ASSESSMENT OF KNOWLEDGE AND BIOSAFETY IN MORTUARY SCIENCE PRACTICE AMONG PRACTISING MORTICIANS IN WESTERN KENYA

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A Thesis Submitted to the School of Public Health Biomedical Sciences and Technology in partial fulfilment of the Requirements for the Award of Master of Science Degree in Health Professions Education of Masinde Muliro University of Sciences and Technology

October, 2025

DECLARATION

This thesis is a product of my own original work, developed solely using the sources and assistance specifically acknowledged, and it has not been submitted to any other institution for the award of a degree or any other qualification

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CERTIFICATION

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DEDICATION

I dedicate this research thesis to my entire family for their unconditional support accorded to me, and joy for their moral support throughout this academic journey

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ABSTRACT

The human body serves as a vital instructional resource in medical education. It plays a central role in training students, morticians, and supporting biomedical research. Despite its essential use, the handling and exchange of human tissues present ethical complexities. While human remains are generally regarded with moral significance and treated with dignity and care, institutional practices often commodify them by relying on a consistent supply for educational and research purposes. This study aimed to evaluate the knowledge and biosafety standards of mortuary science among practising morticians in Western Kenya. The specific objectives were: to examine the level of biosafety knowledge and practices among morticians, to identify the necessary competencies for mortuary professionals, and to investigate the factors influencing competency and biosafety skills in this field. The research was anchored in the Context, Input, Process, and Product (CIPP) evaluation framework introduced in 2007. A descriptive cross-sectional survey design was employed, with both quantitative and qualitative data collection methods. The study targeted practising morticians working across Western Kenya. Using Yamane's formula, a sample size of 89 was calculated. Purposive census sampling was applied prior to data collection, ethical clearance was secured from the Institutional Scientific Research and Ethics Committee (ISREC MMUST) and the National Commission for Science, Technology, and Innovation (NACOSTI). Permissions were also obtained from relevant institutions, and informed consent was secured from participants.A pre-test study was carried out at Jaramogi Oginga Odinga Teaching and Referral Hospital Funeral Home to evaluate the reliability and validity of the data collection tools. Data analysis was conducted using SPSS version 28.While qualitative data was thematically analyzed, and triangulated. Three major themes emerged: Lack of essential medical supply, poor remuneration and lack of representation among practising morticians. Findings were displayed using tables, charts, and graphs. The most common area of training reported was the use of personal protective equipment (PPE), with a participation rate of 87(97.8%). In contrast, training in handling sharps and waste was significantly lower, at 1(1.1%) and 2(2.2%), respectively. Approximately 42(46.60%) of participants indicated they consistently apply biosafety practices in their daily work. Overall, 90(82%)demonstrated strong biosafety skills, with the highest proficiency observed in ethical practices 95(86.5%) and technical abilities 64(58.4%). Additionally, 90(82%) exhibited strong business management skills. A mortician was classified as competent if they showed high proficiency in at least three out of the four assessed skill areas. Based on this criterion, 64(71.9%) of the respondents were considered competent. Competency levels were influenced by both the county of employment and the type of facility. Morticians in Kakamega County were 69% less likely to be deemed competent compared to their counterparts in Vihiga County(AOR=0.31,95% CI=0.04-0.54). Furthermore, those working in public mortuaries were 2.13 times more likely to exhibit competency compared to those in mission-based facilities(AOR = 2.13, 95% CI = 1.39 – 6.13). Personal demographic characteristics did not show a significant impact on competency.Conclusion, there is significant variation on biosafety skills, competence, facility type and county among practising morticians in Western Kenya.The study recommends ongoing biosafety training for practising morticians, the promotion of competency-based training programs, and the enhancement of mortuary facilities with adequate resources to support safe and effective practice.

Keywords: Assessment. Knowledge. Biosafety. Mortuary Science Practice, Practising Morticians.Western, Kenya

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LIST OF ABBREVIATIONS AND ACRONYMS

AHP	Analytic Hierarchy Process
APT	Anatomical pathologist Assistant
AR	Attrition Rate
CBET	Competence-Based Education and Training.
CBT	Competency Based Training.
CIPP	Context, Input, Process, and Product.
ERIC	Institutional Scientific and Clinical Research Ethics committee
HST	Hemorrhagic Syndrome Fever
IBM	International Business Machines co-operation
ICF	International Inner City Fund
IREC	Institutional Scientific and Ethics Review Committee
KNBS	Kenya National Bureau of Standards
KPHOA	Kenya Health oversite Authority
KQNA	Kenya National Qualification Authority
NACOSTI	National Commission for Science, Technology and Innovation
PHCJ	Perpetual Help System Jonelta
PPE	Personal Protective Equipment
TVETA	Technical and Vocational Education and Training Authority

DEFINITION OF TERMS & ACRONYMS

Biosafety: ------- Is the application of knowledge, techniques, and equipment to prevent personal, laboratory, and environmental exposure to potentially infectious agents or biohazards

Competency: ----Ability to do something successfully or efficiently**.**

Cremation: -------Disposal of a dead of a dead's person body through burning

Mortuary Science: Study of the deceased bodies through mortuary work.

SARS-COV-2:------- The Virus That Causes A Respiratory Disease Called Coronavirus Disease.

Skills: -------The ability to do something well.

CHAPTER ONE

INTRODUCTION

1.0 Overview

This chapter presents the background to the study, statement of the problem, objectives of the study, research questions, justification of the study, significance of the study, scope of the study, limitations of the study, and delimitation of the study. A conceptual framework is presented, which explains the association between the independent and dependent variables in addition to the methodology employed in this study.

1.1 Background of the Study

Mortuary science, an integral aspect of the healthcare and funeral service industries, encompasses the preservation, preparation, and management of deceased individuals while adhering to legal and ethical practices. A mortician is a person who prepares the deceased body for cremation or burial and provides support to the grieving (Briedenhann, Gerda Mari, 2023). Mortuary facilities serve as critical nodes for disease surveillance and biosafety, informing mortality statistics and guiding public health interventions(Nyakeriga *et al.,* 2022). However, inadequate management of remains can facilitate pathogen transmission, especially during outbreaks of high-consequence diseases (Godwin & Dumahasi, 2020).

Globally mortician training involves the combination of practical experience, ongoing professional development and formal education. Most countries offer formal programs in the field of mortuary science and practice(Gardner, 2019).The programs are usually hosted in specialized institutions, universities, colleges and technical

schools. Many countries usually issue licenses for morticians which usually involves completing an accredited education program as per regulatory bodies required.

A majority of Mortuary workers working in funeral homes in developing countries (Africa) have been reported in the recent past to be suffering from. long-term fatigue and burnout, which in turn may lead to deleterious consequences for their health-related behaviors and impaired work overall productivity as noted by (Guidetti *et al.,* 2021a). Similarly, the skills and knowledge components serve a central part in the field of mortuary science and practice. This aid in minimizing the risks of error or mishandling of diseased individual as noted by (Okoth-Okelloh *et al.*, 2021). Therefore, studies have shown that dropping the number of legal suits in the corridors of justice in relation to ethics and practice of morticians have a multiple of implications and requirements, i.e. Showing respect for the dignity of the deceased, especially in relation to their religious beliefs, and ensuring social justice for their next of kin. Providing fair and equal treatment to individuals who have not yet been identified and lastly avoiding harm, particularly by preventing misrepresentation of the deceased due to incorrect interpretation of biological evidence as noted by (Guidetti *et al.,* 2021c).

Insufficient training and perceived lack of safety support contribute to low job satisfaction among mortuary personnel. A recent cross-sectional study found that mortuary services staff report feeling underprepared and undervalued, which negatively affects adherence to safety protocols(Dumahasi, 2020)

Mortuary attendants routinely encounter biological hazards including blood borne pathogens, aerosolized tissues, and contaminated sharps. Studies at Kenyan hospitals report low compliance with standard precautions and use of personal protective

equipment, increasing the risk of occupational infections(Moyo, 2021).National biosafety guidelines outline comprehensive measures for handling human remains, but poor dissemination and enforcement undermine their effectiveness(Medicine *et al.*, 2020)

Competency in mortuary science encompasses technical skills such as embalming, and cold-room operations, and nontechnical competencies such as communication, and ethical conduct. In Kenya, formal education programs such as those offered by the Kenya Medical Training College provide foundational training, yet evaluations indicate that graduates often lack sufficient practical exposure (Simiyu, 2017). Apprenticeship models partly bridge this gap, but their unstructured nature results in variable proficiency(Fuller *et al.,* 2011).

Recently, competency training has turned out to be the leading curriculum model which is recommended. This is because it advocates advancement by training to demonstrate capacity to do particular roles. The main merit is in the form of seeming computable flexibility and accountability and for evaluators the promise of evaluation in the workplace which was provide an objective and reliable measurement of trainee's performance(Brightwell & Grant, 2013)

Assessment of skills and knowledge helps encourage morticians to engage in lifelong learning and continuous improvement of competencies required in the field of mortuary science and practice(Warutere, 2024). Due to the increased mortality rate in Kenya, there has been an increase in the establishment of mortuaries and funeral homes, hence the need for professionals in the field of mortuary science. The absence of organized and formal educational training among mortuary attendants increases their vulnerability to workplace hazards and contributes to substandard service provision (Dartey *et al.,* 2021). As the world becomes more interconnected, the

likelihood of breaches in biosafety has markedly risen. A clear instance of such a breach is the COVID-19 pandemic, which has represented a major global biosafety threat ((Shehri *et al*., n.d.)

Public trust and opinion are important in the field of mortuary science which enhances confidence to the public from the mortician and this can only be achieved through continuous practice of the code of ethics in the mortuaries and funeral homes(Larsson, 2007).

Morticians play a critical role in ensuring that these processes are conducted with dignity and professionalism, while also safeguarding public health through stringent biosafety measures. Despite the importance of their work, limited research exists on the competency and biosafety standards among morticians, particularly in Kenya.

Given the growing demand for mortuary services in Kenya, fueled by population growth and urbanization, there is an urgent need to evaluate the competency and biosafety practices of morticians. Such an assessment is crucial not only for improving service delivery but also for ensuring compliance with national and international standards. This research seeks to fill this niche by examining the current state of competency and biosafety among morticians in Kenya, identifying challenges, and proposing actionable recommendations to enhance the profession and protect public health. In order to meet the study objectives, this study adopted the Context-Evaluation, Evaluation-Input-Evaluation, and Product-Evaluation (CIPP) model as developed by Daniel Stufflebeam 1960 (Stufflebeam 2007).

Due to the existing gap in the training of morticians, the present study aimed at assessing the effect of mortician training on the practice of mortuary science and also

identifying the essential competencies required for morticians who seek to attain training in mortuary science and practice in Western Kenya.

1.2 Statement of the Problem

Globally, morticians offer important healthcare as they prepare the diseased body to prevent decay(Snare, 2020). Mortuaries usually serve a crucial role in the hospital care and processing of the deceased, but are not often(Woodthorpe & Komaromy, 2013).

In South Africa, depression in mortuary attendants is increasing due to lower resilience and poor health among inexperienced attendants (Nöthling *et al.,* 2015). In Qatar workers who work in cemetery and mortuary may be exposed to infection of SARS-COV-2 from bodies due to community exposure (Alishaq *et al.*, 2021).

In African, mortuary service has changed perception of people regarding to funerals and death, family of the deceased are given enough time to bury their loved ones. Countries In sub-Saharan Africa have mortuaries which were build earlier and are no longer compatible with safety and current occupational health standard(Akinyemi *et al.,* 2021a). In Ghana among the Akan clan, when one dies a bad death, it's associated with brief, customary rites are avoided and the deceased is expunged from his lineage history(Adinkrah, 2022). According to Dartey *et.al,* (2021), morticians in Ghana preserve the deceased but lack formal structured education which leads to poor occupation hazards and service delivery. In southwest Uganda mortuaries have inadequate human resources and lack proper equipment in the mortuary(James *et al.,* 2015). Mortuary attendants are negatively affected by long-term exposure to formalin, which leads to health issues which can be reduced through surveillance, protective equipment and training(Akortiakumah *et al.,* 2022)

In Nigeria, mortuary attendants and laboratory technologists required re-training and training in modern embalming techniques to cope up with the new trends in embalming services(Ajao *et al.,* 2011). The study recommended re-training and training of laboratory technologists and mortuary attendants in new embalming techniques.

In Kenya, mortuary science and practice is in critical need of establishing standardized and comprehensive competencies thus a need to develop a training program in mortuary science and practice(Silali *et al.,* 2017). Currently, there is a lack of proper competencies and educational guidelines leading to inconsistencies in training thus compromising the quality of mortuary services in the country(Dartey *et al.*, 2021). This gap poses significant challenges, including variation in knowledge, ability, and skill levels of graduates, a lack of clear career pathways, and potential public health risks for aspiring morticians.

Similarly, there is a concern regarding the level of awareness and biosafety among practising morticians during handling and disposal of bodies that were registered as COVID 19 causes. In addition recent studies (Dartey *et al.,* 2021) indicate low educational levels on awareness and handling measures of bodies among practising morticians in western Kenya as per (WHO, 2020).

Given the context of medical educational reforms for morticians, alongside the evolving health demands and existing challenges, this study was being proposed to evaluate the levels of competency and biosafety in mortuary science Practice among practising morticians in Western Kenya. The research is set to take place in western Kenya, aiming to bridge the identified gap.

The main objective of this study was to examine knowledge and biosafety practices within mortuary science training in Western Kenya, thereby aiding in the formula-

tion of a comprehensive and standardised education and training framework for this essential profession.

1.3 Objectives of the Study

This section outlines the broad and specific objectives of this study

1.3.1 Broad Objective

To assess the knowledge and biosafety in mortuary science practice among practising morticians in Western Kenya.

1.3.2 Specific Objective

i. To assess the level of bio-safety skills among practising morticians in selected mortuaries in western Kenya.
ii. To determine the knowledge level of practising morticians in Western Kenya.
iii. To determine the factors associated with knowledge and biosafety skills among practising morticians in selected mortuaries in western Kenya.

1.4 Research questions

i. What is the level of bio-safety skills expected among practising morticians in selected mortuaries in western Kenya?
ii. What determined the knowledge level of practising morticians in western Kenya.
iii. What factors were associated with knowledge and biosafety skills among morticians in selected mortuaries in western Kenya?

1.5 Justification of Study

Competency and biosafety training was ensure that morticians acquire technical skills and uphold dignity and respect for the deceased and their family which enhances public trust and service delivery thereby leading to an improvement of mortuary services. Moreover, through competency and biosafety training, morticians are likely to comply with regulations and standards which was lead to accreditation and licensing of mortuaries` in western Kenya.

In addition, through competency-based training, the biosafety component was equip morticians with the knowledge to prevent the spread of infectious diseases, safely handle and dispose of hazardous materials, and reduce health risks, thereby protecting both themselves and the community. Professional development was also improved through competency and biosafety training morticians can be more competitive in the job market, and through ongoing training support that may lead to career growth and specialization in mortuary science education in western Kenya.

