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Research Report

Understanding beliefs, preferences and actions amongst potential body donors.

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Running title: Why do donors donate?

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ABSTRACT

Body donation is a prosocial act providing a unique learning experience to students, ultimately impacting on patient care and science. With an increasing number of training professionals, there is an increasing need for body donors, yet little is understood about donors' beliefs and preferences. A four-center study aimed to understand donors' perceptions, 843 responses highlighted a significant relationship between completing a body donor consent form and being both an organ donor and having ever donated blood (p=<0.01). In exploring donor intentions, 69% had been considering donation for fewer than 5 years, 40% knew another body donor, and 27% had a family member or friend currently registered. Of those who had requested donor information packs, 97% had completed body donation consent forms. Of these, 92% had not selected any time restriction for their donation and 96% had consented to images being taken. Almost all (98%) were aware that their donation might not be accepted. Donors' motives highlighted a wish to: improve education, improve health care, advance science, and contribute to the greater good. A bimodal response was observed with body donation being used to save relatives money and inconvenience. Donors felt comfortable with their bodies being used by medical, dental and allied health professionals, but this level of comfort did not extend to all groups, 57% were comfortable with artists, beauticians and yoga teachers. Understanding donors' motivations and decision-making process is vital to ensure resources for future and to meet any changing requirements of both donors and those studying them.

Keywords: gross anatomy education, body donation, donation to science, medical students, dissection, medical education, anatomy curricula, anatomy teaching

INTRODUCTION

Pedagogical discussion continues on how best to deliver anatomical education. Numerous studies have explored how anatomy has changed over the past 20 years, showing modifications in allocated teaching hours and the adoption of digital media (Heylings, 2002; Drake et al., 2009; Craig et al., 2010; McBride and Drake, 2017; Smith et al., 2022). The use of body donors has been synonymous with anatomical education since its inception. It has been stated as a rite of passage for medical students (Newel, 1995; Older, 2004), and there has been a reported increase in the use of donors by other student groups e.g. allied health care (Cornwall and Stringer, 2009), with some authors reporting a shortage of donations (Zhang et al., 2008; Asad et al., 2014; Chen et al., 2018; Smith, 2018; Zhang and Ma, 2019). Different perspectives and evidence regarding the benefits of using human body donors in education remain, with authors arguing that it helps students acquire three-dimensional understanding, spatial abilities, communication, and team building skills (Cahill et al., 2002, Granger 2004; Pawlina and Lachman, 2004; Holla et al., 2009). As well as develops students' appreciation for medical ethics and offers an opportunity to discuss topics such as informed consent. Stephens et al., (2019) suggests that dissection may be used as an opportunity to prime students on the integration of medical ethics. Other studies highlight that dissection may be a burden for institutions, with financial outlays and health and safety hazards associated with formaldehyde and transmissible disease (Wiwanitkit and Agthong, 2004). In addition, it has been suggested that dissection may cause anxiety and stress to students (McLachlan et al., 2004; McLachlan and Patten, 2006).

The use of human body donors is not the same as body donation. This study focuses on body donation. However, to place body donation in the wider context of use of body donors it must be acknowledged that in some countries, unclaimed bodies, or bodies that belong to the state/government, e.g., executed criminals, are still used as 'body donors'. In the United States (US), the use of unclaimed bodies was legalized in the mid-1800s and continues in most states today; in 2018, of 89 responses, 11 schools reported using unclaimed bodies (Caplan and DeCamp, 2018). From a study based in Turkey 84.8% of body donors at medical schools were from unclaimed bodies (Güses et al., 2017), studies from Africa and South Africa report that most medical schools use unclaimed bodies (Gangata et al., 2010; Kramer and Hutchinson, 2015; Hutchinson et al., 2020). Although disagreement and contradictory views on the use of unclaimed bodies continue, in more recent years there has been an international effort towards consent-based practice (IFAA, 2012; Rokade and Gaikawad, 2012; Riederer, 2015; Kramer et al., 2019). At the same time, there has been growing concern over the rise of willed, for-profit body companies, also referred to as body brokers in the US (Champney et al., 2019). The need for donated bodies is clearly reported yet the factors that may affect donation requires further exploration. It is also important to state that all of the literature explored is dealing predominantly with one homogeneous population and nuances will exist between different populations that might not offer direct comparisons to the current study in the UK and Ireland.

