Effectiveness of Training on Uptake of Continuous Professional Development among Nurses and Midwives in Clinical Practice - Meru County, Kenya

Odhiambo Roselyne Akinyi[1], Marwa Immaculate Nyaseba[2] Gitonga Lucy Kawira [3]*

[1]*Kenya Methodist University P.O. Box 45240 – 00100, Nairobi, Kenya*

[2]*Kirinyaga University P.O. Box 143 – 10300, Kerugoya, Kenya*

[3]*Chuka University P.O. Box 109 – 60400, Chuka, Kenya*

Correspondence email: odhiamboroselyne01@gmail.com

Abstract

Continuous Professional Development refers to the process by which members of a profession broaden their knowledge and competence to acquire professional qualities required in the practice. In Sub-Saharan Africa, the need for nurses and midwives is increasing. In Meru County, the Maternal Mortality Rate remains a burden. To bridge the gap between knowledge and practice, the Nursing Council of Kenya, in line with the International Confederation of Midwives, requires nurses and midwives to complete 20 hours of CPD annually, promoting continuing education programs. This study is a follow up of phase one study carried out to assess factors that influence uptake of CPD among nurses and midwives in Meru County, Kenya. The objective of the study was to assess the effectiveness of training on uptake of CPD in clinical practice. This was a quantitative study that adopted randomized controlled trial design, utilizing the participants of the phase one study. A total of 70 nurses and midwives from the sampled participants were randomly allocated to the intervention and control groups using systematic random sampling technique. Training was conducted based on the findings of the phase one study. At the beginning of the training, all the participants (n=70) did a pretest, and a post test at the close, with participants from the intervention group being trained. This enabled the researcher to assess the effect of training on participant's knowledge and skills. Data was analyzed using SPSS version 26. Results showed great improvement in knowledge and skills with a pretest mean of 54.19% and a posttest mean of 90%. The paired t-test value was highly statistically significant (p < .001, 95% CI). To enhance a more organized and regularized way of CPD provision, the study developed a CPD Model.

Keywords: *Continuous Professional Development, Effectiveness, Training, Clinical, Nurses, Midwives*

1.0 Introduction

Continuous professional development is the process by which professionals grow, maintain, and improve their knowledge, abilities, and competence, as well as create the professional and personal qualities required for success in their field (Kelley et al., 2017). Globally, the top five causes of maternal mortality in women of all ages include hemorrhage, hypertensive disorders, abortions and sepsis, accounting for over 75% of all maternal fatalities (Bill & Mellinda Gates, 2021). In Sub-Saharan Africa, the need for nurses and midwives is apparently increasing due to the capabilities deficit. Approximately 3.5 percent of the world's health staff is accountable for 27 percent of the disease burden (Hwang et al., 2018). Shortage of nurses and midwives has been directly observed to be the major cause of poor participation in CPD activities. Consequently, nurses and midwives do not get an opportunity to update their knowledge and the skills required for competent management of women and newborns, resulting in inability to competently handle complications that occur during pregnancy, childbirth and the postpartum periods.

There has been deliberate effort to lower maternal and newborn death rates. As such, promoting the delivery of essential obstetric care to women continues to be one of the crucial initiatives that must be carefully adopted to meet the third Sustainable Development Goal by 2030. In Meru County, the SDG report of 2021 puts the MMR burden at 291/100,000 live births. This burden remains a concern, as it exceeds the global MMR. In Meru County, the leading causes of maternal and neonatal morbidity and mortality include post-partum hemorrhage, pre-eclampsia, eclampsia, birth asphyxia and prematurity. This reality falls short of SDG target number three that aims to lower the global maternal and neonatal mortality rates to 70 for every 100,000 live births, and 12 for every 1,000 live births respectively, by 2030.

In Kenya, strengthening CPD is the duty of the Nursing Council of Kenya (NCK). CPD aims to ensure continuing competence and practice relevancy. In order to be licensed or to renew their practice licenses every three years, all Kenyan nurses must complete a minimum of 20 hours of CPD annually (NCK, 2021). By participating in a program that leads to the attainment of a different level of nursing practice, nurses are obliged to engage in formal or informal CPD. With regard to content and teaching techniques, it is expected that the activities would be mostly self-directed. The proposed CPD model developed from this study will adopt the ICM Midwifery clinical competencies from the various categories.