1.6 Significance of the Study

The findings of this study will help to:-

Inform the allocation of resources and policy decisions towards enhancement and development of mortuary science programs. Secondly to promote awareness among regulatory bodies, healthcare providers, and the public about biosafety and competency in mortuary practice. Thirdly is to Foster partnership between health facilities, professional and educational institution to support improvement in mortuary education program .Fourthly is to Contribute to the certification process and establishment of training standards ensuring high quality care and consistent services among morticians in western Kenya. Lastly the Results of the research was add immensely into mortuary science education. On academic literature the institution while instructors

was utilize the discoveries of the research in making decisions concerning the place of competency and biosafety in mortuary science training.

1.7. Scope of the Study

The study was carried in four selected counties that are located in western Kenya, namely Bungoma, Kakamega, Busia and Vihiga. The study took seven months and focused on competency-based training. This CBT advocated for the nurturing of new skills and competencies among morticians who are currently in practice in the region. It empowered them to perform the relevant assigned and supervised duties and responsibilities of a mortician, knowledge acquisition through competency-based training of morticians and technical skills gained through on-the-job training which impacted on their existing skills like embalming which is relevant to morticians.

1.7.1 Limitations of the Study were:-

Regarding the study *time frame*, the researcher remained pro-active to the proposed shedual by engaging actively both in consultation and implementations of the activities which was realized and achieved. On the *study budget,* the researcher observed objectivity in spending by restricting spending to the specific needs while ignoring unnecessary emerging needs (rationalization of spending was the driven drive of motivation).Lastly on the *sample size determination* the researcher were strictly guided in obtaining a sample size of 102 study participants by use of Yamane's formula, they found this sample adequate to achieve the needs of the study objectives as supported by (Kothari, 2004).

1.7.2 Study Assumptions

To meet the current study objectives, we generated four study assumptions that addressed the study objectives, which included:-

I. It was assumed that study participants (mortuary attendants) would provide honest and accurate responses regarding their acquired level of biosafety knowledge and practice to all questions and interviews during the study.

II. It was assumed that the instruments used for data collection was valid and reliable in measuring competencies level of practising morticians in western Kenya

III. It is assumed that external factors beyond the researcher's control (e.g., institutional changes, social influences) will have minimal effect on the outcomes of the current study

IV. The study assumed that ethical considerations, such as confidentiality and informed consent, were fully upheld by both the researcher and participants (mortuary attendants).

1.8 Theoretical Model Framework

CIPP Model

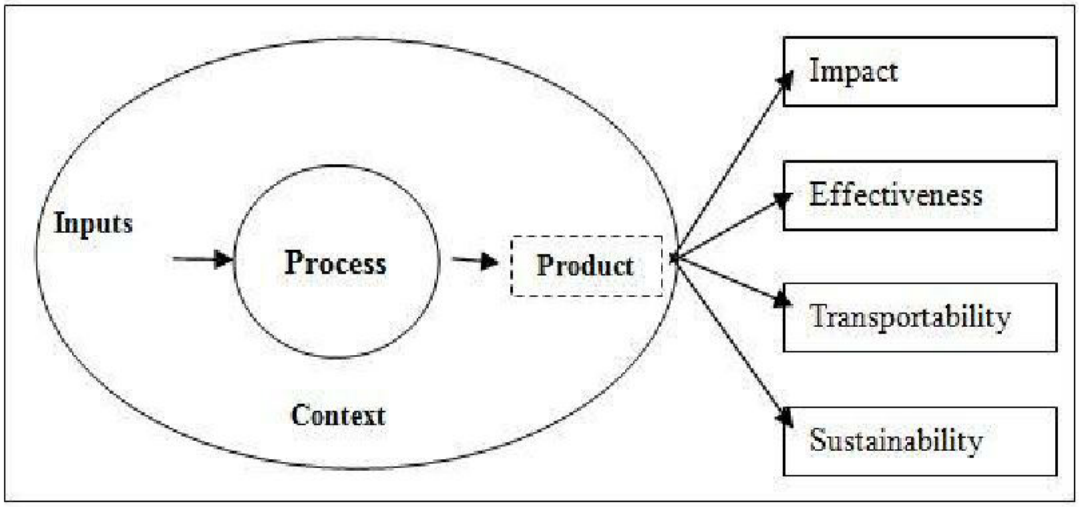

Figure 1.1 CIPP Evaluation Model (Stufflebeam, 2007)

The Context Input Process Product (CIPP) evaluation model is suggested as a framework for

Methodically guiding mortuary science and practice idea, design, execution, and evaluation, as well as providing insights and judgments on the biosafety and competency for ongoing improvement. The CIPP evaluation approach has been used to evaluate several educational programs and entities in educational contexts (Sopha *et al.,* 2019).

The CIPP evaluation technique emphasizes "learning-by-doing" to identify and correct problematic learning features. Practical application of the model can help with decision-making and quality assurance of the mortuary science program.

This model offers a holistic approach to evaluation, making it applicable across all phases, from initial planning to assessing outcomes and aligning with core values. Moreover, it is user-friendly, and ample literature exists regarding its utilization. The model comprehensively addresses every phase involved in the evaluation of an educational program, supplying the necessary data to facilitate meaningful enhancements in the mortuary science curriculum. However, the CIPP model does have limitations; it tends to center its information gathering primarily around decision-makers, and it lacks widespread recognition and application in the area of performance enhancement.

The model was chosen based on the notion that the quality of inputs processed (applied) within a specific physical and psychosocial learning environment influences the output quality of a given process. Clinical competence is measured in this scenario because clinical performance is the result or outcome of mortuary science teaching(Rooholamini *et al.*, 2017).

1.8.1 Context evaluation

Context evaluation helps evaluate the needs and opportunities within a clinical teaching (Aziz *et al.*, 2018). In this study the context referred to the curriculum policy on Biosafety in mortuary science teaching.

1.8.2 Input evaluation

This evaluation gives data for deciding the resources used to accomplish the program's aims (Lee *et al.,* 2019). The resources in this included time, adequacy of numbers and competence of medical teachers, instructional materials, funding, and skill laboratory.

1.8.3 Process evaluation

The functioning of the program, as well as the procedures for teaching and learning, are the subject of process evaluation. Implementation is the step at which the inputs are effectively used to achieve the product's intended achievements. The study looked at the processes to see how the colleges work and which procedures are in charge of enhancing operations and sustaining educational quality. These included the how the time allocated for mortuary rotations. How often mortuary assessments are done and if the students are followed up during mortuary placements.

1.8.4 Product evaluation

The college findings are incorporated into the product evaluation. The product's emphasis is not on the student's academic achievement but on the skills, views, under-

standing, experience, and abilities that the student was use in life to benefit society. The colleges' purpose is to produce competent morticians.

1.9 Conceptual framework

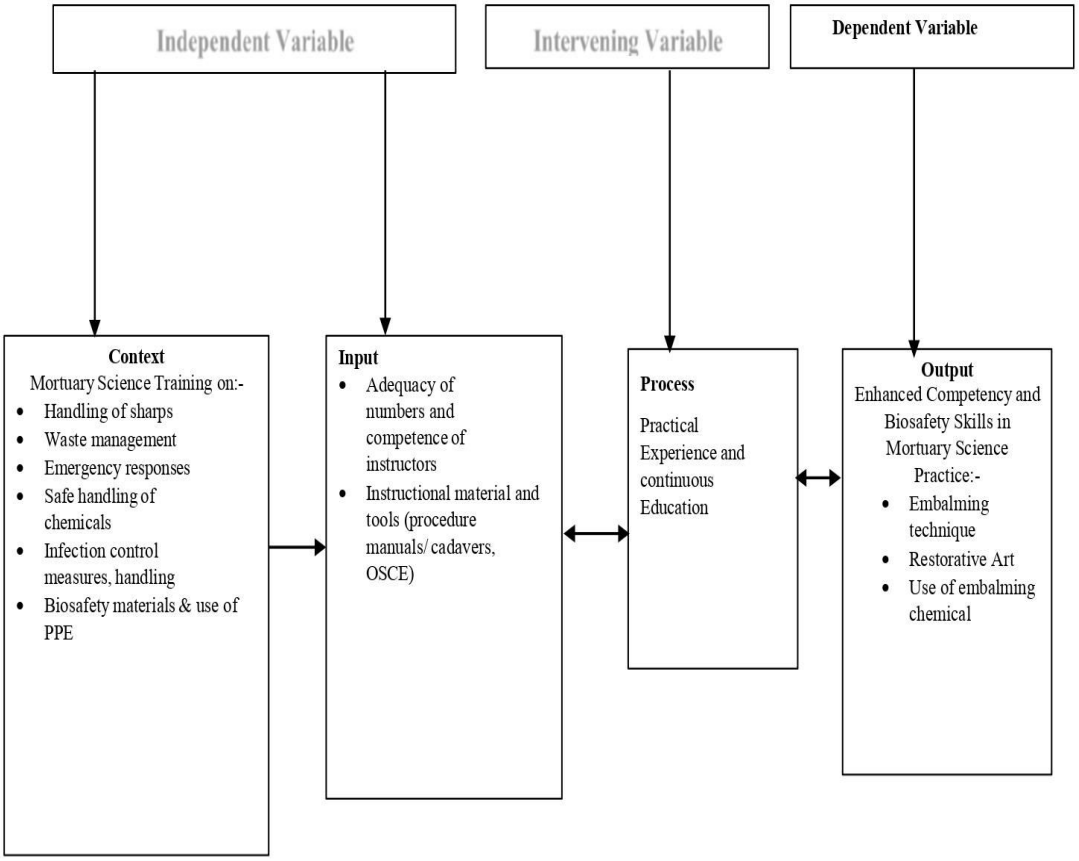

Figure 1.2: Conceptual Framework (Researcher, 2024)

CHAPTER TWO

LITERATURE REVIEW

2.0 Introduction

This section provides an overview of the research study's relevant literature materials. The part includes; Bio-safety skills required among morticians, Competencies required of morticians' professionals, ethical competencies, administrative and business competencies and factors associated with competencies in practising Morticians.

2.1 Bio-safety skills required among morticians

Biosafety encompasses the guidelines, methods, and protocols designed to prevent accidental exposure to or the unintentional release of biological agents, including pathogens, toxins, and genetically modified organisms. Biosafety proficiency in mortuary science practice is crucial for ensuring that morticians effectively manage the inherent risks associated with handling the bodies of deceased individuals. Mortuary workers routinely handle biological materials that may contain pathogens such as hepatitis B and C viruses, HIV, Mycobacterium tuberculosis, and emerging agents (Burton, 2003).

Standard precautions, including hand hygiene, use of body bags, and appropriate personal protective equipment (PPE) are recommended by WHO and are effective in mitigating risks (Ii *et al.,* 2020). In settings, adherence to these guidelines can be challenging but remains imperative to prevent the potential contact with, and spread of pathogens to the community (Sepkowitz & Eisenberg, 2005). In Ibadan, oya state morticians perceived safe handling of corpse's disinfection, restoration and preservation to be important for human remains(Akinyemi *et al.,* 2021a). Safe autopsy practices and universal precautions were important especially during covid-19 pan-

demic to prevent infections during post-mortem examinations(Ashok Chaudhari *et al.,* 2022)

The sensitive method for natural cause of death in adults, include biopsies and minimal invasive autopsies(Blokker *et al.,* 2015). Use of bio-contained systems and N-95 particulate respirators should be worn with autopsy prosecutors when handling blood fluid samples from HSF patients due to the aerosols generated may cause serious risk of infection(Nolte et al., 1996).

In sub-Saharan Africa biosafety gap were identified which informed national-level capacity development of a 5-year strategic plan(Obonyo *et al.,* 2011). The study recommended development of a regional biosafety legislative framework. Pathogenic agents in biotechnology research require biosafety measures to avoid occupational infections and biological risk through training of staff(Coelho & Díez, 2015). The study recommended training of the staffs and adaptation of biosafety measures designed to protect them.

Surveys in Nigeria and Ethiopia reveal inconsistence biosafety practices among mortuary staff(Ogunnowo *et al.,* 2019), found that only 58% of Nigerian mortuary attendants consistently used (Douglas & Peterside, 2016) documented frequent lapses in universal precaution adherence. In Oromia, Ethiopia, (Sewunet *et al.*, 2014) reported that fewer than half of laboratory and mortuary personnel regularly applied safety protocols, citing inadequate training and equipment shortages.

The literature reveals that biosafety proficiency among morticians in Kenya is largely influenced by the adequacy of training, accessibility of personal protective equipment (PPE), and the domestication of standard operating procedures (SOPs) within mortuary settings. (Okoth-Okelloh et al., 2021) reported that while comprehensive SOPs exist, inconsistent implementation and variable levels of training un-

dermine their effectiveness. This inconsistency is further compounded by resource limitations that prevent the regular updating of protocols and the provision of modern PPE factors that are crucial for protecting morticians from exposure to infectious materials.

(Azuekwu, 2022) supports these findings by noting that the application of biosafety measures, such as effective waste disposal, routine disinfection practices, and the strategic use of PPE, significantly improves safety outcomes in mortuaries. However, the same study points to persistent gaps in training and infrastructural support that hinder full compliance with recommended safety practices. Complementing these perspectives, (Simiyu, 2021) found that disparities in biosafety proficiency can be linked to variations in both the quality and frequency of in-service training programs, suggesting that continuous professional development is essential for maintaining high safety standards.

These studies highlight the need for targeted improvements in the training and resource allocation for mortuary staff in Kenya. There emerges a need to establish and rigorously enforce locally-tailored standard operating procedures, alongside continuous education programs to bridge the gap between policy and practice. Advancing biosafety proficiency not only safeguards the health of morticians but also contributes to broader public health efforts by minimizing the risk of cross-contamination and infection among practising morticians.

The following gaps in the practice of biosafety were identified in a few studies which noted that, there were insufficient institutional budgetary allocation to purchase, equip and train staff on biosafety Knowledge and skills (Ali Al Shehri *et al.,* 2022). In addition, the higher continuous overgrowing of general population was overstretching old pre-colonial facilities that do not match with the demands hence

exposing biosafety related risk to both the mortuary attendance and the general population especial in Africa (Ii *et al.,* 2020).

2.2 Competencies determined of morticians' professionals

Morticians require a set of competencies to enable them to carry out their duties efficiently and effectively. The competencies required are legal, ethical, technical, interpersonal, administrative and business.

2.2.1Technical Competencies

Technical proficiency remains the cornerstone of effective mortuary practice. Morticians must be proficient at procedures such as embalming, autopsy assistance, body handling, and preservation. These skills are underpinned by a sound understanding of human anatomy, pathology, and the legal frameworks that govern the management of deceased individuals (Mwangi, 2018). In Kenya, where many practitioners receive on-the-job training, there is growing concern that the variability in formal educational exposure contributes to inconsistent technical proficiency across the profession.

