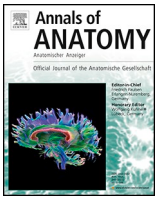
Annals of Anatomy 252 (2024) 152196

Contents lists available at ScienceDirect

Annals of Anatomy

journal homepage: www.elsevier.com/locate/aanat



Challenges to sourcing human bodies for teaching and research in Africa: Are the challenges insurmountable?

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ARTICLE INFO

Keywords:
Human bodies
Africa
Donor programme
Challenges
Religion
Culture

ABSTRACT

The teaching and learning of human anatomy by dissection has existed for thousands of years. Over the centuries, evolving ethical considerations for the sourcing of human bodies for dissection have resulted in a transition from the use of unconsented individuals to that of body donors and the institution of body donation programmes around the world. However, major challenges on the African continent have resulted in the continued use of unconsented or unclaimed bodies and the ethical dilemma for African anatomy departments regarding their use. Some of the key difficulties in sourcing donor bodies which exist on the African continent emanate from religious, cultural, societal trust and other confounding factors. This manuscript explores the challenges and suggests ways in which some of these constraints may be overcome.

1. Introduction

The use of human bodies for anatomical education by the traditional method of dissection has been documented both historically and in the recent past (Biasutto et al., 2014; Ghosh, 2015; Brenna, 2021, 2022). The dissection of human bodies can be traced back to ancient Greek physicians in the third Century BC (Elizondo-Omaña et al., 2005; Ghosh, 2015) but waned thereafter until the Renaissance (Ghosh, 2015; Brenna, 2021). Due to the increased interest in human dissection from medical students and artists (Calkins et al., 1999; Ghosh, 2015), illicit sourcing of bodies through grave robbing and the use of executed criminals was undertaken by anatomists (Tward and Patterson, 2002; Mavrodi et al., 2013; Tarlow and Lowman, 2018; Brenna, 2022). Legislation such as the Murder Act of 1752 which was intended to function as a post-mortem punishment to dissuade criminals from committing murder, provided a source of bodies for dissection (Bennett, 2018). However, it did not act as a deterrent and brought the act of dissection into further disrepute (Bennett, 2018). The bodies of slaves were frequently used for dissection in US medical schools (Halperin, 2007), as were the unclaimed poor from workhouses and hospitals in Britain (Jones, 1994). As societal awareness regarding the body trade and the use of unclaimed bodies increased, public anger rose and resulted in community disturbances (Knott, 1985). As a result, societal disapproval of dissection proliferated (Tarlow and Lowman, 2018) and public awareness led to the rise in legislation regarding the use of unclaimed bodies (Richardson, 2001; Jones and Whitacker, 2009). The Anatomy Act of 1832 severed the use of executions and grave robbing from dissection, and initiated the ethical pathway for anatomists (Jones, 2019), yet the use of unclaimed bodies has persisted.

The ethics surrounding the use of human bodies for teaching and research has evolved substantially since the troubled and nefarious days of the use of unconsented and illegally sourced individuals (Jones, 2019; Comer, 2022). Laws relating to the use of human material were initiated in many countries in order to set guidelines for anatomists regarding the sourcing, use and retention of human bodies (eg UK-HTA, 2004; Aus-HTA, 2003; SA-NHA, 2003). These requirements laid the groundwork for establishing legal opportunities for the use of human bodies. Recently, the International Federation of Associations of Anatomists has provided guidelines for the ethical use of human bodies (IFAA, 2012), specifying that informed consent should be sought from donors and thus, excluding the use of unconsented and unclaimed bodies. Advancements in the ethical treatment of human bodies are undoubtedly due to the change in the mindset of anatomists and of society who have evolved in their understanding of ethics in relation to the use of human material (Jones, 2016; Cornwall and Hildebrandt, 2019; Comer, 2022).