Perceptions of body donation

The reasons for individuals donating their bodies appear quite broad and may include: helping others (Richardson and Hurwitz, 1995), a desire to aid medical science (Richardson and Hurwitz,

1995; Cornwall et al., 2012; Cornwall et al., 2018), family structure and religious affiliation (Cornwall et al., 2012), personal reward (Bolt et al., 2010), usefulness, uniqueness, gift giving, kinship (Cornwall et al., 2018). To understand at a deeper level why a donor might donate, a study examined donor motivation and the Big Five personality traits, finding that positive relationships were associated with agreeableness and conscientiousness (Bolt et al., 2011).

What the term 'body donation' means to individuals has also been questioned (Cornwall et al., 2015a). A study in the US asked the public if they would consider body donation; 49% said they would (Boulware et al., 2004). This is significantly higher than reported by Rokade and Gaikawad (2012), who surveyed 625 adults in India: 32.1% were aware of body donation and 19.5% were willing to donate, and higher than the 15% that Sanner (1994) reported from a Swedish population.

When exploring existing donors' beliefs, one focus has been on understanding what will occur with the body. In 1995 in the UK, it was reported that only 44% of potential donors understood that their bodies would be used for teaching, while 42% thought it would be used for experiments (Richardson and Hurwitz, 1995). Using an ethnographic approach, Olejaz and Hoeyer (2016) asked "Do donors understand that we actually cut them apart?" and found that donors were keenly aware of this. However, Zealley et al. (2021) highlighted that a lack of information remains today, with the material provided by some institutions not constituting informed consent.

The meaning of body donation has also been investigated with the student population. Cornwall et al. (2015b) asked university students if they had donated their bodies, finding that 64 students claimed to have done so. However, on checking donation records, there was no documentation for any donations from the age group matching the student demographic. Possibly suggesting that body donation had been confused with organ donation and this might also be the case in the wider population.

Demographics of body donors

In exploring the demographics of body donors, several factors are frequently considered: age, gender, religion, and socioeconomic or educational status. The mean age of donors at the time of registration appears to be quite stable at approximately 60-70 years of age (Lagwinski et al., 1998; Bolt et al., 2010; McClea and Stringer, 2010; Cornwall et al., 2012; da Rocha et al., 2017). For gender, there have been mixed findings, with some studies reporting a high incidence in males (Boulware et al., 2004; Rokade and Gaikawad 2012; Kramer and Hutchinson, 2015), with others (e.g., Cornwall et al., 2012) finding that the gender of donors was similar to the referenced population, or that females were more likely to donate (Richardson and Hurwitz, 1995; Lagwinski et al., 1998; da Rocha et al., 2017).

As a group of individuals, the percentage of donors who identify as non-religious tends to be higher than that found in the general population. This was highlighted by Richardson and Hurwitz (1995), with 45% of sampled donors reporting that they were non-religious. Similar reports were observed in New Zealand (39%), Ireland (24%) and South Africa (18%) (Cornwall et

al., 2012). It has also been noted that findings from studies reflect that donors represent the local predominate faith, e.g., McGill University highlighted that 60% of donors who were male, their main religion was being Catholic (Noël et al., 2022). In some cases, those with strong religious beliefs have been found to be unwilling to donate (Halou et al., 2012). Voices of donors examined in case reports in China and Hong Kong (Chiu et al., 2012; Jones and Nie 2018) noted that Confucianism and Buddhism were an influence in the decision to donate, together with the desire not to waste precious resource (Subasinghe and Jones, 2015). Understanding how religion affects individuals' decision to donate is important in ensuring ethical practice and support the need for further investigation.