2.2.2 Embalming and body preparation

For realistic teaching conditions for oral surgery and implantology of human cadaver embalming method ,enables drilling, dissection under conditions similar to the living body (Hölzle *et al.,* 2012). The study recommended embalming technique to be ideal for teaching and practising in implantology and oral surgery on human material. The two method of preserving human remain in the funerals for display are, Non-natural and natural which involves human embalming technique to preserve and prevent decomposition (Ajileye *et al.,* 2018). The study recommended mortuaries should be well ventilated or equipped with extractor fans.

Western Muslims are faced with challenges like Muslim post-mortem practices that include, organ donation, funeral customs, washing, shrouding and preparing the deceased for burial attempting to follow traditional practices(Bagasra & Bagasra, 2019). The study recommended the service providers and Muslim community to address them.

To prevent decomposition and preserve human remains as long as possible, aqueous solution of soluble germicidal and perseverative chemicals are used in embalming in a complex process(Batra *et al.,* 2010) The study discussed various body preservation methods and new advances in embalming. Modern embalming is influenced by commercial network, material culture and industrial actors which have evolved from medical science to secular sphere becoming cooperative chain surrounding death(Trompette & Lemonnier, 2009). The study explored how death and embalming had become cooperative chain surrounding funeral industry. In the late 13th century to 19th, aristocratic elite used diverse recipes in embalming with evisceration for archaeological analysis to identify ingredients (Corbineau *et al.,* 2018). The study proposed new research avenue in modern Europe and history of pharmacy in the late medieval era.

2.2.3 Funeral service coordination

Funeral services require more staff because of the high emotional control from consumer and service provider for quality assessment(Korai & Souiden, 2017). The study argued that funeral service depends on proximity, integrity, integrated logistics and funeral houses. Bereavement support can be provided by funeral service providers by adopting ongoing and personalized support, and a proactive approach(Aoun *et al.,* 2019). The study found that funeral providers came third most prevalent form of support after family and friend.

Human remains management new proposed regulation is more stringent, making it impossible for emerging funeral directors than the current one(Maphela, 2023). The study found that current human remains management regulation is fair compared to the proposed regulation.

2.3. Ethical competencies

2.3.1 Ethical conduct

Funeral organization during pandemics needs an ethical approach to ensure sanitary and responsible body handling to cope with grief (Fery, 2020). The study recommended an ethical approach for organizing funeral responsible. After death body parts of the deceased should rest on the presumption that concept is given by the family or the deceased, that's the principle governing organ retention ethics (Brazier, 2002). The study argued that removal of body parts, was rely only from consent from the family of the deceased or the deceased(Law et al., 2016), found out that Moral sensitivity and professional values both have a strong correlation with ethical decision-making. Additionally, professional values play a mediating role in the relationship between moral sensitivity and ethical decision-making. These insights highlight the importance of developing ethics education programs that focus on nurturing students' professional values in conjunction with their moral sensitivity, as this approach can improve their capacity for ethical decision-making.

2.3.2 Cultural competence

Morticians are often required to provide supportive and empathetic communication with bereaved families, necessitating strong interpersonal, cultural sensitivity, and grief counselling skills.(Obilo & Mutua, 2019) highlight that in Kenya's culturally diverse settings, such soft skills are imperative for navigating the varied rituals and

expectations associated with death. These competencies help maintain professionalism and ensure that service delivery aligns with societal values.

Local government cemetery management needs cultural competence to help address intersectional, racial segregation and funeral economics addressing cultural differences and promoting understanding even in death and life(Zavattaro, 2021). The study brings to light how cemetery managers must understand, confront, and tackle cultural differences after life.

For marginalized individuals, Cultural competent care involves valuing, recognizing differences, diversity avoiding stereotype and advocating for effective healthcare model MELEIS1999. The study argues that acknowledgment of differences, intolerance of inequity, stereotyping and advocacy for marginalized requires attention in the funeral service.

2.3.4 Grief counselling and support

Mortuary professionals occupy a unique position of trust at the deathbed and graveside. Integrating grief counselling into their formal training to include grief theories, communication techniques, self-care, and cultural competence was equip them to offer meaningful psychosocial support. Grief counselling is recognized as a specialized competency focused on effectively addressing and managing the emotional needs of clients facing death and experiencing bereavement, serving as a fundamental element of ethical grief support (Gamino & Ritter, 2012).

Grief counselling competency encompasses specialized knowledge, skills, and attitudes enabling practitioners to guide the bereaved through loss (Gamino & Ritter, 2012). Despite broad counselling competencies, practitioners regularly score lower on grief-specific domains such as articulating mourning tasks or distinguishing complicated grief from whom morticians can learn. In addition, training studies us-

ing the Grief Counselling Competency Scale report wide variability in perceived readiness, particularly in conceptual, assessment, and treatment skills (Bouldin & Bouldin, 2019).

Models such as Worden's Tasks of Mourning and Rando's R-process provide theoretical frameworks that morticians can adopt to structure supportive interactions (ERIC, 2005). Empirical studies of be bereavement groups demonstrate that structured support alleviates complicated grief symptoms, especially when facilitated by trained professionals (Logan *et al.,* 2017) Pilot death-counselling interventions based on SPIKES improved caregivers' preparedness and reduced anxiety (Lee *et al.*, 2019).

Cultural sensitivity is critical, as bereavement practices vary widely between cultures (Bouldin & Bouldin, 2019) A recent scoping review emphasizes tailoring grief interventions to cultural contexts, recognizing mourning rituals and belief systems to optimize support. For morticians, this means integrating knowledge of local funerary customs into empathetic communication. Cognitive behavioral therapy strategies and mindfulness, effectively assist bereaved persons rebuild their lives after loss.

The study evaluates current advances in grief practice and research shows it helps bereaved people to rebuild their lives after loss. This shows that morticians need to develop competency in this area to ethically and effectively support grieving families. Regular proficiency assessments and continuing education, aligned with established grief-counselling competencies, are recommended to maintain high standards of care.

2.3.5 Customer service

Customer care in funeral services involve instrumental assistance, clear and compassionate communication, emotional support, professionalism, and post-service fol-

low-up. Bereaved families rate funeral directors highly when these competencies are demonstrated, and strong customer care correlates with satisfaction, loyalty, and healthier bereavement outcomes. However, variability in training and a lack of standardized curricula leave gaps in many morticians' readiness to deliver exemplary service. Funeral directors' competence in handling logistical issues such as arranging transportation, and managing legal paperwork directly affects family perceptions of service quality (Aoun *et. al*, 2018).

Effective logistical support reduces anxiety by ensuring that practical arrangements proceed smoothly (Aoun *et. al,*, 2018). Professionalism, respectful demeanor, adherence to cultural customs, and transparent pricing builds trust and underpins all customer interactions (Aoun, Lowe, Christian, & Rumbold, 2019). In Malaysia i-jenzcare is an app that helps service provider and customers organize Islamic burial service(Saany *et al*., 2021). Using an innovative analytic (AHP) and a cell phone. The study introduces new traditional Islamic burial service practices in Malaysia.

Empirical studies demonstrate that superior customer care predicts both immediate satisfaction and long-term loyalty: families are more likely to recommend and reuse services when they experience personalized, empathetic support. Qualitative analyses revealed that the most anxiety-relieving aspects of a funeral are prompt attention to needs, calm service delivery, and keeping commitments (Kawamoto *et al.,* 2023).

2.3.6 Communication

Advice, availability and memories provide comfort while messages explaining or justifying the death lead to grief, with religious service attendance affecting this relationship(Droser & Seurer, 2022). The study revealed that attending religious services affected reports of grief and adjustment with message type. Clear, timely ex-

planations of options, costs, and procedures are critical; families report that straightforward guidance alleviates confusion during decision-making (Aoun, 2022).

Actively acknowledging family concerns without judgment is a key communication skill linked to higher satisfaction (Fortunatti *et al.,* 2022). Framing funeral care as a "last hospitality" for the deceased underscores the importance of authenticity and warmth in every interaction with the bereaved. Post-service outreach such as follow-up calls or memorial acknowledgements extends care beyond the funeral event, which signals lasting commitment and genuine support for bereaved families (Fortunatti *et al*., 2022).

2.2.4 Administrative and business competencies

2.2.4.1 Business management

Business proficiency is essential in various healthcare professions that require a combination of clinical expertise and operational, financial, and strategic responsibilities. Roles such as those in health administration, financial management, clinical leadership, human resources, and consulting require skills in budgeting, revenue cycle oversight, strategic planning, and stakeholder communication. Additionally, non-clinical positions such as medical practice consultants, and administrative coordinators require business proficiency to ensure efficient, compliant, and patient-centered services.

Challenging the perception of the industry as a conservative business, funeral directors act as intermediaries for services in the funeral industry and innovative digital products(van Ryn *et al.*, 2019). The study provides an account on funeral economy and current development on how funeral industry professionals have embraced technology. Morticians require proficiency in budgeting, cost control, and revenue diversification. Owners of funeral parlours benefit from training in financial analysis,

examining profit margins, managing cash flow, and evaluating service pricing, to balance profitability with quality care as identified by(Javani *et al.,* 2017), In resource-limited settings, technical proficiency in financial and budget management correlates with more effective performance monitoring and strategic allocation of funds.

2.2.4.2 Market and sales

In the healthcare sector, market and sales knowledge has become an essential competency for healthcare professionals. Effective marketing strategies enable providers to understand patient needs, improve service delivery, and sustain organizational growth. A study by (Fortunatti *et al.,* 2022) emphasized that healthcare executives recognize market segmentation, pricing, and product development as critical tasks requiring robust marketing expertise. Moreover, personal selling, where health organizations deploy business development officers, has been shown to strengthen patient-provider relationships and expand referral networks(Elrod & Fortenberry, 2020).

Furthermore, strategic marketing communications help build patient trust and loyalty, influencing healthcare choices and enhancing public engagement(Elrod & Fortenberry, 2020). As competition grows in healthcare markets, the ability to effectively market services and understand sales dynamics is increasingly vital for both public health initiatives and private practice success. In addition, marketing competence is required due to the nature of the services the offer.

A content analysis survey of funeral-home websites and found that user-friendly digital platforms with clear information, contact options, and empathetic messaging improve public engagement and trust revealed that funeral directors need to adopt targeted advertising strategies, such as leveraging community outreach and digital

channels to reach bereaved families sensitively.Casket prices fall when state caskets sales restriction are lifted but funeral services rise not reducing overall funeral home revenues and supporting the one-monopoly-rent hypothesis(Chevalier & Morton, 2008). The study advocates for the one-monopoly-rent hypothesis.

Regarding the gap on competency required of a mortician to practice safely in the field the following studies mentioned the existing gaps which included,

A study done by(Olum *et al.,* 2020) assessed attitude, knowledge and practice among health workers. Found a significant gap on knowledge and biosafety practices should low adherence due to inadequate PPE, fear of infection and lack of institutional support which advocated for continuous training and availability of resources.

2.5 Factors associated with competency

There are differences and similarities in professional competency for biosafety, public health and infection prevention professions a cross training opportunity for various professions(Emery *et al.,* 2022). In the University of (PHCJ), among allied educators, higher levels of skills and knowledge in bio risk management are associated with higher levels of performance in bio risk management(Baragona & Bermudo, 2023).

Trained and experienced nurses were better in personal protection and biosafety practices compared to nurse who have newly graduated(Bajjou *et al.*, 2020).In Dhaka city 94% of laboratory workers have inadequate training and knowledge on biosafety measures(Islam *et al.*, 2021). The researcher suggested cooperation of biosafety topic in the syllabus and adequate financial support.

National autonomous university of Honduras has paved the way for the national biosafety culture and strengthened biosafety capacity through a technical cooperation

program(Sanchez et al., 2011). The study recommended allocation of space for biosafety training centre and the findings to be integrated into school strategic plan.

In Pakistan students learn effectively and improve their awareness and knowledge of laboratory biosafety through the Socratic Method(Muneer *et al.,* 2021). The study emphasised the importance of learning, Socratic style of in teaching students in awareness and information of laboratory biosafety in an academic setting.

According to(Foster & Jones((2020), Competency-based education improved metacognitive and higher academic performance in students taking a nursing course. In developing students' competencies, clinical performance and improving academics, competency-based education can be as effective or equal to traditional didactic models(Foster & Jones, 2020). Newly recruited nurses in clinical nursing care improved on their competency in innovation, critical thinking, interpersonal communication, professional construction, knowledge and personal traits through CBT*(S. Chen et al.*, 2022).

Nursing competency-based training degree program helped develop acquired knowledge and competencies required for labour scenarios for professional practice performance(Lepez & Eiguchi, 2022).

In plastic surgery residency, competency-based education helped them to learn at their own pace, focusing on skills retention and acquisition, which helped them master the competencies*(Reddy et al.*, 2023)

For effective pelvic floor physiotherapy practice, a safe competency-based framework is needed(Frawley *et al.*, 2019)..For competence in pelvic floor physiotherapy, the study proposed a framework for the future that defines, clarity to clinicians about their ethical, clinical, and legal obligations to the public.

Disaster mental health competencies are important for training and selecting mental health professionals, focusing on cultural competencies(King *et al.*, 2015). The study proposed that consideration should be given to the requirements of both international and domestic disaster response to be considered when developing criteria-based competencies for disaster mental health professionals.

Competent practice requires reliable access to equipment such as embalming instruments, refrigeration, and personal protective equipment. In Nigeria, only 58% of mortuary attendants consistently used PPE, directly impacting their skill application in infection control (Ogunnowo *et al.,* 2019) . Ethiopian studies similarly report inadequate biosafety resources as a barrier to safe practice (Tsegaye *et al.*, 2019) In Kenya, surveys reveal that shortages of body bags, disinfectants, and gown supplies limit practical competency (Okoth Okelloh *et al.,* 2015).

Further, establishing clear policies and guidelines establish minimum competency standards. The World Health Organization's mortuary biosafety recommendations for example, universal precautions and engineering controls serve as global benchmarks (WHO, 2020) Kenya's safety regulations similarly mandate training and annual competency assessments, yet only 47% of mortuary staff reported receiving formal safety-aligned training (Okoth-Okelloh *et. al*., 2015).

Hands-on experience under skilled supervision also fosters proficiency. Simulation-based instruction in related healthcare fields has boosted confidence and technical skill. Similarly, Cross-sectional data indicate that Kenyan morticians with structured mentorship report higher job satisfaction and self-rated competency.(Warutere, 2024) On the other hand, absence of mentorship is associated with higher error rates in embalming and autopsy assistance.

In addition, ongoing professional development through workshops, refresher courses, and proficiency testing is documented to improve competency especially among less experienced professionals. In U.S. laboratory settings, bi-annual proficiency evaluations are required to maintain skills (Sepkowitz & Eisenberg, 2005). Kenyan studies however, note that lack of continuous education opportunities contributes to skill decay and low morale, reducing the quality mortuary services (Laisser & Ng'home, 2017).

