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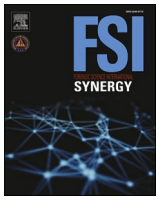

Forensic exhumation and human remains identification: A gap between the Inquest Act 1980 and medico legal education in Tanzania

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ABSTRACT

This article discusses the gap between the Inquest Legislation of Tanzania and the medical practitioner's teaching curriculum which also covers the medico-legal field. The Tanzanian law clearly states that 'any Government medical practitioner' may be given the responsibility of exhumation, provision of post mortem order and then examination of the corpse where there are ample circumstances requiring an inquest to assist police investigation and the Judiciary in determining whether the cause of death was natural. However, the medical training curriculum in Tanzania for many years did not offer any courses of forensic exhumation and identification of human skeletal remains. Therefore, there has been a gap between the legal entities and the curriculum organization of medical practitioner: a condition that leads to medical practitioners failing to fully support the criminal investigation departments and the judicial system. The article highlights the existing gap and its challenges, shortage of experts in the field of forensic science services and provides some suggestions on how to address these challenges where the proposed methods can be applied to both short- and long-term plans.

1. Introduction

Exhumation is an act of unearthing a buried individual [1,2]. Legally the act is performed when there is a need for a medicolegal investigation or grave relocation [3–5]. Forensic exhumation is normally conducted for medicolegal purposes in order to help the judicial system to establish the cause of death or identity of an individual. The process is usually followed by a postmortem inquiry of the exhumed body in order to establish the pathophysiology, pathogenesis and circumstances that led to the death [3]. In Forensic humanitarian matters this process is followed by the collection of postmortem information that is compared with antemortem data to establish the identity of the individual; especially in an event involving mass graves investigation [6–10]. The process itself is technically more involving and is an essential tool for detectives [11]. Therefore, it is of utmost importance for a person performing forensic exhumation to have some knowledge and experiences in crime scene investigation and archaeological excavation. The individual must be well trained in locating possible burial sites, surface survey for evidence collection, excavation techniques involving scraping and screening soil sediments during the exhumation process, flotation procedures for obtaining very small pieces of physical evidences, dead body management, sorting commingled human remains, distinguishing animal and human bone, bioethics, cleaning, and conjoining skeletal remains [4,12–14]. Furthermore, the individual must be familiar with the basic techniques used in sampling DNA materials and fingerprinting dead bodies for human identification and collecting essential samples for crime detection such as toxicological evidence [15–17]. According to the Tanzanian Inquest Act of 1980, a dead body can be exhumed if it appears to any Coroner or Judge that the body of any person, who has died in circumstances requiring the holding of an inquest but has been buried without the inquest (having)been performed or where the inquest could not fulfill the request to establish the cause of death or identity of an individual. The Judge may direct exhumation or postmortem examination requiring a Government medical practitioner within or outside his jurisdiction or, in the absence of such officer, any other medical practitioner within his jurisdiction, to make an examination of the body and to report on it [18]. Although it is true that the law stipulates that '*any Government medical practitioner*' may be responsible for such an examination, in reality, most medical practitioners do not have the necessary knowledge in medico-legal investigation, particularly in the field methods for forensic exhumation and human remains identifications [19] (see Table 1).

It is also true that the medical education curriculum in Tanzania has a special course that introduces medical students to forensic pathology techniques, but it does not include components of forensic exhumation and human remains identification practices, tasks that medical officers legally have to perform [20]. Although the law requires them to perform those functions in their offices, however, it does not provide them with the means to do so, therefore, it is a major challenge. The challenges that affect many cases in Tanzania are those that require exhumation and postmortem examination in preparing evidence that may assist the court in making decisions [21]. These challenges include lack of solid evidence or proper acquisition of evidence that is admissible in the court of law. It has also been a difficult task for medical practitioner to be responsible for something they are not trained to perform professionally [19].

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Table 1
The table shows the number of incidents involving Exhumation for the City of Dar es Salaam only in the last seven years from 2015 to 2021.

