







# The anatomist's perspective today towards human body donation for procurement of cadavers for study of human anatomy

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## ABSTRACT

Anatomy is the study of structure of human body. Dissection of human cadavers has always been an integral part of study of anatomy as well as research in it. Till now the only source for cadavers for dissection purposes were unclaimed bodies. Today the need for bodies for medical education has increased and most medical schools are experiencing difficulties in procuring the requisite number of cadavers. Body donation programs may help fulfil this need of the medical schools. The present study was an attempt to analyze the attitude of the anatomists towards different aspects of body donation. 24.7% of the participants stated that they have insufficient cadavers, 12.3% claimed surplus cadavers while 62.8% claimed sufficient cadavers. 26% of the anatomists were unaware of the necessity for a death certificate and 35% were unaware of the necessity for a unique identification document for carrying out body donation.

**Keywords:** body donation, cadaveric dissection, body donation program, dissection, medical education

## INTRODUCTION

Anatomy is the study of structure of human body and forms the basis of further medical education. Dissection of human cadavers has always been an integral part of study of anatomy as well as research in it [1]. The dissected cadaver remains the most powerful means of learning anatomy and must not be dismissed as obsolete [2]. There is no substitute for human body in teaching anatomy [2].

Cadaveric dissection helps a student to learn topographic localization of the organs of the body [3]. Now-a-days there are cadaveric labs being developed that are used for providing cadavers for surgical training. Such labs also have need for constant inflow of cadavers [4].

For a long time the only source for cadavers for dissection purposes were unclaimed bodies. But with medical colleges mushrooming all over India, the need for bodies for dissection and education of medical students has increased. Most medical schools are experiencing difficulties in procuring the requisite number of cadavers [5]. In a national study, it was found that 63.79% of medical, dental, and physiotherapy colleges had barely sufficient cadavers for the purpose of dissection during 1<sup>st</sup> year of the anatomy course [6].

The bodies usually used for dissection are unclaimed bodies where there is always a risk of infectious diseases [7]. It is therefore important to have "whole body donation

programs" and to encourage society to donate bodies for dissection and research purposes [7].

Today people are encouraged to bequeath their bodies to anatomy for anatomical dissection and learning. The body bequest has been defined as an act of giving one's body after death for medical research and education [8]. Body donation programs can encourage the people pledge to body donation and thus, fulfil this need of the medical schools.

The present study is an attempt to analyze the attitude of the anatomists towards body donation and its various aspects today including the disposal of the remains.

## MATERIALS AND METHODS

### Purpose Statement

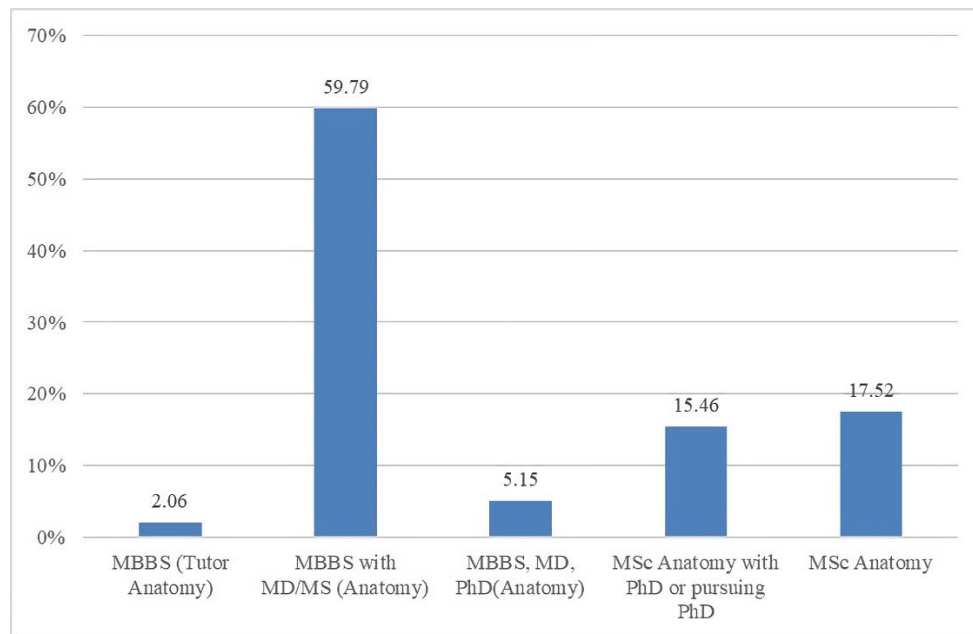
The present study aims at studying the anatomist's perspective towards human body donation for procuring cadavers for learning of gross anatomy.