Regarding factors associated with competency among practising morticians studies identified the following factors having influenced the competency level of morticians to performance of their duties during their daily routine at their respective work places.(WHO, 2020)(Islam *et al.*, 2021)(Silali *et al.*, 2017).

2.6 Summary of literature gaps

The current literature on assessing biosafety and competence levels of morticians in Kenya reveals several important gaps that warrant further investigation. There is a notable scarcity of empirical studies that specifically focus on morticians compared to other healthcare professions. Most available research tends to concentrate on doctors, nurses, and other clinical practitioners, leaving the unique competencies required for mortuary science such as technical proficiency in body handling, embalming procedures, and biosafety practices.

Kamau (2021) investigated the challenges that mortuary science professionals face, particularly regarding the development and implementation of standardized competency benchmarks. While the study outlines the critical competencies that should be possessed by morticians, such as technical proficiencies, it focuses on the current training frameworks and educational curricula provided to mortuary professionals in Kenya, but not on competencies and biosafety skills among practising morticians

Furthermore, research on biosafety by scholars such as (Akinyemi *et al.*, 2021b; Dumahasi, 2020) put a lot of emphasis on the use of individual PPEs among morticians, which leaves gaps in the documentation of overall biosafety training and adherence. Additionally, the literature shows a significant disparity between the availability of biosafety training and guidelines, and the application of biosafety protocols in practice, hence the need for context-specific research.

CHAPTER THREE

MATERIALS AND METHODS

3.0 Overview

This chapter details the methodology that was guide the execution of the research, including the procedures and steps taken to fulfill the study's objectives. It describes the research setting, study design, sample size determination, sampling methods, data collection procedures, data analysis techniques, and the ethical considerations that were followed throughout the study

3.1 Study Area

This study was undertaken in both public, private and Missionaries' funeral homes and mortuaries that were unevenly located in western Kenya, as illustrated in Table 3.1, Pg. 28. These study sites were purposively selected since they had been approved by TVETA and KQNA as of 2022 for mortuary science training. Secondly, they were unevenly distributed in western Kenya, which includes Kakamega, Bungoma, Vihiga and Busia counties respectively. Western Kenya has a population of 5,021,843 with an area of 7,400.4 km² in accordance to (KNBS & ICF, 2023)

3.2 Study Design

The study used a descriptive study design (Saraswati & others, 2023), which specifically utilized a cross-sectional survey that combines both qualitative and quantitative research methods.Data was collected at a single point in time. This design was also enable testing of cause-and-effect relationships of the variables under study. The study was employ a systematic way of gathering inform (Sulaiman *et al.*, 2022). The information gathered was describe the aptitude and biosafety of morticians practising in Western Kenya.

3.3 Study Population

According to the register book Kenya Health Professional Oversight Authority (KHPOA), the targeted population was 102 practising mortician as at January 2022. While, the accessed population (study participants) were 89 drawn from Western Kenya. This study was carried out in both private and public funeral homes and mortuaries located in Western Kenya as indicated in table 3.1.

Table 3.1: Study sites and Target Population

Study Sites	Number of Mortuar-ies/Funeral homes	Study Population	Sample Size (target popu-lation
KAKAMEGA a) Kakamega funeral palour b) St. Elizabeth Mukumu Mortuary c) Orthopedic Funeral home d) St. Mary Mumias Mortuary	4	52	45
BUNGOMA a) Life care funeral home b) Bugoma County Funeral Mortu-ary	2	12	11
VIHIGA a) Vihiga Funeral palour b) Kaimosi Funeral Palour	2	8	7
BUSIA a) Port Victoria Sub-district Mortu-ary b) St. Joseph Funeral homes c) Busia County Hospital Funeral Palour d) Alupe Funeral Home e) Tanaka Funeral Home f) Nagina Mission Funeral Home	6	30	26
TOTAL	**14**	**102**	**89**

3.3.1 Inclusion criteria

All practising Morticians who were licensed and trained on competency-based train-ing and were working in both private and public mortuaries and funeral homes in western Kenya.

3.3.2 Exclusion criteria.

All practising Morticians who did not consent to the study were excluded during the time of the study.

3.4 Sample Size and Sampling Procedure

3.4.1 Sampling Procedure

The study employed purposive census sampling by grouping funeral homes and mortuaries into distinct clusters based on their locations within Kakamega County, Vihiga County, Bungoma County, and Busia County, respectively. Stratified sampling was used to identify the target population of morticians practising in different counties in Western Kenya. Thus, purposive sampling was also employed to identify practising Morticians working in registered funeral homes and mortuaries in Western Kenya. Simple random sampling was also utilised to choose respondents short of bias from the available population.

Simple random sampling is also as simple as possible to do statistical analysis with, which can utilise standard probability theory directly for more accurate estimates and intervals of confidence. However, the method is also efficient and transparent since it is easy to use (given a good sampling frame) in research protocols (Pradesh & Pradesh, 2025). The application of simple random sampling generally improves the methodological soundness of the study through the reduction of error by the system and the use of robust inferential statistics.

3.4.2 Sample Size Determination

This research drew a sample size using .(Taro Yamane, 1973).

$$n = \frac{N}{1 + N(e^2)}$$

n = the desired sample size

N = the total population

e = the level of statistical significance (0.5)

Therefore, the sample size for the study is

$$n = \frac{102}{1+102(0.05^2)} = 81$$

n=81

Sample size: (n=81) and attrition rate %10 (Eysenbach, 2005)

Actual size 81+ AR (attrition rate) = 89

3.5 Instruments for Data Collection

This makes reference to the creation of the tools that was employed in the data collection exercise. The researcher was create questionnaires, schedules for small group discussions, and interviews in order to gather the necessary data in order to address the research topics.

3.5.1 Questionnaires

This is one of the research strategies that is frequently used in academic studies to quickly and clearly learn about attitudes and opinions while also learning about existing conditions and practices (Raskind *et al.,* 2019). Ordinal, interval, and ratio data was collected via questionnaires to apply the more potent statistical method.

Questionnaires were administered for objectives one, two, and three which was assess the competency and biosafety among morticians on skills and performance.

3.5.2 Interviews guide

The interview guide was used to ascertain the effects of competency-based training on skills and performance of morticians practising in Western Kenya. The interview guide, particularly refers to person to person communication. This method is well-suited for exploring in-depth information, attitudes, and perspectives of students and medical teachers. The respondent is asked questions to elicit his/her own information or opinion (University.Loyola, 2020) The researcher was create a one-level interview schedule for morticians practising in Western Kenya.

3.6 Validity and Reliability

3.61 Validity of the Instrument

The research was pre-validated as suggested by ((Höfling & Tibshirani, 2008) in particular both internal and external validity were put into consideration. The tool was pre-viewed by the subject experts who confirmed that it meet the following criteria content, construct and criterion as recommended by .(Kothari, 2004)

3.62 Reliability

Reliability refers to the extent to which a research instrument consistently produces stable and uniform results across repeated trials, assuming all other conditions remain unchanged. Scholars commonly acknowledge a standard method for assessing the reliability of a questionnaire. In this study,

A pre-test study was done at Jaramogi KWEE Funeral Homes in Kisumu. The funeral home that had similar characteristics as those funeral homes and mortuaries that are found in Western Kenya the Cronbach's alpha coefficient for internal con-

sistency was found to be 0.88. This enabled the researcher to proceed on to the main study as proposed by (Mugenda, 2003). This enabled the researcher to test the reliability and validity of the research instrument. It also help the researcher ensure that the questions are clear and to take into account feedback from respondents that was aid in the development of the instruments.

3.7 Data Management, Analysis and Presentation

With regard to quantitative data, SPSS software (statistical package for social sciences) Version 28 was used for data entry, cleaning, coding, and analysis as guided by (IBM, 2024). The distribution of each variable in the study objective was described using a univariate analysis, and appropriate descriptive analysis was utilized to produce frequency distributions, tables, and other drawings that were used to analyse diagnostic treatment methods. The strength of the link and any discrepancies between the outcome variable and the other independent variables was examined using bivariate analysis as recommended by (Tobi & Kampen, 2018).

With regards to qualitative data, coding were done based on each study objectives from Key Informant responses , subthemes were generated and later merged to form key three major themes that were triangulated with quantitative data as recommended by (Saraswati & others, 2023)

3.8 Logistic and Ethical Consideration

Authorization: Research protocol was submitted to Masinde University of Science and Technology, Institutional Scientific Ethic Review committee for approval before the study commences. A research permit was obtained from the National Commission for Science, Technology and Innovation (NACOSTI). Additionally, approval to conduct data collection was granted by the management of the funeral homes and

mortuaries involved in the study. The research was carried out in line with the ethical principles outlined in the Declaration of Helsinki, as well as the international ethical guidelines for biomedical research involving human subjects as noted by (Gray *et al.*, 1978).

Informed consent (Autonomy): Before participants were enrolled in the study, they were provided with a clear explanation of its purpose, objectives, potential benefits, and associated risks. Written informed consent was obtained from each participant. Approval and authorization were also sought from the appropriate governing bodies.(Gray *et al.,* 1978)

Privacy: Privacy of the study participants was safeguarded throughout the study period.

Confidentiality: Confidentiality and autonomy were applied at all stages of the research (data collection, data analysis and reporting, etc.). A unique identification number was used for recording purposes (Kothari, 2004)

Publication and dissemination: Results of this study shall be made publicly available by publishing them in peer-reviewed journals and disseminated through institutional presentations, national and international conferences.

Table 3. 1 Statistical analysis matrix as per the study objectives

Data analysis was done as per the study objective variables as shown in the table below.

Objective	Data type	Data analysis	Data Analysis Tool
Level of biosafety skills.	Categorical Quantitative	Frequency and Tables	SPSS version 28
Knowledge level of morticians	Categorical Quantitative	Descriptive data - percentages and frequencies Inferential data -Chi-square	SPSS version 28
Factors Associated with knowledge and biosafety	Categorical and continuous Quantitative	Descriptive data - percentages and frequencies Inferential data – multinomial logistic regression	SPSS version 28

CHAPTER FOUR

RESULTS

4.0 Introduction

This chapter summarizes the results of the research. The researcher. The key results are presented sequentially in this chapter as per the objectives, the assessor assessed the level of proficiency and knowledge among morticians in the Western region of Kenya. In addition to that, the influencing factors on knowledge were also explored the study.

4.1 Demographic profile

The sample was composed of 89 morticians working within Western Kenya. Questionnaires were distributed to 89 (84.76%) respondents out of 105 entire population between 27th February 2025 and 28th March 2025. Of the questionnaires administered, 89 were returned, out of which all were completed and were analyzed, with a 100% response rate. There were more males, n = 55 (61.8%), than females, n = 30(33.7%). The age of the respondents ranged from 19 to 62 years, with a mean of 28.6 years and a standard deviation of 8.1 years. The majority, n = 45 (50.6%), were practising in the county of Kakamega at the time of data collection. Their work experience varied from 1 to 20 years, with a mean of 3.7 and a standard deviation of 4.1. A certificate in mortuary science was the highest level of education attainment by almost all, n = 81(95.3%) of the respondents. Table 4.1 presents the findings.

Table 4.1: Respondents demographic profile

Factor	Frequency	Percent
Gender		
Male	55	61.8
Female	30	33.7
Not indicated	4	4.5
Education		
Certificate in mortuary science	81	95.3
Ongoing	4	4.7
Not indicated	4	4.5
Location		
Kakamega	45	50.6
Bungoma	12	13.5
Busia	25	28.1
Vihiga	7	7.9

Minimum	Mean	Std. dev	Maximum
Age			
19	28.6	8.1	62
Experience			
1	3.7	4.1	20

As illustrated in Figure 4.1, almost half, 49.4% of the facilities were public, 29.2% were missionary, and 21.3% were private.

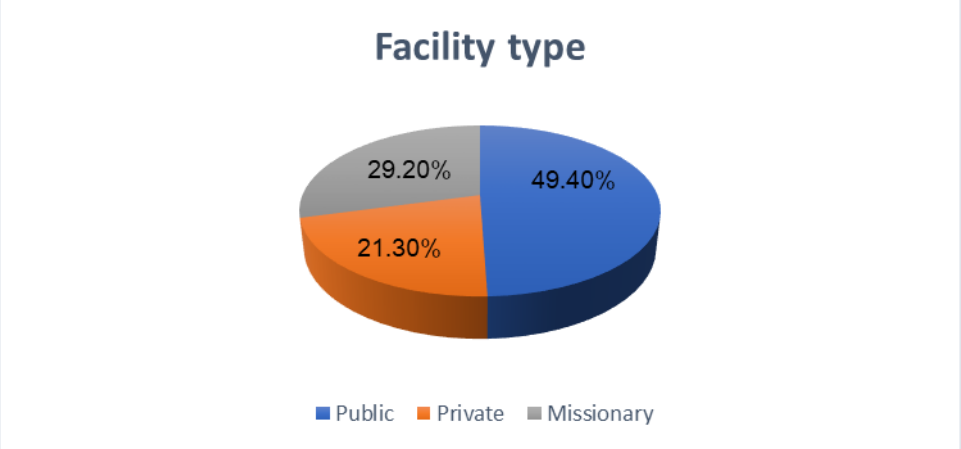

Figure 4.1: Facility type

4.2 Level of Biosafety skills

Overall, the respondents were highly trained in all but two of the biosafety aspects. The most training ventured in was the utilization of PPEs, at 97.8%, followed by infection control and handling of bio-hazardous material at 91% each. Handling of sharps and waste management were the least undertaken training. Figure 4.2 illustrates the results.

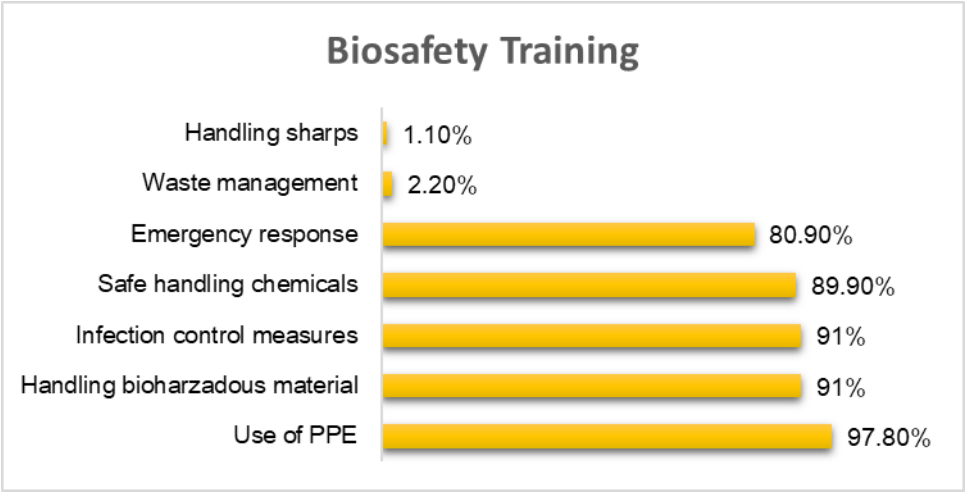

Figure 4.2: Biosafety training

Similar to the trend in biosafety training, the respondents scored highly in biosafety practices, reporting mostly good and excellent bio-safety practice skills, especially in Handling and disposal of bio-hazardous material, and Safe handling of chemicals and disinfectants, where none were poor. Furthermore, the respondents admitted to frequently leveraging their biosafety skills in their practice. Table 4.2 and Figure 4.3 show the results.