Year	Number of incidents	Forensic exhumation	Grave relocation
2015	87	9	78
2016	306	5	301
2017	109	5	104
2018	93	11	82
2019	189	8	181
2020	301	8	293
2021	209	7	202
Total	**1294**	**53**	**1241**

Lack of proper training has created a huge gap between the legal requirements and the medicolegal education curriculum for medical practitioners in the country. Many cases have been poorly served because the responsible medical experts were not well trained in field of exhumation and osteology techniques of human identification; especially when the deceased has decomposed or skeletonized. It has become a major challenge for medical practitioners to establish biological profiles, cause and manner of deaths in human skeletal remains, and even collecting diagnostic samples for toxicology and DNA analyses. In developed countries these roles are performed by specialized experts in forensic pathology, osteology, archeology and anthropology [4,22]. In Tanzania this is not the case due to a shortage of well-trained forensic specialists [23]. There are only five specialists trained in forensic pathology and two in forensic anthropology and bioarcheology in the country of 55 million people. Four out of those seven have been trained recently, as a result of such a shortage of experts in the country, most of the forensic work including exhumation, postmortem and human identification has been performed by medical practitioners who have been authorized to practice in the medical field by virtue of their credentials, registrations and or licenses under the provisions of the Medical Practitioners and Dentists Ordinance [18].

The shortage of experts in forensic pathology has been around for a very long time and it has led to the realization that there is a need to remedy the situation; which led to the enactment of a legislation allowing any medical practitioner to be able to carry out a forensic investigation during the inquest [18,24]. At present it seems that there is an alternative way to amend this law especially after the increase of a number of archaeologists graduating with the first degree, master and PhD at the University of Dar es Salaam where a component of forensic osteology is included in the curriculum and also in the field. Additionally, there is also an increase in numbers of graduates with a General Forensic Science Diploma from the University of Dodoma in Tanzania with experiences in crime scene investigation, forensic anthropology and pathology. Unfortunately, the field of forensic pathology has continued to lag behind due to the lack of specialists despite the high demand in the country. So far there is no college in the country that offers a diploma or any degree program in forensic pathology and it is very costly to send students to study forensic pathology abroad. Subsequently, this paper will use select cases of forensic exhumation to highlight the challenges posed by the existing gap between the Inquest Act of 1980 and the medico legal education in Tanzania, and propose technical solutions to try to solve or to bridge the gap by either improving the medicolegal education curriculum or by amending the law.

2. History of the problem

In Tanzania like many other countries in Africa, the account of Forensic Science and Criminal Investigation Departments (CID) has been grandfathered with the colonial history of the world. The history of Forensic Investigation in Tanzania began as a Criminal Record Unit in the criminal investigation department during the colonial period in 1954. All Forensic operations were undertaken by the Criminal Investigation Department. Even after independence there was no special law governing postmortem examinations of corpses during the police investigation until 1980 when the Inquest Act was enacted. The law stipulated that the matter of post-mortem examination during the Police Investigation would be done by medical practitioners, however, both the Ministry of Education and the Ministry of Health at the time did not update the curriculum of medical practitioners and add appropriate sections that meet the new legal requirements. As a result, this created a huge gap between legal requirements and medicolegal practices for medical practitioners in Tanzania. Although the gap has existed for an exceptionally long time, it was first documented in 2017 at Ifakara in a dialogue between the Commissioner of Police Edward Bukombe and Professor Cassian Magori of Saint Francis University College of Health and Allied Science in Morogoro, Tanzania. Wilson (2021) was the first Tanzanian anthropologist to report this problem, and in his article he describes in detail the challenge of Tanzanian medical practitioners, especially lack of exhumation skills and human remains identification techniques. Wilson (2021) used a case that occurred in Kawe district where a pastor was reported missing on March 18, 2017, and his body was found on April 11, 2017, buried in the small bush of Mabwepande in Dar es Salaam. The medical practitioner who was charged with the "Exhumation Order" and "Postmortem Order" admitted that he did not have sufficient expertise to perform the exhumation and autopsy work on a decomposing corpse. So, an expert team had to be formed, it included an archaeologist, an anthropologist, a pathologist and a medical doctor, assisted by Police detectives. Because of the nature and the quality of the forensic team and the methods used, the investigation yielded reliable results. The techniques that were used "field investigation and recovery" were adopted from the archeology field guides because archaeologists apply excavations methods on ancient burials as

Fig. 1. A. A team of experts lifting a dead body during Exhumation; B. Shows the experts collaborating in examining the corpse at the Muhimbili National Hospital Mortuary.

