Evaluating the performance of clinical officer anaesthetists' curriculum from Kenya Medical Training College, Kenya

Kennedy Kinyua Njeru[1*]
Felix Mutua[2]
Felisters Muinde[3]
David Ngunjiri[4]
Grace Mwangi[5]
David Wafula Nandebe[6]

[1*]kkinyua@kmtc.ac.ke
[2]fmutua@kmtc.ac.ke
[3]fmuinde@kmtc.ac.ke
[4]dngunjiri@kmtc.ac.ke
[5]gmwangi@kmtc.ac.ke
[6]dnandebe@kmtc.ac.ke

[1,2,3,4,5,6]Kenya Medical Training College, Kenya

https://doi.org/10.51867/ajernet.6.4.55

ABSTRACT

The trend in Kenya is that the number of patients requiring safe anaesthesia services has increased along with the growth of the surgical services. The labour force remains strongly dependent on the COAs that have been trained in the Kenya Medical Training College. Physician anaesthesiologists remain in serious shortage in Kenya, as only less than 200 are available to over 50 million people. This study aimed to evaluate the effectiveness of the Clinical Officer Anaesthetists' curriculum at Kenya Medical Training College. This study was anchored on the Context, Input, Process, Product model. Cross-sectional design was used, which allowed use of both qualitative and quantitative methods. Level five hospitals were selected as the study area. The census method was used for clinical officer anaesthetics (140), and seven anaesthesiologists were interviewed. Questionnaires and interview guides were used for data collection. The Statistical Package for Social Sciences aided data analysis. Qualitative data was coded and reported in narration and verbatim. Strict ethical guidelines were followed in this study. Findings of this study reveal that the perceptions of Clinical Officer Anaesthetists (COAs) trained by KMTC are typically seen as competent, with the mean scores in all domains being 3.63 to 3.72. The correlation analysis shows highly significant and strong relationships between competence in the practice of anaesthesia, effective communication and collaboration, patient outcomes from knowledge and skills and professional development and improvement ($r = 0.957$ to $r = 0.986$, $p = 0.001$). This study concludes that clinical officer anaesthetists trained at KMTC are competent in their practice of anaesthesia and teamwork and positively impactful on patient outcomes. Nevertheless, the possibilities of professional development are still restricted, and there is concern regarding the possibility of long-term development and preparedness foradvanced practice. It recommends that KMTC should enhance its curriculum by incorporating formal continuing professional development like regional anaesthesia, increasing exposure to more advanced anaesthetic methods, and providing more mentorship.

Keywords: Anaesthesia Training, Clinical Officer Anaesthetists (COAs), KMTC Curriculum, Professional Development

I. INTRODUCTION

Quality patient care by anaesthesia is regularly regarded as an essential part of a safe procedure around the world. According to the World Federation of Societies of Anaesthesiologists (WFSA), to maintain patient safety and guarantee excellent perioperative care, anaesthetists should have competency-challenged training that corresponds to the international standards (Gelb *et al.*, 2018). Training systems that combine simulation, mentoring phase and formal evaluation have demonstrated to contribute to great revenue of patient results, and minimize perioperative morbidity (Ruscher, 2024). The Context aspect of the CIPP Model explains the significance of implementing national curriculums aligned to these international standards so that Clinical Officer Anaesthetist (COAs) are fully equipped to perform to international standards.

In Africa alone, the shortage of human resources, poor infrastructure, and disproportionate training opportunities limits the service around anaesthesia (Choo, 2020). In most sub-Saharan countries, anaesthesia provider density is significantly lower than the recommended number of 5 per 100,000 population put forward by WFSA, and some countries have less than 1 provider per 100,000 population (Ho *et al*., 2019). In the literature on the region, non-physician staff members provide most of the care, such as anaesthesia (COA), but authors note that such staff often has problems

with mentorship and retraction to modern equipment, as well as fail to develop afterward (Ho *et al.*, 2019). The Input aspect of the CIPP Model is quite applicable in this case because the well-being of the institutions of training is evaluated in terms of their provision of proper and appropriate resources, teaching resources, and support systems. As it was proven, the education of anaesthesia could be improved through regional initiatives such as foreign experience exchange and capacity-building systems in order to ensure workforce stability (Mussa & Sweetbert, 2025).