While challenges with the sourcing of donor bodies and developments in technology have introduced many software programmes and virtual resources for the teaching of anatomy, dissection of the human body has persisted in many countries globally and is considered as highly important in the learning of anatomy (Newell, 1995; Johnson, 2002; Guttmann et al., 2004; Korf et al., 2008). However, sourcing of bodies, particularly donor bodies for dissection is a mammoth challenge

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https://doi.org/10.1016/j.aanat.2023.152196
Received 1 October 2023; Received in revised form 13 November 2023; Accepted 29 November 2023
Available online 6 December 2023
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in Africa. This manuscript seeks to review the challenges and then attempts to propose mechanisms for solving these challenges.

2. Human bodies: anatomy education in Africa

There are 54 countries demarcated as Africa supporting a population of 1.46 billion individuals (Galal, 2023). Scattered across this large continent are a scant number of medical schools (approximately 200) of which 143 are in sub-Saharan Africa (Chen et al., 2012). These sub-Saharan medical schools are said to produce approximately 10,000 graduates per year (Kigoto, 2021). Despite ongoing attempts at communication, the International Federation of Associations of Anatomists (IFAA) has only been able to reach eight anatomical societies in seven African countries (personal communication).

While many medical departments of anatomy globally use dissection for teaching anatomy (Memon, 2018; Habicht et al., 2018), information on the sourcing and use of human bodies for dissection in Africa is scarce. However, based on information in the literature, it has been posited that the majority of African medical schools rely on unclaimed bodies (Gangata et al., 2010; Mazyala et al., 2014; Mwachaka et al., 2016; Habicht et al., 2018). Information on the teaching of anatomy in Africa is reflected in the scientific literature, with the majority of the publications emanating from Nigeria (Osuagwu et al., 2004; Akinola, 2011; Obaje et al., 2016; Chia and Oyeniran, 2019: Owolabi et al., 2020; Owolabi et al., 2022) and South Africa (Gangata et al., 2010; Kramer and Hutchinson, 2015; Kramer et al., 2019; Brits et al., 2020; De Gama et al., 2020) and with some from Kenya (Ogeng'o et al., 2013; Karau et al., 2014; Mwachaka et al., 2016), Ethiopia (Bekele et al., 2011; Getachew, 2014; Tesfaye et al., 2021), Zimbabwe (Siwela and Mawera, 2017; Zilundu et al., 2022) and Tanzania (Mazyala et al., 2014). However, few of these publications reflect the source of bodies used in dissection.

Attempts at acquiring comprehensive information on dissection/body donors in Africa.

Contact, communication and information from health sciences institutions in Africa is difficult due to poor internet facilities, language barriers, and cultural differences (Nketia, 1968; Clark, 1969; Emuze and James, 2013). The first known attempt on the African continent to accumulate comprehensive information on the use of human bodies and dissection for teaching yielded only 19 responses from anatomy departments at different institutions in seven countries (Kramer et al., 2008). Of these, 90% of the responders used dissection as the primary means of teaching anatomy, but the source of the body (ie donor or unclaimed), was not specified. A further study by Gangata et al. (2010) derived 14 responses from different institutions in 10 countries and found that most of the respondent countries utilised unclaimed bodies with the exception of South Africa, Zimbabwe, Ghana and Malawi. An analysis of the literature by Habicht et al. (2018), found that of the 14 countries in Africa which were known to use dissection, eight sourced unclaimed bodies exclusively, five further countries used bodies that were mostly unclaimed and only one country used almost exclusively donor bodies.

Africa has relied heavily on unclaimed bodies for teaching anatomy (Mwachaka et al., 2016). For example, the majority of bodies used for dissection at institutions in Kenya are from unclaimed sources with only two bodies being donated at the University of Nairobi in 2014 (Ongeti, 2002; Mwachaka et al., 2016). Students participating in a survey, admitted to a lack of knowledge of the body donor programme (Mwachaka et al., 2016). Unclaimed bodies which are sourced from hospital mortuaries are also used in Tanzanian Medical Schools for teaching anatomy (Mazyala et al., 2014). Nigerian and Ethiopian departments of anatomy struggle to obtain bodies from ethical sources (Akpa, 2003; Kinfu, 2008).