Fig. 2. Picture "A" shows the process of scraping soil sediments and Figure "B" shows the screening and flotation process in collecting evidence during Exhumation.

part of their training. The exhumed body was so damaged, it was not easy for the medical doctor to establish the physical trauma in the soft tissues, however, the presence of an experienced anthropologist with knowledge in examining cadavers and skeletonized human remains helped in the discovery of radial fractures on the forehead bone indicating that the "frontal bone was split by a blunt object". This helped in identifying the perimortem trauma that may have caused the death. Also discovered was the presence of animal scavenging marks at the distal end of the tibia of the left foot which was previously identified as postmortem trauma but could help establish a sequence of taphonomic events that are usually hard to establish. By comparing antemortem data with postmortem information the "murdered pastor" was positively identified. Based on the findings from this case, it was clear that a medical practitioner alone could not have been in a position to establish a forensic case and determine the cause of death if an interdisciplinary team would not have been formed. This was a first case in Tanzania where an interdisciplinary team of experts collaborated in solving a forensic case (see Figs. 1 and 2).

The second case reported by Wilson (2021) involves an exhumation of commingled human remains of three children murdered and then dumped in a garbage pit along the road. The three children were reported missing on October 26, 2015, at Kilwa Road Police Station, Temeke, Dar es Salaam. On May 15, 2016 bones believed to be human appeared on a small informal dump along the Mwakalinga Road in the Temeke district in Dar es Salaam, Tanzania. Police visited the area and then called a medical doctor to examine the remains. The doctor visited the crime scene and established that the investigation could not be done by a regular medical doctor and advised that a forensic pathologist should be involved. When the pathologist arrived, he was able to identify several bones as human and some of them he could not fully identify and recommended that an anthropologist or archaeologist with experience in bioarcheology or forensic osteology be involved. This was another case where a medical doctor and a pathologist had recommended an archaeologist or anthropologist to conduct the exhumation and identification of human remains. The suggestions were accepted, and the archaeologist was enrolled in the investigation. Wilson (2021) reported that the methods used in the investigation included survey, scraping, scene documentation, cleaning human remains, separation of bones from other materials, recognition of human and nonhuman bones, separation of the three individuals human remains, establishment of biological profile, examination of cause of death and matching antemortem and postmortem data for identification [12]. Almost all of the techniques used in this case study are not in the curriculum used to teach Medical Practitioners but are available to forensic archaeologists and anthropologists [9,20]. Therefore, it was clear that the doctor who recommended the search for a specialist in the field was correct.

A most recent case of exhumation reported in this article occurred in December 2021, in Bumbuli, Lushoto district in Tanga region in Tanzania. The exhumation was ordered following an illegal unearthing of the grave of an individual with albinism by people with malicious intentions. It should be noted that albino cemeteries in many places in Africa are mostly vandalized by people who believe that possessing such bones will help them gain more wealth and rise to prominence or election into politics and or recover from chronic diseases [25–27]. The criminals who looted a grave of an albino, cut off part of the right limb, the tibia. After a thorough police investigation the criminals were arrested (red-handed) selling a human tibia. In order to establish the evidence beyond any doubts in the court of law, the bones found triggered an exhumation order, thus directing a medical doctor to collect DNA samples for comparative work and reference-identification. Unfortunately, the disinterment was done carelessly and damaged the body. After completing the exhumation, a medical doctor took a DNA sample by sawing off a piece of bone from the medial condyle of the femur which became sample "A" from the recovered dead body. Additional samples were collected from the proximal end of the tibia recovered from the criminals, which became sample "B" for reference. Furthermore, the doctor placed the samples in two separate containers and preserved them with formalin and sent them to the laboratory of the Government's Chief Chemist in Dar es Salaam. The efforts to preserve the samples in formalin actually destroyed most of the DNA evidence required in identification. No pun intended, the doctor unknowingly destroyed the DNA evidence (base modification and cross linkage between DNA and proteins) [22,28]. Consequently, the samples could not be used for genetic testing and the exhumation and sampling exercise had to be repeated after two weeks. This is an example of the many challenges that arise during the implementation of the Inquest Act of 1980 within the community. There are many examples of Tanzanian medical practitioners failing to take DNA samples from skeletal remains. Others fail to take fingerprints from the dead bodies when they are bloated and in a decay stage of decomposition, and some time they fail to establish proper excavation protocols for exhumation. These doctors cannot be blamed for their failure to properly collect forensic evidence because they did not receive proper training and it is out of their scope of work [19,20]. Although the law requires them to fulfill that duty, it is like taking on a responsibility that is not relevant to medical doctors because they are not fully equipped with specific techniques for forensic exhumation and human remains identification [18].