The trend in Kenya is that the number of patients requiring safe anaesthesia services has increased along with the growth of the surgical services, although the labour force remains strongly dependent on the COAs that have been trained in the Kenya Medical Training College (KMTC) (Shirly & Wamai, 2022). The national evaluations have reported the existence of hindrances in the curriculum, financing and infrastructure facets with implications to the quality of training (Mumbo & Kinaro, 2015). The Process element of the CIPP Model is highly important here because it considers the way the curriculum is being applied, this includes the teaching methodologies, clinical placements, and supervision. There has been a demonstration that the curriculum of KMTC gives a competent base of theory and clinical rotations but, there still exists a problem regarding the adequacy of mentorship, exposition to well-advanced techniques and keeping with the changing national health priorities.

KMTC COA curriculum is structured to empower trainees with skills that will give them the competencies of providing safe anaesthesia services in the county and referral hospitals. It is organized with the combination of classroom teaching, simulation and clinical rotations. Nonetheless, assessments have revealed the necessity of constant curriculum revision and implementation to support the introduction of new technologies, reinforce mentorship, and make them relevant to global standards and the needs of the health system in Kenya (Shirly & Wamai, 2022). It is in this connection that that Product element of the CIPP Model would have played a critical role in looking at whether the graduates have the required abilities to be exhibited in the real practice or not. There is some evidence that KMTC graduates are qualified in the provision of anaesthesia of the routine type, still, the shortcomings in advanced practice preparation are observed, especially at the county hospitals that do not have enough resources (Ho *et al.*, 2019; Choo, 2020).

1.1 Statement of the Problem

The specialty of physician anaesthesiologist remains a serious shortage in Kenya as only less than 200 are available to over 50 million people (Nyamai *et al.*, 2013). To overcome this, Kenya Medical Training College (KMTC) produces annually around 120 Clinical Officer Anaesthetist (COA) (Shirly & Wamai, 2022). Though this has bolstered the amount of workforce, there have been fears over the preparedness, competency and citizens trust of the services provided by COAs. This study, thus, sought to evaluate the effectiveness of the Clinical Officer Anaesthetists' curriculum at Kenya Medical Training College from Level Five hospitals in Kenya.

1.2 Objective of the Study

To evaluate the effectiveness of the Clinical Officer Anaesthetists' curriculum at Kenya Medical Training College

II. LITERATURE REVIEW

2.1 Theoretical Review

2.1.1 Context, Input, Process, Product (CIPP) Model

Daniel Stufflebeam formulated the Context, Input Process Product (CIPP) model of program evaluation, a decision-based model of evaluation in the 1960s (Stufflebeam, 1971). Contrasting outcome only methods, CIPP Model attaches importance to systematic evaluation of needs and resources fostering implementation and outcomes to promote improvement. In education, health sciences and curriculum assessment (and teacher education and nursing education) it has been used rampantly, and it has served to harmonize training with professional criteria and expectations of the stakeholders (Stufflebeam, 1983; Stufflebeam, 2000).

In Kenya, the importance of systematic frameworks to investigate the quality of teaching practice, resource utilization, and programme evaluation outcomes have as well been the focus of curriculum assessment research (Shirly & Wamai, 2022). Using CIPP Model, the Kenya Medical Training College (KMTC) Clinical Officer Anaesthetists (COAs) curriculum is analysed with the help of the Context evaluation which focuses on the analysis of workforce shortages and healthcare requirements. Input stage: the stage evaluates the curriculum design, resources and standards congruency. The Process evaluation is focused on reviewing teaching strategies, mentorship, and clinical placements and the Product evaluation is focused on the outcomes of measuring the graduate competencies, preparedness, and patient safety. This holistic application will guarantee that KMTC curriculum is evaluated in relevance, quality and impact in the Kenya healthcare system systematically.

2.2 Empirical Review

The international concept of competency-based training of anaesthesia is a pillar of safe perioperative care. The global standards, such as those of the World Federation of Societies of Anaesthesiologists and Royal College of

Anaesthetists focus on the structured training, supervision, and constant evaluation of all anaesthesia providers, including non-physician cadres (Gelb *et al*., 2018; Kempthorne *et al*., 2017; Royal College of Anaesthetists, 2021). These frameworks facilitate lifelong learning. They are particularly important in low-resource environments where the workforce sustainability and patient safety are closely connected to the quality of training.

