

# The Effectiveness of Medical Laboratory Trainees' Internship Programs in Improving Technologists' Competence and Operational Strategy for the Healthcare Sector in Kenya

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**Abstract:-** The study, anchored on the social learning theory, aimed to establish the effectiveness of clinical laboratory trainee attachment programs in improving laboratory technologists' competence in Kenya. Through an e-mail survey, structured questionnaires that targeted senior medical laboratory personnel working in Kenyan medical laboratories were used to gather the data. The findings indicate that most of the study participants were moderately allowed to operate laboratory types of equipment. The lack of staff to guide during the attachment is cited as a major challenge. Further, the study findings show that most of the study participants believe that the current medical laboratory attachment programs are not so effective in providing them with the competence required for employment as medical laboratory technologists.

**Keywords:-** Clinical laboratory, Competence, Healthcare sector and in Kenya, Laboratory Technologist, Trainee attachment programs.

## I. INTRODUCTION

Attaining health objectives in a population depends on effective, efficient, and accessible services provided by human resources for health. These include doctors, nurses, pharmacists, dentists, laboratory technologists, and other auxiliary professionals.

In Kenya, the training for human resources for health is controlled by government-funded health regulatory agencies which are mandated with the training and practice by ensuring the availability and accessibility of medical professionals (Muthaura et al., 2015). The Kenya Medical Laboratory Technologists and Technicians Board (KMLTTB) is mandated to provide general supervision of training, employment, and practice of medical laboratory technologists.

Laboratory technologists provide a vital role in health care delivery, especially for services that depend on diagnostic testing for decision making (Rioki, 2019). The demand for quality laboratory tests has been increasing year after year due to the increase in the aging population and the emergence of new disease states like COVID-19.

Over the years, there have been three entry levels of clinical laboratory personnel in the labor market in Kenya: a two-year certificate course, a three-year diploma program, and a four-year bachelor's degree in medical laboratory sciences.

In the majority of developing countries, training facilities for medical laboratory personnel in many training institutions are under-equipped with both qualified tutors and modern laboratory training equipment.

Unlike the majority of other medical professions, clinical laboratory testing is equipment-dependent and therefore the quality of patients' results released to doctors depends heavily on the laboratory technologist's ability to understand the principles and operations of the types of equipment used in the laboratory.

As a result, part of the training curriculum for laboratory technologists includes a prescribed mandatory practical/ attachment within a hospital/laboratory setup to gain types of equipment hands-on experience, and increase confidence, and competence before entering the labor market (Rioki, 2019).

Currently, the opportunities for clinical laboratory trainee attachment openings before employment are limited and faced with several challenges including inadequate certified centers for attachments, inadequate laboratory staff, and a lack of modern diagnostic types of equipment for practicals. Consequently, the newly graduated medical laboratory technologists enter the labor market with limited practical exposure and hands-on experience.

Failure to undergo a sufficient structured and standard attachment/internship program before entry into the labor market might compromise the quality of diagnostic healthcare services offered. This ultimately harms the operational effectiveness of health care units in Kenya.

## II. LITERATURE REVIEW

In Kenya, the medical laboratory workforce is grouped into several categories depending on the level of their training. Medical laboratory technicians (MT) are laboratory personnel who have undergone a two-year certificate course in medical laboratory training while medical laboratory technologists (MLT) are professionals who have undergone either a three-year diploma or four-year degree course in medical laboratory training.

Using sophisticated equipment and technology, laboratory technologists examine and analyze patients' samples to guide physicians make correct treatment decisions.

The Kenya Medical Laboratory Technicians and Technologists Board (KMLTTB), a government professional regulating authority, is mandated to regulate the training and practice of medical laboratory professionals.

A medical laboratory attachment is an internship program in which an unpaid work-based learning experience brings practical application to learning beyond the classroom (Miller, 2020). The attachment aims to provide hands-on experience in a laboratory testing environment while simultaneously creating a high level of awareness of the challenges confronted by laboratory personnel.

**A. Research Objective**

The study aims to establish the effectiveness of medical laboratory trainee attachment programs in improving laboratory technologists' competence in Kenya.