Ethnicity appears to have an impact on willingness to donate, with one study in the United States finding that African-Americans were 50% less likely to donate compared to their Caucasian counterparts (Boulware et al., 2004). This is also supported by a study in Brazil that found a clear prominence of potential donors who categorized themselves as white being more likely to donate (da Rocha et al., 2017). In Ireland, no difference was reported in ethnicity of donors and the population (Cornwall et al., 2012).

The United Kingdom and Ireland Body Donation Context

In the United Kingdom (UK) and Ireland, 10,093 students study medicine (Smith et al., 2022), the number of students is controlled by the Medical Workforce Standing Advisory Committee (1997). It is not just medical students who use human body donors in the UK and Ireland; the majority of institutions also teach a wide variety of allied health care professionals and deliver a

range of higher surgical training programs. The teaching of anatomy follows the Anatomical Society's core regional anatomy syllabus for undergraduate medicine (Smith et al., 2016), 87% of medical schools using human body donors and have a current requirement for 1,363 donors per annum (Smith et al., 2022). Body donation in the UK and Ireland is covered by three separate laws. In England and Wales, the UK the Human Tissue Act of 2004 (HTA, 2004) is governed by the Human Tissue Authority and operates through codes of practice, the first being Code A Guiding principles and the fundamental principle of consent (HTA, 2017). A major change in the 2004 Act was the introduction of body donation only with first-person consent. Prior to 2004, it was possible for the next of kin to donate a relative's body without donor involvement. In Scotland, the Anatomy Act (1984) and the Human Tissue (Scotland) Act 2006 (HTA Scotland, 2006) govern body donation. In Ireland, body donation is governed by the 1832 Irish Anatomy Act (Anatomy Act, 1832).

In the UK and Ireland an individual interested in body donation needs to contact their nearest medical school or in the case of London and the South East, the London Anatomy Office. This contact may be through a website, email, written letter or telephone. Bequeathal Officers then provide the individual with a donor information pack that also contains the consent form. In the UK and Ireland consent forms must be completed with a written signature and sent back to the medical school in paper form. The London Anatomy Office, information pack and consent form can be seen in Appendix A. Interestingly body donation is not advertised in the UK and Ireland, so no marketing occurs. The sectors relies on educational information, sometimes discussed through a media article, discussion with healthcare professionals, and word of mouth for

potential donors to know about body donation. It is part of the law that no financial gain can occur from body donation. Anatomy departments do cover the cost of cremation of donors.

Body donation in the UK and Ireland was halted in March of 2020 due to the Covid-19 pandemic as concerns were raised regarding to health and safety and transmission of the virus. Planned cremations were put on hold and organized memorial services were cancelled (Brassett et al., 2020). For teaching a move to digital resources tried to compensate for a lack of cadaveric based teaching (Longhurst et al., 2020). From the 1st July 2020 three medical schools in London and the South East resumed body donation, offering in-person teaching in the fall of 2020 before the rise in Covid-19 cases and the second National Lockdown at the end of 2020, that again closed medical schools and donation programs. In-person teaching for anatomy re-opened for some in spring of 2021, for others it was not until the fall.

Aim and Research Questions

The aim of this study was to provide a snapshot of the beliefs and attitudes towards body donation, to discuss any differences since the last survey in the UK in 1995, and to improve how anatomists can help support the process to guide the delivery of sustainable and ethically appropriate body donation programs. This study was guided by the following exploratory research questions: (1). What do donors cite as their main reasons for, and barriers to, donating their bodies? (2). How much do donors understand about the donation process? (3). How much do donors understand or care about how their bodies will be used when donated?

MATERIALS AND METHODS

A questionnaire methodology was deployed. The questionnaire was developed using a previous study from the UK in mind (Richardson and Hurwitz, 1995). The questions were designed to explore further each aspect of the components involved in body donation. A section of the survey (Q20-28) was based on the Theory of Planned Behavior that assesses behavioral beliefs (Fishbein and Ajzen, 2015; Ajzen, 2019), while additional open-ended questions were analyzed using grounded theory, already reported (Farsides et al., 2021). A draft survey was pilot tested by support staff in each institution, with refinements made in light of the responses. The final survey (Appendix B) comprised 40 questions. Ethical approval for this study was granted by Brighton and Sussex Medical School Research Governance Ethics Committee (ER/BSMS3867/10).