The recent world reviews highlight the significance of the curriculum framework which is responsive to the contextual requirements, the active forms of teaching, and the effective means of assessment. These clues support the necessity of the curricula that will be not only technically sound but also flexible to the changing clinical realities and practitioner profiles (Gelb *et al*., 2018).

Empirical evidence in the sub-Saharan Africa has shown that non-physician anaesthesia providers have a crucial role to play in increasing the reach of surgical care, especially in rural and underserved regions. Nonetheless, training situations tend to be out of line with the actualities of practice and will result in competency gaps. Qualitative research notes that mentorship, interprofessional collaboration, and context specific competencies can be used to address these gaps (Al Shamsi, 2020).

Organised continuing professional development (CPD) programs like the SAFE (Safer Anaesthesia From Education) obstetric anaesthesia course have shown significant knowledge and practice changes by non-physician anaesthetists in Kenya and other neighbouring countries. These results indicate that the key to the future of safety and efficacy in the delivery of anaesthesia in the region is specific curriculum reinforcement and mentorship frameworks (Gasparini *et al*., 2021).

The Clinical Officer Anaesthetist (COA) course at Kenya Medical Training College (KMTC) has played a leading role in mitigating the workforce issues of anaesthesia in Kenya particularly in Level Five hospitals. Graduates always testify to the sufficient basic training, but empirical research notes the consistent lack of skills at higher levels like peripheral nerve blocks and epidural anaesthesia (Nyamai, Ng'ang'a, and Mutisya, 2013). These loopholes indicate that curriculum should be revised to reflect the needs of clinical requirements.

General assessments of training clinical in Kenya would be systematic curriculum management, resource match, and ongoing relevance measurement (Shirly & Wamai, 2022). These results are all approached to the necessity of improving the KMTC COA curriculum by continuous evaluation, mentorship reinforcement, as well as competency-based revisions. These gains would see to it that graduates are not only technically competent but also practice-based in the foreseeable intricacies of perioperative care in public health system of Kenya.

III. METHODOLOGY

The descriptive cross-sectional design was used to evaluate the performance of Clinical Officer Anaesthetists' Curriculum from Kenya Medical Training College graduates and work in Level Five hospitals. This design was deemed suitable since it enables the gathering of data at one point in time on a specific population, and it is thus effective in determining the current competence, communication, and professional development of the COAs. Cross-sectional studies are especially applicable in the health sciences to determine the prevalence, discern trends, and provide evidence with which to make policy decisions and revise the curriculum (Creswell & Creswell, 2017). The design allowed a deep comprehension of the study problem as it combined both qualitative and quantitative methods.

The choice of Level Five hospitals as the study locations was strategic because the hospitals have adequate infrastructure and well-developed anaesthesia services (Kenya Medical Training College, 2019). The sampling strategy adopted was non-probability sampling in seven regions in Kenya, where a single county referral hospital was chosen in each region. Based on these facilities, a census of available COAs was made, on 140 participants, and seven key informants (in charge anaesthetists) were purposely selected to take part in in-depth interviews.

The structured questionnaires were used to gather quantitative data in the form of Likert scale and closed-ended questions, which were distributed electronically through Google Forms. The qualitative information was acquired using semi-structured interviews using a checklist. Pilot testing of the questionnaires was done to improve reliability and validity, and the inter-rater reliability to facilitate qualitative coding. Internal validity was also enhanced by triangulation of data sources (Kenya Medical Training College, 2019). Strict ethical guidelines were followed, and they included informed consent, anonymity, and ethical approval of the researchers. The Statistical Package of Social Sciences was used to analyse the quantitative data and descriptive statistics, correlation, and regressions were applied to determine the performance determinants. Qualitative sources were transcribed, coded, and thematically analysed to identify the patterns that arise.