**B. Research Questions**

- Which institutions in Kenya provide laboratory internship programs?
- What are the challenges experienced by the laboratory trainees during attachment programs?
- How effective are medical laboratory trainees' attachment programs in improving laboratory technologists' competence in Kenya?

**III. METHODOLOGY**

This study applied an exploratory kind of study. The study targeted senior medical laboratory personnel working in Kenyan medical laboratories. Structured questionnaires were used to collect the data. The questionnaires were emailed to the respondents.

The study involved clarifying research questions and objectives, collecting qualitative data through a semi-structured questionnaire, and finally analyzing the data to establish the relationship of the data.

The data gathering process began with the development and refinement of the questionnaire, which was then assessed for validity by a sample of medical laboratory professionals. After the final questionnaire was designed, it was administered to a sample of 28 medical laboratories at Kenya's Level IV county hospitals, and private and mission hospitals.

Eighteen (18) senior laboratory employees completed the questionnaire, which indicated their training and laboratory attachment history.

**IV. RESULTS**

This chapter presents an analysis of the quantitative data collected and the results of the data analysis.

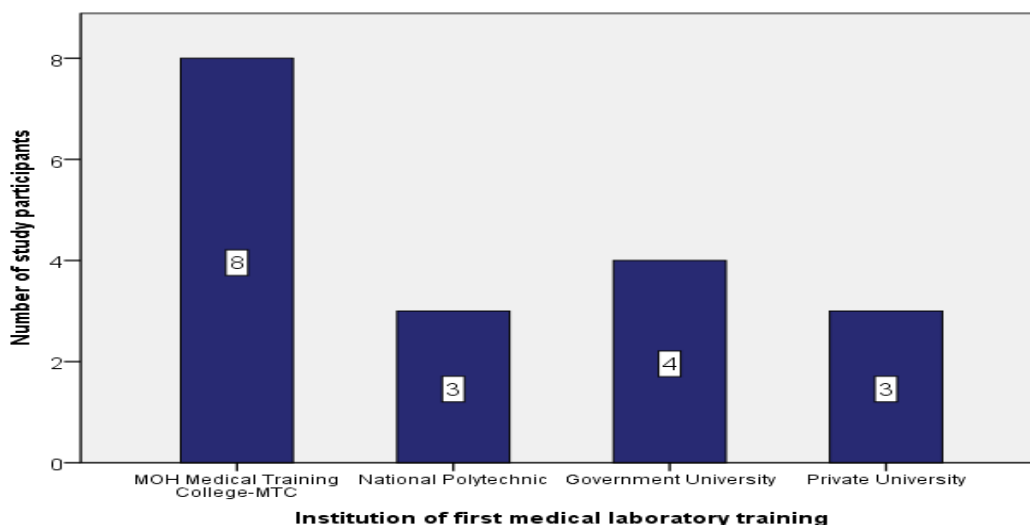


Fig. 1: Institution of First Medical Laboratory Training

Note: Extracted by the Researcher from SPSS-Statistics data analysis output

According to the findings (Figure 1), 8 of the respondents (44.4%) indicated to have received their first medical laboratory training from the Ministry of Health (MOH) medical training college while 4 (22.2%) had received their first medical laboratory training from a government university. The findings also indicated that 3 (16.7%) of the study participants had received their first medical laboratory training from national polytechnics while

a similar number had received their first medical laboratory training from private universities.

These findings indicate that medical laboratory training in Kenya was mostly conducted by government-sponsored institutions such as medical training colleges and public universities.

**A. Institution of Laboratory Practical Attachment**

Regarding attachment, the study sought to find out the institution that provided laboratory practical attachment to the study respondents.