Continuous Professional Development programs are therefore critical to nurses' and midwives' long-term education and are a necessary part of preserving their knowledge and skills (Kelley et al., 2017). Therefore, as stipulated by NCK, it is a requirement for nurses and midwives to complete 20 hours of CPD annually (Canal et al., 2017). The ICM's mission (Nove, 2018) is to improve Midwives Associations and to progress the occupation of obstetrics on a global scale, to boost nurses and midwives autonomy. The main objective of this study is in line with one of the ICM's five strategic goals which emphasize the need to strengthen continuous midwifery education programs through consistently offering training platforms (Fullerton, 2013).

2.0 Materials and Methods

This study is follow up of a previous study on the factors that influence uptake of CPD among nurses and midwives. The study is a quantitative analysis that adopts the

randomized controlled trial design, utilizing participants from phase one study. A total of 70 nurses and midwives from the sampled participants were randomly allocated to the intervention and control groups using systematic random sampling technique. To ensure reliability and validity of research tools, the nurses and midwives were trained using modules adopted from the BEmONC guidelines, and as informed by the findings of the phase one study. The study aimed to address, through training, the existing gaps in the knowledge and skills of nurses and midwives as stipulated in ICM Essential competencies.

The various topics for training were selected based on the gaps that were identified in phase one study. The training modules ranged from essentials of maternal and newborn care, to skills assessment in managing obstetric emergencies, preconception care, pregnancy care, labor and delivery care to care during postpartum period. The methods of learning included use of lectures, demonstrations, practical and case studies. The training included both classroom teaching and clinical practice. Nurses and midwives were trained for a period of 3months. The course was to run for a period of 12 weeks. The total number of hours for the course was 45 hours, in a 4-hour credits unit. The first 8 weeks constituted rigorous training process with 4 hours every week (total 32 hours). The training focused on the development, application and evaluation of knowledge and skills, and took place in the classroom. There were other 2 weeks for general assessments through observation, practical and return demonstrations. The rest of the 2 weeks (10 days) was meant for coaching in the clinical area (8 hours). After this, the nurses and midwives were let out to their respective clinical areas for a period of 3 months. During the clinical practice session,

the learners completed logbooks of the competency skills acquired.

> *"The paper reported that despite the efforts put in place to ensure that nurses and midwives maintain competence levels in clinical practice, there are still gaps identified regarding standardization of the competences"*

In addition to the training modules developed, a pretest and posttest was administered to all the participants, to assess knowledge and skills prior to and after the intervention, in both the intervention and the control groups. Tested areas comprised recognition, recall, understanding, synthesis, analysis and application of midwifery clinical competencies. The results in this phase necessitated the researcher to sum the total scores obtained by the participants, from the pre and posttest, and then compute the differences in scores. Among the activities involved was daily registration of participants. After the registration and introduction process, all the participants undertook a pretest, which was done under the supervision of the researcher.

During the training, the participants (intervention group) took part in different learning activities including lectures, demonstrations, practical and case studies. After the training, the participants (control and intervention groups) were administered with a post test, which was the similar test done at the beginning of the training. The trainees had a ten-day clinical practice session after which they were assessed on handling of actual patients. There was significant improvement on the post test for all participants who met the WHO

Akinyi, Nyaseba and Kawira

percentage pass threshold of 80%, indicating attainment of standard midwifery competencies.

The training had a great influence on the knowledge and skills of nurses and midwives, with excellent performance observed especially among those in the intervention group. Emphasis on the training was on the ICM Essential Competencies for nurses and midwives in clinical practice, which included follow-up training.

Learners had developed action plans before leaving the training site where they had selected two to three skills that needed to be acquired for application in their workplaces. Recommended follow-up took place from six weeks to three months after the training in the identified skills (World Health Organization, 2015). The study was conducted following approval by the Chuka University research, Ethics and Review Committee and a permit acquired from the National Council for Science and Technology. Approval was also obtained from the Sub-County hospitals in Meru County. Ethical considerations on study participation was adhered to and the participants signed the informed consent.