IV. RESULTS & DISCUSSION

4.1 Results

4.1.1 Performance of clinical officer Anaesthetists against the curriculum standards

The study had 140 COA and seven anaesthetists in charge at the facilities. Response rate was 100% for both the COA and anaesthetists in charge. The major areas studied on curricular requirements of the performance of clinical officer anaesthetists, are professional growth, teamwork and communication during their procedures, impacts of knowledge and skills on patient outcomes, and competence in the anaesthetic practice. The results as summarised in Table 1 shows the trends and insights among the participants.

Table I

Performance Assessment of Clinical Officer Anaesthetists against Curriculum Standards

Statement	Strongly Disagree	Strongly Agree	Neutral	Agree	Strongly Agree	Mean	Std Dev.
The colleague demonstrates competence in anaesthesia practice	2.1%	6.3%	39.6%	21.9%	30.2%	3.72	1.033
The colleague effectively communicates and collaborates with the healthcare team during procedures	2.1%	7.3%	36.5%	27.1%	27.1%	3.70	1.017
The colleague's knowledge and skills have positively impacted patient outcomes	1.0%	9.4%	36.5%	26.0%	27.1%	3.69	1.009
The colleague actively seeks opportunities for professional development and improvement	2.1%	8.3%	42.7%	18.8%	28.1%	3.63	1.049

Findings of this study reveals that the perceptions of Clinical Officer Anaesthetists (COAs) trained at KMTC are typically seen as competent, with the mean scores in all domains being 3.63 to 3.72. This shows that the KMTC curriculum has managed to ensure that its graduates possess the necessary competencies that would enable them to deliver routine anaesthesia services. The best score was in competence in anaesthesia practice (M = 3.72, SD = 1.033). this curriculum is very technical. Likewise, teamwork and communication (M = 3.70, SD = 1.017) domain were rated high. This indicates how the curriculum has focused on interprofessional collaboration which is an indispensable competency in the surgical environment. The fact that the COAs influence patient outcomes (M = 3.69, SD = 1.009) is another sign of the usefulness of KMTC training. The last score was in the case of professional development (M = 3.63, SD = 1.049). A good base is being laid by KMTC, but without structured CPD, there is a danger of stagnation.

4.1.2 Relationship Between Clinical Officer Anaesthetists' Performance and Curriculum Standards

The correlation table presents interrelationships among competence, communication, patient outcomes, and professional development, highlighting their strong, statistically significant associations.

Table 2

Relationship Between Clinical Officer Anaesthetists' Performance and Curriculum Standards

No	Correlation		1	2	3	4
1	The colleague demonstrates competence in anaesthesia practice	Pearson Correlation	1			
		Sig. (2-tailed)				
		N	140			
2	The colleague effectively communicates and collaborates with the healthcare team during procedures	Pearson Correlation	.973**	1		
		Sig. (2-tailed)	.000			
		N	140	140		
3	The colleague's knowledge and skills have positively impacted patient outcomes	Pearson Correlation	.966**	.986**	1	
		Sig. (2-tailed)	.000	.000		
		N	140	140	140	
4	The colleague actively seeks opportunities for professional development and improvement	Pearson Correlation	.958**	.957**	.957**	1
		Sig. (2-tailed)	.000	.000	.000	
		N	140	140	140	140

**. Correlation is significant at the 0.01 level (2-tailed).

The correlation analysis shows highly significant and strong relationships between competence in practice of anaesthesia, effective communication and collaboration, patient outcomes from knowledge and skills and finally professional development and improvement (r = 0.957 to r = 0.986, p = 0.001). These results indicate that multidimensionality of professional effectiveness of Clinical Officer Anaesthetists (COAs) is not separate, so technical

competence, teamwork, and continuous learning are not independent constructs. Practically, it means that the maintenance of safe anaesthesia delivery is not only a matter of individual ability, but also relational and developmental abilities.

4.1.3 Overall Performance Assessment of Anaesthetists

The overall performance of anaesthetists was measured and graded in five levels namely, Poor, Fair, Good, Very Good, and Excellent. The findings indicated that the lowest percentage of the respondents (1.0%) indicated the overall performance of the anaesthetists as Poor, which implies that the very small percentage of the cohort felt that the performance was characterised by critical shortcomings. There was a marginally more percentage (7.3%) that evaluated the performance as Fair, implying that there were possible areas of area of improvement, although within acceptable levels. The biggest proportion of respondents (40.6%) listed the performance as Good. This showed that a significant percentage of the respondents evaluated themselves as working at a competent level and were effective in meeting the expected standards. The percentage that rated their performance as Very Good was 25.0%, which indicates that most respondents viewed the anaesthetists as being beyond the basic competence and demonstrating greater proficiency and effectiveness. Lastly, 26.0% of the respondents classified the performance as Excellent, which is a high level of recommendation to the competence of the anaesthetists and indicates that they were working at the best. The Figure 1 provides the distribution of responses.

