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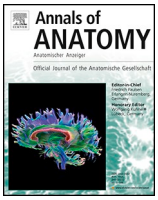
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Leading the transition to ethical human body sourcing in Africa: The South African experience

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ABSTRACT

Background: The use of human bodies for anatomy education and research forms an integral part of the training of health professionals around the world. However, the ethical acquisition of human remains for this purpose has been a challenge in many countries, particularly for those on the African continent. South African institutions have however, been able to progressively transition to a more ethical approach to human body acquisition. The aim of the current study was to investigate the provenance of human bodies and the number used in South African health sciences institutions during the period 2017–2021.

Methods: an online self-administered anonymised questionnaire was circulated to all health sciences institutions in South Africa. Questions were focused on establishing the provenance and the associated number of bodies and body donor programmes.

Results: responses were received from thirteen of the fourteen South African institutions. All thirteen institutions use human bodies for teaching and research, with the majority of the institutions being reliant on bequests (77%) and family donations (62%), and less on unclaimed remains (46%). Most institutions have established body donor programmes. Four institutions were negatively affected by the effects of the pandemic. Memorial services, which continued during the pandemic, were conducted by eight of the thirteen institutions.

Conclusion: South Africa is leading the transition to the ethical acquisition of human remains on the African continent. It is hoped that South African institutions will soon transform to the exclusive sourcing of bodies through willed donation and provide guidance and support for the other countries on the continent.

1. Introduction

Dissection of human bodies for the teaching of human morphology remains a fundamental aspect of anatomy since the first documented evidence of its inception in ancient Greece (Ghosh, 2015; Jones, 2019) and is considered to be best practice in many parts of the world (Moore, 1998, Ellis, 2001; Pawlina and Lachman, 2004; Biasutto et al., 2006; Azer and Eizenberg, 2007; Izunya et al., 2010; Wood et al., 2010; Alexander et al., 2014; Ghosh, 2015; Romero-Reverón, 2017, Sotgiu et al., 2020). In the late 20th century, although some institutions within the developed world including the United Kingdom and United States of America (Ghosh, 2017) had abandoned dissection-based teaching in favour of artificial replicas or blended-learning interventions, many elected to reintroduce dissection. This was mainly due to students' lack of knowledge and challenges experienced in later years (Rizzolo and Stewart, 2006; Ghosh, 2017; Flack and Nicholson, 2018; Memon, 2018; Onigbinde et al., 2021), but also because of the students' interest in bringing back dissection (Rizzolo et al., 2006). Dissection-based teaching does not only provide foundational knowledge in anatomy but also fosters the development of many other skills such as teamwork and problem-solving (Huitt et al., 2015), spatial awareness (Vorstenbosch et al., 2013) and professionalism (Warner and Rizzolo, 2006; Arráez-Aybar et al., 2021), all of which are needed for the production of skilled health science professionals (Rizzolo and Stewart, 2006; Ghosh, 2017; Flack and Nicholson, 2018). However, due to the rather dubious history of body acquisition, with anatomists' party to unethical and sometimes illegal practices, the sourcing of human remains for education and research remains contentious (Ball, 1989; Jones and Whitaker,

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to inform staff of the provenance of human remains in their department. Of the nine institutions, seven (77.8%) of the respondents stipulated that all academic staff are informed of the provenance, while five (55.6%) respondents indicated that all technical and administrative staff were similarly informed.

Strategies for informing students were in place at seven (53.8%) of the 13 institutions. Five (38.5%) institutions did not have strategies in place, while only one respondent did not know if strategies were in place to inform students of the provenance of human remains. From the open-ended responses, strategies for making students aware of the provenance of the bodies included a module for the teaching of ethics, general information sessions on the provenance of bodies and information provided at dedication/thanksgiving ceremonies.

When asked whether the COVID-19 pandemic affected the body donation programme at their institution, seven (53.8%) of the 13 South African institutions reported no effect. Two (15.4%) respondents did not know whether there had been an effect on their body donor programme. From the open-ended responses to the survey, four institutions indicated that their programmes were negatively affected by the COVID-19 pandemic for the following reasons: either the institution didn't accept bodies during this period, or accepted COVID-negative donations only, or the institutions were using bodies that had been previously received.