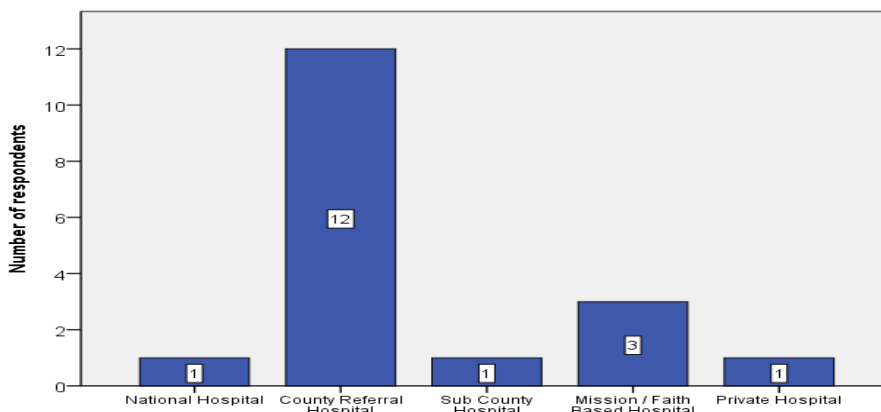


Fig. 2: Institution of Laboratory Practical Attachment

Note: Extracted by the Researcher from SPSS-Statistics data analysis output

The findings in Figure 2 indicate that 12 of the respondents (66.7%) had received their practical laboratory attachment from county referral hospitals while 3 (16.7%) had laboratory practical attachment in mission/faith-based hospitals. The findings indicated that those who received their laboratory practical attachment from the national hospital, sub-county hospitals, and private hospitals were 1 (5.6%) each.

The findings of this study imply that in Kenya, county referral hospitals were the main providers of practical laboratory attachment opportunities.

**B. Challenges during Laboratory Attachment**

The study investigated the challenges that the respondents experienced in the process of gaining practical experience during their medical laboratory practical attachment period. Various probable challenges were listed and respondents were required to indicate whether those were serious, minor, or no challenges to them.

Challenge	Not a challenge		Minor challenge		Serious challenge	
	F	%	F	%	F	%
Lack of staff to provide guidance	-	-	5	27.8	13	72.2
Lack of training equipment in the facility	-	-	6	33.3	12	66.7
lack of time (attachment period)	15	83.3	3	16.7	-	-

Table 1: Challenges during Laboratory Attachment

Note: Table provided by the author

The findings summarized in Table 1 indicate that lack of time during the attachment period was not a challenge to 83.3% (n = 15) of the study participants. However, the findings show that the lack of staff to guide during the attachment period was a serious challenge according to 72.2% (n = 13) of the respondents. Moreover, the lack of training equipment in the facilities was cited as a serious challenge to 66.7% (n = 12) of the study participants.

These findings imply that the facilities that provided medical laboratory practical attachment lacked adequate staff to guide interns and also lacked adequate training equipment. These challenges are consistent with the findings by Rioki (2019) to be vital since students leave these facilities with insufficient professional abilities, skills, and competence.

**C. Effectiveness of laboratory attachments in major clinical areas**

The study investigated the opinion of the study participants regarding the overall effectiveness of the attachment towards providing needed skills and competence. The areas of competence were assessed according to the various medical laboratory departments and included clinical chemistry, hematology and coagulation, microbiology, immunohematology, urinalysis and body fluids, serology and immunology, and parasitology.

Area of Competence	Not effective		Moderately effective		Highly effective	
	F	%	F	%	F	%
Clinical chemistry	13	72.2	4	22.2	1	5.6
Hematology and coagulation	1	5.6	17	94.4	-	-
Microbiology	12	66.7	6	33.3	-	-
Immunohematology	2	11.1	11	61.1	5	27.8
Urinalysis and body fluids	-	-	6	33.3	12	66.7
Serology and immunology	-	-	16	88.9	2	11.1
Parasitology	-	-	2	11.1	16	88.9

Table 2: Effectiveness of laboratory Attachment in Providing Competence

Note: Table provided by the author

The findings summarized in Table 2 indicate that 94.4% (n = 17), 88.9% (N=16), and 61.1% (n = 11) of the participants were of the view that the attachment was moderately effective in providing competence in hematology, serology, and immunohematology respectively.

However, most of the respondents indicated that the attachment was not effective in providing them with competence in clinical chemistry (72.2%, n = 13) and microbiology (66.7%, n = 12).

To determine how the medical laboratory attachment provided skills and competence to the study respondents, they were asked whether they were allowed to operate laboratory equipment during the attachment period.