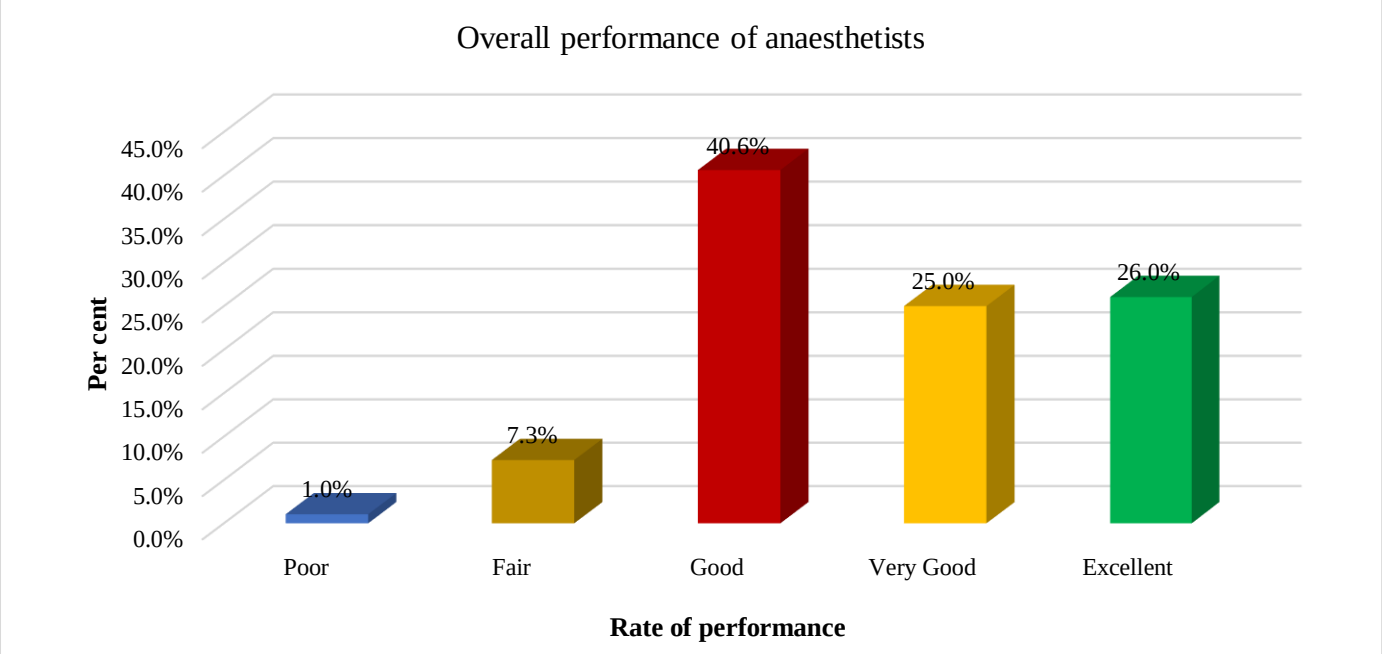

Figure 1
Overall Performance Assessment of Anaesthetists

This data from Figure 1 shows that there is a positive perception of the anaesthetists with regards to their overall performance. It was shown that 91.7% of the students rated the performance from Good to Excellent. Half (51.0%) of them said that the performance was Very Good and or Excellent.

4.1.4 Association between performance of anaesthetist and performance assessment of clinical officer anaesthetists against curriculum standards

The positive correlation between competence in practice of anaesthesia and effective communication and collaboration with the health care team was very strong ($r = 0.900$, $p < .000$), which indicated that the competent were also considered to be effective in communication and collaboration in the team. The relationship with the effect on patient outcomes was also significant ($r = 0.824$, $p < 0.001$), which means that perceived competence is strongly related to positive patient outcomes. Competence correlated positively with seeking professional development ($r = 0.815$, $p < 0.001$) and overall performance ($r = 0.857$, $p < 0.001$) with significance further supporting the importance of perceived competence in the overall performance.

