants over the two days. Two participants (clinical officer interns) presented themselves during the practical sessions of the second day. Since they did not participate in the pre-test, they were eliminated from data analysis. The modal cadre of participants were the Clinical Officers and clinical officer interns, accounting for almost half of the participants (43%). The 3 Obstetricians/ Gynaecologists present were not faculty at the hospital, but opted to participate in the training as part of the ongoing Pre-congress workshops of the 44th Annual Scientific Congress of the Kenya Obstetrical and Gynecological Society.

Two of the participants were foreign medical students on an exchange programme but had not yet rotated in Obstetrics and Gynecology. It was reported that although there were more nurses available at the facility only 25% participated. These results are shown in Table 1.

Table 1: Cadres of participants in the Post-Partum Haemorrhage workshop (N=28)

CADRE	NUMBER
Obstetrician/Gynecologist	3
Medical Officer	2
Medical Officer Intern	2
Clinical Officer Intern	8
Clinical Officer	4
Nurse midwives	7
Medical Student	2
TOTAL	**28**

The Pre- and Post-course evaluation scores of the participants are shown in Table 2. There was an overall trend of improvement noted as a result of the training. The overall scores improved from 31.8% to 75.2% in the pre- and post- tests respectively. The overall pre-test scores ranged from 22.9 to 72.3%, while the overall post-test scores ranged from 44.3 to 88.5% (95%CI 35.8 – 78.1%; p=0.001). Baseline knowledge levels were sub-par (<50%) in relation to devascularization procedures, uterotonics and medical management (39.7%, 48.4% and 48.4% respectively).

During the pre-course expectation, all participants were offered the opportunity to share their expectations regarding the minimum amount of knowledge they hoped to gain from the Workshop. Respondents were (50%), of the participants. The three top aspects of knowledge they desired to gain were: management of post-partum haemorrhage; diagnosis of post-partum haemorrhage and prevention of Post-partum haemorrhage in respective in descending order (57%, 50% and 29%). These results are illustrated in Figure 2.

Upon completion of the workshop, the participants provided a post-course evaluation. During this evaluation, the participants were also provided the opportunity to highlight the topics that they felt were new to them. There was 50% feedback on the identification of new topics, and 100% of participants rated the training. The content that was consistently unfamiliar among both groups trained comprised the use of devascularization procedures in the management of post-partum haemorrhage; uterotonics and use of MEOWS Chart. The day 1 participants reported greater unfamiliarity with the content compared to day 2. These results are shown in Table 3.

In regards to the perception of the quality of the training,100% of participants rated the training using a Likert scale. Of these responses, 21 (75%) rated the training as excellent, while 6 (21%) rated the training as good. Only one abstained from rating the training. These ratings are illustrated in Figure 2.

Table 2: Average test scores of training participants following pre-course and post-course evaluations of knowledge levels on various aspects of management of post-partum hemorrhage (N=28)

Aspect of prevention and management of Post-Partum Hemorrhage	Marks allocation	Pre-Test scores Day 1 (%)	Post-Test scores Day 1 (%)	Pre-Test scores Day 2 (%)	Post-Test scores Day 2 (%)	Pre-Test scores Overall (%)	Post-Test scores Overall (%)	SEM	SD	95% CI	t	p value
Prevention	4	69.1	87.5	65.9	84.1	67.5	85.8	4.13	10.1	66.0 - 87.2	18.5	<0.001
Uterotonics	15	41.6	72.9	55.2	67.3	48.4	70.1	5.21	12.8	45.8 - 72.6	11.3	<0.001
Resuscitation	16	33.5	82	46	75	67.5	78.5	8.00	19.6	43.2 - 84.3	7.9	0.001
Medical Management	10	36.5	81.3	66.4	82.7	48.4	82	8.05	19.7	45.5 - 86.9	8.2	<0.001
Devascularization	12	19.6	65.1	43.9	62.1	39.7	63.6	7.35	18.0	30.1 - 67.8	6.7	0.001
MPDSR	4	60.3	79.7	27.3	68.2	51.4	73.9	7.73	18.9	40.2 - 79.9	7.8	0.001
TOTAL	61	36.8	78.8	50	71.7	31.8	75.2	8.39	20.6	35.8 – 79.0	6.8	0.001