A survey carried out in Ethiopia on eight government institutions, showed that many of the bodies obtained were from unclaimed sources, a small percentage were paid for from other universities, and no bodies were donated (Tesfaye et al., 2021). Furthermore, poor ethical practices regarding human body usage and absence of standard ethical guidelines or body donation programmes in Ethiopia were reported (Tesfaye et al., 2021).

Over 90% of medical schools in Nigeria use traditional dissection (Anyanwu et al., 2011). While some authors have documented the use of criminals and unclaimed accident victims for dissection in Nigeria (Akpa, 2003; Osuagwu et al., 2004; Anyanwu et al., 2014), Asala (2022) has explained that the United Kingdom Anatomy Act (UK-AA, 1984), which has never been reviewed in Nigeria, originally made provision for the use of condemned criminals for anatomy dissection. Asala et al. (2022) dispelled the use of criminals through interviews with senior anatomists in Nigeria and West Africa. Asala's own experience from 1980 showed that this category of criminals was not sourced into Anatomy departments as the manner of execution made such bodies unsuitable for teaching (Asala, 2022). On the basis of this information, the IFAA map of the source of bodies in Nigeria was updated in 2022 and shows that Nigeria uses mainly unclaimed bodies with some executed criminals. Alternative software and virtual reality programmes for teaching anatomy such as the Anatomage Table (Owolabi et al., 2022) have been introduced where bodies are limited in number, but dissection is still the most used method of teaching anatomy in the vast majority of Nigerian medical schools.

In South Africa, the National Health Act (SA-NHA, 2003) allows for the use of unclaimed bodies. However, mostly donated bodies are used with some being unclaimed (Labuschagne and Mathey, 2000; Kramer and Hutchinson, 2015; Habicht et al., 2018; Adana et al., 2019). As the South African law states that unclaimed bodies are permissible, this at some institutions, has been interpreted as a government "donation" (personal communication). However, institutions in South Africa are generally transforming from the use of purely unclaimed bodies, which were the majority in the past, to the use of only donor bodies in recent years (Da Silva, 2006; Kramer and Hutchinson, 2015; Kramer et al., 2019).

Thus, while those medical schools in African countries reporting in the literature use dissection for training health sciences professionals (Kramer et al., 2008; Gangata et al., 2010; Mwachaka et al., 2016), the majority of the bodies used in these departments are from unclaimed sources (Gangata et al., 2010; Habicht et al., 2018). The reasons why donations or donor programmes do not exist in some of these African countries may be based on several factors such as religion, traditional belief systems and culture, as well as other factors.

3. Challenges to body donation in Africa: religious constraints

Aderibigbe (2015) describes three key religious belief systems in Africa, namely Christianity, Islam and the African traditional religion. There are a number of challenges to body donation for all the major religious groups, such as desecration (intactness) of the body at burial and the length of time to burial (eg on the same day or as soon as possible for Islam) (Gatrad,1994). In addition, resurrection from the dead is specified as a challenge for Christianity as well as certain African groups such as the Igbo and Yoruba of Nigeria (Daar, 1994; Anibezi, 2021).

While anecdotal evidence suggests that the three major monotheistic religions (Christianity, Judaism and Islam) of the world do not allow body donation and dissection, there have been challenges to this view. None of the three are said to preclude dissection or body donation (Daar, 1994; Notzer et al., 2006; Sandler-Phillips, 2015; Rokade and Bahetee, 2017; Bokek-Cohen et al., 2022), but have some restrictions.

Conflicting opinion exists in the literature regarding Christianity and body donation and dissection. Certain authors have interpreted the period in the Middle Ages when little progress was made in the study of human anatomy as being due to the Church having banned dissection (Blakstad, 2011) or having a belief that the body was being desecrated (Gregory and Cole, 2002). However, alternative sources from historians

(Alston, 1944; Park, 1995; Thadani, 2012; O'Neill, 2022) argue that this interpretation is flawed and that it was social and cultural issues rather than the Church which delayed the study of anatomy. Christianity in general thus appears to be supportive of body donation (Daar, 1994; Triska et al., 2020). Many Black African individuals, even if they are Christian, also practice one of the African traditional religions, and thus there is a unique fusion of traditional religion and Christianity in Africa.

