

**ORIGINAL RESEARCH ARTICLE****Kenya Medical Training College lecturer perception on adequacy of teaching and learning resources in the advent of COVID-19.****Benson Mbat Kondo¹ Simon Kang'ethe¹, Anne Ngeno¹**¹*Moi University, Department of Medical Education, Eldoret, Kenya*Corresponding author email: bkmbati@yahoo.com**ABSTRACT**

Strategies set up to achieve sustainable development goals 3 and 4 in Kenya are via expansion of the health workforce by training healthcare workers. However, challenges such as lack of adequate human resources, physical facilities, teaching aids, and finances existed. In the advent of the COVID-19 pandemic, the above challenges were made worse by the health requirements to mitigate against the pandemic. For instance, the need for more human resources, expansion of physical facilities, adoption of relevant eLearning, and the much-needed financial resources. In order to conduct this study, the researcher adopted a pragmatism theoretical framework. The study investigated lecturers' perceptions of the adequacy of human resources, physical facilities, and teaching aids, in the Department of Medical Laboratory Sciences at Kenya Medical Training College in the advent of COVID-19. This was a descriptive cross-sectional study using a triangulation mixed method design. The study setting was the eastern region, selected out of the eight regions of Kenya through simple random sampling. The four campuses with a Medical Laboratory Science department within the eastern region were all selected through census sampling. The study sample was all the 18 lecturers selected through census sampling. The data collection instruments were interview guides and self-administered closed and open-ended questionnaires. The data was analyzed using Statistical Package for the Social Sciences for the descriptive statistics (measures of central tendency) and then presented in frequency tables. The response rate from the four campuses with the Medical Laboratory Science department was 100% (18 lecturers). The majority of the lecturers had a mean age of 38 years. The majority of lecturers were not satisfied with the adequacy of human resources with a mean of 1.5833 and (std. deviation=.51493). The majority of lecturers perceived the state of physical facilities to be in a poor state with an average mean of 1.6. and (std. deviation =0.418). The satisfaction level of the majority of lecturers on teaching aids was a mean of 3.01 (std. deviation=1.459), representing neutral to very inadequate. The majority of lecturers perceived that there were insufficient human resources, physical facilities, and teaching aids in the Department of Medical Laboratory Sciences at Kenya Medical Training College. Kenya Medical Training College board of directors should provide and avail adequate teaching and learning resources notably human resources, physical facilities, and teaching aids to the Department of Medical Laboratory Sciences.

Key words: Perception, adequacy, teaching/learning resources, lectures, advent, COVID-19



1.0 Introduction

Teaching and learning resources are the backbone for training health care professionals. They enhance the acquisition of relevant knowledge and skills, facilitate the delivery of information, and influence the development of attitudes. Adequacy of quality and relevance of teaching materials is crucial for the training of healthcare professionals as well as for continuing professional development. Without appropriate teaching and learning materials, healthcare professionals encounter many problems in training and practise. Even when the materials are available, there is a need for periodic review and the production of new ones to cope with ever-advancing technology. Teaching and learning involve all the complex processes utilised in the active transfer of knowledge from an instructor to a learner. As outlined by Sequeira (2012), learning generates a permanent change in behaviour through the acquisition of new skills. Teaching, also referred to as instruction, is the employment of different techniques to impact knowledge, skills, and attitudes in a learner. Of importance is that information can only be passed to the learner effectively if an instructor utilises the right materials to present relevant content (American Psychological Association, 2015). Teaching and learning resources are therefore potent instructional facilities that must be envisaged by teachers in the administration of the content of the curriculum. This is evident from the curriculum development in regards to the ten steps, whereby one of the identified steps is the development of teaching and learning resources (Njeru et al., 2020). The COVID-19 pandemic had a significant impact on teaching and learning resources, which may have compromised the quality of education. With over 100,000 students spread across 71 campuses, Kenya Medical Training College (KMTC) is facing an increasing demand for teaching resources. In particular, the need for diagnostic courses like medical laboratory sciences has grown, but COVID-19 presented unprecedented challenges such as a shortage of laboratory equipment, physical facilities, teaching aids, and human resources for teaching and learning (KMTC, 2018).

While KMTC has produced numerous graduates in medical laboratory sciences, it remains to be seen whether all campuses offering the medical laboratory science course had adequate resources with the advent of COVID-19, especially with an increasing demand for laboratory technicians. Kenya Medical Training College requires both academic and non-academic staff, physical facilities, teaching aids, crucial equipment, and reagents for teaching and learning. While the Kenya Medical Laboratory Technicians and Technologist Board recommends a teacher-to-student ratio of 1:10, COVID-19 has strained teaching and learning resource provision in institutions of learning. Given the drastic effects of COVID-19 on the adequacy of teaching and learning resources, it is crucial to explore the perceptions of learners for better preparedness and a continued learning process (Curran, 2020).

