

# Body Donation vis-à-vis the Anatomist - Be Proactive, Vigilant and Safe.

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## ABSTRACT

**Background:** Most medical schools are facing a shortage of cadavers. The general attitude and propensity is to procure more cadavers for the Institute. In their efforts to procure bodies for dissection most anatomists ignore measures which ensure their own safety. **Methods:** In order to assess the attitudes of the anatomists towards the donated body and its management a structured questionnaire was framed in light of the literature. **Results:** The trends and results indicate that a lot needs to be done to inculcate 'safe practices' and develop a 'seasoned etiquette' and 'mindset' towards handling of bodies received in anatomy departments. **Conclusion:** Standard precautions should be taken during every moment of contact with cadaver. The donated bodies must immediately be categorized on receipt and bodies unsuitable for embalming must be refused by the institution. Hepatitis B vaccination is recommended for all personnel likely to come into contact with dead bodies. Formaldehyde levels must not exceed .1ppm for closed spaces.

**Keywords:** Donated body, Safe practices, Embalming.

## INTRODUCTION

Most medical schools are facing a shortage of cadavers.<sup>[1]</sup> The general attitude and propensity nowadays is to procure more cadavers for the Institute. Anatomy departments are promoted as places "where death delights to serve the living" and body donation is slowly becoming the principal means of procuring the body for the institute.<sup>[2]</sup> In their efforts to procure bodies for dissection most anatomists ignore measures which ensure their own safety. The bodies donated should be considered at par with the unclaimed bodies for protocol regarding their management.

If we Anatomists are not vigilant and proactive how can we expect managements/governments to respond to challenges faced by us in daily routine?

It should be the duty of the senior anatomists serving the Institute to sensitize both their staff and managements regarding the potential hazards from a

donated body and the procedures undertaken on the cadaver. The universal standard precautions for handling human donated bodies,<sup>[3]</sup> and precautionary measures for handling and disposal of dead bodies<sup>4</sup> have been mentioned in literature and need to be embodied in practice in all institutions [Tables 1 & 2].

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**Table 1: Standard Precautions for handling human donated bodies.**

1.	Hand washing: After all procedures
2.	No smoking/Eating within work area
3.	Specific protective embalming and dissection clothing.
4.	Skin care-covering cuts/avoiding false nails
5.	Spillages-Use appropriate spillage management kit.
6.	First aid box with eye wash station
7.	Immunization against Hepatitis B
8.	Sharps Injury-Wash area with soap and running water.

Extracted from HPSC's Management of Deceased Persons Harboring Infectious.<sup>[3]</sup> Available at [www.hpssc.ie](http://www.hpssc.ie)

**Table 2: Precautionary measures for handling and disposal of dead bodies**

Risk category	Bagging	Viewing in funeral parlour***	Embalming	Hygienic preparation in funeral parlour****	Disposal of dead body
Category 1 (Items not in categories 2 & 3).	Not reqd.	Allowed	Allowed with PPE*	Allowed with PPE*	Coffin burial/cremation
Category 2 1) HIV 2) Hepatitis C 3) Creutzfeldt-Jacob disease without necropsy 4) Severe Acute Respiratory Syndrome 5) Avian influenza 6) Middle East Respiratory Syndrome 7) Others**:	Must	Allowed	Not allowed	Allowed with PPE*	Cremation is advisable
Category 3 1) Anthrax 2) Plague 3) Rabies 4) Viral haemorrhagic fevers 5) Creutzfeldt-Jacob disease with necropsy 6) Others**:	Must	Not allowed	Not allowed	Not allowed.	Cremation strongly advisable

Extracted from: [http://www.chp.gov.hk/files/pdf/grp-guideline-hp-ic- precautions for handling and disposal of dead bodies,<sup>\[4\]</sup> en.pdf.](http://www.chp.gov.hk/files/pdf/grp-guideline-hp-ic-precautions%20for%20handling%20and%20disposal%20of%20dead%20bodies%20en.pdf)

\*PPE: Personal Protective Equipment for category 1 and 2 includes gloves, water repellent gown and surgical mask. Use goggles or face shield to protect eyes, if there may be splashes. For category 3 use standard PPE and eye protection (goggles or face shield), double gloves, shoe covers / boots.

\*\* Including other infectious diseases as advised by the physician i/c, the infection control officer or microbiologist.

\*\*\*Viewing in funeral parlour: allowing the bereaved to see, and spend time with the dead before disposal.

\*\*\*\* Hygienic preparation in funeral parlour: cleaning and tidying the body so that it presents a suitable appearance for viewing. Applying makeup may be included.