Key: CI – Confidence Interval; **MPDSR** – Maternal and Perinatal Death Survey and Review; **SD** – Standard Deviation; **SEM** – Standard Error of the mean

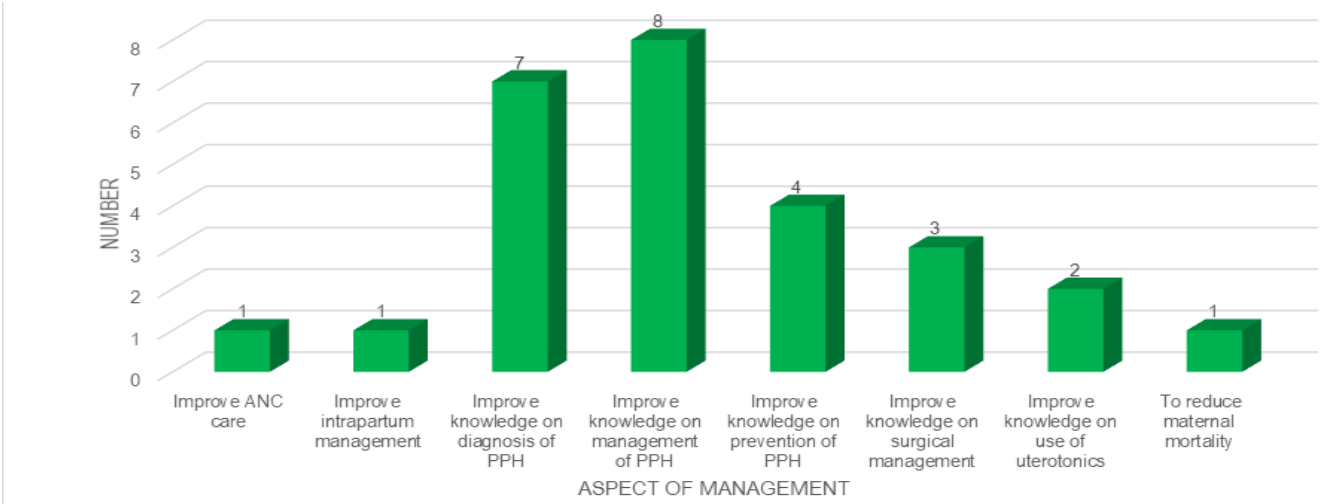

Figure 1: Pre-course expectations of participants prior to beginning the post-partum hemorrhage prevention and management training (N=14)

Table 3: New topics encountered by participants during the Post-partum haemorrhage Workshop (N=14)

Topic	Day 1	Day 2	TOTAL
Nothing was new	3	2	5
Devascularization procedures	3	2	5
Uterotonics	4	0	4
Everything was new	2	0	2
Anatomic basis for PPH	1	0	1
Resuscitation	2	0	2
Hemostatic sutures for PPH	2	0	2
MEOWS	3	1	4
Temporizing measures	1	0	1
TOTAL RESPONDENTS	**10**	**4**	**14**
TOTAL PARTICIPANTS	**15**	**15**	**28**