When asked about future plans for their donation programmes in response to the COVID-19 pandemic, seven (53.8%) respondents anticipated no change to their institution's body donation programme while two respondents (15.4%) did not know if any changes would be forthcoming. However, of the four institutions who signalled that they would make changes, one indicated that they would move to a virtual environment, while the other emphasized creating awareness of body donor programmes and community engagement:

Only eight (61.5%) of the 13 responding South African institutions honour the deceased with a memorial ceremony. One out of the five institutions which does not have a body donor programme but receives bodies from another institution, conducts a memorial ceremony to honour the dead. Of the institutions that conduct ceremonies, half of the respondents indicated that these ceremonies were compulsory for students, while the other half reported that student attendance was optional. Comments from the respondents indicated that they had either continued to conduct these ceremonies during the COVID-19 pandemic using strict COVID-19 protocols dictated by South African law or moved to online services.

4. Discussion

This study has established that the provenance of human bodies at South African institutions were mainly from bequests and family donations with fewer unclaimed remains, and that the number of human bodies used at institutions ranged widely between 3 and 110 bodies per annum.

4.1. Modes of sourcing bodies at South African Institutions

The sourcing of human remains for teaching and research at South African health sciences institutions has changed over the last century (Kramer and Hutchinson, 2015), with concerted efforts by anatomists driving an ethical approach through body donor programmes and reducing the reliance on unclaimed remains. While most South African anatomy departments in the past relied on unclaimed bodies (Labuschagne and Mathey, 2000; Kramer and Hutchinson, 2015), a promising result from the current study is that 38% of the responding South African institutions no longer receive unclaimed bodies. As the South African National Health Act 2003 (SA NHA, 2003) allows for the donation of unclaimed remains by government designated authorities to medical institutions, it is legal to use unclaimed remains in South Africa. However, while it is legal this is considered to be unethical, as no consent was granted by the decedents. Africa is highly dependent on unclaimed remains for teaching and research (Habicht et al., 2018) for a multitude of reasons (Manjatika et al., 2024; Kramer, 2024; Marima et al., 2024). Thus, the shift toward less reliance on unclaimed human remains in South Africa, however small, is positive. Since receiving its first unclaimed body in 1919 which led to a cohort of unclaimed bodies in use for over a hundred years (Kramer and Hutchinson, 2015), it is reassuring to note that most of the human remains at one of the oldest health sciences institutions in South Africa (University of the Witwatersrand) are now sourced from donations (Kramer et al., 2019). In addition, many of the major South African health sciences institutions are now using similar consent instruments with nuanced differences that allow for remains to be donated either for a finite period or indefinitely (personal communication), as per the IFAA guidelines requiring clear and legal frameworks for the length of time a body may be retained (IFAA., 2012).

Family donations, which relate to a family member donating the remains of their relative without the consent of the deceased (SA NHA, 2003, subsections 62.1–62.3), continue to be a prevalent source of bodies in South Africa due to financial constraints and high funeral costs among other reasons (Kramer et al., 2019). While the practice of family members donating bodies after death is common around the world (Jones, 2016, Riederer, 2016; Hutchinson et al., 2020), most programmes will only accept a body donated by the next of kin if they are willing to attest that the deceased did not stipulate an unwillingness to have their body donated during life. In South Africa, the family may still donate on behalf of the individual without the donor's consent (SA NHA, 2003). Similarly, family members in Hong Kong can override the wishes of registered donors after their death (Chan et al., 2020). These examples, emphasise the significance of family engagement during life to ensure that the wishes of the donor are respected. Further studies are required to better understand the role of families in the donor decision-making process during and after life at South African institutions. However, while legal in South Africa, this form of donation is not in compliance with good ethical practice (IFAA., 2012) and is hence problematic.

An interesting finding from the current study was one account of a donation by a friend. Donations from non-related persons are not common but do occur. Rajasekhar et al. (2016) reported a case where a friend was able to convey the wishes of a decedent to the body donor officers through a notarised affidavit. The South African National Health Act (2003) does not make provision for 'friend' donations, (SA NHA, 2003, subsections 62.1–62.3). This raises the need for clarity for laymen on the interpretation of the legislature and legal ramifications of donation with reference to friends and community members.