According to a study carried out on 134 pre-school teachers, Okongo et al. (2015) noted that inadequate teaching and learning resources affected the implementation of the curriculum. This, in turn, has caused inadequacies in knowledge, skills, and attitudes among learners. Mohammad (2014) established that the availability of resources affects the quality of training in any medical service. Resources include instructional materials and media that a teacher may use to stimulate all the senses of the learner during the learning process. Materials include all physical structures such as classrooms and objects such as printed texts, charts, posters, LCD



projectors, the internet, smart phones, computers, physical facilities, as well as human resources. A cross-sectional survey was conducted by Wynter et al. (2019) on educational resources used by medical students during learning. The researcher concluded that the majority of the students used traditional resources and not modern resources such as E-learning. According to Talukder (2021), medical colleges should have adequate trained manpower for medical education, audiovisual experts, computer operators, and support staff. In essence, the human resource establishment in medical colleges should focus on staff with technical skills in various fields, such as lecturers with specialised skills in that field.

The status of physical facilities, especially in public schools, tertiary colleges like KMTTC, and universities today, appears to be of great concern to educators. Due to an increase in the college enrollment rate and such pandemics as COVID-19, Ebola, and Influenza, the provision of school facilities has dwindled. These problems and concerns necessitate finding out the perception of lecturers and students on the adequacy of the physical facilities, in line with standards set by regulatory bodies like the Nursing Council, Clinical Officers Council, Pharmacy and Poisons Board, and the Kenya Medical Laboratory Technicians and Technologies Board (2002). The KMLTTB clearly states the profile of each physical facility to include the classrooms, demonstration rooms, libraries, ablution/toilets, and transportation in regards to: number in place, size, sitting capacity, fittings in regards to windows, doors, emergency exits, desks/fixed benches, water provision, necessary plumbing (sink and waste disposal), essential equipment, reagents, and availability of current books and journals as per the prescribed list.

It is a common phenomenon nowadays that many medical colleges are located on buildings or campuses constructed for other purposes (Akram et al., 2016).

According to Orwenjo (2021), the outcome of teaching and learning is dependent on the perceptions of students towards the lecturers and the resources used for teaching. The availability of appropriate media for teaching has an influence on the outcomes of teaching and learning and, subsequently, on the attitudes of students towards learning. The general objective of the study was to determine the perceived adequacy of teaching and learning resources in the advent of COVID-19 by lecturers in the department of Medical Laboratory Sciences at Kenya Medical Training College. The specific objectives were:

- i. To determine perceptions among KMTTC lecturers on the adequacy of human resources
- ii. To determine the perception among KMTTC lecturers on the adequacy of physical facilities, projected and non-projected teaching aids, and financial resources.

2.0 Materials and methods

This study employed a descriptive cross-sectional study design and mixed methods of both qualitative and quantitative data collection. This design was adequate for collecting data that addressed the intended research questions for the study (Mugenda & Mugenda, 2003).

2.1 Study population

Kenya has eight regions, one of which (the Eastern Region) was selected through random sampling. All four KMTC campuses in the region, namely Embu, Meru, Kitui, and Machakos, were purposefully sampled. The study involved all the lectures in the Department of Medical Laboratory Sciences on the four KMTC campuses. The department was chosen by the researcher because he was familiar with teaching and learning in the department.

2.2 Sample size determination

Since the number of lecturers was less than 30, the census sampling method was used to select the lecturers. The researcher selected all lecturers as respondents because they were at the right place at the right time as per the researcher's interests as recommended by Kothari (2004). The sample size was therefore 18 lecturers.

2.3 Data collection

A descriptive cross-sectional study design and mixed methods of both quantitative and qualitative data collection techniques were employed. The rationale for the mixed-methods design was to obtain a more comprehensive view and data that addressed the intended research questions for the study, as recommended by Mugenda (2003). Data was collected through the use of structured questionnaires comprising both open-ended and closed-ended questions. To ensure validity, the research instrument underwent scrutiny from a panel of peer reviewers. Further, to ensure reliability, pretesting of the data collection instruments was conducted at the Department of Medical Laboratory Sciences at the KMTC Nakuru Campus, which is not one of the campuses chosen for this study. Cronbach's alpha was used to test the reliability of the questionnaire items.