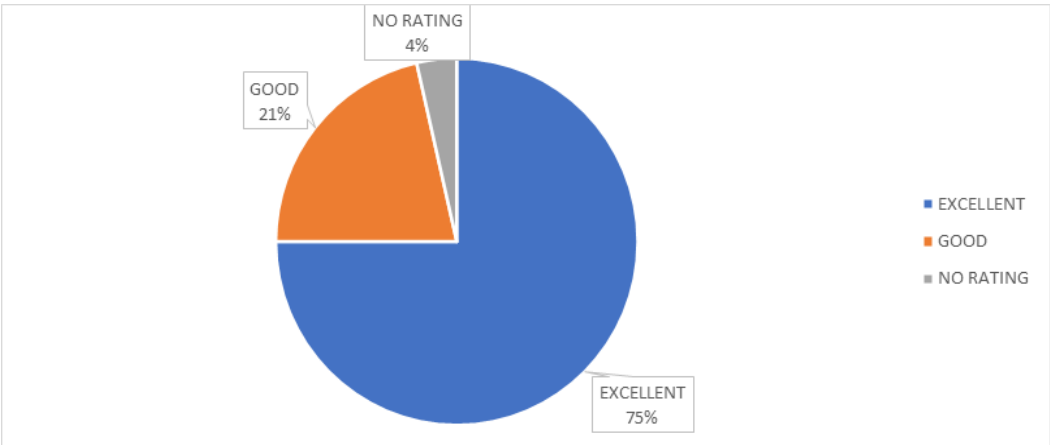

Figure 2: Post-course evaluation of Pos-partum hemorrhage training by participants (N=28)

DISCUSSION

The Kenyan health care sector is decentralized and increasingly focused on provision of services directed towards reducing health inequities; provision of universal health coverage[4]; zero tolerance to preventable maternal and perinatal mortality and social accountability[5,6,7]. PPH is the leading cause of direct maternal and perinatal morbidity / mortality globally[8,9,10] and in Kenya and the confidential enquiry on maternal and deaths

in Kenya reporting the principle reason being sub-optimal care[11]. Increasingly focus on aspects of human resource for health[12] includes address to workforce to workload; contributing towards task shifting and sharing between cadres[13]; review of scope of practices and quality of service delivery. Msambweni Sub-District Hospital is a public facility that offers Obstetric and perinatal services. The KOGS Congress provided an opportunity for health care providers of reproductive health to be in attendance. During this inaugural workshop the majority of attendees were drawn from the clinical officers. The plausible explanation they are the providers found primarily at lower level facilities and with their increased scope of practice according them more roles and responsibilities, particularly in emergency maternal health[14,15,16.] Medical officers are usually deployed to internship training centers and Msambweni Hospital is one such facility with a robust foreign exchange program[17]. Nurse midwives despite being the majority front line providers in all obstetric units nationally. Unfortunately, their attendance was less than anticipated questioning either their workload/workforce at the facility or facility-based trainings versus a preference for hotel-based trainings where per diem incentives are often given[18,19].

The participants who responded to their expectations from the workshop showed in the majority they wanted to know management of PPH and refine their skills on making a diagnosis of PPH. In the first confidential enquiry on maternal deaths in Kenya the commonest cause of death was reported as postpartum hemorrhage and sub-optimal care provided as the main reason. Possible reason could be the disconnect between evidence best practices and implementation with standardized point of care protocols. Further this is challenged by the need to have the postpartum care bundles[20] that includes readiness, recognize, response with appropriately orchestrated interventions; engaging different the personnel in prevention[21] and treatment[22] in a robust health system all conducted within a limited time frame to save the mother. Various studies have shown this to be the challenge in both low and also high-income countries[23]. Dilemma is accuracy of diagnosis of postpartum hemorrhage which commonly employs visual estimates as opposed to the more accurate calibrated drapes and laboratory estimations. This posing plausible reasons for delaying recognition and response[24,25,26]. Prevention of PPH training was requested in 29% of the participants though not a major concern from the participants this prong addresses our being pro-active in readiness to address PPH such as access to blood and blood products, supply and logistics of uterotonics including management of the cold chain when needed; risk assessment of mothers in pre conception, prenatal care including antenatal profiling; diligent intrapartum care and patients have WASH, prophylactic hematinics, deworming, anti-malarial prophylaxis and functional referral systems.