4.2. Strategies to inform staff and students of provenance of bodies used for teaching and research

Knowledge of the provenance of human bodies creates an awareness that feeds into good ethical practice (Lottering et al., 2022) and can influence the manner in which human remains are treated in the dissection laboratory (Jones, 1994). Furthermore, a lack of knowledge of the provenance of human remains might have negative consequences for community trust and the sustainability of donor programmes (Lottering et al., 2022). Most South African institutions in the current study indicated that strategies are in place to inform both academic and technical staff of the provenance of human remains. This result therefore sheds a positive light on the number of South African institutions that have interventions in place to make staff aware of provenance.

Another promising insight from the current study is that only one respondent was unaware of the provenance of bodies received from another South African institution in contrast to the study by Lottering et al. (2022) who found that a number of South African anatomists were unaware of the provenance of bodies sourced from neighbouring institutions. The difference between the two studies could be related to the study sample. The current study had a focus on senior anatomists, while

the study by Lottering et al. (2022) derived information from a broader range of anatomists i.e. from early career to senior anatomists. This difference in information suggests that additional strategies must be implemented to inform staff of the provenance of human remains sourced from neighbouring institutions.

A lower percentage of institutional respondents (54%) had strategies in place to inform students of the provenance when compared to staff, suggesting that more could be done to sensitise health sciences students of the provenance of the bodies. Whilst Nnodim (1996), found that students reacted to unclaimed human remains in much the same manner as bequeathed bodies, a more recent study indicates a level of discomfort from students using unclaimed remains (Caplan and DeCamp, 2019). It has also been shown that medical students' reluctance to donate their own remains is influenced by the use of unclaimed remains in their teaching and research (Naidoo et al., 2021). No reported study to date has investigated the perceptions of African health sciences students on the use of unclaimed human remains during their research or training. Such a study is needed. Overall, knowledge of the provenance of human remains is said to act as a positive approach to good ethical practice (Winkelmann et al., 2016) and should be encouraged.

4.3. General numbers and the adequate provision of human bodies for teaching and research

Learning from human bodies is still considered best practice for anatomy teaching and research for health sciences professionals across the globe (Newell, 1995; Johnson, 2002; Guttmann et al., 2004; Korf et al., 2008, Gosh, 2017; McMenamin et al., 2018; Pather, 2020). Most of the surveyed African health sciences institutions are highly dependent on dissection-based teaching (Kramer et al., 2008; Gangata et al., 2010), and South Africa is by no means the exception based on the current results, with all of the 13 institutional responses indicating reliance on human bodies for anatomical teaching and research.

The average number of human remains received by South African institutions over the period 2017–2021, extends from 3 to 110 bodies annually, illustrating a wide range in numbers across the 13 institutions. This range in the number of bodies may be due to multiple factors such as poor donor numbers, the size of the classes and the different types of professional degrees taught across these institutions and that some groups dissect human remains and others are dependent on plastinated specimens and plastic models (Kramer et al., 2008). Some of the South African health sciences institutions act in a supportive role by transferring surplus bodies to those neighbouring South African institutions that are at risk of reduced numbers of bodies.

From the current study, it is evident that South African institutions that don't have established body donor programmes use fewer bodies per annum. Hence it appears that South African institutions with donor programmes are not only acquiring human remains more ethically (with the exception of family donors) but are also attaining more reliable numbers of bodies to address the ever-increasing student complement (Riederer, 2016).

4.4. Body donor programmes

Body donor programmes are important in the ethical sourcing of human remains both locally and internationally (Zhang et al., 2013; Subasinghe and Jones, 2015; Riederer, 2016; Hutchinson et al., 2020). While the inception date of the two oldest medical schools in South Africa is known, the University of Cape Town in 1911 (Tobias, 1990) and the University of the Witwatersrand in 1919 (Kramer and Hutchinson, 2015), the date on which the first donor programmes were introduced is not known. It is however, encouraging to note that 62% of South African health sciences institutions have established donor programmes, suggesting that South African health sciences institutions are transitioning toward the establishment of an ethical means of acquiring human remains. However, two of the institutions with body donor programmes source human bodies directly from their own donor programme, and also from other neighbouring institutions to supplement the numbers of bodies for teaching and research. The ability to obtain bodies from neighbouring institutions is an important support structure which enables institutions struggling to achieve a sufficient number of bodies as they transition toward the establishment of ethically sourced-body donor programmes. This mechanism for achieving adequate numbers of bodies for teaching may be a useful recommendation for regions struggling to establish their own donor programmes.