Another fact which embalmers and individuals who handle remains of dead bodies must accept is that embalming without precautions is a sure shot health hazard and that formaldehyde is a known carcinogen.<sup>[5,6]</sup> Based on limited evidence in humans, and sufficient evidence in animals, studies have shown statistically significant associations between site-specific respiratory neoplasms and exposure to formaldehyde or formaldehyde-containing products. An increased incidence of nasal squamous cell carcinomas was observed in long-term inhalation studies in rats and in mice. The classification is supported by in vitro genotoxicity data and formaldehyde's structural relationships to other carcinogenic aldehydes such as acetaldehyde. When an embalmed body decays, the fluid can seep into the ground and affect surrounding soil and water ecosystems, and if cremated, the formaldehyde enters and remains in the atmosphere for up to 250 days. Formaldehyde, a known carcinogen in humans and animals, is water soluble and when found in the atmosphere, combines with condensation and rains down onto plants, animals and water supplies.<sup>[7]</sup> Various National Cancer Institute studies reported an increased risk of death due to lymphoma, leukemia and some brain cancers in those exposed to formaldehyde in their professions and the chemical is featured on the U.S. Environmental Protection

Agency's list of top 10% most hazardous and damaging chemicals to the environment. Formaldehyde has been described as a silent killer in the laboratory and safety measures and safety precautions should be the priority of the modern day anatomist.<sup>[8]</sup>

## MATERIALS AND METHODS

In order to assess the attitudes of the anatomists towards the donated body and its management a structured questionnaire was framed in light of the literature. The trends and results indicate that a lot needs to be done to inculcate 'safe practices' and develop a 'seasoned etiquette' and 'mindset' towards handling of bodies received in anatomy departments.

### Questionnaire:

Kindly Answer in Yes/No:

1. Does your Institute categorize the body on receipt regarding its level/potential of infection?
2. Do you feel that a donated body is non-infectious and safer compared to an unclaimed body?
3. Can you/your institute refuse a body pledged for donation on receipt? If yes provide reasons/circumstances.

4. Is there any compulsory window period before the donated body is embalmed in your institute?
5. Is there an enquiry from your institution regarding history of illegal drug use before the donated body is accepted by the institute?
6. Is the donated body immediately utilized or there is a compulsory window period before the donated body is utilized in the Institute?
7. Do you believe that body donation is a noble act and should be encouraged?
8. Are all personnel handling the dead body in your department immunized against Hepatitis B?
9. Are all members of your department sensitized that Formaldehyde is a carcinogen?
10. Have you ever been sensitized regarding dealing with the dead by a lecture/presentation /discussion in your institute?

- A- Categorizing donated bodies (All Anatomists).
- B- Categorizing donated bodies (Anatomists<40 Years).
- C- Can refuse donated body on receipt.
- D- Window period before embalming.
- E- Obtaining history of illegal drug use by body donor.
- F- Procuring Observations and contact number of body donor.

## RESULTS

The results have been depicted in Figures 1 and 2. Most Anatomists (55%), particularly the younger staffs (85%) are unaware about categorizing the body on receipt regarding its level of Infection. Most feel that a donated body is non-infectious and safer than an unclaimed body (90%). Most anatomists are unaware that the institute reserves the right to refuse the unsuitable donated body on receipt (54%). In most institutes there is no compulsory window period before the donated body is embalmed (88%). Most departments are not focusing on possible history of illegal drug usage by the donor (96%). The observations and contact number of the treating physician is not mandatory in most institutes (82%). The Anatomists are well aware that body donation is a noble act and should be encouraged (100%). However most of them are neither immunized against hepatitis B (60%), nor are they aware that Formaldehyde is a potential carcinogen (65%).

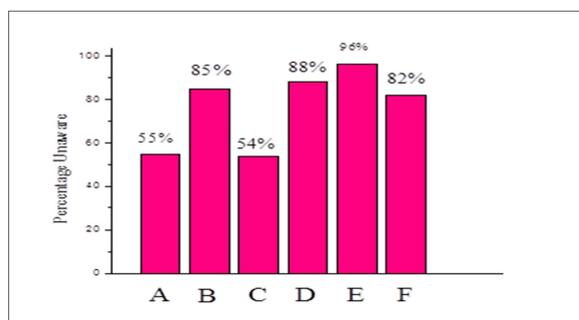


Figure 1: Percentage anatomists unaware regarding safe practice and procedures.