3.0 Results and Discussion

Results

Analysis of results was done using SPSS version 26. In assessing the midwifery clinical competencies among participants, a detailed examination of their knowledge across various topics reveals a diverse range of understanding. There were a total of 30 multiple choice questions. The pretest exam was meant to assess the entry level of knowledge pertaining the midwifery clinical competencies for the nurses and midwives.

Results in table 1 indicates variations in knowledge levels across different midwifery topics. Some questions achieved a 100% correct response. Notable strengths were observed in questions related to fetal complication-vitamin B12 deficiency and the use of emergency contraceptives, both receiving a 100% correct response. Conversely, questions regarding AMSTL and lactation amenorrhea showed lower correct responses. The question pertaining the pillars of safe motherhood garnered a relatively high correct response of 75.7%. Questions related to indirect causes of maternal mortality, uterine inversion, and maternal death reviews received lower correct responses. The overall mean percentage score is 54.19%, indicating a moderate level of competency among participants. While there are strengths, continuous training and reinforcement in specific areas are essential for sustained improvement. There is need to have targeted training programs to address gaps in knowledge

Akinyi, Nyaseba and Kawira

Table 1

Pretest scores for all the nurses and midwives

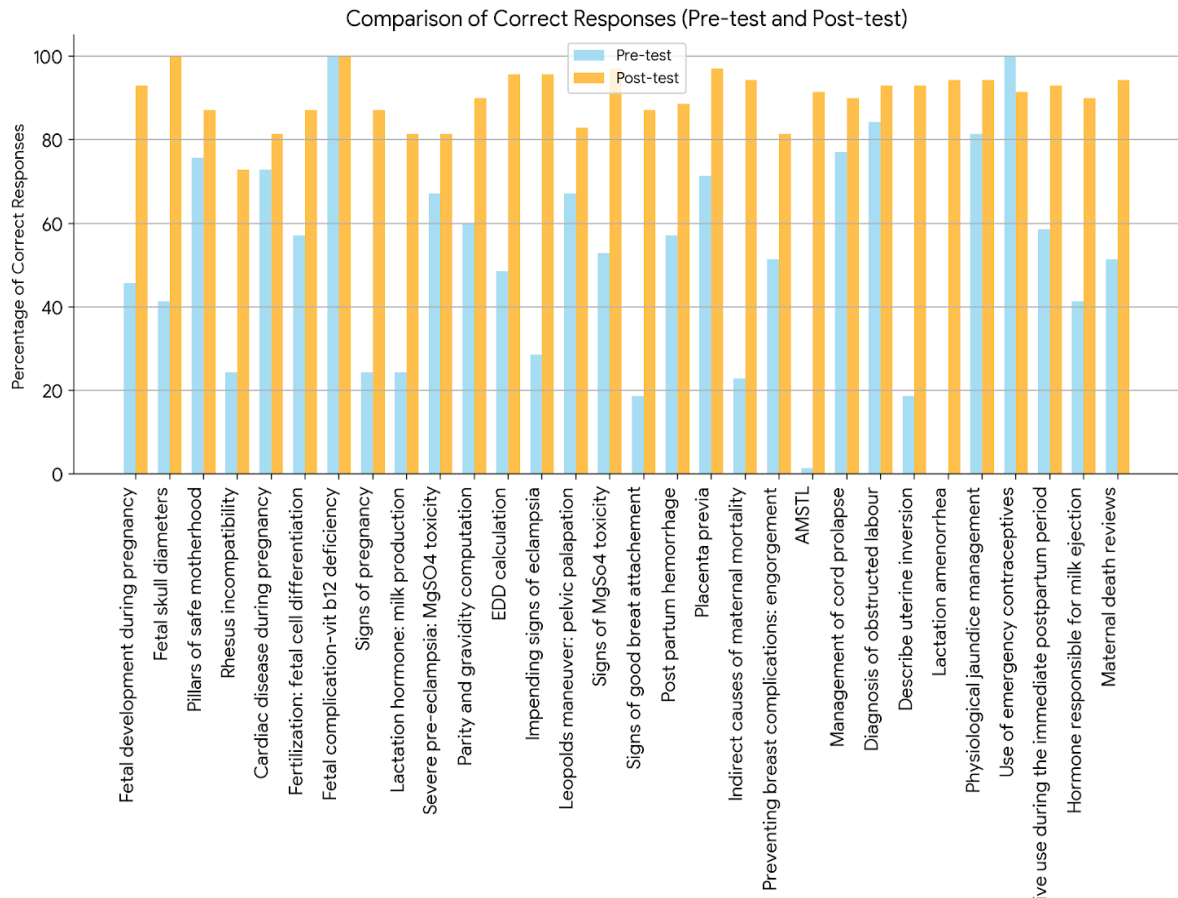| Pretest	Correct Answers & Percentage	Incorrect Answers & Percentage