Table 4.2: Biosafety practices

Practice	Frequency	Percent
Proper PPE use		
Poor	1	1.1
Fair	3	3.4
Good	53	59.6
Excellent	32	36.0
Handling and disposal of bio hazardous material		
Fair	3	3.4
Good	58	65.2
Excellent	28	31.5
Infection control measures		
Poor	1	1.1
Fair	3	3.4
Good	50	56.2
Excellent	35	39.3
Safe handling chemicals and disinfectants		
Fair	3	3.4
Good	58	65.2
Excellent	28	31.5
Emergency response procedures		
Poor	1	1.1
Fair	6	6.8
Good	60	68.2
Excellent	21	23.9

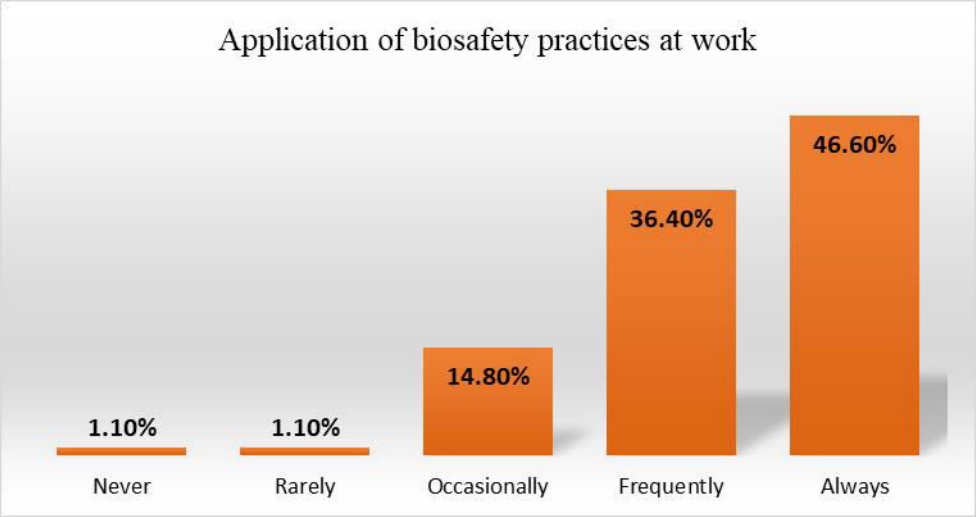

Figure 4.3: Application of biosafety practices at work

A high level of proficiency was considered for the respondents with good skills, who applied the skills frequently or always. 82% were found to be highly proficient, as presented in Figure 4.4.

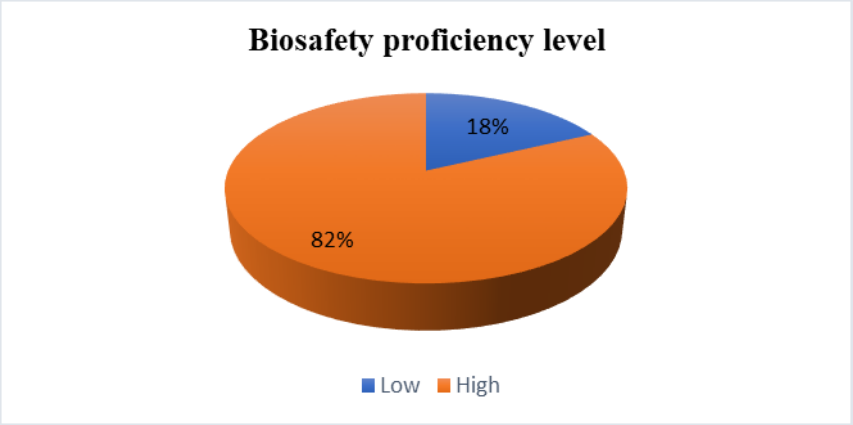

Figure 4.4: Biosafety proficiency

4.3: Knowledge level of morticians

4.3.1 Technical proficiency

About 53% of the respondents, which was the majority, had an intermediate level of proficiency in embalming, even though 95.5% believed they were adequately trained in the latest embalming techniques and practices.

Cumulatively, n= 74(83%) had at least an intermediate level of proficiency in compliance to health and safety guidelines, and only 6(6.7%) had not participated in competency-based continuing education such as workshops. Table 4.3 shows the results

Table 4.3: Level of technical skills and knowledge

Proficiency	Frequency	Percentage
Embalming		
Beginner	10	11.2
Intermediate	48	53.9
Advanced	31	34.8
Reconstruction		
Beginner	13	14.6
Intermediate	41	46.1
Advanced	35	39.3
Use of embalming chemicals		
Beginner	13	14.6
Intermediate	34	38.2
Advanced	42	47.2
Health and safety compliance		
Beginner	15	16.9
Intermediate	34	38.2
Advanced	40	44.9
Continuing education or training workshops		
Never	6	6.7
1-3 times a year	66	74.2
Over 3 times a year	17	19.1
Adequately trained in the latest embalming tech-		
No	4	4.5
Yes	84	95.5

The vast majority of the respondents, n = 84(94.4%), participated in health and safety compliance competency-based training in the last year. Meanwhile business management skills training was the least participated in n= 64(71.9%) as presented in table 4.4

Table 4.4: Competency-based training

Competency based training	Frequency	Percent
Health and safety compliance	84	94.4
Business management skills	64	71.9
Embalming techniques	81	91.0
Ethical and cultural competence	73	82.0
Restorative art	69	77.5

Respondents who had at least an intermediate level of proficiency in embalming techniques, restorative art, the use of embalming chemicals, health and safety compliance, and participated in continuing education at least 1 to 3 times a year were considered to have high levels of proficiency in technical skill and knowledge in general. Just over half n = 52(58.4%) showed a high level of proficiency. Figure 4.5 illustrates the results

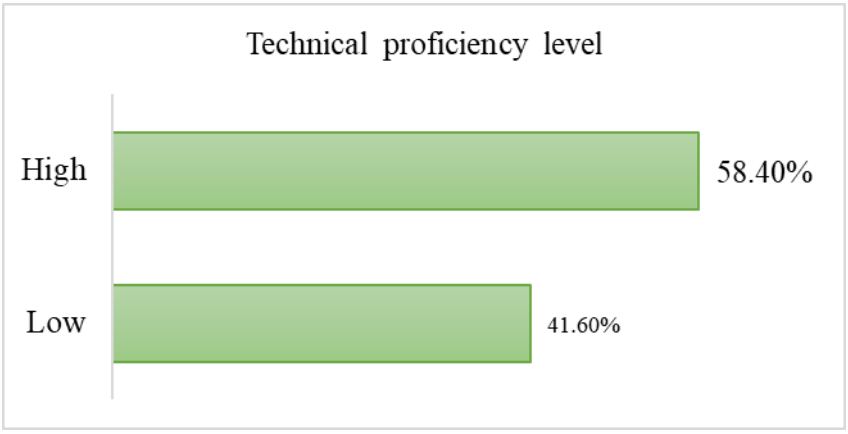

Figure 4.5: Proficiency in technical skills and knowledge

As presented in Table 4.5, none of the demographic factors had any significant association with proficiency at the 95% significance level.

Table 4.5: Association between demographic factors and technical proficiency

Factor	Category	Low	High	Chi (p value)
Gender	Male	25(45.5)	30(54.5)	0.24(0.63)
	Female	12(40.0)	18(60.0)	
Education	Secondary	0(0.0)	1(100)	
	Certificate in mortuary science	35(43.2)	46(56.7)	1.29(0.52)
	Ongoing	1(25.0)	3(75.0)	
Location	Kakamega	15(33.3)	30(66.7)	
	Bungoma	5(41.7)	7(58.3)	3.41(0.33)
	Busia	14(56.0)	11(44.0)	
	Vihiga	3(42.9)	4(57.1)	
Facility type	Public	15(34.1)	29(65.9)	
	Private	10(52.6)	9(47.4)	2.20(0.33)
	Missionary	12(46.2)	14(53.8)	

4.3.2 Ethical and cultural proficiency

The vast majority of the respondents, n= 87(97.8%), had training in resolving ethical issues, with a cumulative 84.3% having at least a good understanding and respect for cultural and religious practices related to death in Western Kenya. However, less than a third, 27.3% reported having rarely or never ever encountered ethical issues in their practice. The majority also reported having a good, (57.5%) and excellent 29.9% (n = 26) ability to engage with different community members. The results are presented in Table 4.6.

Table 4.6: Ethical and cultural proficiency

Factor	Frequency	Percentage
Understanding & respect for cultural& religious rites		
Poor	2	2.2
Fair	12	13.5
Good	47	52.8
Excellent	28	31.5
Frequency of encountering ethical issues		
Never	5	5.7
Rarely	19	21.6
Sometimes	36	40.9
Often	28	31.8
Trained in resolving ethical issues		
No	2	2.2
Yes	87	97.8
Ability to engage with different community members		
Poor	3	3.4
Fair	8	9.2
Good	50	57.5
Excellent	26	29.9

Respondents trained in resolving ethical issues, and at least a good understanding of the region's death rites, and rarely had ethical issues, as well as at least a good ability to engage with different community members, were considered to have a high level of ethical proficiency, of which, 86.5% had a high level of ethical proficiency, as illustrated in figure 4.6

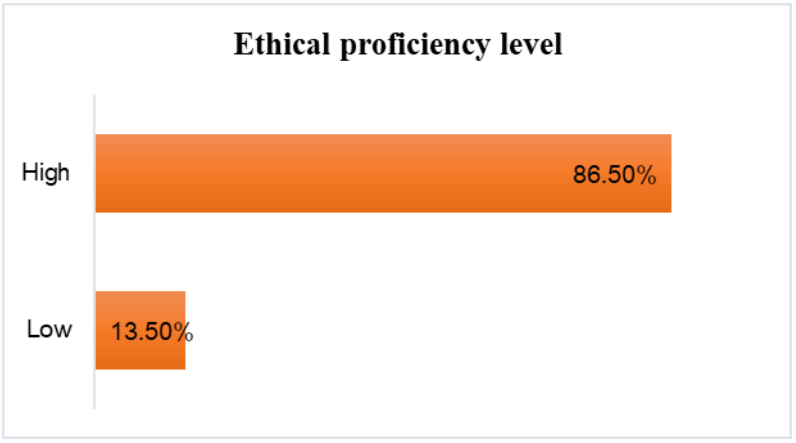

Figure 4.6: Ethical and cultural proficiency

A significant association was not found between the level of ethical proficiency and any of the demographic factors at the 5% level of significance as shown in table 4.7.

Table 4.7: Association between ethical proficiency and demographic factors.

Factor	category	Low	High	Chi (p value)
Gender	Male	9(16.4)	46(83.6)	0.65(0.42)
	Female	3(10.0)	27(90.0)	
Education	Certificate in mortuary science	12(14.8)	69(85.2)	0.87(0.65)
	Ongoing	0	4(100)	
Location	Kakamega	3(6.7)	42	6.62(0.09)
	Bungoma	3(25.0)	9(75.0)	
	Busia	6(24.0)	19(76.0)	
	Vihiga	0(0.0)	7(100.0)	
Facility type	Public	6(13.6)	38(86.4)	0.17(0.92)
	Private	3(15.8)	16(84.2)	
	Missionary	3(11.5)	23(88.5)	

4.3.3 Business proficiency

Most of the respondents received formal training in business management, 86.5% (n = 77), with 30.3% (n = 27) indicating an advanced level of proficiency in funeral planning management, and n = 18(20.7%) having a low (beginner) level proficiency in financial management &budgeting. Only 6.7% deemed the business training they received to have poorly prepared them for the business aspect of running a mortuary, as presented in table 4.8.

Table 4.8: Business proficiency

Factor	Frequency	Percent
	Funeral planning management	
Beginner	20	22.5
Intermediate	42	47.2
Advanced	27	30.3
	Customer service & client communication	
Beginner	15	17.0
Intermediate	36	40.9
Advanced	37	42.0
	Financial management &budgeting	
Beginner	18	20.7
Intermediate	43	49.4
Advanced	26	29.9
	Formal training business management	
No	12	13.5
Yes	77	86.5
	Business training fit in running mortuary	
Poorly	6	6.7
Fairly well	33	37.1
Well	22	24.7
Very well	28	31.5

Respondents with a formal training and at least an intermediate level of proficiency in funeral planning management, customer service & client communication, and financial management and budgeting were considered high in business proficiency. The majority were highly proficient in business management skills as shown in figure 4.4.

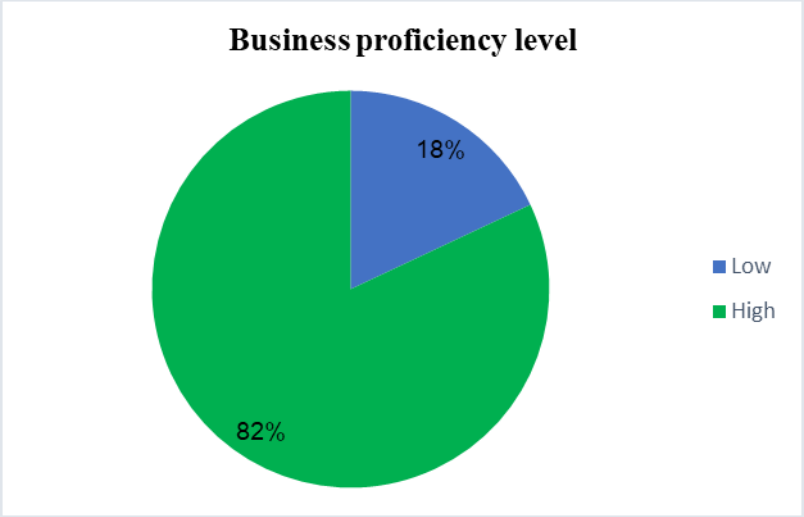

Figure 4.7 : Business proficiency level

The demographic factors had no significant association with business proficiency as presented in table 4.9

Table 4.9: Association between business proficiency and demographic factors.