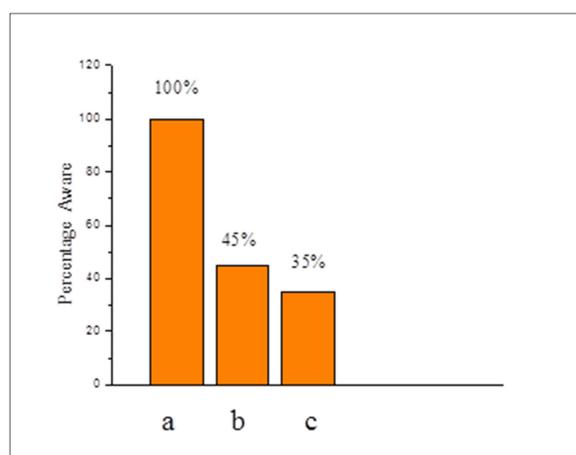


Figure 2: Percentage anatomists aware regarding safe practice and procedures.

- a- Body donation is a noble act.
- b- Immunized against Hepatitis B.
- c- Formaldehyde is a carcinogen.

## DISCUSSION

The modern day anatomist cannot afford to be oblivious to the risks of the profession. Our duty and responsibilities are a priority and at the same time the health and safety concerns must be addressed and conveyed to the appropriate authorities for redressal. Categorization of body on receipt regarding its level of infection should be mandatory in Institutions. Bodies in categories 1,2 and 3 should be signified by blue, yellow and red labels according to international standards to facilitate appropriate management protocol.<sup>[4]</sup> The donated body should never be treated safer compared to an unclaimed body and proper protocol and workup should be ensured before considering it safe to handle. It is the right of the institute to refuse a donated body if it is unsuitable for donation. Frequent reasons for refusal are body of a medicolegal case (suicide, homicide, accidental death), postmortem body, body of a person having contagious and communicable disease like HIV, AIDS, Hepatitis B and C, Gangrene etc, decomposed body, extremely

obese or emaciated body, bodies with organs removed(except eyes),bodies of persons with skin diseases like psoriasis, bedsores etc. Even though willingness form is filled by the prospective donor, the execution of the donation is not mandatory for both the donor as well as the recipient (the medical institution).<sup>[2]</sup>

History of illegal drug use and contact of treating/family physician should ideally be a part of the body donation form. A history of illegal drug usage increases the possibility of the donated body being a health hazard to individuals handling the body. In case of a needle/sharp injury during embalming the contact of the treating physician can be handy to decide further management in the situation. Hepatitis B vaccination should be mandatory for all persons handling the human remains.<sup>[9]</sup>

One way of further reducing the risk of infection during autopsies and embalming procedures (in addition to universal precautions), is to delay doing the autopsy/embalming. The rationale for this is that longer a person is dead, the less the risk of transmission.<sup>[10]</sup> However, since most bodies are quickly refrigerated after death, the risk of infection when performing an autopsy/embalming procedure can still occur, even days after death. It also depends upon viral load of person when dead. As long as universal precautions (standard infection control guidelines) are followed, the risk of infection from a dead body is very low. If the body fluids of a recently dead body do not have a direct access to another person's bloodstream, there will not be a risk of infection. However, transmission can still occur during embalming/autopsies if a needle stick occurs, or if a person is cut by a knife.

Embalming using formaldehyde has health and environmental risks.<sup>[11]</sup> Benefits of embalming outweigh risks in two situations. First is when embalming is done so that medical students can study anatomy and second when the body needs to be viewed over a period of time (in the eventuality of death of an eminent person) or it needs to be transported over a huge distance. Because the bodies in both above scenarios need to last longer than a funeral service anatomy departments tend to use a higher concentration of embalming fluid. The corresponding increase in health risks for embalmers, students and teachers can be compensated by increased ventilation and greater diligence. Monitoring of formaldehyde levels in embalming area and dissection halls should be done by indoor air quality

monitoring agencies to ensure that formaldehyde levels must not exceed .1ppm for closed spaces.<sup>[12]</sup>

## CONCLUSION

1. All donated bodies and human remains should be treated as if infectious. Standard precautions should be taken during every moment of contact with a cadaver. Sharp injuries must be dealt with on priority and procedure should be strictly enforced.
2. The donated bodies must immediately be categorized on receipt regarding their hazard potential. Bodies unsuitable for embalming must be refused by the institution.
3. A proper record of the death details with medical history must be maintained on receipt of body. We should always try to ascertain the details of the attending physician, and enquire from relatives regarding possibility of illegal drug use by the deceased. The body donation form must have a column proving details of the medics who have treated the person for ailments.
4. Hepatitis B vaccination is recommended for all personnel who are likely to come into contact with dead bodies. There should be periodic assessment of atmospheric level of formaldehyde in embalming room and dissection hall by indoor air quality monitoring agencies. Formaldehyde levels must not exceed .1ppm for closed spaces.

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