Fetal development during pregnancy	32 (45.7%)	38 (54.3%)
Fetal skull diameters	29 (41.4%)	41 (58.6%)
Pillars of safe motherhood	53 (75.7%)	17 (24.3%)
Rhesus incompatibility	17 (24.3%)	53 (75.7%)
Cardiac disease during pregnancy	51 (72.9%)	19 (27.1%)
Fertilization: fetal cell differentiation	40 (57.1%)	30 (42.9%)
Fetal complication-vit b12 deficiency	70 (100%)	0 (0%)
Signs of pregnancy	17 (24.3%)	53 (75.7%)
Lactation hormone: milk production	17 (24.3%)	53 (75.7%)
Severe pre-eclampsia: MgSO4 toxicity	47 (67.1%)	23 (32.9%)
Parity and gravidity computation	42 (60.0%)	28 (40.0%)
EDD calculation	34 (48.6%)	36 (51.4%)
Impending signs of eclampsia	20 (28.6%)	50 (71.4%)
Leopolds maneuver: pelvic palapation	47 (67.1%)	23 (32.9%)
Signs of MgSo4 toxicity	37 (52.9%)	33 (47.1%)
Signs of good breat attachement	13 (18.6%)	57 (81.4%)
Postpartum hemorrhage	40 (57.1%)	30 (42.9%)
Placenta previa	50 (71.4%)	20 (28.6%)
Indirect causes of maternal mortality	16 (22.9%)	54 (77.1%)
Preventing breast complications: engorgement	36 (51.4%)	34 (48.6%)
AMSTL	1 (1.4%)	69 (98.6%)
Management of cord prolapse	54 (77.1%)	16 (22.9%)
Diagnosis of obstructed labour	59 (84.3%)	11 (15.7%)
Describe uterine inversion	13 (18.6%)	57 (81.4%)
Lactation amenorrhea	0 (0%)	70 (100%)
Physiological jaundice management	57 (81.4%)	13 (18.6%)
Use of emergency contraceptives	70 (100%)	0 (0%)
Contraceptive use during the immediate postpartum period	41 (58.6%)	29 (41.4%)
Hormone responsible for milk ejection	29 (41.4%)	41 (58.6%)
Maternal death reviews	36 (51.4%)	34 (48.6%)
Mean Percentage Score	**54.19%**	**45.81%**