Admissibility of Forensic archeology and anthropological evidence is another challenge facing the country. Despite the fact that anthropologist and archaeologist participating in the few cases mentioned here, there is still the challenge of admission of such evidence in court especially considering that the Inquest Act of 1980 does not recognize them. According to the Inquest Act of 1980, medical practitioners are the only ones authorized to practice forensic exhumation and postmortem examination, prepare reports, and testify in court. This applies to whole medical profession as long as they are registered or certified under the requirements of the Medical Practitioners and Dentists Ordinance. Although it is well known that in any public administration, the rule of

law, which is the admissibility of evidence and the directives that allow which evidence should be admitted or rejected in court, the Tanzanian Inquest Act has continued to be a hindrance even where the law of evidence gives such opportunity to an anthropologist. Furthermore, Medical Practitioners have been involved in the management of grave transfers when the exercise is conducted to accommodate any development projects such as roads, railways, airports, houses and school infrastructures, particularly in areas where there is no public health officer. Pursuant to section 7 [1] of the Grave (Removal) Act No.9 of 1969, the removal, transportation and reinstatement or re-interment of a grave or dead body authorized under the Act shall be undertaken in a manner which is not detrimental to public health. So, medical practitioners have been given the responsibility of managing such events as an alternative to a public health officer [29].

3. Recommended technical mitigation measures

3.1. Amending the law

The Tanzania Evidence Act of 1967, revised as Cap. 6 R.E of 2019 and the Penal Code Cap .16, R.E of 2019 dictate that all evidence ranging from burden of proof, relevance, weight, admissibility and satisfactory scientific evidence should be admissible into the record of legal matters to both civil and criminal proceedings. It is clear that expert witness is required when the court has to form an opinion upon a point of science or art, therefore archaeological or anthropological exhumation and skeletal postmortem examination in any criminal matters are relevant facts. Consequently, it is necessary to change the provisions of the Inquest Act to bring it in line with the revised Law of Evidence Cap.6 R.E of 2019 section 47. The Inquest Act Section 9 [1] relating to "Power to Order Exhumation" should state that the exhumation exercise during the inquest shall be performed by a forensic archaeologist or anthropologist or forensic specialist or medical practitioner who is well trained and certified for forensic exhumation and human remain identification, and the provision of evidence in court. Section 10 [2] of the inquest Act reads that "*Coroner may direct postmortem examination or require any Government medical practitioner within or without his jurisdiction or, in the absence of such officer, any other medical practitioner within his jurisdiction, to make an examination of the body and to report on it*" should be amended to "*Coroner may direct postmortem examination or require any Government Forensic Pathologist, forensic archaeologist or anthropologist or forensic specialist or medical practitioner who is well trained and certified within or without his jurisdiction or, in the absence of such officer, any other medical practitioner within his jurisdiction, to make an examination of the body and to report on it*" so as to allow the field experts of General Forensic Science, Archeology and Anthropologist to also participate in such inquest, especially in cases from a scientific point of view are beyond the scope of a medical practitioner such as forensic exhumation and identification of skeletonized human remains. The law also has to specify the qualifications of a medical practitioner who is required to do a postmortem not to "any Government medical practitioner" as it states now, in fact many do not meet the criteria to do a postmortem or an exhumation.

3.2. Improving the medico-legal education

Currently, the nature of medicolegal education in the country is based on the examination of cause and manner of death on fresh dead bodies with well-preserved soft tissues, detecting pathogenesis, biomarkers of sexual violence, poisoning and skin injuries. In cases of poisoning, medical students are learning to examine endocardium lining of the left ventricle and document presence or absence of petechial or large hemorrhages, to examine the entire stomach especially the appearance of its inner surfaces, and the intestines and urine which the bladder may contain. On the skin physiognomic injuries, they focus on looking at the nature of the sores and wounds whether they are open or closed, skin scratches, contusions, tearing, and examining the type of

Fig. 3. A picture showing the bones of two juvenile individuals who were commingled at a crime scene have been isolated in the laboratory.

