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Anatomy

A REVIEW OF TRENDS, PERCEPTIONS, BELIEFS, AND PRACTICES IN VOLUNTARY BODY DONATION

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ABSTRACT

The advancement of basic sciences in healthcare relies heavily on a strong foundation in anatomy. Cadavers play an essential role in the training of healthcare students. Historically, these were obtained from executed criminals, unclaimed bodies, and voluntary body donations. Among these, voluntary donation is considered the most ethical source for educational and research purposes; however, its prevalence varies widely across different regions of the world. The willingness to donate one's body is influenced by multiple factors, which may differ between individuals and communities. Spiritual, religious, and cultural beliefs play a significant role in shaping such decisions. Additionally, demographic and socio-economic factors—such as age, gender, education, occupation, financial status, and the legal framework of a country—also impact attitudes toward body donation. A sense of spirituality, detachment, and altruism tends to encourage donation. Factors like increasing age, male gender, higher education, awareness, occupation, and economic stability have also been associated with a greater inclination to donate. Interestingly, even within the healthcare community, where awareness of the importance of body donation is high, reluctance persists. This hesitation often stems from personal concerns, such as the idea of being dissected by colleagues or fears of disrespectful handling of cadavers. Legal provisions that support and promote body donation can help alleviate these concerns. Such measures may include ensuring that the donor's wishes—such as cremation after use—are respected, obtaining proper written consent, and prioritizing the donor's intent. Furthermore, maintaining dignity through memorial services, religious rites, and public acknowledgment and honoring of donors can foster greater acceptance and encourage voluntary body donation.

The foundations of human science are rooted in the study of the human body. Human anatomy is explained through detailed dissection of each structure within the body. These observations were carefully documented as evidence, forming the basis on which the field of human anatomy was developed. It remains one of the core subjects and a fundamental pillar in the advancement of medicine.

Mannequins and simulators cannot fully replicate the experience of real cadaveric dissection. Each cadaver is unique, much like a new textbook, as it may present different variations, whereas such differences or abnormalities are not observed in mannequins. In earlier times, anatomy was primarily learned through animal dissection. Renowned figures such as Andreas Vesalius advanced the field by performing dissections on human bodies.

Initially, bodies for dissection were obtained legally from executed criminals. However, this limited supply led to unethical practices such as body snatching, grave robbing, and even murder to procure cadavers. [1-4]

In 2012, the International Association of Anatomists recommended that only donated bodies be used for the study of anatomy. Although donor-based surgical simulation training is highly valuable, its use can be limited due to challenges in accessing donated bodies (5). This shortage has created opportunities for for-profit companies to sell human remains obtained under ethically questionable conditions. In the United States, there is minimal regulatory oversight governing the procurement and distribution of whole-body donors, resulting in a lack of accountability (6).

Compared to organ donation, individuals are generally more aware of and willing to donate their organs than their entire bodies (7). Consequently, more research has focused on the knowledge, attitudes, and practices surrounding organ

donation than whole-body donation (8). Access to donated human material for education and research is influenced by multiple factors, including financial, legal, ethical, religious, and technical considerations (9). As a result, the availability of donor bodies—and opportunities for donor-based surgical simulation training—varies across different regions.

To improve access and maximize the benefits of body donation, recent studies have explored preservation techniques that extend the usability of donor bodies while maintaining lifelike characteristics, allowing clinicians to train more effectively (8).

A voluntary body donation program allows individuals to choose to donate their bodies for medical education and research after death. Whole-body donation programs are organized by medical schools and universities to obtain cadavers for teaching purposes. This approach is considered the most ethical means of acquiring human bodies, which are essential for developing life-saving medical skills and advancing medical knowledge. Such programs also reduce reliance on unclaimed bodies. Typically, unclaimed bodies are first allocated to government medical colleges, and only after their needs are met are any surplus bodies provided to private institutions, in accordance with state government regulations.