According to Islam, the body is a gift from God, and it is not owned by the individual, and thus cannot be disposed of by advance direction (proposal to donate) or by relatives. The Iranian Shiite religious authorities have deemed that dissection is allowed for life saving education, research and treatment. The religious authority thus allows the dissection of a non-Muslim body but not a Muslim body by Muslim students (Aramesh, 2009). However, in the case of "Fatwas" handed down by the Ayatollahs Khamenei and Shirazi, the dissection of a Muslim is allowed if no non-Muslim bodies are available (Aramesh, 2009). Further "Fatwas" have also been pronounced in Kuwait, Egypt and Saudia Arabia approving the donation of human organs (Daar, 1994).

Buddhist communities see donation as a gift (Jones, 2015; Subasinghe and Jones, 2015; Techataweewan et al., 2018) and may be more responsive to the donation of their bodies. While the size of Buddhist communities throughout the African continent is not known, the majority of Buddhists are said to reside in South Africa (Okiror, 2020). Communication with Buddhist groups may assist in making them aware of the presence of body donor programmes where they exist in Africa. It is important to note however, that many people who register as body donors do not have a religious affiliation (Arraez-Aybar et al., 2014; Cornwall et al., 2012; Bajor et al., 2015).

It is likely that the challenges surrounding body donation in Africa may not have taken root from a religious background, but are rather based on legal, cultural and societal issues. However, in Africa, African traditional religions, spiritual belief systems and culture cannot be separated.

4. African traditional religion and cultural constraints

One of the greatest challenges to body donation in Africa is the influence of culture together with spiritual belief systems (Gangata et al., 2010; Akinola, 2011; Anyanwu et al., 2011; Arraez-Aybar et al., 2014; De Gama et al., 2020).

For many individuals of African traditional belief systems (African traditional religions) across Africa, "Death is not the end of life, but a journey into the spirit world of ancestors" (Anyanwu et al., 2011). For this reason, great importance is placed on the intactness of the body at burial as well as peri-mortem rituals. African people in general practice ancestor veneration (De Gama et al., 2020; Anibezi, 2021) and the importance of consultation with ancestors in daily life cannot be sufficiently stressed (Anibezi, 2021), hence the intactness of the body at burial is of great importance.

Numerous rituals are performed peri-mortem in Africa (Martin et al., 2013; Owino, 2017; Anderson, 2001) such as the washing and preparation of the body for burial (Martin et al., 2013) and communication by a senior relative with the spirit or soul of the departed individual. The intact body of the deceased allows for collection of the spirit from where the individual died. In cases where trauma has occurred and the body is not intact, "branch" rituals for guiding the spirit home need to be performed (personal communication). Whole body burial is of great importance as the deceased individual is going home to become an ancestor (Misimang, 1991). If the body is not buried, the spirit will wander and inflict havoc (Enzenweke et al., 2008). Much is known about the cultural practices of the Zulu ethnic group in South Africa in relation to death, due to the seminal work by De Gama et al. (2020). The authors of the latter study hold that the "hopes of accessing cadavers for anatomical education from this group are limited by strongly held cultural beliefs" (De Gama et al., 2020, p 728). The study by De Gama et al. (2020) further confirms that both spiritual and cultural beliefs are a major influence on a Zulu individual's willingness to donate their body for teaching and research.

Challenges such as the peri-mortem rituals and communication with the spirit after death may be some of the issues that could be overcome for body donor programmes if institutions could accommodate for these rituals prior to collection of the body. Of course, timeous preservation of the body in these cases, may become a further challenge. The major lingering challenge remains the dismemberment of the body during dissection. Institutions for example in South Africa, cremate the bodies at the end of the dissection period. While cremation may be problematical for Black African communities (Masango, 2005), donated bodies do not have to undergo cremation and could be returned to families for burial.