### Type of Research Methodology

It is a descriptive, cross sectional study.

### Data Collection Tool Used

The tool used to collect data was a questionnaire. The questionnaire was pilot tested. The validated questionnaire was finally used for the study.



**Figure 1.** The participants and their educational qualifications (Source: Authors' own elaboration)

**Table 1.** Availability of cadavers in department for dissection by students

	Number of participants	Percentage (%)
Insufficient	24	24.7
Sufficient	61	62.8
More than required	12	12.3

### Timeline

The data used in the study collected in 2020-2021.

### Inclusion and Exclusion Criteria

All those participants who were above age of 18 years, and whose educational qualifications were either MBBS (who has worked or is employed presently as tutor in the Department of Anatomy), MSc (anatomy), MBBS with/pursuing MD/MS (anatomy) or Phd (anatomy) or pursuing Phd (anatomy), and who were willing to consent to participate in the study, were included in the study. The exclusion criterion for the study was all those who did not fit the age or education qualifications or were unwilling to participate in the study.

The sample size was calculated to be 1,675. A questionnaire exploring the objectives of the study was created. The questionnaire was pretested and standardized. The validated questionnaire was converted into a Google Form. The participation information sheet as well as the link to this form was sent to 1,675 anatomists either by e-mail or phone with an appeal to participate in the study. The respondents were assured of confidentiality of their identity and responses.

Written consent for participation in the study was a compulsory first question of the questionnaire on the Google Form, without filling which the participants would not be able to fill the questionnaire. The data obtained in the excel sheet was analyzed statistically.

## RESULTS

97 anatomists consented to participate in the study and responded to the questionnaire. 60 (62%) of the participants

were females and 37 (38%) were males. 47 (48%) were aged between 18 and 40 years while 45 (46%) were between 40 and 60 years of age. Only 6% were aged above 60 years. 94% (92) of the participants belonged to India, 5% (four) Nepal, and 1% (1) to Malaysia.

Out of the total participants in the study, 82%, 4%, 7%, 2%, and 1% each were followers of Hinduism, Islam, Christianity, Buddhism, Jainism, and Sikhism, respectively. The educational qualification of the participants is depicted in **Figure 1**.

The participants had variable years of experience in the field of anatomy. Highest number of participants (28%) had six-10 years of experience in this field.

**Table 1** depicts the availability of cadavers in the departments to which each participant belonged. 65% of the participants used both donated and unclaimed cadavers in their departments while 31% used only donated bodies and 4% used only unclaimed bodies.

79% of the departments had started their own body donation program while 21% did not have such a program. In those departments where there was an active body donation program, 86% kept printed body donation forms in their departments for people who wanted to register for body donation, 13% also kept them in the OPD of the hospital and 26% made the forms available on the website too. 33% held special camps to promote body donation and made the forms available there too. When asked about awareness regarding the procedure of the body donation program in their respective department, 87% claimed awareness about their body donation program and 10% non-awareness while 3% declined to comment on the issue.

**Table 2** depicts the knowledge of the participants about documentation in relation to human body donation.

60% of the participants opined that there was no necessity for the funeral registration document while 16% felt that even the death certificate was not necessary for the procedure of body donation. 17% of the participants wanted all documents including the death certificate, funeral registration form, unique identification document of the donor as well as that of his/her family members as well as filled body donation form.

**Table 2.** Documents needed for the procedure of body donation in the respective departments to which the participants belonged

	Participants	Percentage (%)
Filled body donation form with signature of family members on consent form	81	83.51
Death certificate	72	74.23
Unique identification document (UID) of donor	63	64.95
Unique identification document (UID) of two consenting family members,	52	53.61
Funeral registration document from municipal corporation or gram panchayat	25	25.77

**Table 3.** Methods used to dispose the cadavers

Method of disposal used	Number	Percentage (%)
Incineration	41	43
Burial with retrieval of bones	33	34
Burial	15	15
Any other	8	8

80% of the participants were aware of the legislation governing the body donation process in their state and country while 15% clearly stated that they were unaware of any such legislation and the rest chose to remain silent on the issue.