This study was conducted at four centers based on geographical regions to represent body donation in England, Ireland, Scotland and Wales, with Heads of Anatomy at institutions from each region approached to act as collaborators. The institutions invited to take part were Cardiff University (Wales), Trinity College Dublin (Ireland), the University of Dundee (Scotland) and the London Anatomy Office (LAO) (England), that forms the largest donation group in England. The LAO is based at King's College London and serves nine medical schools in London and the South East (Anglia Ruskin University, Brighton and Sussex Medical School, Kent and Medway Medical School, Imperial College London, King's College London, Queen Mary University of London, St George's University of London, University College London). Table 1

gives more information about each of the four centers, including the approximate number of donor information pack requests they receive in 12 months.

Based on the donation process being paper based, it was decided that a paper-based questionnaire would be optimal. Using the number of donor information packs sent out over 12 months the same number of questionnaires and pre-paid response envelopes were sent to each center to be distributed with their own donor information packs from 1 January 2019 until 31 December 2019 (For Trinity College Dublin, data was collected over a 6-month period).

The prepaid responses were received and collated by each center and at the end of the year returned to Brighton and Sussex Medical School. The data was then inputted into Microsoft Excel® (Microsoft Corp., Redmond, WA) using a prefix for each center e.g., London, response 1 was L001. This created a unique identifier for each response. The original response sheet was also marked with the code. All responses were anonymous. To check for accuracy a random number generator was used to select 10% of the data file to double the data entry. The data were subjected to cleaning in SPSS and were analyzed using IBM SPSS statistical software, version 25.0 (IBM Corp., Armonk, NY). All entries were returned to at least 80% completion; any empty cells were left as empty and excluded in subsequent statistics. No participants' responses were removed.

The data was analyzed with descriptive analysis using mean averages. Further statistical analysis included Cronbach's alpha to assess internal consistence, the survey resulted in a

Cronbach's Alpha score of 0.74. In addition, statistical significance between groups was assessed using Chi Squared. Differences were considered to be statistically significant when P=<0.05. The distribution of the data was assessed using either standard error of the mean or standard deviation.

RESULTS

Calculating an accurate response rate for this study was not possible, because individuals may download body donor information packs from the website of the institutions. Based on the calculation of the total number of donation packs sent out over 12 months, an approximate response rate of 68% was calculated. The response rate, within the sample who returned questionnaires, per question varied from 840 (99.64%) to 559 (66.31%).

Demographics

The demographics of participants were explored (Table 2) and demonstrates a distinct lack of diversity. The mean age was 69.57 ($\pm$ 12.47) years, the predominant gender was female (55.71%). Just over half of participants reported being religious (442, 53.84%) and in a relationship (424, 51.02%), with (422, 57.89%) self-reporting as organ donors and (441, 54.18%) as blood donors. A Chi Squared test demonstrated that there was a significant relationship between completing a body donor consent form and being both an organ donor and having ever donated blood (*P* = <0.01). Of the responses, (813, 96.44%) identified as British or Irish, highlighting a considerable lack of diversity.

Intention to donate

Data suggests a variety of factors that contribute to a person's decision to donate. Nine questions explored donation facts or participants' intentions to donate, eight of which are summarized in Table 3. Over half of the sample reported having thought for less than five years about the possibility of registering body donation willingness (506, 69.13%). A minority of participants (331, 40.07%) knew another person who had become a body donor, even fewer (224, 27.42%) had a family member or friend currently registered. Of the potential donors, 819 (98.20%) had discussed their donation with someone. Fourteen (93.33%) of the 15 participants who had not discussed it with someone were not in a relationship.

Of those who had requested donor information packs (708, 96.99%), 86% said they had completed them and 10% said they expected to. When asked about length of time for body retention, 657 (92.15%) selected no restriction. Within the sample (742, 95.99%) also had consented to images being taken, and 802 (98.04%) were aware that it may not be possible for their donation to be accepted.