Factor	Category	Low	High	Chi (p value)
Gender	Male	11(20.0)	44(80.0)	1.08(0.30)
	Female	9(30.0)	21(70.0)	
Education	Certificate in mortuary science	20(24.7)	61(75.3)	0.00(0.99)
	Ongoing	1(25.0)	3(75.0)	
Location	Kakamega	10(22.2)	35(77.8)	4.16(0.25)
	Bungoma	3(25.0)	9(75.0)	
	Busia	9(36.0)	16(64.0)	
	Vihiga	0(0.0)	7(100.0)	
Facility type	Public	10(22.7)	34(77.3)	2.28(0.32)
	Private	3(15.8)	16(84.2)	
	Missionary	9(34.6)	17(65.4)	

To determine the competence level of the morticians, respondents with a high proficiency level in at least three of the four measured; biosafety, technical skills and knowledge, business management, and ethical proficiency, were considered to be competent. 71% of the morticians were found to be competent as illustrated in figure 4.8

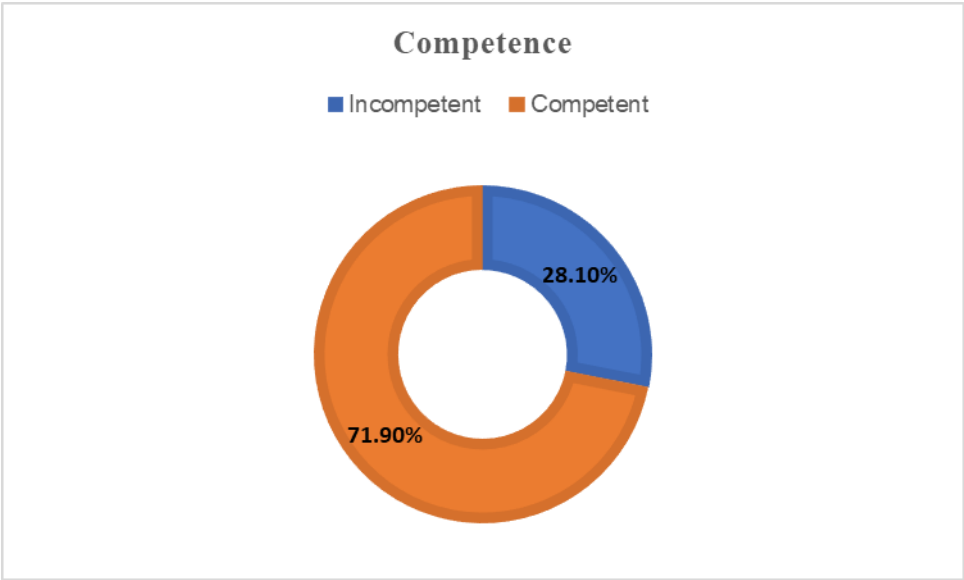

Figure 4.8: knowledge level of morticians

4.4 Factors associated with knowledge among morticians

As shown in Table 4.10, the mean age was significantly higher (F=4.85,p= .03) among those who were competent (*M* =29.7, *SD* = 8.9) compared to those who were not competent (*M*=25.6, *SD* =4.6). There were more competent males (73%) than females (67%), as well as in Kakamega county (76%) compared to the other counties, however, the differences were not statistically significant (p>0.05).

Table 4.10: Factors associated with knowledge

Factor	**Category**	**Competence**		**Chi (p val)**
		Incompetent	Competent	
Gender	Male	15(27.3)	40(72.7)	0.34(0.56)
	Female	10(33.3)	20(66.7)	
Education	Certificate	23(28.4)	58(71.6)	0.02(0.88)
	Ongoing	1(25)	3(75)	
Location	Kakamega	11(24.4)	34(75.6)	0.65(0.89)
	Bungoma	4(33.3)	8(66.7)	
	Busia	8(32)	17(68)	
	Vihiga	2(28.6)	5(71.4)	
Facility type	Public	10(22.7)	34(77.3)	2.04(0.36)
	Private	5(26.3)	14(73.7)	
	Missionary	10(38.5)	16(61.5)	
Factor		***MSD***	***MSD***	**F (p.val)**
Age		25.6(4.6)	29.7(8.9)	4.85(0.03)
Experience		2.5(1.7)	4.1(4.7)	2.78(0.10)

A multinomial logistic regression analysis was undertaken to assess the predictors of competence in morticians. Facility type was found to significantly predict knowledge with morticians in public hospitals being 2.13 time as probable to be knowledgeable likened to those in missionary amenities, (AOR = 2.13, 95% CI = 1.39 – 6.13), while those in private facilities were 1.75 times as likely compared to their missionary counterparts (AOR = 1.75, 95% CI = 1.38-6.36). Morticians in Kakamega were 69% less likely to be competent compared to those in Vihiga, while those in Bungoma were 1.17 times more likely to be knowledgeable compared to Vihiga. Individual factors were not significantly associated with competence after accounting for between factors interactions. Table 4.10 contains the results.

Table 4.11: Predictors of knowledge among practising morticians

Factor	Category	AOR (95% ci)	p value
Age	Age	1.05(0.86-1.27)	0.64
Experience	Experience	1.01(0.68-1.52)	0.94
Gender	Male	0.4(0.09-1.85)	0.24
	Female	Ref	
Education	Certificate mortuary science	0.28(0.01-7.02)	0.44
	Ongoing	Ref	
County	Kakamega	0.31(0.04-0.54)	<0.01
	Bungoma	1.17(1.12-11.18)	<0.01
	Busia	0.88(0.11-7.09)	<0.01
	Vihiga	Ref	
Facility type	Public	2.13(1.39-6.13)	0.02
	Private	1.75(1.38-6.36)	0.03
	Missionary	Ref	
Frequency of applying knowledge& skills from CB training	Occasionally	0.65(0.05-8.79)	0.74
	Frequently	1.32(0.26-6.83)	0.74
	Always	Ref	
Training frequency biosafety practices	Never	1.47(0.03-71.64)	0.85
	Once a year	0.7(0.03-18.44)	0.83
	Twice a year	2.06(0.05-79.95)	0.70
	Over twice a year	Ref	
Participated CB training last 1 year	None	0.06(0.03-1.39)	
	1	0.23(0.01-6.2)	0.38
	2 to 3	2.29(0.09-56.92)	0.61
	4 and above	Ref	

Table 4.11 study findings on predictors of knowledge among practising mortician with regard to the minimum entry level was a certificate in mortuary science (AOR=0.31,95% CI=0.2(0.88) which was significant. A majority of Male mortician were found to be currently in practice (AOR=0.4, 95% CI=0.02(0.88). Secondly, Kakamega county mortician were 69% deemed to be knowledgeable as compared to their counter parts in the selected counties in the study (AOR=0.31,95% CI=0.04-0.54). Thirdly, mortician working in public facilities (public mortuaries) were 2.13 times less likely to be knowledgeable compered to missionary hospitals at (AOR = 2.13, 95% CI = 1.39 – 6.13). While, mortician working in private mortuaries were 1.75 times likely to be knowledgeable as compared to mortician working in missionary mortuaries at (AOR = 1.75, 95% CI = 1.38-6.36).

CHAPTER FIVE

DISCUSSION

5.0 Introduction

This chapter presents in-depth discussion of the study findings which have been organized in accordance to specific objectives that guided the undertaking of the study, in the context of the existing literature. The researcher has provided a critique to the findings of other studies and also appraised their findings.

5.1 Demographic profile

Similar to(Emmanuel & Police, 2021a), there were more male morticians than there were females in this. While the mean age in this study was 28 years, it overlapped with the modal age (Emmanuel & Police, 2021a)of, which was 21 to 30. These profiles were similar to those found by Dumahasi (2020) in Ghana, even though in his finding, most of the mortuary attendants were between 32 and 45 years old. The majority of morticians in this study had a certificate in mortuary science, which is higher than the level of education reported in Nigeria (Douglas & Peterside, 2016) as well as in Ghana (Godwin & Dumahasi, 2020), both of whom found mortuary attendants to have mostly a secondary school level of education. The work experience among morticians in this study had a mean of 3.7 years, and a standard deviation of 4.1. By comparison, the majority of morticians in Port Harcourt had 4-6 years of experience (Douglas & Peterside, 2016). In the Sekondi-Takoradi metropolis of Ghana, (Godwin & Dumahasi, 2020) showed that the modal years of experience was 1 to 5 years, while (Emmanuel & Police, 2021b) found the majority of morticians in the Rivers state, Nigeria to have 4 to 8 years of experience. Studies outside of the

continent also indicate that mortuary science and funeral service in general remain a male-dominated profession,(Guidetti *et al.*, 2021b). However, the workforce skews toward middle-age rather than the predominantly young workforce in Africa. An international analysis similarly found that the average age of funeral service workers is around 50 years, underscoring an older workforce profile (Dartey *et al.,* 2021). Despite growing female enrolment in mortuary science programs, women still represent a minority among practising funeral directors (Denissen, 2013). The overlaps in these results highlight the similarity in the profile of morticians across the continent, with morticians being mostly young males, with at least a secondary level of education, even though this profile differs from the international context.

5.2 Level of Biosafety Skills

A high level of proficiency and adherence of 82%, was found for biosafety among morticians in this study. Research by Akinyemi *et, al* (2021) supported those by Okoth-Okelloh (2015) that knowledge overall, knowledge on the use of PPEs was high among morticians, however, in practice, it was found that hand gloves and isolation gowns were the most consistently highly used PPEs, with varying degrees of use for other forms of PPE (Akinyemi *et. al,* 2021). Further, Dumahasi (2020) had found that public facilities rarely ever provided the full complement of PPEs to the morticians as required by the IPC protocols. Locally, this observation is attributed to a lack of sufficient funds allocated to the mortuary department during the hospital budgeting process. The current study did not explore the use of individual PPEs, however, the high overall practice of using PPEs at work was in line with other scholars across the continent.

This study also found that a large proportion, over 95%, of the morticians had been trained on and adhered to infection control and handling biohazards material. Du-

mahasi (2020) found that even though mortuary attendants in the Sekondi-Takoradi metropolis region of Ghana were similarly trained, the practice of the skills learned was low. Akinyemi *et. al.,* (2021) (50%) respondents had experienced splash of body fluids of corpses on them. This corroborated the findings of Emmanuel *&* Police (2021) that there was a significant exposure to viruses from exposed communicable diseases and bacteria from waste materials.

In this study, the respondents were found to be highly trained in all but two of the biosafety aspects. The most undertaken training was the use of PPEs, at 97.8%, followed by infection control and handling of biohazardous material at 91% each. On the other hand, handling of sharps and waste management were the least undertaken training by the practising mortician in western Kenya. A comprehensive biosafety training program implemented by KEMRI (Muriithi *et al.,* 2018) for environments where high-risk pathogens are handled found that after completing the training program, participants demonstrated a clear improvement in both their technical competencies in handling hazardous materials and their overall awareness of biosafety measures, which strongly provides significant supports in the findings of this study.

These similar outcomes give weight to the benefits of the established high level of training in this study, in the context of improving the observance of biosafety protocols among practising morticians. In addition, the study (Muriithi *et al.,* 2018) also determined that continuous, structured training is essential in mitigating the risks inherent in high-containment environments. Further, it recommended that biosafety training needs to be initiated before personnel begin working in high-containment environments to improve readiness and reduce risk. Additionally, combining theoretical instruction with practical, hands-on sessions and mentorship, and tailoring

international standards to fit local contexts were found necessary to ensure relevance and effectiveness of biosafety standards.

Even though the current study did not actually assess the determinants of biosafety adherence, the findings of (Bajjou *et al.*, 2020) showed that experienced nurses were more consistent in maintaining the required levels of biosafety, whereas newly graduated nurses showed significantly lower compliance. The authors further noted critical shortcomings among less experienced nurses, including improper donning of gloves before patient contact, a tendency to touch their faces during undertaking of procedures, and wearing jewelry, all of which are factors that elevated the risk of biosafety lapses during patient care which is related to mortuary attedents day to day routine while on duty. This led them to concluded that biosafety training should begin early in the educational curriculum, incorporating both theoretical knowledge and practical skills to resolve the observed discrepancies in biosafety practices between trainees and proffessionals.

The implication of these results is that even though a high level of training has been found to be given to morticians on biosafety, it may not translate to consistent application in practice. Additionally, there needs to be frequent re-trainings and continuing learning opportunities as well as assessments to ensure that protocols are up-to-date and guidelines are adhered to.

5.3 knowledge level of morticians

5.3.1 Technical skills and knowledge

In regards to preparing bodies, most of the morticians in this study were found to have at least an intermediate level of proficiency. Embalming with solutions of formalin was demonstrated to be widespread, even though different mixtures and formulations were used (Nnamdi Onyejike *et al.*, 2018). While the current study sought

to assess the levels of proficiency in embalming and the use of chemicals, most existing literature focuses on the risks faced by morticians in the embalming process. Scholars such as Douglas & Peterside (2016), Nnamdi (2018) and Akinyemi *et.al* (2021) all identified the risk of injuries such as cuts, while Nnamdi (2018) further identified risks associated with the chemicals such as formalin causing catarrh and cough, and body weakness.

Contrary to the findings of (Akortiakumah *et al.*, 2022), a large proportion of morticians in this study reported participating in continuing education within the last 12 months of the study.(Akortiakumah *et al.,* 2022) identified that morticians in the Kerala society did not receive any further training beyond the formal mortician education. However, this difference can be attributed to the fact that their study was carried out in the context of the COVID-19 pandemic, during which social restrictions were put in place that could hinder professional development. As was established by (Glogowska et al., 2011), continuing education among morticians is a good intervention measure to alleviate the risks associated with the occupation. This was also different from Emmanuel & Police (2021) who determined that mortuary workers did not engage in safety training organized by the management, neither did they participate in periodic medical exercise and safety talks.

Knowledge of health and safety practices required of morticians was found to be high in the country (Okoth-Okelloh, 2015). This aligns with the findings of this study, wherein 87% of the morticians had at least an intermediate proficiency level in health and safety. In addition, the demographic characteristics were found to have no significant association with technical proficiency in this study. In a study of Jordanian nurses,(Wimpenny *et al.,* 2019) found a high mean level of knowledge, with a strong correlation between knowledge and compliance to standard safety profi-

ciency. This is in line with the findings of the current study. Even though the current study did not test the correlational association between the two factors, the findings of (Qin *et al.,* 2023) emphasize the need for a good level of biosafety procedures in improving biosafety adherence. Moreover, in Nigeria (Oluwafemi *et al.*, 2024) established, similar to the current study, that The study revealed that, aside from gender, socio-demographic factors did not significantly influence healthcare workers' adherence to standard infection prevention and control (IPC) practices. A notable difference was observed between male and female healthcare workers, with males demonstrating better IPC practices. Interestingly, even though there was no clear link between IPC knowledge and its practical application, doctors exhibited stronger safety practices compared to nurses, despite the latter possessing greater knowledge in IPC (Oluwafemi *et al.*, 2024).