The COVID-19 pandemic negatively influenced multiple donor programmes globally (Manzanares-Céspedes et al., 2021; McCumber et al., 2021) and presented a period of uncertainty concerning the continued use of human bodies and dissection-based teaching. Some institutions opted for alternative teaching modalities (e.g., computer aided software, plastinated and plastic specimens) during this period (Longhurst et al., 2020; Pather et al., 2020). Remarkably, seven of the South African institutions reported no change to their donor programmes during the pandemic and over half of the institutions did not have any future changes in mind in response to the pandemic. Further studies are required to identify which aspects of the donor programmes were resilient to the challenges posed by the pandemic. Four institutions did however highlight a negative impact on their donor programme. Issues ranged from the need for certified negative COVID-19 bodies, the rejection of bodies that presented with COVID-19-related causes of death and in certain instances, non-acceptance of any bodies during the pandemic, all of which led to a decrease in numbers of bodies during this period. In response to the challenges emanating from the pandemic, the same four institutions commented that changes to current Standard Operating Procedures and improved awareness campaigns might be possible solutions for the future.

While there are benefits to body donor programmes, they have their own challenges. For example, body donor programmes may contain individuals with demographics (e.g., age and population affinity) which differ from the general population of the country. In Africa this translates to the donation of older individuals of the White population group (Gangata et al., 2010; Kramer et al., 2019, Brits et al., 2020; Manjatika et al., 2024). These demographics influence research, teaching, and clinical applications due to the limited representation of certain population groups and ages within the dissection laboratory.

Furthermore, donor programmes are successful in communities that are willing to donate their remains. Unfortunately, many African communities are reluctant to donate for a multitude of reasons (Kramer, 2024; Manjatika et al., 2024; Marima et al., 2024). Africa has few body donor programmes and a high reliance on unclaimed remains (Habicht et al., 2018; Kramer, 2024; Manjatika et al., 2024; Marima et al., 2024), yet graduates several thousand medical students annually (Kigoto, 2021). From the current study it seems as if South Africa is leading the transition from a reliance on unclaimed remains to established consented donor programmes when compared to the rest of Africa. However, this may be the consequence of the socio-political history of the country. South Africa struggles from the unsavoury consequences of apartheid which was the socio-political and economic exclusion of most of the population, namely Black South Africans (Tshishong, 2019). This exclusion extended into the dissection halls of institutions where Black students were prohibited from dissecting the bodies of White individuals in the early part of the twentieth century (Phillips, 2019). Most of the bodies represented within dissection laboratories were Black individuals and unclaimed (Kramer and Hutchinson, 2015). Today the opposite is evident, with predominantly White bodies making up the donor population. This change occurred following the transition to democracy in South Africa in 1994, coupled with the establishment of donor programmes (Labuschagne and Mathey, 2000; Kramer and Hutchinson, 2015; Kramer et al., 2019). Black South Africans are reluctant to donate their remains for reasons shared across the African continent which include spirituality and burial practices (De Gama et al., 2020; Kramer, 2024; Manjatika et al., 2024; Marima et al., 2024). In many regards, the

success of South Africa's body donor programmes is a result of a willing White South African donor population. White South Africans make up 7% of the 63 million South Africans while the majority Black population forms 81% of the total population (Statistics, 2023). More directed interventions and awareness campaigns are required to understand how the majority of South Africans can be encouraged to donate their bodies to donor programmes. Despite the socio-cultural restrictions imposed on the acquisition of human remains, additional donor programmes have been successfully developed across the globe (e.g. Da Rocha et al., 2012; Saw, 2018 and Zhang et al., 2023). Community engagement is a key component in raising awareness and more specifically in regaining trust in communities that have lost trust in "western practices" due to the far-reaching consequences of racial discrimination (Boulware et al., 2003; Mueller et al., 2021; Kramer, 2024). While the imbalance of population representation within the dissection halls may reflect the socio-political history, it poses an interesting dilemma regarding representation of Black South Africans with reference to inclusivity, diversity and aspects of decolonising the academic programme (Finn et al., 2022).