Table 2

Post test results after training

Post test	Frequency & Percentage (Correct)	Frequency & Percentage (Incorrect)
Fetal development during pregnancy	65 (92.9%)	5 (7.1%)
Fetal skull diameters	70 (100.0%)	0 (0.0%)
Pillars of safe motherhood	61 (87.1%)	9 (12.9%)
Rhesus incompatibility	51 (72.9%)	19 (27.1%)
Cardiac disease during pregnancy	57 (81.4%)	13 (18.6%)
Fertilization: fetal cell differentiation	61 (87.1%)	9 (12.9%)
Fetal complication-vit b12 deficiency	70 (100.0%)	0 (0.0%)
Signs of pregnancy	61 (87.1%)	9 (12.9%)
Lactation hormone: milk production	57 (81.4%)	13 (18.6%)
Severe pre-eclampsia: MgSO4 toxicity	57 (81.4%)	13 (18.6%)
Parity and gravidity computation	63 (90.0%)	7 (10.0%)
EDD calculation	67 (95.7%)	3 (4.3%)
Impending signs of eclampsia	67 (95.7%)	3 (4.3%)
Leopolds maneuver: pelvic palapation	58 (82.9%)	12 (17.1%)
Signs of MgSo4 toxicity	68 (97.1%)	2 (2.9%)
Signs of good breat attachement	61 (87.1%)	9 (12.9%)
Postpartum hemorrhage	62 (88.6%)	8 (11.4%)
Placenta previa	68 (97.1%)	2 (2.9%)
Indirect causes of maternal mortality	66 (94.3%)	4 (5.7%)
Preventing breast complications: engorgement	57 (81.4%)	13 (18.6%)
AMSTL	64 (91.4%)	6 (8.6%)
Management of cord prolapse	63 (90.0%)	7 (10.0%)
Diagnosis of obstructed labour	65 (92.9%)	5 (7.1%)
Describe uterine inversion	65 (92.9%)	5 (7.1%)
Lactation amenorrhea	66 (94.3%)	4 (5.7%)
Physiological jaundice management	66 (94.3%)	4 (5.7%)
Use of emergency contraceptives	64 (91.4%)	6 (8.6%)
Contraceptive use during the immediate postpartum period	65 (92.9%)	5 (7.1%)
Hormone responsible for milk ejection	63 (90.0%)	7 (10.0%)
Maternal death reviews	66 (94.3%)	4 (5.7%)
Mean Percentage score:	**63(90%)**	**7 (10%)**

Akinyi, Nyaseba and Kawira

Figure 1

A histogram on Pre and Post test results

Comparison of Correct Responses (Pre-test and Post-test)

The histogram above offer valuable insights into the changes in correct response percentages between the pretest and post-test for various midwifery topics. Overall, there significant increase in the mean percentage score from 54.19% in the pretest to 90% in the post-test, highlighting a substantial improvement in overall knowledge and midwifery competencies. Pertaining individual topic comparisons, the histogram demonstrates the distribution of percentage changes for each topic. Most topics exhibited positive shifts, indicating successful learning and knowledge retention.

Topics like "Fetal skull diameters" and "Fetal complication-vit b12 deficiency"

achieved perfect scores (100%) in both tests, suggesting strong mastery. Several other topics like "EDD calculation," "impending signs of eclampsia," and "signs of MgSo4 toxicity" showed remarkable improvement, from less than 50% in the pretest to over 90% in the post-test. A few topics like "rhesus incompatibility" and "cardiac disease during pregnancy" show minimal improvements, possibly requiring further focus or targeted interventions.

The histogram reveals variations in the magnitude of improvement across topics. This could be due to differences in teaching emphasis, prior knowledge levels, or inherent difficulty of the subject matter. While the mean score increase was

Akinyi, Nyaseba and Kawira

impressive, it's important to remember that individual performance could vary.

Hypothesis Testing

This study sought to test the hypothesis that there is no statistically significant relationship between training the nurses and midwives in clinical practice and the outcomes. To assess this, paired t-test was used to test the level of statistical significance. The table below presents the results.

Table 3

Relationship between training the nurses and midwives knowledge in clinical practice

Paired Samples Test

		Paired Differences						
				95% Confidence Interval				
		Std.	Std. Error	of the Difference				Sig. (2-
	Mean	Deviation	Mean	Lower	Upper	T	df	tailed)
Pair 1 correct responses pretest - correct responses post test	-.39194	.26229	.04711	.48814	.29573	8.320	30.000	

(t-value =8.320.30 df=2, p=<0.00)

The results in table 3 shows Paired Differences indicating that the mean difference between correct responses on the pretest and posttest is approximately 0.39194, and the standard deviation is around 0.26229. The results revealed a t-value=8.320.30 DF=2, p=0.00) at 95 % CI. The positive difference within means suggests that, on average, participants scored higher on correct responses in the post test compared to the pretest. The t-value of 8.320 is highly statistically significant (p < .001), indicating a significant change in correct responses after training. This therefore supported the rejection of the null hypothesis that stated there is no statistically significant relationship between training and the nurses and midwives clinical practice outcomes.