Careful and sensitive communication and discussions with a variety of communities and the leaders of the different African traditional religious groups would be required to overcome many of the challenges pertaining to sourcing bodies from communities in Africa. Communication on the importance of training future health professionals is essential, as the severe shortage of health care workers in Africa (WHO, 2022) has daunting implications for the continent. It appears however, that in the interim, donor bodies could be derived from individuals who do not have a religious affiliation (Cornwall et al., 2012). Other individuals may also be willing to donate their bodies, for example, Buddhist individuals (Jones, 2015; Techataweewan et al., 2018) who are known to view donation as a gift. Similarly, individuals who may be atheist or agnostic, and in the case of South Africa, individuals of population affinities not subscribing to African traditional belief systems (Kramer et al., 2019) may be willing to donate. These continued sources of bodies could be sensitively investigated without the targeting of different communities.

5. Legal constraints

Little is known across the African continent regarding the legal challenges for sourcing bodies or for setting up a human body donor programme. While some information exists in the literature for South Africa (Hutchinson et al., 2020), Nigeria (Chia et al., 2019) and Tanzania (Mazyala et al., 2014), there appears to be a paucity of information on the legality of donor programmes in the rest of Africa.

In Tanzania for example, it appears as though there is no provision for the donation of bodies under section 128 of chapter 16 of the Penal Code of the Tanzanian legislature, but there has been a call for the introduction of a body bequest programme (Mazyala et al., 2014). In South Africa, body donor programmes are supported by the Human Tissues Act 65 of 1983 (SA-HTA, 1983). In Ethiopia where there is a reliance on unclaimed bodies, the lack of legislation is seen to be a problem for these programmes (Tesfaye et al., 2021). The Anatomy Act was enacted in 1933 in Nigeria, but is seen to be deficient (Chia et al., 2019) in that it does not specify voluntary body donation and no regulatory authority.

Thus, active engagement with legislators in African countries is a priority in the first instance, in order to initiate body donation programmes where needed. This unfortunately is a long process and one that requires a persistent and resilient champion to see it through.

6. Other challenges: mistrust

Mistrust, is a major obstacle to obtaining bodies, particularly for bodies of the Black African population group. The bodies of slaves of African origin were used for dissection in American medical schools in the 19th Century and in some instances, were based on an elaborate trans-Atlantic body trade (Berry, 2018). In the early 20th Century, bodies of indigent African-Americans were illegally obtained by Texan medical schools from US county officials and used for the training of white medical doctors (Davidson, 2007). Fear among the black

population in America was based on the use of the bodies of slaves and their use in the first decades following the liberation of the slaves (Fry, 1975). As a result of the mistrust, African-Americans are less likely to donate their bodies than their White counterparts (Boulware et al., 2004). Decades of abuse and lies have resulted in this mistrust (Davidson, 2007; Halperin, 2007). On the African continent, knowledge of the slave-trade, colonisation (Omolewa, 2009) and also the disappearance of Black individuals during the apartheid era in South Africa (Rousseau et al., 2018; Thomas, 2018), may also have resulted in the same fear and mistrust for body donation although once again, little information appears in the scientific literature. Also in the South African context, the exclusion of Black students from the use of White bodies in the dissection laboratory during the apartheid era (Digby, 2013; Phillips, 2019) may have similarly resulted in trust issues by communities.

Mistrust by individuals may also arise from not knowing in what way the bodies of donors are being used. In South Africa for example, there are ongoing crimes in which individuals disappear and are murdered for the use of their body parts for "muti" (Masson and Ndlovu, 2023) and occasional reports of thefts of body parts from medical schools do occur (Steyn, 2005). The word "muti" is derived from the isiZulu word "Umuthi" meaning medicine and is assigned when the intention is to gather human body parts. Muti has been practiced as a "subculture of traditional African beliefs for centuries" (Labuschagne, 2004) and body parts are used as they are believed to be more effective or powerful than the other ingredients traditionally used by traditional healers. Muti murders differ from ritual and satanic murders in that the death of the particular individual is not the intention. In South Africa muti murders have been estimated as occurring between 15 and 300 times a year (Labuschagne, 2004). In the context of trust and mistrust, the use of donor bodies, which occur far away from the eye of the public, may be considered as an inappropriate use of body parts in an environment in which muti practices occur.