85% of the participants held a prayer in their department before commencement of the dissection. 61% (59) participants felt that at the time of body donation, a small part of the cadaver should be given on request to the relatives for carrying out the last rituals while 39% (38) were against this. 89% (86) participants felt that at the end of the dissection process the ashes/ remnants of the donated body should not be returned to the family at their request and 11% (11) participants were in favour of such a handover. On further enquiry it was found that 73% (71) felt that there would be difficulty in identifying the cadaver for such a return, 62% (61) stated that some parts are used for making specimens that could be stored for prolonged period of time making such a handover impossible, 16% (16) felt that such an activity will further increase the work burden of the anatomist and 6% (six) felt that all of above reasons were valid for not returning any ashes after utilization of the cadaver.

47% (46) of the participants stated that the cadavers in their departments were tested for HIV, 40% (39) for hepatitis B and C, 20% (19) for TB, and 4% (four) any other diseases. 90% (87) participants were happy with the ways in which cadavers were stored in their anatomy departments while 10% (10) participants were not happy about the method of storage of the cadavers.

30% (29) participants felt that dissecting unclaimed bodies for studying anatomy is unethical as that individual has never consented to being dissected while 70% (68) did not believe so. 55% (53) were willing to be body donors after their death while 45% (44) were unwilling to do so.

**Table 3** gives data regarding the procedure used by their individual departments for disposal of the cadavers after their utilization. 50% (48) participants stated that their respective departments held a special program to honour the body donors.

## DISCUSSIONS

Today the world is seeing an acute need for doctors in every nation. So also such a need has been felt by India, too. Accordingly, there has been a steep rise in new medical colleges in India in the last few years. Also several medical colleges were granted permission to increase the number of seats of medical students taking admission each year.

The cadaver to student ratio expected for good knowledge of anatomy gained by the process of human body dissection has been estimated to be at most 1:10. However many medical colleges are unable to sustain this ratio and often function at cadaver student ratio of 1:20 [9]. In the present study, 24.7% of the participants stated that they have insufficient cadavers for teaching anatomy by way of anatomical dissection (**Table 1**). 12.3% claimed that they had surplus cadavers while 62.8% claimed sufficient cadavers. There is a clear lack of human cadavers worldwide to train medical students and postgraduates. This is compromising the health services of the surgical nature [10]. 65% of the participants used both donated as well as unclaimed cadavers for anatomical education.

The International Federation of Associations of Anatomists stated that only donated bodies be used for education or research by anatomical dissection of cadavers [11]. For this to be uniformly implemented, body donation programs will have to be run efficiently. In the present study, only 31% of the participants claimed that their departments used only donated cadavers for anatomical education. In some countries bodies of executed prisoners are also used as cadavers for medical education [12-15]. However, this is not applicable in India. The COVID-19 pandemic since 2019 banned body donations reducing the number of cadavers available for medical education of students in the subject of anatomy by way of anatomical dissection.

To be able to obtain bodies by body donation, it is essential for that department to run a body donation program. In the present study, 79% of the participants stated that their departments ran a body donation program while 21% did not run a body donation program. At the Federal University of Health Sciences of Porto Alegre, lack of bodies for dissection led to the setting up of the body donation program. They had a three pronged approach, which involved public awareness campaigns, donor registration and finally body donation. Over the period of time, body donations increased so that fewer unclaimed bodies were used for anatomical dissection. The quantity as well as the quality of material available for cadaveric dissection increased [16].

Several countries have no body donation program in place. In such countries, severe difficulties are faced in obtaining cadavers for anatomical studies as well as research [17]. Some countries do have body donation programs in place. Despite having body donation programs, it is difficult to obtain bodies by way of human body donation. This is because of lack of information and awareness among the people, lack of manpower to facilitate body donation, lack of related tradition among the general public and lack of knowledge of legalities involved [10].

In the present study, 13% of the participant anatomists claimed lack of awareness of the body donation program run by their department. Only 74% of the participants had knowledge about the necessity of a death certificate and only 65% were aware of the necessity of a unique identification document for facilitation of human body donation.

Thus, 26% of the anatomists were unaware of the necessity for a death certificate and 35% were unaware of the necessity for a unique identification document for this procedure. Such lack of awareness will lead to hesitancy in facilitation of body donation. 20% of the participants were unaware of the national anatomy act that governs human body donation in their respective countries.

In 1970, Japan was intent on starting more medical colleges. This is when it became a challenge for the colleges to source the cadavers needed for the education of the medical students studying in these medical colleges. Two strategies were applied by the Government of Japan. In 1982, an official certificate of appreciation was created from the Ministry of Education to be awarded to the family of the donor and in 1983, the body donation law of Japan was formulated. This law ensured the cultural acceptance of body donation in Japan and also its endorsement by the Government of Japan. Today Japan has sufficient number of cadavers for the purpose of medical education [18]. Thus, medical institutes may need the legal and ethical aspects of the human body donation defined to ease the process of body donation. The legal and ethical framework governing body donation in Europe, discussing the current practice as well as making recommendations for good practice [19]. In an update of the same article, it was expanded upon possibilities of commercialization of human body parts and related weaknesses in the legal directives [20]. It was stressed on importance of knowing what is unethical, which will lead to optimum utilization of human body parts for teaching and research [20].