Paired t-test results within means of intervention and control groups in phase II

Table 4

Paired Samples Test

		Paired Differences						
			Std.	95% Confidence Interval of the				
		Std.	Error	Difference				Sig. (2-
	Mean	Deviation	Mean	Lower	Upper	t	df	tailed)
Pair 1 correct scores for intervention group - correct scores for control group	25.433	23.773	4.340	16.556	34.310	5.860	29.000	
Pair 2 incorrect scores for intervention group - incorrect scores for control group	-25.433	23.773	4.340	-34.310	-16.556	-5.860	29.000	

T -value =5.860 df= 29, p=<0.00)

Akinyi, Nyaseba and Kawira

The researcher sought to perform a Paired Sample t-test to compare the differences within correct scores and incorrect scores for both the intervention and control groups. Pair 1 (Correct Scores) showed a mean difference of 25.433, with a standard deviation of 23.773, between the correct scores for the intervention group and the control group. The 95% confidence interval for the difference is 16.556 to 34.310, with a standard error of the mean of 4.340. With 29 degrees of freedom, the t-statistic is 5.860, and the p-value is extremely significant ($p < 0.001$). The intervention group's average correct score is much greater than the control group, as indicated by the positive and significant mean difference. As a result, there is little doubt that the training intervention has improved the proper ratings for midwifery clinical abilities.

When Pair 2 (Incorrect Scores) is taken into account, the standard deviation is 23.773 and the mean difference is -25.433 between the incorrect scores for the intervention group and the incorrect scores for the control group. The 95% confidence interval for the difference is -34.310 to -16.556, and the standard error of the mean is 4.340. As a result, the p-value is very significant ($p < 0.001$) and the t-statistic is -5.860 with 29 degrees of freedom. Therefore, the negative and significant mean difference shows that the intervention group had significantly fewer wrong scores overall than the control group.

The findings support the effectiveness of the CPD program in enhancing clinical competencies. Hence, a positive impact is evident not only in improving correct responses, but also in reducing incorrect responses, indicating a comprehensive improvement in midwifery skills. In conclusion, the study suggests that the CPD intervention is successful in improving both the correct and the incorrect scores in midwifery clinical competencies, providing a comprehensive enhancement in the skills of the intervention group, compared to the control group.

Discussion

In light of the training conducted in this study, the participants improved greatly in their performance for midwifery competencies, as evidenced by the outcomes of the training engagements. Therefore, the training program was timely and demonstrated improved nurses' and midwives' knowledge of critical topics in antenatal care, labor, newborn care, and postpartum care; most especially where gaps were vivid such as was the case in AMSTL and complications management. Further, according to Felarmine (2016), there is need to identify areas of strength and weakness which could be used to inform future training programs to ensure comprehensive coverage of essential topics so as to address specific knowledge gaps.

Essentially, continuous monitoring and evaluation of clinical competencies through post-training assessments is crucial to identify areas where knowledge retention might need additional support. These recommendations are in line with a study by Feldacker et al. (2017). Therefore, the essence of the training was to ensure that nurses' and midwives' skills in completion of the patograph was improved. Notable performance was observed after the training, where the respondents could confidently complete the patograph. Observations were done back in the wards where they dealt directly with clients, and continuous monitoring as follow-up. Evidently, there was knowledge retention.

While comparing means between the intervention and the control groups, results

from the hypothesis showed a positive mean difference, indicating an improvement in correct responses in post-training. This suggested that the training had a positive impact on participants' knowledge and skills. The results implies effectiveness of training, suggesting that it had a positive impact on participants' clinical practice outcomes. In support of this finding, Kukkonen et al. (2020) concluded that nurse leaders could take advantage of the clinical ladder plan to provide a training program for nurses to promote their continued professional development.

To compare means within the intervention and control groups, paired t-test results revealed that the training intervention also has a clear positive impact on reducing incorrect scores in midwifery clinical competencies. Clearly the paired samples test results suggest that the training intervention had a significant positive impact on both correct and incorrect scores in midwifery clinical competencies. These results highlight the practical significance of the training program and its potential to positively influence nurses and midwives' abilities to provide accurate and appropriate care.

Correspondingly, a study done by Felarmine (2016) places emphasis on the need to identify areas of strength and weakness which could be used to inform future training programs to ensure comprehensive coverage of essential topics in order to address specific knowledge gaps.