This factor was not only among the variables which demonstrated high correlation with competence but also demonstrated a very strong correlation with overall performance ($r = 0.885$, $p < 0.000$), which implies that effective communication is perhaps one of the most telling qualities of overall high performance. The same level of relationships

was noted with the influence on patient outcomes (r = 0.800, p < 0.001) and pursuing professional growth (r =.830, p < 0.000).

The correlation coefficients showed that there exist strong positive correlations among the influence on patient outcomes and the seeking of professional development (r = 0.833, p < 0.001) and the overall performance (r = 0.825, p < 0.000), which show the inseparable nature of clinical skills, the pursuit of professional development, and overall patient outcomes.

The overall performance was significantly related to the seeking of professional development (r = 0.855, p < 0.001), which confirms that continuous professional growth is highly associated with overall job performance in clinical practice. Everything learned was highly correlated with overall performance, underlining the overall association of competence, communication, patient impact, and professional development between overall job performance of anaesthetists.

Table 3

Correlation matrix overall performance of anaesthetist and performance assessment of clinical officer anaesthetists against curriculum standards

	Correlation		1	2	3	4	5
1	The colleague demonstrates competence in anaesthesia practice	Pearson Correlation	1				
		Sig. (2-tailed)					
		N	140				
2	The colleague effectively communicates and collaborates with the healthcare team during procedures	Pearson Correlation	.900**	1			
		Sig. (2-tailed)	0.000				
		N	140	140			
3	The colleague's knowledge and skills have positively impacted patient outcomes	Pearson Correlation	.824**	.800**	1		
		Sig. (2-tailed)	0.000	0.000			
		N	140	140	140		
4	The colleague actively seeks opportunities for professional development and improvement	Pearson Correlation	.815**	.830**	.833**	1	
		Sig. (2-tailed)	0.000	0.000	0.000		
		N	140	140	140	140	
5	Overall performance of colleague anaesthetist	Pearson Correlation	.857**	.885**	.825**	.855**	1
		Sig. (2-tailed)	0.000	0.000	0.000	0.000	
		N	140	140	140	140	140

**. Correlation is significant at the 0.01 level (2-tailed).

4.2 Discussion

The results of the study confirm that Clinical Officer Anaesthetists (COAs) trained and graduated at KMTC are perceived to be clinically competent, especially in the provision of routine anaesthesia. The large means of the competence (M = 3.72), communication (M = 3.70) and patient outcomes (M = 3.69) indicate that the curriculum is attaining its core objective, which is to train safe and effective anaesthesia providers to the Kenya public health system. The results reflect Gelb *et al*. (2018) and Kempthorne *et al*. (2017) who reckon that competency-based training plays a vital role in offering safe perioperative care, especially in under-resource settings.

However, the relatively low outcome in professional development (M = 3.63), and the problems with stagnation, show a massive gap in the skill training of COAs after they graduate. This concurs with the study by Nyamai *et al*. (2013) that found out that, despite the confidence of KMTC graduates in dealing with the simple procedures, they were not exposed to more complex ones such as peripheral nerve blocks and epidural anaesthesia. This concern can be summarized by the observation of one of the supervisors:

> *"The curriculum provides them with a solid base, but unless they receive organised continuing professional development, their skills will stagnate after a couple of years."*

This highlights why CPD needs to be institutionalised as a formal curriculum-based extension, to enable COAs to keep up with the changing clinical needs and technology.