4.5. Memorial ceremonies

Memorial ceremonies have an important role to play in the treatment of human remains and ethical practice, as their goal is to honour the dead in a dignified manner. However, five South African institutions do not conduct memorial services. This may be due to those institutions not having their own donor programmes or they might be dependent on plastinated and plastic models and consider the memorial services unnecessary. Nonetheless, memorial ceremonies are common practice at South African health sciences institutions, and surprisingly one of the institutions who do not have their own body donor programme still hold a service. These ceremonies are compulsory for staff and students at approximately half of the South African institutions and were still held despite the COVID-19 pandemic with the use of unique strategies such as online events (e.g., live streaming and prerecorded videos) and strict protocols during face-to-face interactions. The benefits of conducting these ceremonies have been documented (Štrkalj and Pather, 2017) and include giving thanks to the family and friends of the donors, instilling a sense of ethics and gratitude for both students and staff and also the benefit of developing trust within communities and sustaining body donor programmes.

Body donor programmes are highly dependent on a co-operative donor community. Potential donors are encouraged to donate if good ethical practice is identified at health sciences institutions (Jones, 2016). These practices include the use of consented bodies and thereby, respect for the personal autonomy of the individual. Dignity and respect in the handling and care of these human remains further contribute to good ethical practice. Memorial services thus provide a platform for sharing information regarding these ethical practices with students, staff, donor families and communities (Leeper et al., 2024) and in so doing may assist in promoting donation.

While the current study demonstrates changes that favour a positive transition toward the ethical acquisition of human remains for research and teaching at some of the major South African health sciences institutions, additional efforts are required to attain a system which is fully compliant with ethical donation. Lobbying for legislation which prohibits the use of unclaimed remains could be an important step. Enhanced community engagement through awareness campaigns on radio, television and social media could be initiated, but more importantly would be finding innovative ways of integrating cultural and religious needs of the community into the donor programme.

5. Limitations

The questionnaire was tested for content validity only and not statistical validation. However, the questions were mainly focused on factual information pertaining to the numbers of bodies and the associated provenance and therefore less reliant statistical validation. As only one expert from each institution responded to the questionnaire, a selection bias may have occurred. Donor numbers were based on an estimated average and ranges, not exact numbers over the 5-year period. Data collection was restricted to a 5-year period (2017–2021) as data was not readily available for all institutions prior to that period. In the future, more in-depth information could be derived from semi-structured interviews.

6. Conclusion

Historically, the discipline of anatomy lost societal credibility due to unethical practices (Štrkalj, 2014; Štrkalj and Billings, 2023) and a commonly held notion is that African anatomy institutions continue to depend on unethical practices for sourcing human bodies. The current study shows a shift towards a majority of donor programmes in South Africa, with greater numbers of bodies sourced from bequests and family donations than from unclaimed sources. Collectively, the positive results exhibited in this study coupled with a deeper understanding of the constraints caused by legislation and socio-cultural beliefs, will hopefully assist with dispelling the existing notion of unethical practices in body sourcing in Africa.

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Goran Štrkalj: Writing – review & editing, Writing – original draft, Methodology, Investigation, Conceptualization. **Brendon Billings:** Writing – review & editing, Writing – original draft, Project administration, Methodology, Investigation, Formal analysis, Data curation, Conceptualization. **Beverley Kramer:** Writing – review & editing, Writing – original draft, Project administration, Methodology, Investigation, Data curation, Conceptualization. **Erin Hutchinson:** Writing – review & editing, Writing – original draft, Methodology, Investigation, Conceptualization. **Elena Libhaber:** Writing – review & editing, Writing – original draft, Methodology, Investigation, Formal analysis, Conceptualization. **Tanya Augustine:** Writing – review & editing, Writing – original draft, Methodology, Investigation, Conceptualization. **Desire Brits:** Writing – review & editing, Writing – original draft, Methodology, Investigation, Conceptualization.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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Appendix A. Supporting information

Supplementary data associated with this article can be found in the online version at doi:10.1016/j.aanat.2024.152263.

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