Running a successful body donation program needs taking efforts to reach it to the masses, making the consent forms for body donation easily available and easy facilitation of human body donation. In the present study 86% of the participants kept the body donation forms ready in their departments, while 13% also kept them ready in the OPD and hospital website. Some participants shared that special body donation camps were organized to promote human body donation. It was elaborated upon methods of running a successful body donation program. These include investing in good preservation techniques, engaging in ethical practices and acknowledging the body donors and their families. These then act as ambassadors for the institute's body donation program [21]. Easier the process of body donation for the family, better is the reputation of the Institute and better is the body donation rate for the institute [21].

85% of the participants held a prayer in their department before commencement of the dissection. Students have often felt inspired to honour the cadaver who was their first teacher during the medical schooling years. Respecting the cadavers, the knowledge they bring in the subject of anatomy is a must and will promote further body donations by the general public [22-25]. Ceremonies to celebrate the donated cadavers have an inspirational effect on the medical students and could promote ethical and humanistic attitude among the medical students [26-31].

61% (59) participants in the present study felt that at the time of body donation, a small part of the cadaver should be given on request to the relatives for carrying out the last rituals while 39% (38) were against this. Sharing a part of the cadaver with the donor family for religious purposes is done regularly as a protocol in Thailand [31, 32]. The participant anatomists discussed how it was difficult to hand over the remains of the donor after utilization of the cadaver for anatomical study and

research purposes as often the body would be dissected into smaller parts tracing, which would be challenging.

The present study raised important question about the bodies being tested for HIV, hepatitis, and COVID-19 diseases. In the present study, 47% (46) of the participants stated that the cadavers in their departments were tested for HIV, 40% (39) for hepatitis B and C, 20% (19) for TB, and 4% (four) any other diseases. This finding therefore brings to the forefront the fact that in 53% of anatomy departments to which the participants belonged, the donated cadavers were not tested for HIV, in 60% for hepatitis B and C, and in 80% for tuberculosis. Though the fixatives are said to be effective in inactivation of infectious agents present in the cadavers, they may still pose an infection hazard to those handling the cadaver [33]. Infectious pathogens presenting particular risk to the persons dissecting the cadaver include HIV, hepatitis B and C, and tuberculosis [33]. Thus, it is necessary to test all donated cadavers for presence of these common infectious agents.

## CONCLUSION

The present research stresses on the necessity of adequate number of cadavers being available for medical education with the optimal ratio of student to cadaver being 10:1. To obtain adequate cadavers to meet this ratio, it is important for anatomy departments to run a body donation program. 31% of the participants in this study stated that they used only donated bodies for purpose of education of medical students. Thus, 69% of the departments to which participants belonged were dependant on other means of obtaining cadavers. Some countries used bodies of executed prisoners, which is completely dependent on the law prevailing in that country.

Adequate bodies for education of medical students necessitate an effective body donation program. In the present study 79% of the participants stated that their departments ran a body donation program while 21% did not run a body donation program. Such program must be in place and run effectively supported by adequate efforts at body donation awareness among the general public for success of the program.

There was discrepancy in the understanding of legal documentation in relation to human body donation. 20% of the participants were unaware of the national anatomy act that governs human body donation in their respective countries. Such a lack of understanding may lead to apathy or hesitancy towards the processes of body donation. Medical institutes may need the legal and ethical aspects of the human body donation defined to ease the process of body donation.

In the present study in 53% of anatomy departments to which the participants belonged, the donated cadavers were not tested for HIV, in 60% for hepatitis B and C, and in 80% for tuberculosis. Research has shown that though the fixatives are said to be effective in inactivation of infectious agents present in the cadavers, they may still pose an infection hazard to those handling the cadaver. Thus, it is necessary to test all donated cadavers for presence of these common infectious agents.

Thus, the present study concludes that though participant anatomists understand the need for human body donation to procure cadavers for medical education and research, but they may need biological, legal, and ethical aspects of human body donation defined further to ease process of body donation.



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**Declaration of interest:** No conflict of interest is declared by authors.

**Data sharing statement:** Data supporting the findings and conclusions are available upon request from the corresponding author.

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