Fig. 4. Shows non human bones that were sorted from commingled human remains.

object involved whether it is sharp, blunt or projectile. In the case of sexual violence cases, they look for trace evidence that could establish link between suspect and victim. There are certainly no components that teach doctors and other medical practitioners on how to use *Pythagoras* formula to establish trenches, photographing dead body at crime scene, use of a trowel in digging, use of mesh wire in screening sediments and flotation in the searching of evidence during Forensic Exhumation. There is no topic or module related to human remains identification or any short course certification that instructs the Doctors and other medical practitioner on how to collect antemortem information and compare it with postmortem data to achieve positive identification when faced with a challenge that requires human identification techniques. In the current medico legal curriculum there is no sections that teach them how to lift fingerprints on dead bodies, determine the biological profile from skeletal remains, collect DNA samples from skeleton or dental remains, or using dental records to help during the identification process. There is no further field-based training that provide instructions to medical practitioners on how to use various forensic techniques during disaster management. Therefore, there is a need for improvements at least by incorporating one course into the medical doctors' curriculum on "Forensic Exhumation and human Identification". Such course expansions are important in addressing the problem

Fig. 5. Medical Practitioners who attended short course on Forensic Exhumation and Human remains Identification at the University of Dodoma- College of Natural and Mathematical Science-learning how to use dead body bags in handling human remains.

Fig. 6. Field school for Forensic archeology and anthropology at the University of Dodoma offering Forensic Exhumation and Human remains identification training for students and medical Practitioners.

of shortage of experts in the field of forensic science especially in forensic pathology and osteology (see Figs. 3 and 4).

3.3. Setting up a short course

The idea of setting up a special short course for doctors to address this emerging challenge can be implemented as a way to address the challenges. It is well known that the process of amending the law or improving the medical legal education curriculum will take a long time to be approved, but by introducing short courses (one to two weeks') will help to solve the problem by providing relevant skills to medical practitioners whose Inquest Act recognizes them as experts to fulfill the responsibility of exhumation and human remains identification. A similar approach has been used by the International Organisations working on Forensic Humanitarian Action such as the ICRC have been building forensic capacity in the dignified management of the dead including how graves and skeletonized remains ought to be managed in the field and in the mortuary. In Tanzania, the approach has evaluated at the University of Dodoma, through the College of Natural and Mathematical Science the Forensic Science Unit conducted such a short course in partnership with the Ministry of Health and social welfare for five days (Fig. 5). The unit invited Forensic pathologist and anthropologist experts from the University of Pretoria-South Africa for training local doctors in Tanzania. But they have also done other similar training in collaboration with the Tanzania Police Force (Fig. 6). Both of the two implementations of the course have shown immense success despite the fact that the participants were few due to the circumstance that many beneficiaries could not afford the cost of fees and accommodations. So, it is important for the government to see the need to fund such training so that more doctors can participate.

3.4. Interdisciplinary team of experts

Cases that were investigated by an interdisciplinary team of experts provided results that were much better than the events performed by an expert or group of experts of the same profession. This means that doing research work in a teamwork environment especially a hybrid of archaeologist, pathologist, medical doctor, and anthropologist in assistance of Police detectives becomes more effective in capturing the breadth of the contribution of ideas emerging. So perhaps it would be better for the Court to see that and direct all forensic exhumation and human remains identification work to be done by a multidisciplinary team of experts. It is clear that this approach of working on a multi-expert team structure is probably the best and easiest mitigation of all [19].

4. Conclusion

First, this historic problem has been caused by the absence of the Department of Pathology Services in the government structure. Consequently, this is a strong reason to have a Government Chief Pathologist's office that will be responsible for overseeing forensic pathology or medical services including Forensic osteology (archeology and anthropology). The Ministry of Health or the Ministry of Home Affairs may have a special Forensic Pathology Service Unit that will be responsible for supervision, ethical practice, accreditation, risk management and other important matters to be considered during the provision of forensic services. Second, the issue of improving the structure of our education to address the challenges we face is crucial. There is no alternative to solving these existing challenges without educating Tanzanians working in these service areas. Health colleges in the country

have reason to establish degree programs in forensic pathology or medicine to address this emerging challenge. Third, Parliament should also play its role by changing the challenging provisions of the law, but while all this is being done the government should consider alternatives to address these emerging challenges with the release of a special short course on forensic Exhumation and human identification. Further research should be done to find out how these problems can be resolved quickly and a lasting solution.

Conflict of interest

In this article there is no any conflict of interest.

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