2.4 Data analysis

The data was edited, cleaned, sorted, coded, and classified as either quantitative or qualitative data for ease of presentation (Mugenda & Mugenda, 2003). The analysis was conducted with the assistance of Statistical Package for Social Sciences (SPSS) Version 28. Thereafter, qualitative data was presented through the use of themes, while quantitative data was presented through frequency distribution tables, pi-charts, bar-graphs, and histograms.

3.0 Results

The response rate among respondents was 100% (=18).

3.1 Perceived adequacy of human resources

The aggregate perception by lecturers on the availability and adequacy of both male and female support staff and lecturers was interpreted based on the mean scores and standard deviations of the responses to the selected open-ended items rated on a four-point scale. Since the mean scores required proper interpretation, it was important to give the scale for interpretation based on a five-scale interpretation. Figure 1 shows the mean score level interpretation.

- i. From 1 to 1.80 represents (Very inadequate)/very poor / very dissatisfied
- ii. From 1.81 until 2.60 represents (inadequate) / poor/dissatisfied

- iii. From 2.61 until 3.40 represents (neutral)/ Average/Neutral
- iv. From 3.41 until 4.20 represents (adequate) Good/Satisfied
- v. From 4.21 until 5.00 represents (very adequate)/very good/ very satisfied

As Table 1 indicates, male lecturers showed a higher mean score with regard to availability as compared to female lecturers (mean = 3.4444) and female lecturers (mean = 1.7778), respectively. Generally, all the lecturer staff were perceived to be inadequate, that is, falling in the category of 1 to 1.80 (very inadequate). Particularly, lecturers were perceived to be inadequate in the MLS department, as demonstrated by the level of satisfaction (mean = 1.5833).

Table 1: Perceived adequacy of male and female lecturers.

Statistics		Perceived adequacy of <i>male</i> lecturers in MLS department	Perceived adequacy of <i>female</i> lecturers in MLS department	Satisfaction level with staffing
N	Valid	18	18	12
	Missing	0	0	6
	Mean	3.4444	1.7778	1.5833
	Std. Deviation	1.54243	.94281	.51493

A similar trend was experienced among support staff for both males’ and females’ findings. It was, however, seemingly better in overall satisfaction level (mean =2.6875) as compared to that of lecturers (mean = 1.5833), as shown in Table 2.

Table 2 : Perceived adequacy of support staff at the MLS department

Statistics		Perceived adequacy of male support staff	Perceived adequacyof female support staff	Satisfaction level
N	Valid	11	12	16
	Missing	7	6	2
	Mean	1.2727	1.5833	2.6875
	Std. Deviation	.46710	.51493	1.30224
	Sum	14.00	19.00	43.00

The trend was further demonstrated by Table 3, which shows that only about 51.8% of the respondents were not satisfied with the staffing of lecturers and support staff.

Table 3: Lecturers satisfaction with human resource adequacy.

	Frequency	Percent	Valid Percent	Cumulative Percent	
Valid	Extremely Dissatisfied	40	12.9	18	18
	Dissatisfied	34	10.2	13.9	31.3
	Neutral	45	15.1	20.5	51.8*
	Satisfied	55	20.0	27.1	78.9
	Extremely Satisfied	46	15.6	21.1	100.0
Total	18	73.8	100.0		
Missing	System	0			

3.2 Perceived adequacy of physical facilities

Using the measures of central tendency to interpret the five-level Likert scale on satisfaction level among lecturers with regard to the number of rooms available and using the five-point mean interpretation (Figure 1), the number of rooms in all five clusters was not adequate, with only computer laboratories showing the highest mean (3.2941), see Table 4.

Table 4: Satisfaction level on rooms occupied by lecturers

Descriptive Statistics

	N	Minimum	Maximum	Sum	Mean	Std. Deviation
Offices,	18	1.00	4.00	54.00	3.0000	1.02899
Classrooms	18	1.00	4.00	46.00	2.5556	.92178
Demo laboratories	18	1.00	4.00	50.00	2.9412	1.02899
Skills laboratories	18	1.00	5.00	34.00	3.0909	1.44600
Computer laboratories	18	1.00	4.00	56.00	3.2941	.98518
Valid N (listwise)	18					

3.3 The state of facilities at MLS departments measured on a Likert scale (lecturer category)

The analysis of internal consistency using Cronbach’s test gave a very reliable internal consistency outcome on the variable regarding the state of ten (10) structures or equipment at over 90%.

Table: Reliability test on the state of physical facilities among lecturers

Reliability Statistics

Cronbach's Alpha	N of Items
.907	10

Using the measures of central tendency to interpret the five-level Likert scale on the state of facilities using a scale of five based on Figure 1, level of interpretation, there was a generally poor state of facilities ranging from a mean value of 1.8889 to 2.8889 (From 1.81 until 2.60 represents poor), as determined from the mean computation of a five-level Likert scale, as shown in Table 5.