4.0 Conclusion

Despite the efforts put in place to ensure that nurses and midwives maintain competence levels in clinical practice, there are still gaps identified regarding standardization of the competences. To enhance CPD uptake, it is important to address potential barriers, tailor needed interventions, and promote a culture of continuous learning. The BEmONC curricular has detailed the procedures required for up-to-date service delivery, implementation and maintenance of knowledge and skills through continuous monitoring and evaluation; thus, ensuring improvement of nurses' and midwives' knowledge and skills over time.

5.0 Recommendations

Strategies to bridge quality gaps necessitates that the relevant personnel and key players should consider tailoring skills-based courses that meet the changing trends in managing maternal and newborn conditions. It is highly recommended that trainings be informed by midwifery competencies as outlined in ICM guidelines. This will ensure that gaps in the required knowledge and skills will be adequately addressed to improve maternal and neonatal outcomes. This will also sensitize nurses and midwives on the need to continuously update skills based on current emerging needs in the practice.

References

Bill and Mellinda Gates Foundation (2021). *Annual report.* Bill and Mellinda Gates Foundation Goalkeepers. https://www.gatesfoundation.org/about/financials/annual-reports/annual-report-2021

Canal, G. P., Maingi, R., Evans, T. E., Kaye, S. M., & Mansfield, D. K. (2019). Study of the impact of pre-and real-time depositions of lithium on plasma performance on NSTX. *IEEE Transactions on Plasma Science, 47*(8), 4225-4232. https://ieeexplore.ieee.org/abstract/document/8752018

Felarmine, M., Joachim, O., & Agina, O. (2016). Facility factors influencing utilization of active management of third stage of labour among skilled birth attendants in Kiambu County, Kenya. *Pan African Medical Journal.* *25*(2), 1-5 https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5390064/

Feldacker, C., Pintye, J., Jacob, S., Chung, M. H., Middleton, L., Iliffe, J., & Kim, H. N. (2017). Continuing professional development for medical, nursing, and midwifery cadres in Malawi, Tanzania and South Africa: A qualitative evaluation. *PLOSONE, 12*(10), e0186074. https://doi.org/10.1371/journal.pone.0186074

Fullerton, J. T., Thompson, J. B., & Johnson, P. (2013). Competency-based education: The essential basis of pre-service education for the professional midwifery workforce. *Midwifery, 29*(10), 1129–1136. https://doi.org/10.1016/j.midw.

Hwang, S. Y., Kim, J. S., Ahn, H., & Kang, S. J. (2015). Development and effect of a global health capacity building program for nursing students. *Journal of Korean Academy of Community Health Nursing, 26*(3), 209-220. https://doi.org/10.12799/jkachn.2015.26.3.209

Kelley, M. A., Spangler, S. A., Tison, L. I., Johnson, C. M., Callahan, T. L., & Iliffe, J. (2017). Promoting regulatory reform: the African health profession regulatory collaborative (ARC) for nursing and midwifery year 4 evaluation. *Journal of Nursing Regulation, 8*(3), 41–52.

https://doi.org/10.1016/ S2155-8256(17)30159

Kukkonen P, Leino-Kilpi H, Koskinen S, Salminen L, Strandell-Laine C. (2020). Nurse managers' perceptions of the competence of newly graduated nurses: a scoping review. *Journal of Nursing Management, 28*(1), 4-16. https://doi.org/10.1111/jonm.12891.

Nove, A., ten Hoope-Bender, P., Moyo, N. T., & Bokosi, M. (2018). The Midwifery services framework: What is it, and why is it needed? *Midwifery, 57*, 54-58. https://www.sciencedirect.com/science/article/pii/S0266613817306307

Nursing Council of Kenya (2021). *Nursing Council of Kenya.* https://engagement.wcea.education/nck

World Health Organization (2018). *Defining competent maternal and newborn health professionals: Background document to the 2018 joint statement by WHO, UNFPA, UNICEF, ICM, ICN, FIGO and IPA: definition of skilled health personnel providing care during childbirth.* World Health Organization. https://apps.who.int/iris/handle/10665/272817

Akinyi, Nyaseba and Kawira