5.3.2 Ethical and cultural proficiency

This study find a high level of proficiency in ethical and cultural practices required of morticians. By comparison, a cross-sectional study in Malawi assessed ethical competence among 271 clinical nurses using the Moral Competence Scale for Home Care Nurses. According to the results, 57% of nurses demonstrated a low level of ethical competence (Maluwa *et al.*, 2022). Research conducted by (Chen *et al.,* 2021) found that both moral sensitivity and professional values have a positive influence on ethical decision-making. Furthermore, professional values were found to mediate the relationship between moral sensitivity and ethical decision-making. These findings suggest that enhancing ethics education by focusing on students' moral sensitivity and professional values could lead to better ethical decision-making skills.

Similar to (Maluwa *et al.,* 2022), this study found no significant association with demographic factors. However, their study identified the key determinants of higher ethical competence to included strong was, judgment skills, and recognition of discrepancies in intention. More than two thirds were found to have a good understanding of the local cultural and religious rites, with 98% formally trained as part of their course. Despite this, the majority reported encountering ethical and cultural issues in their work, and a good capacity to engage with bereaved family members. In Nigeria,(Ogunlana *et al.,* 2023) found, contrary to our findings that about a third of hospital-based healthcare professionals had no formal training in cultural competence. As a result, they recommended incorporating cultural competence in the formal education curricula of healthcare professionals as a way to enhance the quality of care in the multicultural setting.

(Karimi *et al.*, 2013) reviewed existing research on educational programs aimed at improving cultural competence and found generally positive, though low-quality, evidence suggesting some benefit in engaging patients from culturally and linguistically diverse backgrounds. The studies either supported the effectiveness of these interventions or showed no significant impact. Due to the wide variation in the content, scope, structure, duration, implementation methods, and outcome measures of the interventions, the authors concluded that the existing evidence was too weak to make broad, reliable generalizations. As a result, they emphasized the need for future research that applies more consistent and rigorous methodologies, particularly in the way educational interventions are developed, described, and assessed. The implication of this is that educational interventions on cultural proficiency in populations as diverse as those in the cultural context of this study need to be made with caution, and frequent evaluation so as to remain relevant.

Among professional grief counsellors, (Bouldin & Bouldin, 2019) found that counsellors who had dedicated training on grief counselling performed better than those trained as part of the course material. This was despite the finding that the perceived competence between the two groups was not statistically different. This speaks to the training the morticians receive in dealing with bereaved families. While the integrated training is adequate, dedicated training is required as it improves their proficiency in this regard. In exploring the ethical and cultural issues related to burial in West Kenya, (O.D. Nyaoko((2024) found that there was a desire to understand why death occurred, especially in cases of child death. This may cause ethical dilemmas, for example, in cases where there are legal investigations(Moreno, 2016). An understanding of the local rites ensures that morticians are able to handle death, rumours and myths, and unmet expectations from families.

5.3.3 Business proficiency

The study revealed that morticians in Western Kenya demonstrated a high degree of occupational competence. (Batt *et al.,* 2020) offered a framework for defining competency, emphasizing several key characteristics: it centers on the achievement of specific outcomes or goals of training; it aligns with expectations beyond the immediate educational setting; it can be described through observable and measurable behaviors; it is assessed using objective criteria rather than comparing individuals to one another; and it clearly communicates expectations to both learners and relevant stakeholders. For this study, competency was assessed based on proficiency in biosafety, technical skills and knowledge, business management, and ethical proficiency. In comparison,(Wick, 2003) had suggested a curriculum for clinical pathologist identifying areas of competency such as practice-based learning, interpersonal/communication skills, professionalism, and systems-based practice, with

Vos *et,al* (2025), further proposing the inclusion of AI knowledge as a key competency. The current approach, however, was in line with Zhao *et*, *al* (2015) in assessing doctors' competency, where he found the method to be highly consistent.

A high level of proficiency was found for business management among the morticians in Western Kenya, with over three quarters having at least an intermediate level of proficiency. This provides an advantage, as demonstrated in (Majidi *et al.,* 2023) research, which found that morticians' business proficiency significantly influenced their awareness of funeral-related aspects such as prepayment options, funeral regulations, various funeral types, and payment methods. However, no significant differences were noted regarding funeral costs or preplanning activities in funeral service management. The study emphasized the importance of integrating funeral planning management into modern funeral services, recommending that such additions be evaluated based on their cost-effectiveness and value to clients. Furthermore, (Waithaka *et al.,* 2020) had earlier identified a gap in the provision of funeral services, with a large number of funeral service providers in Nairobi, but only 19% had mortuaries of their own. The implication of this is that families seek additional, necessary funeral services outside of the mortuaries at the health facilities, thus business proficiency among the morticians could be a factor in tapping into such market demands. In further support, the findings of (Islam *et al.,* 2021) demonstrated that among physicians, having additional training in business management provided leadership opportunities in health management.

By comparison, among middle managers in tertiary hospitals scored an average of 3.96/5 on a validated management-competency scale, with strategic control and financial management identified as areas of weakness (Gao *et al.,* 2024) with years of experience being a contributing factor to higher proficiency. The researchers con-

cluded that middle managers in hospitals positively influence organizational performance through their management competencies. However, their overall competency levels were found to be below the desired standard. To address this gap, the authors recommended several strategies, including the incorporation of management training into clinical medical education, the development of specialized training programs for clinicians in leadership roles, and the promotion of project management approaches to strengthen the managerial capabilities of hospital middle managers.

In addition, contrary to our study, a scoping review on nursing leadership concluded that while clinical leadership proficiency was generally high, business management skills such as market analysis and cost containment were generally significantly lower and varied widely by region(Raftery *et al.,* 2022). The study also emphasized that business acumen plays a significant role in enabling nurses and nursing leaders within the global clinical workforce to navigate the complexities of modern healthcare systems. Despite this, the concept of business competency—particularly as it relates to leadership and management—has not been extensively explored or consistently defined within healthcare contexts. This lack of clarity has hindered efforts to fully understand and leverage the potential impact of business skills in the healthcare sector.

5.4 Factors associated with knowledge among morticians

Facility type was found to significantly predict competence, with morticians in public hospitals being more competent. This finding was partially in line with those by who found differences in performance between public and private facilities. However, the differences they found were weighted more towards the provision of equipment. The findings on the factors associated with competency in this study, where individual demographic factors and training had no effect on competency, were con-

trary to the findings of (Chen *et al.* (2021) . Their study on family doctors showed that education level and job title, work team dynamics, training, grasp of specific content, and understanding of the family doctor system were significantly associated with competency.

They further found that competency and work cognition had a significant impact on work stability. The differences may arise from the differences in the target populations; however, it is possible that their findings on work stability may hold in the field of mortuary science due to the contact with families. In contrast, a study by (Rizany *et al.,* 2018a) identified several factors that influence nurses' competency, including years of experience, the nature of their work setting, level of education, commitment to professional standards, and ability to think critically. Among these, educational attainment and practical experience emerged as the most significant contributors to enhancing nursing competency.

(Rizany *et al.,* 2018b) identified that institutions with robust competency frameworks and evidence-based management practices reported higher proficiency in both technical and non-technical skills. Inadequate resources and lack of structured mentorship on the other hand, were cited as barriers to competence in several contexts. This may explain the difference in competence between facility types, especially when there are discrepancies in resource availability based on facility type.

The county of practice was also found to be a significant predictor of competence. This could be attributed to differences in organizational support between the counties. Evidence suggests that competence among healthcare professionals was is influenced by the availability of resources, mentorship, and supportive work environments (Saunders *et al.,* 2019). Access to modern equipment, clear protocols, and collaborative teams enhances the ability of healthcare professionals to perform their

roles effectively(Sanaeifar *et al.,* 2025) These findings are further in line with (Okello & Gilson, 2015) who pointed out that work environment factors such as workloads, supervision, and a culture of continuous learning are linked to higher competence levels.

In contrast to the findings of (Almarwani & Alzahrani, 2023) who identified six major factors influencing nurses' occupational competency—including years of experience, educational background, theoretical knowledge, marital status, clinical training, job satisfaction, turnover intentions, job-related stress, and critical thinking—the present study found no significant link between individual characteristics and competency. Instead, it highlights that workplace-related factors are the primary determinants of competency in this context.

In line with (Almarwani & Alzahrani, 2023), (Rizany *et al.*, 2018b) also identified similar factors for competency, noting that To enhance staff competency, nurse managers should provide continuous support through initiatives such as ongoing professional development, mentorship and preceptor-ship programs, as well as teaching strategies that involve case-based discussions and reflective practice. Furthermore, organizational support, including access to resources, clear policies, and supportive leadership were found to bolsters competency (Almarwani & Alzahrani, 2023) These differences in findings however may result from the difference in the target populations, and occupational requirements.

5.5 Summary of findings

There are more males than females in the practice, most morticians having a certificate in mortuary training. There was demonstrated a moderate level of technical proficiency, with the minority having low skills in aspects such as embalming and reconstruction. Almost all the morticians felt confident that the training they had was

up-to-date with the latest in embalming techniques. The frequency of participation in competency-based, on-going learning was high, however, the areas of learning were found to be skewed in favor of health and safety compliance, and embalming techniques.

By comparison, there was lesser participation in restorative art, and business management training. Most morticians have an understanding of, and respect of the local rites, and have a good ability to engage the bereaved families. Even though they often encounter ethical issues, they are formally trained in resolving these issues. The morticians demonstrated a high level of proficiency in their business skills, in line with the high proportion of them who had formal training in business management. Despite the high proficiency in skills such as customer service & client communication, and budgeting, the funeral management skill was slightly lower. Other than handling of sharps and waste management, the training in all the other biosafety skills was at near 100%.

The high level of training was reflected in practice, with almost all morticians frequently applying skills such as infection control and using PPEs. Overall, the morticians showed a high level of adherence to biosafety requirements. In all four proficiencies tested in this study; technical, ethical, business, and biosafety, demographic factors were found to have no significant influence. That is, any differences in proficiency in the four categories between the categories of demographic factors are not significant. All in all, the majority of the morticians were found to be competent in their work, with facility type, missionary, private or public, as well as the county of practice having an influence on their competence level.

CHAPTER SIX

CONCLUSIONS AND RECOMMENDATIONS

6.0 Introduction

This chapter presents the summary of findings and the conclusions drawn from the study findings. In addition, the recommendations for both the practice and further research made by the researcher are also presented in this chapter.

6.1 Conclusions

The current study assessed the knowledge and biosafety skills in mortuary science and practice among practising morticians in western Kenya, and found that:-

a) There was a significant level of competency in biosafety skills among practising morticians. Proficiency was measured in technical skills, business management, ethics and culture, and biosafety. Both the level of training and application of biosafety practices were found to be high.

b) There was a Significance level of knowledge required for practising morticians in western Kenya, with overall proficiency in all the skills; technical skills were equally high, over 80%, as were their constituent factors. The proficiency in technical skills, however, was moderate, with near half split between low and high levels of proficiency. Overall competency was found to be high, and individual demographic factors such as age and sex were determined not be predictors of competence.

c) County and type of facility influenced knowledge in biosafety skills, with those in public facilities being over twice as likely to be competent as those in mis-

sionary facilities. Both of the significant factors are attributed to possible differences in resource availability and support.

6.3 Recommendations for Practice

Based on the findings of this study, the following recommendations are made regarding the knowledge and biosafety practice among practising morticians in western Kenya.

a) There is need for Counties (MoH-Kenya) to Continuous engage in biosafety skills training among practising morticians in order to enhance competent level among morticians as well as improve health care standards.
b) Practising mortician should be consistently supported in skill-based competence training to increase their overall performance outcome.
c) Health facilities to prioritise their budgetary allocation on mortuary services in order to offer holistic care to the deceased person and their family.

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APPENDICES

APPENDIX I: TRANSMITTAL LETTER

Dear Sir/Madam

Date…….

I am a student at Masinde Muliro university Department Health profession education, pursuing ***MSc***, in Health profession education.

Currently, I am conducting a research study entitled "**Assessment of Competency and Biosafety in Mortuary Science Training among practising Morticians in Western Kenya" .**

The findings of this study was contribute to knowledge that was greatly assist the institution in making decisions regarding innovative medical curriculum planning and development. The findings was also be useful in developing an elaborate criterion by which the principles of curriculum reforms can be judged and improved. Findings generated from this study was communicated to you upon completion.

You have been identified as one of the respondents in this study because, you are considered to be well qualified, experienced and possess the attributes and characteristics sought in this study.

The purpose of this letter is to request for your participation by responding to the question items regarding the study and returning it on the date specified.

There was no direct benefits, no risks, no hazards or discomforts associated with this study procedures.

Identity is concealed and therefore, you are requested not to reveal your name and information provided was highly confidential and was used only for the purpose of this study.

Participation is voluntary and that you may, at any time during the course of this study be free to withdraw without any penalty, injury or loss of benefits if any.

Should you have any complaints concerning this study, you are free to contact the Chairman, Secretary or any other official of the Institutional Scientific Research and Ethics Committee (ISREC),

P.O Box 190-50 100, **Tel. (053)33471/2/3**.

Kindly return this questionnaire/instrument by

Thanks in advance

Yours faithfully

Patrick Wangira Myles-Researcher

Cell Phone: 0725288033

APPENDIX II: QUESTIONNAIRE

Unique code:……

A. Competency Levels in Mortician Training

Section A:

Demographic Information

1.

Name:……

……

2. Age:

……..