Table 5 : State of facilities

Descriptive Statistics						
	N	Minimum	Maximum	Sum	Mean	Std. Deviation
State of Furniture	18	1.00	4.00	47.00	2.6111	.91644
State of Windows	18	2.00	4.00	51.00	2.8333	.92355
State of Lab equipment	18	1.00	4.00	46.00	2.5556	.92178
State of Reagents	18	1.00	4.00	41.00	2.2778	.82644
State of Microscope	18	1.00	4.00	34.00	1.8889	.75840
State of Doors	18	1.00	5.00	43.00	2.5294	1.12459
State of Ventilation	18	1.00	4.00	42.00	2.3333	.90749
State of Lighting	18	1.00	4.00	43.00	2.3889	.91644
State of Classroom space	18	1.00	5.00	52.00	2.8889	1.27827
State of Floors	18	1.00	4.00	47.00	2.6111	1.03690
Valid N (list wise)	18					

3.4 Perceived adequacy of teaching aids (projected and non-projected)

The adequacy of teaching and learning aids was assessed by asking the lecturers to rate their satisfaction level using a five-point Likert scale (1=extremely dissatisfied to indicate a lack of enough aids, 2 = dissatisfied, 3= neutral, 4= satisfied, and 5= very satisfied).

The lecturers were asked to rate fourteen (14) different factors associated with the state of teaching aids at MLS departments. The factors used to rate the state of the resources included the level of satisfaction with whiteboards, flipcharts, overhead projectors, posters, handouts, chalkboards, magnetic boards, textbooks, DVD players, tape recorders, episopes, computer-assisted aids, and internet connectivity.

Response based on a five-point Likert scale with reference to mean level interpretation (as in Figure 1) indicated only whiteboard and overhead projectors elicited above good satisfaction level (from 3:41 until 4:20 represents (adequate) / Good / Satisfied), with the rest giving below neutral satisfaction level, as indicated in Table 6.

Table 6: Satisfaction level on teaching aids (projected and non-projected)

Satisfaction with:	N	Minimum	Maximum	Mean	Std. Deviation
Whiteboards	16	1.00	5.00	3.6452	1.52096
Flipcharts	13	1.00	5.00	3.0345	1.33639
Overhead Projectors	11	1.00	5.00	3.7042	1.18633
Posters	10	1.00	5.00	3.2139	1.28024
Handouts	12	1.00	5.00	3.3050	1.32694
Chalkboards	14	1.00	5.00	2.7577	1.44612
Magnetic boards	15	1.00	5.00	2.2919	1.32746
Textbooks	12	1.00	5.00	3.5613	1.35989
DVD players	10	1.00	5.00	2.6468	1.47296
Tape recorders	12	1.00	33.00	2.7222	2.57252
Episcope	15	1.00	5.00	2.5615	1.39130
Computer assisted aids	14	1.00	5.00	3.0386	1.33600
Internet Connectivity	13	1.00	5.00	2.7042	1.40479
Learning systems	13	1.00	5.00	2.9718	1.47596
Valid N (listwise)	14				

4.0 Discussion

4.1 Perceived adequacy of human resources

According to Choudhury (2016), unequal distribution and inadequacy of both teaching and non-teaching staffs in medical colleges have had an indirect impact on medical training and access to medical services by populations. In this study, the majority of the respondents perceived staff to be inadequate in the various MLS departments. Further, Jain, Mathew, and Bedi (2012) argued that the maintenance of employees at different levels assists an organisation in setting and achieving its goals. Indeed, there exists a strong positive relationship between human resource establishment during teaching and learning and the outcome of the process. In medical education, the importance of human resources, whether skilled or unskilled, has been highlighted in various forums.

4.2 Perceived adequacy of physical facilities

In the study, the majority of the lecturers felt that the number of rooms available as offices, classrooms, demo laboratories, skills laboratories, and computer laboratories was not adequate. Recent studies have emphasised the importance of the availability of physical facilities in training institutions. Ajayi and Ayodele (2001) emphasised that the availability of these resources in institutions is necessary for effective instructional delivery and supervision of the same.

Additionally, KMLTTB (2002) outlines specifications for offices and rooms in terms of number, size, and capacity, in line with the number of lecturers. An office should have a minimum of 10 square metres per employee. Classrooms, laboratories, demonstration laboratories, and libraries should be 90 square metres with a standard number of rooms, size, and fittings



(windows, doors, emergency exit, ground, desks, fixed benches, water provision, plumbing, fire extinguishers, safety cabinet, and essential apparatus or equipment).