The correlation between communication and overall performance (r = 0.885, p < 0.001) suggests the pivotal role of interprofessional collaboration regarding safety in anaesthesia. This is a good sign of the focus of the curriculum on team learning and clinical placements. The results are consistent with those of Gasparini *et al*. (2021), who showed that systematic CPD programs such as the SAFE course have a strong impact on the teamwork and procedural safety of non-physician anaesthetists in Kenya. This is supported by qualitative data further:

> *"The COA are strong in teamwork. They interact well with the nurses and surgeons, and this makes the operating theatre run smoothly."*

Nevertheless, a lack of mentorship is also observed in the process dimension. Supervisors reported that the COAs are very effective in routine cases, however, they lack confidence even in complex cases, which is caused by a lack of mentorship:

> *"Even patient outcomes are better since more COAs were implemented in this area, but active mentorship is still wanting, and this influences their confidence levels in complex cases."*

This implies that the delivery systems of the curriculum should be reinforced including delivery methodology especially clinical supervision and feedback processes to ensure the gap between theoretical and advanced clinical preparation is reduced.

The input level issues to some degree limit the effectiveness of the curriculum. The absence of experience with modern tools like fibreoptic video laryngoscopy and techniques of regional anaesthesia are manifestations of inadequate infrastructure. This can be compared to the data provided by Ho *et al*. (2019) who stated that the training of anaesthesia in sub-Saharan Africa is frequently blocked by insufficient equipment, small number of faculty and lack of access to modern technologies. This can be depicted by the remark of one of the supervisors:

> *"The KMTC COAs show good fundamental abilities in the provision of anaesthesia particularly in the field of routine cases, but they require additional experience in advanced access methods such as regional blocks. Video laryngoscopy(fibre) as a tool for teaching"*

To counter this, there is need to invest specifically in simulation laboratories, up-to-date pedagogical tools and staff training. These are not peripheral inputs, but the key to the attainment of the planned outcomes of the curriculum.

It is possible to find the appropriateness of the curriculum to the requirements of Kenya health system in the provision of workforce. The KMTC COA programme has a considerable gap because less than 200 physician anaesthesia's serve the over 50 million people (Nyamai *et al*., 2013). It is affirmed by Shirly and Wamai (2022) that COAs in Level Five hospitals are the individuals that do most anaesthesia services since they cannot be replaced.

Nonetheless, Mumbo and Kinaro (2015) warn that the effectiveness of curriculum should not be measured, solely, by what the graduates do, but it should also be responsive to the systemic limitations to it, namely, financing, infrastructure, and policy support. The fact that the correlation between the professional development and the overall performance are strong ($r = 0.855$, $p < 0.001$) supports the argument that the relevance of the curriculum should be maintained by the constant adoption of the national strategies of surgical and anaesthesia scale-up.

The findings suggests that although KMTC Clinical Officer Anaesthetists (COA) curriculum is successful in equipping graduates with the requirements of practicing routine anaesthesia, its implementation effects are hampered by lack of mentorship, continuing professional development (CPD), and resources. The study suggests the ability to solve these challenges by improving the curriculum with advanced techniques and simulation-based learning, providing structured mentorship systems, especially in county hospitals, making CPD an obligatory part of the curriculum, and making COA training consistent with the overall strategy of the Kenyan workforce in surgical and anaesthesia. These insights have a foundation grounded in the CIPP evaluation model that provides a comprehensive framework of enhancing curriculum relevance, graduate competence and systemic health outcomes.

V. CONCLUSION & RECOMMENDATIONS

5.1 Conclusion

The results show that Clinical Officer Anaesthetists who developed their skills at KMTC are competent in their practice of anaesthesia, teamwork, and positively impactful on patient outcomes. Nevertheless, the possibilities of professional development are still restricted, and there is concern regarding the possibility of long-term development and preparedness to the advanced practice. Although the curriculum offers a solid technical base, long term performance needs to be designed to promote mentorship and ongoing learning and reward systems to guarantee that the graduates are confident, flexible, and relied upon in the changing healthcare system in Kenya.

5.2 Recommendations

This study recommends that KMTC should enhance its curriculum by incorporating formal continuing professional development, increase exposure to more advanced anaesthetic methods, and more mentorship. Moreover, institutional systems are expected to focus on reviewing the curriculum, professional recognition, and resource support to maintain competence, confidence in complicated cases and strengthening the trust of the population.

REFERENCES

Al Shamsi, A. (2020). *An investigation into knowledge sharing in cross professional teams in healthcare: A multi-method, qualitative case study design* (Doctoral dissertation, University of Sheffield).