Beliefs and Attitudes

Potential body donor responses demonstrate a mixture of beliefs and different attitudes that underpin their motivation to donate their body. Potential donors' beliefs, attitudes and intentions to donate were explored in 24 questions that involved them rating statements on a 7-point scale from extremely likely to extremely unlikely. A summary of responses can be seen in Figure 1. Overwhelmingly, responses reported extremely likely attitudes to improving

education (726, 89.62%), improving health care (700, 84.90%), advancing medical science (686, 83.65%), contributing to the 'greater good' (639, 78.69%) and expressing gratitude to the medical profession (552, 68.48%). In addition, participants felt that providing a good ending to life (551, 68.36%) and avoiding waste (630, 78.55%) were extremely likely. Conversely, potential donors reported going against religious/spiritual/cultural beliefs (602, 77.47%), risking their bodies being treated inappropriately or disrespectfully (537, 67.8%) and achieving 'life after death' (481, 86.04%) as extremely unlikely.

When recipients were asked how much they agreed with the statement 'save their relatives money' there was a bimodal response, with 389 (50.52%) reporting unlikely and 285 (37.01%) reporting likely. A similarly bimodal response was seen when asked about 'saving family members inconvenience' with 419 (53.51%) reporting unlikely, compared to 282 (36.06%) stating likely (Figure 2).

When asked if becoming a body donor would be a source of comfort to relatives, 423 (53.48%) felt this was likely. However, 220 (27.82%) reported this unlikely. Similarly, when asked if becoming a body donor would avoid 'normal' burial rituals, 300 (38.02%) participants felt it was unlikely, while 421 (53.36%) thought it was likely (Figure 2).

Participants felt that it was up to them whether or not they became body donors, with 672 (83.88%) selecting this as extremely likely. Conversely, 610 (77.61%) and 648 (83.08%) of potential donors chose extremely unlikely when asked if they had mixed feelings about

becoming a body donor, or if they felt uncomfortable when thinking of being a body donor. Similarly, 667 (87.54%) chose extremely unlikely in response to 'it would be difficult for me to become a body donor'. There was considerable agreement when asked if becoming a body donor would be a morally good thing to do, and their attitudes towards becoming a body donor were very positive, with 572 (71.68%) and 721 (89.68%) respectively selecting extremely likely. This dropped to 385 (48.67%) of participants choosing extremely likely when asked if most people who are important to them probably agree that they should become a body donor. However, only 51 (6.45%) felt this extremely unlikely.

Figure 3 demonstrates that 536 (68.89%) of potential donors selected strongly agree or agree in response to the statement, 'on the consent form a donor's relative should have to indicate their willingness to contact the medical school to inform them of the death'. Contrarily, participants predominantly disagreed with the statements 'I do not want to think about what will happen to my body if I become a body donor' and 'the idea that donated bodies and body parts might be cremated is upsetting to me', with 536 (67.85%) and 766 (95.87%) choosing disagree or strongly disagree respectively. The statement 'the possibility that my donated body might not be accepted is upsetting to me' produced a relatively even split with 380 (47.98%) selecting disagree or strongly disagree and 412 (52.02%) selecting agree or strongly agree. Finally, when asked if participants believed, on a 4-point scale from considerable shortage to excess, that there was a shortage or an excess of body donors at present in their area, 629 (90.37%) chose either considerable shortage or shortage.

Users and uses of body donors

Data shows that potential body donors feel differently about different professionals studying their bodies. Participants were asked to rate on a 4-point scale from very uncomfortable to very comfortable how they felt about different users and uses of their bodies. Potential donors felt very comfortable with medical or dental students learning anatomy (767, 95.40%), specialists e.g. surgeons learning or practicing specialist procedures (777, 96.52%), physiotherapists/nurses, and other healthcare professionals learning anatomy (758, 94.40%) and lastly, medical artists, science teachers and biomedical engineers learning anatomy (716, 89.28%). Interestingly, only 455 (56.95%) felt very comfortable with other artists, beauticians and yoga teachers learning anatomy, with 224 (28.06%) stating that it made them feel uncomfortable or very uncomfortable.