During the workshop significant improvement were noted in the scores of the pre-test to post-test were noted ($t=6.8$; $p=0.001$). There was inadequate knowledge on the use of uterotonics, MPDSR, resuscitation and devascularization procedures. Evidence in the armamentarium of uterotonics for prevention of PPH include oxytocin, ergometrine, syntometrine, Misoprostol, prostaglandins and heat stable Carbetoncin. In management of PPH high dose oxytocin, tranexamic acid, Misoprostol and prostaglandins are being employed. This necessitates evidence-based updates be relayed to health workers through guidelines, emergency obstetric drills, OJT, CME and conferences; provision of a supportive health system to avail these life -saving commodities; clinical governance and pre-service curricula review. The MPDSR is an indicator of the quality of care in the processes of patient care; recognizing the contributory factors that may have delayed her care[27] and culminated in maternal and / or perinatal death. It is during the audit of these cases that necessary interventions are identified and implemented to defer subsequent occurrence of the same. Hospital quality improvement teams need to provide leadership and technical expertise in conducting these audits but plausible explanation its ill-understood by the providers due to lack of capacities with the MDSR cycle and the perceived stigma associated with blame and name shaming hampering learning and corrective measures. During the workshop it was evident there is need to improve death notification, review of cases with employment of forensic audit

and death certification with the appropriate WHO ICD 10 TO deaths during pregnancy, childbirth and puerperium[28]. Similar shortcomings in MPDSR have been noted in other countries in the African region[29,30,31,32].

Resuscitation and devascularization procedures were familiar in less than 40% of the participants. During the training, the maternal early warning obstetric signs (MEOWS) chart, an important triage tool was unfamiliar to the majority of participants yet its crucial to institution of resuscitative measures and triggering cascaded care[33]. There was notable lack of familiarity with the resuscitation cart, its content and hands on orchestration of emergency resuscitative drills. Pre-service training resuscitation is a fundamental skill imparted to ensure patients regain hemo-dynamic stability as concurrent address to the underlying cause of postpartum hemorrhage made. More is needed to re-enforce this skill through conducting of regular drills that use humanistic simulation that mimic the real situation, conducted repetitively, in a non- threatening environment and offers for proficient training thereby reducing harm to patients. Unfortunately, there are hardly any Obstetric and neonatal skills laboratories set up country-wide possibly accounting for inadequate resuscitation skills. Considerations to setting up of accredited simulation centers to provide continuous learning and improvement for individuals and teams[34]. Devascularization procedures are gaining ground as conservative surgical approaches for management of refractory PPH before recourse to performance of hysterectomy.

However, this requires an understanding of anatomy, physiology and pathophysiology associated with PPH critical to success of attaining hemostasis. The procedures include compression sutures, ligation of the uterine, ovarian or internal iliac artery. Often these procedures are conducted in tertiary referral facilities under senior health personnel but important other health cadres be aware of these alternatives that can save mothers lives, preserves the uterus secondarily retaining her fertility and psychosocial well–being[35,36,37.]

Evaluation of the course was deemed good (21%) to excellent (75%) by the participants. Facilitation of the workshop was provided by faculty engaged in teaching, research, clinical practice, guidelines development and policy in obstetric emergencies. They were drawn from professional bodies, academic institutions; public - private sector and postgraduates in their final year of training. Various clinical training methodologies[38] used included didactics interspersed with practical sessions provided individually and in teams with high fidelity simulation throughout the training duration[39,40]. These were the probable attributes for participant effective engagement and their positive evaluation of the course.

CONCLUSION

The workshop provided valuable insights across various health cadres on the knowledge and skills gap in the continuum of care of mothers from preconception all the way to puerperium in prevention and management of PPH. Findings from training indicate attention related to diagnosis and management of PPH with focus on resuscitation; uterotonics and uterus preservation procedures with refractory PPH. The high-fidelity simulation provided favorable training methodology to impart skills. Systematic review and improvements in the health system regarding health personnel, commodities, related supply and logistics and maternal death surveillance and review all providing an opportunity for learning and a trajectory towards enhancing standards and quality of care[41] geared to averting future catastrophes from PPH.

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