To support ethical practices, the International Federation of Associations of Anatomists (IFAA) has issued "Recommendations of Good Practice for the Donation and Study of Human Bodies and Tissues for Anatomical Examination." These guidelines assist countries in developing body donation programs while emphasizing respect for the donor's wishes for education and research purposes. (10)

Although body donation is widely accepted across the world,

there remains a shortage of human cadavers. This scarcity may result from a decline in body donations or an increased demand for cadavers. For instance, in India, the rapid rise in the number of medical colleges over the past decade, along with the growth of surgical simulation programs, has significantly increased demand, while the supply has remained limited, leading to this shortage. (11)
Factors influencing body donation:

1. Religious and Cultural Beliefs: All major religions, including Hinduism, Islam, Christianity, and Buddhism, in various ways support the idea of body donation for the benefit of humanity. In Hindu philosophy, the *Shrimad Bhagavad Gita* (Chapter 2, Verse 22) conveys that just as a person discards old garments and wears new ones, the soul leaves the old body and takes on a new one. This suggests that the body is temporary and should not be a source of attachment, thereby encouraging the concept of body donation. However, despite this spiritual perspective, many Hindus continue to follow traditional last rites that emphasize maintaining the integrity of the body for attaining *moksha* (liberation). As a result, they may be reluctant to donate their bodies (12,13)

2. Age: According to Bhusari PA et al. [11], most donated bodies belonged to individuals aged 71–80 years. In contrast, Armstrong [24] from Australia found that younger individuals were more willing to donate their bodies than older Australians, a finding also supported by Maryland Boulware [25]. Despite these variations across age groups, the majority of body donations still come from the elderly population. This trend may be attributed to a sense of satisfaction and fulfillment of life responsibilities, along with increased maturity and spirituality with advancing age, which encourages body donation. Additionally, changing social dynamics—such as the rise of nuclear families, an increase in old-age homes, and instances of parental neglect—may further motivate elderly individuals to donate their bodies due to concerns about their personal relationships.

3. Gender: In general, males have been found to be more willing to donate their bodies than females [2,11,13]. A study conducted in Japan reported that male respondents exhibited a more positive attitude toward body donation, whereas females often required additional encouragement. However, women were more inclined to donate their bodies than their organs [16]. Another study suggested that men may be more willing to donate in order to avoid the financial burden associated with funeral practices [17]. In many traditionally patriarchal societies, where education and decision-making authority have historically been associated with men, males may be more inclined to make independent decisions regarding body donation. Nevertheless, with evolving social norms and increasing autonomy for women, this gender disparity is likely to diminish in the future.

4. Education Status: Education plays a crucial role in creating awareness, which significantly influences attitudes toward body donation. Greater understanding of the concept, purpose, and scientific value of body donation tends to increase willingness to donate. As a result, individuals with higher levels of education are generally more inclined toward body donation compared to those with limited education [2]. In contrast, ignorance and misconceptions rooted in beliefs may discourage individuals from donating [18,11,13,16]. However, the relationship between education and body donation varies across different ethnic groups. For instance, in China, the majority Han ethnic group demonstrated a positive correlation between educational status and willingness to donate. Conversely, among minority groups such as the Bi, Dai, and Hani, a negative correlation was observed, with less educated individuals showing greater willingness to donate. In these groups, financial constraints associated with traditional rituals may motivate body donation as a means to reduce expenses [19]. It is important to note that education

does not solely refer to formal academic qualifications but also encompasses awareness, critical thinking, and the ability to evaluate altruistic motives against traditional beliefs. Since body donation is a personal decision, it should be addressed at both individual and societal levels. Public awareness through media platforms is essential, but personalized counseling is equally important. Such counseling helps in understanding individual perceptions, motivations, and concerns, allowing for tailored communication that can encourage informed decision-making [16]. Additionally, body donation rates tend to be lower in rural and remote areas, where limited educational exposure may restrict awareness and critical engagement with the concept [11,19]. Overall, education influences willingness to donate in diverse and context-dependent ways.

5. Economic background: Individuals from lower socioeconomic groups may be more inclined toward body donation, partly to reduce the financial burden of funeral expenses on their families [13,19,17]. In contrast, certain populations—such as the Han community in China—have demonstrated higher rates of body donation among individuals with better economic status [19]. Overall, body donation tends to be more prevalent in high-income countries compared to low-income nations. However, this trend is not universal; for instance, Gulf countries report relatively low rates of body donation despite their economic prosperity. It is important to note that no single factor solely determines the decision to donate one's body. Instead, a combination of influences is involved. In Middle Eastern countries, although economic conditions are favorable, psychological and familial considerations often play a more significant role in shaping such decisions [20].