When asked about the type of activities that potential donors felt could be conducted on their bodies, participants were very comfortable with the following: bodies having X-ray, CT or MRI imaging for research and teaching (744, 92.77%), making 3D models/images of body parts for teaching (720, 90.00%), research on differences between individuals' anatomy (737, 91.90%) and research on individual diseases or conditions (764, 95.03%). The authors believe this is the first study in the UK to ask this and therefore no comparison data exists. In exploring how potential donors felt about their body parts being divided to be used separately, participants felt very comfortable (721, 89.68%); they felt equally comfortable about body parts being stored separately from the rest of the body (708, 88.72%).

DISCUSSION

Irrespective of the debate on how to best teach anatomy (Wilson et al., 2017; McMenamin et al., 2018) it is clear that for the time being the use of human body donors through body donation programs remains a vital part of anatomical and surgical education. It is therefore important that anatomists understand the perspectives of body donors. The requirements for donors being higher, reflects a global trend, Canada reported a 36.5% rise in the need for donors in ten years, especially in soft embalmed, skill-based curricula (Noël et al., 2022). The increasing need for donors has also been highlighted in Italy (Gunderman, 2008) and China (Chen et al., 2018). Within the UK and Ireland, the lack of supply has resulted in some institutions in the UK and Ireland importing body parts from other countries, e.g., US body broker companies. The UK and Ireland is not alone in this and Habicht et al. (2018) reports that other countries import from the US and India. When importing bodies from the US to the UK, it is possible to request donors who have consented to body donation, although anecdotally the number of available donors often does not match the requirements. Purchasing donors in this way challenges anatomists ethically and the authors support the principle that body donation should only be willed, as proposed by Champney et al. (2019). To some extent the UK and Ireland is perpetuating body broker companies by importing bodies/body parts and perhaps anatomists and regulators could work to reduce the requirement or to create frameworks where only willed donors from not-for-profit organizations can be imported. In the UK and Ireland with no central repository or integrated system that enables the separation of donors into body parts individual medical schools are left to manage their own specimen requests and their own systems for ensuring the most if made of every donation.

Typical body donor

It is possible to summarize the typical body donor in the UK and Ireland as being British, aged 70 and registered as an organ donor and blood donor. This shares some similarities to other countries. The mean age of 70 is similar to findings in New Zealand (68), South Africa (69), but older than a previous survey in Ireland (60) (Cornwall et al., 2012) but older than 50 as identified by Fennell and Jones (1992). Cornwall et al. (2012) also reflected that, since most body donors had been thinking about body donation for around a decade, slightly more than this present study, it could be stated that this gives a 'target group' of individuals 60-70 years old.

Some elements do appear to be different to other studies, suggesting a regional affect, likely due to cultural and ethnic aspects. For example, in India, Rokade and Gaikawad (2012) found younger male graduates and postgraduates were more willing to donate their bodies. Asad et al. (2014) found two donor groups: one slightly younger, educated and married, with US or US-born parents, the other consisted of older, separated women with some college education, of which a higher proportion were nonnative. Similarly in Greece individuals of high education levels was found to be more inclined to donate (Halou et al., 2012), none of these findings were represented in the UK and Irish population. In examining the diversity of donors, the present study noted that 96% identified as being British or Irish, in the wider population, this demographic amounts to 78.4% (Office National Statistics, 2021), reflecting that clearly that more could be done to increase the diversity of body donors.

The population of UK and Irish donors being relatively homogeneous does concern the authors, having predominantly British donors in a multicultural community requires further investigation to establish why underrepresented groups do not engage. The study did not ask participants to disclose their race, so the race of those who identified as British is unknown. It is only anecdotally that the authors can share that the majority of donors in anatomy departments are white and this likely to also be reflected in this survey. Increasing the diversity of donors is important in ensuring that donors represent and reflect both the patient and student population, however this should not be viewed as action towards decolonization in anatomy (Finn et al., 2022) but an action that would improve representation. Understanding why underrepresented groups do not donate and what reasonable actions e.g. improved information, can be taken requires further investigation. One option might be though optimizing medical school's websites and the ease and searchability from a potential donor's perspective. A review in Turkey found a lack of content might be contributing towards low body donation numbers (Ok and Gürses, 2020).