7. Engagement with the community

Around the world, anatomists have engaged with communities and students regarding the need for body donor programmes (Mwachaka et al., 2016; Park et al., 2021; Jiang et al., 2020; Jenkin et al., 2023) but with varying success. In Kenya, unclaimed individuals are the predominant source of bodies for dissection (Mwachaka et al., 2016) and this may stem from a lack of awareness of body donor programmes due possibly to the lack of active campaigns. Among other reasons provided for the lack of self-donation among Kenyan medical students are religious beliefs and customs (Mwachaka et al., 2016).

However, a lack of willingness of anatomists and medical students to become body donors (Anyanwu et al., 2014; Mwachaka et al., 2016) not only in Africa but around the globe (Bolt et al., 2012; Sehirli et al., 2004; Mekahli et al., 2009; Saha et al., 2015) may also play a role in dissuading potential body donors. Mwachaka et al. (2016) reported that a lack of self-donation by Kenyan medical students was due to a belief of poor handling of body donors. Similarly, the "poor ethical practices of human body usage and absence of standard ethical guidelines" in Ethiopia described by Tesfaye et al. (2021) may be one of the reasons why individuals do not donate their bodies in that country.

The use of unclaimed bodies is still widespread in Africa, and as far as can be determined, body broker companies which sell or lease parts of donated bodies (Schiffman and Grow, 2017) have not arisen although one African country (Libya) is said to import bodies from India (Gangata et al., 2010). Efforts by certain South African institutions to transform from the use of unclaimed bodies to body donation have been achieved (Kramer and Hutchinson, 2015; Kramer et al., 2019) in accordance with the IFAA's (2012) regulations on body donors. The latter transformation may provide the rest of Africa with determination to follow suit.

8. Conclusion: no challenge is insurmountable

It is apparent that there are many challenges to the sourcing of human bodies for teaching and research in Africa. However, as human dissection is acknowledged as the best practice for teaching and learning anatomy, should African anatomists wish this method of teaching to persist, then mechanisms need to be put in place to sustain sources of body donors.

In order to surmount the challenges to body donation in Africa, individual/s (anatomists and community members) who are deeply committed to changing the situation need to take the time to institute legal changes, set up donor programmes and continue to maintain and update these regularly. There are many individuals of different population affinities or religious beliefs who, if they were aware of an existing body donor programme, may wish to donate their body. Thus, communication with religious leaders and communities needs to be actively undertaken regarding the importance of training health professionals in anatomy by dissection. It is necessary to bring African traditional healers and traditional religious leaders into the conversation in order to understand the variety of traditional beliefs, rituals and cultures that populate Africa. It is also important to understand the opinions and beliefs of the varied communities and then adapt strategies to support body donation. Transparency on the use and respectful manner in which the bodies are treated by anatomy departments may inculcate trust within the community, as would an increase in the number of anatomists and medical professionals who donate their own bodies.

While body donation programmes in Africa may not flourish overnight, a careful and engaging approach with many different groups may lead to small incremental steps in resolving the myriad of challenges which face human body donation and the teaching of anatomy in Africa.

Funding

This study did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

Declaration of Competing Interest

The authors declare the following financial interests/personal relationships which may be considered as potential competing interests: The author declares that she has no competing financial interests. I declare that I am currently President of the International Federation of Associations of Anatomists (IFAA).

Acknowledgements

The author expresses sincere thanks to the thousands of body donors around the world, without whom anatomists would be unable to provide our students with a tangible and sustained knowledge of anatomy. In addition, grateful thanks to Professor Goran Straklj and Dr Brendon Billings for inviting me to participate in this special issue on Africa and body donation.

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