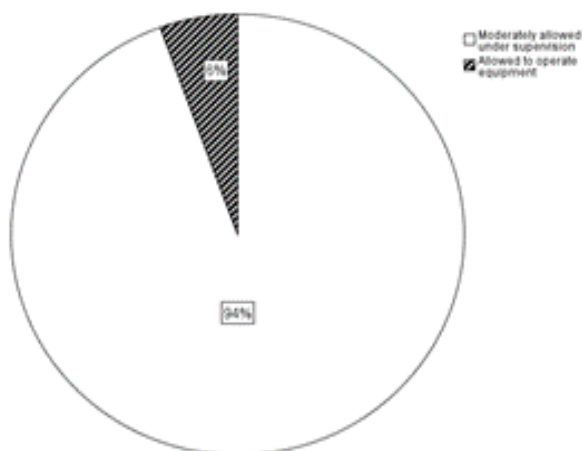


Fig. 3: Whether Laboratory Trainees were allowed to Operate laboratory Equipment

Note: Extracted by the Researcher from SPSS-Statistics data analysis output

The findings displayed in Figure 3 indicate that 94% of the study participants (n = 17) were only not allowed to operate laboratory equipment while 1 (6%) was allowed to operate equipment.

Though the attachment program enables graduates to hone their abilities in medical laboratory practice and exposes the respondents to the field of laboratory medicine and modern equipment, Zhao et al. (2021) observe that the skills and competence acquired may be limited without adequate practical exposure and interaction with laboratory personnel and equipment.

Further, the study sought to find out whether the attachment provided the participants with the requisite competence required in professional employment.

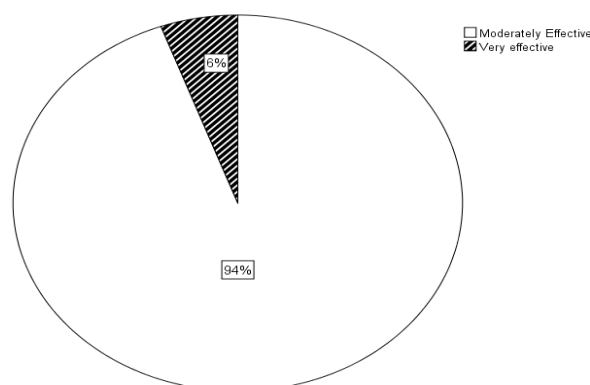


Fig. 4: The Study Findings

Note: Extracted by the Researcher from SPSS-Statistics data analysis output

The study findings displayed in Figure 4 show that 94% (n = 17) of the study participants believed that the medical laboratory attachment was only moderately effective in providing them with the competence required in employment. These findings indicate that there are skill gaps that medical laboratory attachment in Kenya does not bridge, thus not providing the required transition from training to employment as indicated in the internship policy by the Government of Kenya (2020).

## V. CONCLUSIONS & RECOMMENDATIONS

In establishing which institutions offer medical laboratory training, the current study showed that a majority of the sampled participants (44.2%) went through Kenya medical training colleges (MTC) while 22.2% went through the government universities.

On the second objective, results from the survey revealed that 66.7% had received their practical laboratory attachment from county referral hospitals while 16.7% of the sampled respondents had their laboratory practical attachment in mission/faith-based hospitals.

Regarding challenges encountered during attachment, the study concludes that the lack of staff to guide during the attachment period was a serious challenge as demonstrated

by 72% of the respondents. Lack of training equipment in the facilities was also identified to present serious challenges experienced by 66.7% of the respondents. The prevalence of these challenges in Kenya has been documented by Rioki (2019) and the Government of Kenya (2020).

The study provides the following recommendations based on the findings and conclusions herein. To senior medical laboratory managers, the study recommends ensuring that medical laboratory interns are provided adequate guidance and opportunities to interact with the equipment and systems in the laboratory.

To the Government of Kenya, it is recommended that it should fast track the implementation of the strategies in its internship policy by enhancing the capacity of county referral hospitals with personnel and equipment to enable them to provide attachment opportunities for fresh graduate laboratory technologists.

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