Choo, V. (2020). *The state of anesthesia practice in Sub-Saharan Africa: Statistics, case studies, and ways forward* (Doctoral dissertation).

Creswell, J. W., & Creswell, J. D. (2017). *Research design: Qualitative, quantitative, and mixed methods approaches* (5th ed.). Sage Publications.

Gasparini, M., Khan, S., Patel, J. M., Parekh, D., Bangash, M. N., Stömpfle, R., Shah, A., Baharlo, B., Soni, S., & Collaborators (2021). Renal impairment and its impact on clinical outcomes in patients who are critically ill with COVID-19: a multicentre observational study. *Anaesthesia*, *76*(3), 320–326. https://doi.org/10.1111/anae.15293

Gelb, A. W., Morriss, W. W., Johnson, W., Merry, A. F., Abayadeera, A., Belîi, N., Brull, S. J., Chibana, A., Evans, F., Goddia, C., Haylock-Loor, C., Khan, F., Leal, S., Lin, N., Merchant, R., Newton, M. W., Rowles, J. S., Sanusi, A., Wilson, I., Velazquez Berumen, A., … International Standards for a Safe Practice of Anesthesia Workgroup (2018). World Health Organization-World Federation of Societies of Anaesthesiologists (WHO-WFSA) International Standards for a Safe Practice of Anesthesia. *Anesthesia and analgesia*, *126*(6), 2047–2055. https://doi.org/10.1213/ANE.0000000000002927

Ho, M., Livingston, P., Bould, D., Nyandwi, J. D., Nizeyimana, F., Uwineza, J. B., & Urquhart, R. (2019). Barriers and facilitators to implementing a regional anesthesia service in a low-income country: A qualitative study. *Pan African Medical Journal, 32*, Article 152. https://doi.org/10.11604/pamj.2019.32.152.17246

Kempthorne, P., Morriss, W. W., Mellin-Olsen, J., & Gore-Booth, J. (2017). The WFSA global anesthesia workforce survey. *Anesthesia & Analgesia, 125*(3), 981–990. https://doi.org/10.1213/ANE.0000000000002258

Kenya Medical Training College. (2019). *Annual report on curriculum and training standards*. Nairobi, Kenya: Kenya Medical Training College.

Mumbo, H. M., & Kinaro, J. W. (2015). Assessment of quality and relevance of curricula development in health training institutions: a case study of Kenya. *Human resources for health*, *13*, 67. https://doi.org/10.1186/s12960-015-0048-9

Mussa, S. S., & Sweetbert, A. (2025). Regional Anaesthesia in Low-Resource Settings: Focusing on Sub-Saharan Africa. IntechOpen. https://doi.org/10.5772/intechopen.1011846

Nyamai, K., & Mutisya, R. (2013). Impact of clinical officer anaesthetist training programme at the Kenya Medical Training College, Nakuru, on trainee satisfaction, quality of practice, and cadre shortfall alleviation. *East African Medical Journal, 90*(7), 226–234.

Royal College of Anaesthetists. (2021). *Anaesthesia curriculum 2021*. London, UK: Author.

Ruscher, A. (2024). *Optimizing postoperative care: The significance of simulation training in reducing adverse events and promoting patient safety* (Doctoral dissertation, Northeastern University).

Shirley, H., & Wamai, R. (2022). A Narrative Review of Kenya's Surgical Capacity Using the Lancet Commission on Global Surgery's Indicator Framework. *Global health, science and practice*, *10*(1), e2100500. https://doi.org/10.9745/GHSP-D-21-00500

Stufflebeam, D. L. (1971). *The relevance of the CIPP evaluation model for educational accountability.* Columbus, OH: Ohio State University.

Stufflebeam, D. L. (1983). The CIPP model for program evaluation. In F. F. Madaus, M. Scriven, & D. L. Stufflebeam (Eds.), *Evaluation models: Viewpoints on educational and human services evaluation* (pp. 117–141). Kluwer. https://doi.org/10.1007/978-94-009-6669-7_1

Stufflebeam, D. L. (2000). The CIPP model for evaluation. In D. L. Stufflebeam, G. F. Madaus, & T. Kellaghan (Eds.), *Evaluation models: Viewpoints on educational and human services evaluation* (pp. 279–317). Springer Netherlands.