3. Sex: ☐ Male ☐ Female ☐ Other

4. Years of Experience as a

Mortician:_____

5. Education Level:

☐ Secondary School

☐ Diploma in Mortuary Science

☐ Bachelor's Degree

☐ Other (Please specify):

_____

6. Name of Mortuary:

_____

7. Location of Mortuary:

_____

Section B: Technical Skills and Knowledge

8. Rate your proficiency in the following areas:

Embalming techniques:

☐ Beginner

☐ Intermediate

☐ Advanced

Restorative art (reconstructive work on the deceased):

☐ Beginner

☐ Intermediate

☐ Advanced

Use of embalming chemicals:

☐ Beginner

☐ Intermediate

☐ Advanced

Health and safety compliance:

☐ Beginner

☐ Intermediate

☐ Advanced

9. How often do you participate in continuing education or training workshops?

☐ Never

☐ Occasionally (1-3 times a year)

☐ Frequently (4 or more times a year)

10. Do you feel adequately trained in the latest embalming techniques and practices?

☐ Yes

☐ No

☐ Unsure

Section C: Ethical and Cultural Competence

11. Rate your understanding and respect for cultural and religious practices related to death in Western Kenya:

☐ Poor

☐ Fair

☐ Good

☐ Excellent

12. How frequently do you encounter ethical issues in your work?

☐ Never

☐ Rarely

☐ Sometimes

☐ Often

13. Do you receive training on handling ethical issues and maintaining confidentiality?

☐ Yes

☐ No

☐ Occasionally

14. How would you rate your ability to engage and communicate with different community members?

☐ Poor

☐ Fair

☐ Good

☐ Excellent

Section D: Business and Management Skills

15. Rate your proficiency in the following areas:

Funeral service planning and management:

☐ Beginner

☐ Intermediate

☐ Advanced

Customer service and client communication:

☐ Beginner

☐ Intermediate

☐ Advanced

Financial management and budgeting:

☐ Beginner

☐ Intermediate

☐ Advanced

16. Do you have formal training in business management?

☐ Yes

☐ No

☐ Somewhat (e.g., short courses, workshops)

17. How well do you think your training has prepared you for the business aspects of running a mortuary?

☐ Poorly

☐ Fairly well

☐ Well

☐ Very well

Section E: General Feedback

18. What are the biggest challenges you face in your profession? (Please describe briefly)

- _____

_____

- _____

_____

- _____

___

18. What additional training or resources do you think would help improve your competencies?

- _____

_____

- _____

_____

•

_____

_____

19**. Effects of Competency-Based Training Programs on Knowledge Acquisition of Morticians**

Section B: Training Program Participation

19. Have you participated in any competency-based training programs?

☐ Yes

☐ No

20. If yes, how many competency-based training programs have you attended in the past year?

☐ 1

☐ 2-3

☐ 4 or more

21. What types of competency-based training programs have you participated in? (Select all that apply)

☐ Health and safety compliance

☐ Ethical and cultural competence

☐ Business and management skills

☐ Restorative art

☐ Embalming techniques

☐ Other (Please specify): _____

Section C: Knowledge Acquisition

22. Rate your level of knowledge acquisition before and after participating in competency-based training programs:

Before training:

☐ Poor

☐ Fair

☐ Good

☐ Excellent

After training:

☐ Poor

☐ Fair

☐ Good

☐ Excellent

23. Which areas did you see the most improvement in after the training? (Select all that apply)

☐ Embalming techniques

☐ Restorative art

☐ Use of embalming chemicals

☐ Health and safety compliance

☐ Cultural and religious practices related to death

☐ Ethical handling of deceased bodies

☐ Funeral service planning and management

☐ Customer service and communication

☐ Financial management

24. Do you feel more confident in your job after receiving competency-based training?

☐ Yes

☐ No

☐ Somewhat

Section D: Impact on Professional Practice

25. How has competency-based training impacted your professional practice? (Select all that apply)

☐ Improved technical skills

☐ Enhanced ethical and cultural competence

☐ Better customer service

☐ More effective funeral service management

☐ Improved health and safety practices

☐ Increased job satisfaction

☐ Other (Please specify): _____

26. How often do you apply the knowledge and skills acquired from competency-based training in your daily work?

☐ Always

☐ Frequently

☐ Occasionally

☐ Rarely

27. Have you noticed any changes in client satisfaction since attending competency-based training?

☐ Yes, positive changes

☐ Yes, negative changes

☐ No change

☐ Not sure

Section E: Feedback on Training Programs

28. How would you rate the overall effectiveness of the competency-based training programs you attended?

☐ Very effective

☐ Effective

☐ Neutral

☐ Ineffective

☐ Very ineffective

29. What aspects of the training programs were most beneficial? (Please describe briefly)

_____

_____

_____

_____

_____

_____

30. What improvements would you suggest for future competency-based training programs?

_____

_____

_____

_____

_____

_____

31. Any other comments or suggestions:

_____

_____

_____

_____

_____

_____

33. **Level of Bio-Safety Skills among Morticians**

Section B: Bio-Safety Training

34. Have you received any training in bio-safety practices?

☐ Yes

☐ No

35. If yes, how often do you receive training on bio-safety or refresher courses?

☐ Never

☐ Once a year

☐ Twice a year

☐ More than twice a year

36. What type of training have you received in bio-safety? (Select all that apply)

☐ Handling and disposal of bio hazardous materials

☐ Infection control measures

☐ Safe handling of chemicals and disinfectants

☐ Emergency response procedures

☐ Use of personal protective equipment

☐ Other (Please specify): _____

Section C: Bio-Safety Practices

37. Rate your bio-safety practices skills in the following:

Proper use of PPE:

☐ Poor

☐ Fair

☐ Good

☐ Excellent

Handling and disposal of bio hazardous materials:

☐ Poor

☐ Fair

☐ Good

☐ Excellent

Infection control measures (e.g., hand hygiene, sterilization):

☐ Poor

☐ Fair

☐ Good

☐ Excellent

Safe handling of chemicals and disinfectants:

☐ Poor

☐ Fair

☐ Good

☐ Excellent

Emergency response procedures (e.g., spills, exposure incidents):

☐ Poor

☐ Fair

☐ Good

☐ Excellent

38. How often do you apply bio-safety practices in your daily work?

☐ Always

☐ Frequently

☐ Occasionally

☐ Rarely

☐ Never

39. Do you have access to bio-safety equipment and necessary PPE at your workplace?

☐ Yes, always

☐ Sometimes

☐ Rarely

☐ Never

40. How would you rate the overall safety of your work environment in terms of bio-safety?

☐ Very safe

☐ Safe

☐ Neutral

☐ Unsafe

☐ Very unsafe

Section D: Knowledge and Awareness

41. Are you aware of the bio-safety guidelines and protocols applicable to mortuaries?

☐ Yes

☐ No

☐ Somewhat

42. How would you rate your knowledge of these bio-safety guidelines and protocols?

☐ Poor

☐ Fair

☐ Good

☐ Excellent

43. Do you receive update briefings on bio-safety guidelines and protocols regularly?

☐ Yes

☐ No

Section E: Challenges and Improvements

44. What challenges do you face in implementing bio-safety practices at your workplace? (Select all that apply)

☐ Lack of adequate training

☐ Insufficient PPE or equipment

☐ Inadequate facilities or infrastructure

☐ Lack of awareness or knowledge

☐ Resistance to following protocols

☐ Other (Please specify): _____

45. What improvements would you suggest to enhance bio-safety practices in your mortuary?

_____

_____

_____

_____

46. Any other comments or suggestions:

_____

_____

_____

_____

APPENDIX III: INTERVIEW GUIDE

1. Have you taken any courses or attended workshops to improve your skills? If so, can you describe them?

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2. What challenges do you face in implementing biosafety measures in your work?

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3. What topics or areas of biosafety would you like to learn more about?.

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4. In your opinion, what improvements can be made in the current biosafety practices in mortuary science in Western Kenya?

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5. Is there anything else you would like to add about competency and biosafety practices

   in your field.

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   ……

   ……

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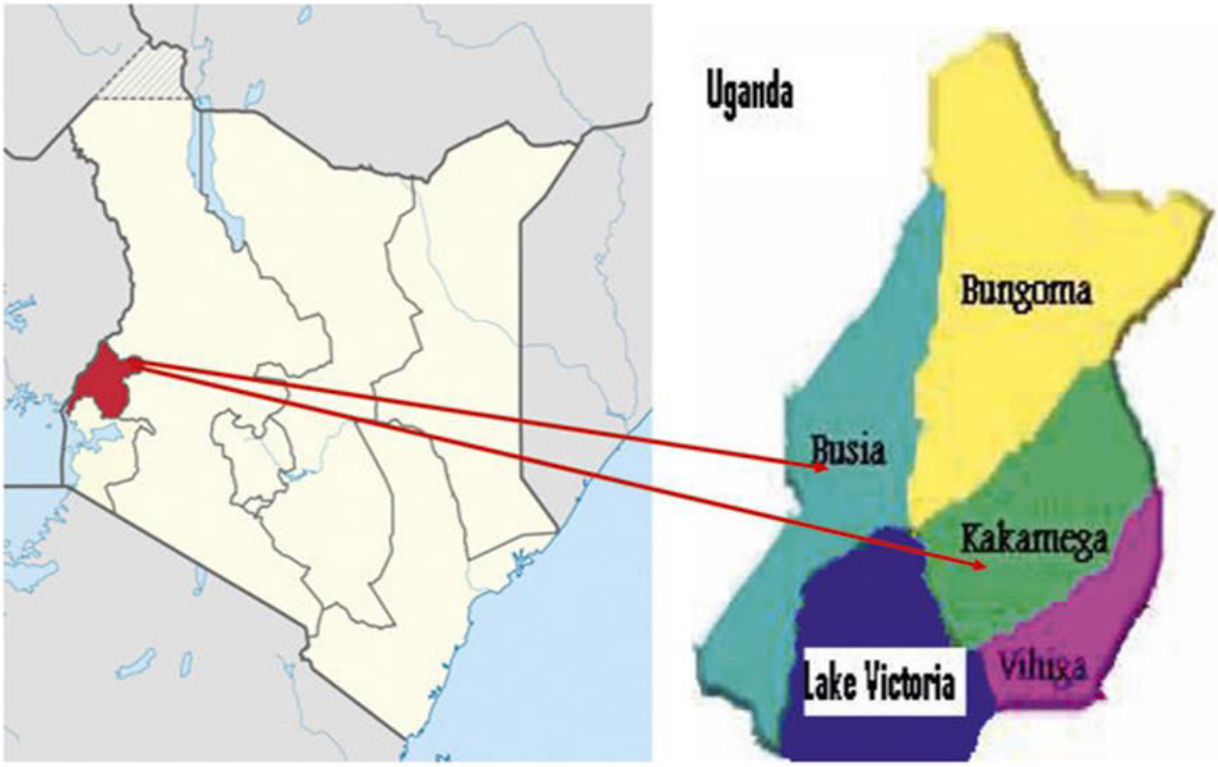
APPENDIX: V MAP OF THE STUDY AREA



Map of Kenya showing Western Kenya (red color). The red arrows show Busia and Kakamega counties. Source: Kenya National Bureau of Statistics, 2019

APPENDIX VI: RESEARCH APPROVAL

MASINDE MULIRO UNIVERSITY OF SCIENCE AND TECHNOLOGY (MMUST)

Tel: 056-30870 P.0 Box 190
Fax:056-30153 Ka-kamega-50100
E-mail: directardps@mmust.ac.ke Kenya
Website: www.mmust.ac.ke

Directorate of Postgraduate Studies

Ref: MMU/COR:509099
4th February,2025

Patrick Myles Wangira
HPE/G/01-70441/2022
P.O. Box 190-50100.
KAKAMEGA.

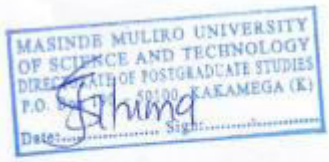
Dear Mr. Myles

RE: APPROVAL OF PROPOSAL

I am pleased to inform you that the Directorate of Postgraduate Studies has considered and approved your Masters Proposal entitled: "Assessment of competency and biosafety in mortuary science practice among morticians in FWestern Kenya "and appointed the following as supervisors:

1. Dr. Harun Chemjor (PhD) - MMUST
2. Dr. David Kigaya Kaniaru(PhD -MMUST

You are required to submit through your supervisor(s) progress reports every three months to the Director Postgraduate Studies. Such reports should be copied to the following: Chairman, School of Public Health, Biomedical Sciences and Technology Graduate Studies Committee and Chairman, Department of Health Professions Education. Kindly adhere to research ethics consideration in conducting research
It is the policy and regulations of the University that you observe a deadline of two years from the date of registration to complete your Master's thesis. Do not hesitate to consult this office in case of any problem encountered in the course of your work.
We wish you the best in your research and hope the study was make original contribution to knowledge.
Yours Sincerely,



for Prof. Stephen O. Odebero, PhD, FIEEP
DIRECTOR, DIRECTORATE OF POSTGRADUATE STUDIES

APPENDIX: VII MMUST IREC APPROVAL

MASINDE MULIRO UNIVERSITY OF SCIENCE AND TECHNOLOGY
Tel: 056-31375
P. O. Box 190,
Fax: 056-30153
Kakamega, 50100.
E-mail: ierc@mmust.ac.ke
KENYA
Website: www.mmust.ac.ke
Institutional Scientific and Ethics Review Committee

REF: MMU/COR: 40312 Vol 6(01) Date: February 06th, 2025

To: Mr. Patrick Myles Wangira

Dear Mr. Wangira

RE: ASSESSMENT OF COMPETENCY AND BIOSAFETY IN MORTUARY SCIENCE PRACTICE AMONG MORTICIANS IN WESTERN KENYA.

This is to inform you that the ***Masinde Muliro University of Science and Technology Institutional Scientific and Ethics Review Committee (MMUST-ISERC)*** has reviewed and approved your above research proposal. Your application approval number is **MMUST/ ISERC/017/2025.** The approval covers for the period ***February 06th, 2025*** *to* ***February 06th, 2026.***
This approval is subject to compliance with the following requirements;

i. Only approved documents including informed consents, study instruments, MTA was used.
ii. All changes including (amendments, deviations, and violations) are submitted for review and approval by ***MMUST-ISERC.***
iii. Death and life threatening problems and serious adverse events or unexpected adverse events whether related or unrelated to the study must be reported to ***MMUST-ISERC*** within 72 hours of notification
iv. Any changes, anticipated or otherwise that may increase the risks or affected safety or welfare of study participants and others or affect the integrity of the research must be reported to ***MMUST-ISERC*** within 72 hours
v. Clearance for export of biological specimens must be obtained from relevant institutions.
vi. Submission of a request for renewal of approval at least 60 days prior to expiry of the approval period. Attach a comprehensive progress report to support the renewal.
vii. Submission of an executive summary report within 90 days upon completion of the study to ***MMUST-ISERC***.

Prior to commencing your study, you was expected to obtain a research license from National Commission for Science, Technology and Innovation (NACOSTI) https://research-portal.nacosti.go.ke and also obtain other clearances needed

Yours Sincerely,



Prof. Gordon Nguka (PhD)
Chairperson, Institutional Scientific and Ethics Review Committee

Copy to:

- The Secretary, National Bio-Ethics Committee
- Vice Chancellor
- DVC (PR&I)

APPENDIX VIII: NACOSTI APPROVAL

REPUBLIC OF KENYA

NATIONAL COMMIS-
SCIENCE, TECHNOLOGY & INNO-

R Dat /

RESEARCH LI-



This is to Certify that Mr.. Patrick Myles wangira of Masinde Muliro University of Science and Technology, has been licensed to conduct research as per the provision of the Science, Technology and Innovation Act, 2013 (Rev.2014) in Bungoma, Busia, Kakamega, Vihiga on the topic: ASSESSMENT OF COMPETENCY AND BIOSAFETY IN MORTUARY SCI-ENCE PRACTICE AMONG MORTICIANS IN WESTERN KENYA. for the period ending : 25/February/2026

L NACOS-

Applicant Identification

Di-
NATIONAL COMMIS-
SCI-
IN-

Verification

NOTE: This is a computer generated License. To verify the authenticity of tl
Scan the QR Code using QR scanner ap-

See overleaf for

APPENDIX VIII: STUDY SITES