Law of the country: The legal framework and policy outlook of a country or region significantly shape public attitudes toward body donation. Historically, cadavers were often procured through unethical means, prompting statutory authorities to intervene and establish regulatory guidelines. This led to the development of various Anatomy Acts, first introduced in Europe and later adopted by regions such as the United States and Asia.

Europe has witnessed substantial growth in cadaver availability, largely due to strong promotion and well-structured legal systems supporting body donation. These laws emphasize individual autonomy, granting people the right to pledge their bodies after death. This right is given high priority, encouraging donation. In cases where an adult is unable to decide, the next of kin assumes responsibility. Individuals aged 16 years and above can express their intent through written documentation. While most European countries actively promote body donation, each follows its own specific legal framework with minor variations.

European regulations also outline the respectful handling of donated bodies after their use in education and research. Practices vary across institutions, including burial, cremation, return of remains to families, or dispersal of ashes in designated areas. Ethical considerations are strongly emphasized, including teaching students to treat cadavers with respect. Many countries prohibit commercialization (such as plastination for profit), public display of dissected remains, and cross-border sale of bodies. Some also permit donation of body parts during hospital stays (e.g., amputations) with proper written consent. Importantly, institutions cannot retain anatomical specimens permanently without explicit consent. These measures enhance public trust and facilitate donation.

In the United States, legislation such as the Uniform Anatomical Gift Act ensures that body donation is conducted in a scientific, ethical, and efficient manner, with the donor's wishes given paramount importance. Individuals have the

exclusive right to decide on body donation after death, and procedures are streamlined to encourage participation. Additional laws, such as the Texas Anatomical Gift Act, extend provisions to allow emancipated minors to donate with parental consent.

Legal challenges have arisen in various contexts, including disputes over decision-making authority after death, the necessity of informed consent, and administrative complexities that may hinder donor intentions. To address these issues, recommendations include distinguishing anatomical donation from general property law, involving legal experts in policy development, and prioritizing the individual's consent. Such measures can support clearer and more effective decision-making.

In India, Anatomy Acts have been implemented at the state level since 1948, legally recognizing an individual's intent to donate their body. However, ambiguity remains regarding the enforcement of the deceased's wishes, as final authority typically rests with the relatives. Some individuals therefore formalize their intent through legal affidavits submitted to institutions. Despite this, institutions generally have limited authority in determining the outcome, and such uncertainties may delay or discourage donation. Written consent, including witness verification, remains an essential requirement.

Cultural and legal influences also play a role in other regions. In countries like Thailand, royal endorsement has positively influenced body donation rates. Similarly, advocacy by educators—such as referring to cadavers as “silent mentors”—has encouraged altruistic perspectives and increased donations in places like Taiwan. Conversely, in certain populations, such as Black African communities, historical experiences of exploitation and unethical practices have contributed to reluctance toward body donation.

The key challenge lies in sensitizing and encouraging families to consent to the donation of their loved ones' bodies. Government initiatives should actively promote voluntary body donation, particularly through widespread awareness campaigns using mass media. Involving religious leaders in such efforts could enhance acceptance and effectiveness. Body donation programs must be thoughtfully structured, taking into account the various factors that influence individuals' decisions, while also addressing the concerns of potential donors. Establishing dedicated body donation units in all medical colleges would further streamline the process. Additionally, when well-known public figures pledge or donate their bodies, such acts should be widely publicized to inspire others.

Donors and their families deserve recognition and respect for their selfless contributions. It is essential to reassure prospective donors that their bodies will be handled with utmost dignity. To uphold this commitment, medical students should be sensitized to appreciate the significance of body donation and the emotions underlying such decisions. Practices such as honoring donors, as observed in countries like Korea, Taiwan, and Thailand, could be adopted more broadly across institutions. Clear guidance and support systems should also be made readily accessible for individuals considering donation, with non-governmental organizations and social workers playing a vital role in facilitating this process.

These efforts can also contribute to improving the current state of organ transplantation. Activities related to organ retrieval, preservation, and transplantation should be well-coordinated, and all anatomy departments must be equipped with adequate infrastructure and training for handling cadaveric organs.

Concerns regarding the illegal trade of cadavers in India

highlight the need for stricter oversight. Establishing an independent regulatory authority, in coordination with law enforcement, could help monitor the allocation and disposal of unclaimed bodies. Furthermore, since some medical colleges receive more cadavers than necessary, appropriate legal provisions should be introduced to allow the regulated transfer of cadavers between institutions and across states.

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