4.3 Perceived adequacy of projected and non-projected teaching aids

The satisfaction level with the perceived adequacy of teaching and learning aids among lecturers showed an unacceptable level. According to a study by Subedi et al., (2021) on the perceptions of lecturers' towards teaching and learning resources, the usage of the internet was very low. The satisfaction level with the perceived adequacy of projected aids, which required the use of the internet, was very low.

5.0 Conclusion and recommendations

There was evidence that the lecturers generally perceived that human resources were not adequate, the physical facilities were inadequate, and teaching aids were not adequate with the advent of COVID-19. Based on the findings of this research, the following recommendations are made: The Ministry of Health and The Kenya Medical Training Management should increase the human resources, improve the physical facilities, and provide adequate teaching aids to the department of Medical Laboratory Sciences. The study also recommends that further studies be conducted to cover all other departments at KMTC, and similarly, it should cover other private institutions, faith-based institutions, and institutions of higher learning such as universities.

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6.1 General acknowledgement

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6.2 Funding

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6.3 Conflict of interest

None.

6.4 Ethical consideration

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7.0 References

- Akram, A., Daud, M. Z., Farzana, R., Md Joha, M. G., & Khan, R. (2016). Structuring Quality Education by Proposing Physical Infrastructure of a Medical School. *Education in Medicine Journal*, 8(3).
- Ajayi, I. A., & Ayodele, J. B. (2001). Introduction to educational planning, administration, and supervision. Ado-Ekiti: Yemi Printing Services.



- Choudhury, P. K. (2016). Role of private sector in medical education and human resource development for health in India. *Economic and Political Weekly*, 71-79.
- Curran, F. C. (2020). School Preparedness Plans for Pandemics and Continuity of Education.
- Jain, H., Mathew, M., & Bedi, A. (2012). HRM innovations by Indian and foreign MNCs operating in India: a survey of HR professionals. *The International Journal of Human Resource Management*, 23(5), 1006-1018.
<https://kmtc.ac.ke/>
- Kenya Medical Laboratory Technicians and Technologists Board (2002). Pre-registration general procedures, inspection procedures and evaluation checklist for medical laboratory sciences training institutions. Ministry of Health Publication, 2002.(unpublished)
- Kothari, C. (2004). Research Methodology: Methods of Department and Techniques. 2nd ed. New Delhi: New Age International (P) Limited, Publishers.
- Mohammad, A. M. (2014). Factors affecting medical service quality. *Iran Journal of Public Health* 2014, Feb: 43(2): 210-220
- Mugenda, O., & Mugenda, A. (2003). Research methods: Quantitative & Qualitative approaches . Nairobi: African Centre for Technology Studies press.
- Njeru, M., Kang'ethe, S., Kwena, A., & Otieno, C. A. (2020). Perceptions of the adequacy of teaching and learning resources for undergraduate medicine (MBChB) and nursing (BScN) programmes in two Kenyan public universities. *International Academic Journal of Health, Medicine and Nursing*, 2(1), 26-35.
- Okongo, R. B., Ngao, G., Rop, N. K., & Wesonga, J. N. (2015). Effect of availability of teaching and learning resources on the implementation of inclusive education in pre-school centers in Nyamira North Sub-County, Nyamira County, Kenya.
- Orwenjo, D. O., & Erastus, F. K. (2021). Teachers' Perceptions of Open Educational Resources: The Case of Open Resources for English Language Teaching (ORELT) in Kenya. *Journal of Learning for Development*, 8(3), 582-600. <http://www.aapor.org/Education-Resources/For-Researchers/Poll-Survey-FAQ/Response-Rates-An-Overview.aspx>
- Sequeira, A. H. (2012). Introduction to concepts of teaching and learning. *Social sciences education e-journal*.
- Singh, R., Subedi, M., Pant, S., Rai, P., Gupta, K. K., Pachya, A. T., & Singh, B. (2021). Perception towards online teaching-learning in medical education among medical students during COVID-19 outbreak in Nepal: a descriptive cross-sectional study. *JNMA: Journal of the Nepal Medical Association*, 59(234), 128.
- Talukder, M. H., Nazneen, R., Kabir, M. F., Nuruzzaman, M., Talukder, M. S., Tapu, T. T., ... & Faruque, T. B. (2021). Need Assessment for Updating the MBBS Curriculum 2012 of Bangladesh. *Mymensingh Medical Journal: MMJ*, 30(3), 789-795.
- Wynter L., Burgess A., Kalman E., Heron E. J. Bleasel J., (2019). Medical students: what educational resources are they using? *Journal of BMC Medical Education volume 19, Article number: 36 (2019)*