Motivation of body donors

Motivation for body donation appears to be multifactorial; it has been postulated that it may form part of the notion of a 'good death' (Smith et al., 2020). Abductive analysis on the same population highlighted two sets of motives that have been classed as 'medical altruism' and 'intimate altruism' (those seeking benefits for medical professionals and patient groups and

those seeking benefits for friends and family, respectively) either could impede or facilitate body donation (Farsides et al., 2021).

Richardson and Hurwitz (1995) rejected the notion of money as an incentive for body donation, but in the present study, some individuals said that this was part of their decision. With the average funeral costing $8,000 (USD), 241 (28%) donors felt that there was a saving to be made, either to prevent hardship, or as a choice for better use of the funds. This is significantly higher than 8% previously identified by Bolt et al. (2010). Similarly, in terms of saving inconvenience, the time after a death is an intense time of emotion and practical requirements, documentation, organizing, etc. Body donation takes some of those decisions away from the family and means that the donor has control. Some have called for no financial remuneration resulting from donation (Riederer and Bueno-López, 2014), and the Human Tissue Act in the UK makes it clear that no profit can be made from human tissue (HTA, 2004), but it is a long-established practice in the UK and Ireland that the medical school receiving the donation covers the costs of cremation.

In examining the influence of family and friends, 40% of possible donors in the present study knew another body donor, 27% had a family or friend registered, this might indicate a cascade relationship. Bolt et al. (2010) found in their study that the partners of 37% of donors were also registered donors. Richardson and Hurwitz (1995) noted that a quarter of their participants had been influenced by someone who had donated.

Use of the body

As part of informed consent, it is expected in the UK and Ireland that information provided to donors covers an overview of the type of uses and users of the donation (Appendix A). In this study most participants (95%) were comfortable with medical and dental students using their bodies. High acceptability of allied health care professionals was seen, but the lower numbers for other groups, such as beauticians and yoga teachers. It is perhaps not surprising given this has received media attention in the UK when these group have attended dissecting rooms. It might be argued that these groups are undertaking procedures on the human body, so training and education is important for safe practice. Perhaps a method to address this is to ask consent for a range of different user groups.

In considering the uses a high majority (95% of donors) said they had given consent for retention of body parts. This survey did not seek further details e.g., if there were specific body parts that individuals felt it was appropriate to retain. Retention of parts is important in creating prosection based specimens that can be used repeatedly in teaching. The high percentage of potential donors (90%) who agreed to images is an interesting finding. The Human Tissue Authority falls silent on the use of taking images and good practice is to seek consent (Anatomy Associations Advisory Committee, 2017).

Within the scope of the legislation in the UK and Ireland, research on donors is permitted and does not require further ethical approval (Anatomy Associations Advisory Committee, 2017),

interestingly this study showed that there was a high on differences between individuals' anatomy (737, 91.90%) and research on individual diseases or conditions (764, 95.03%)

Legislation

Appropriate legislation has been described as the key for body donation (Taylor and Wilson, 2007; Zhang et al., 2008; Riederer, 2015; Gürses et al., 2019). There is a great deal of variety in practice; for example, across Europe (McHanwell et al., 2008; Riederer et al., 2012; Riederer and Bueno-López 2014). The variety in practice reflects cultural and religious variations and 'ownership' of cadavers (Bin et al., 2016) and that a common principle is that the ethical framework needs to be considered (Champney, 2011), and the donation should be voluntary and not for profit. In the countries where the present study was conducted, there are clearly defined laws and regulatory frameworks. One element for consideration is that a donor might complete all of the consent forms, but there is no automatic mechanism for a medical school to be notified of the death. The system relies on a relative, first, to be aware of the intention to donate, and second, to agree to contact the medical school. Donors are perhaps aware of this, with nearly 70% saying they would support a witness also signing to say that they will act on the donation at the time of death. In reality, this might not solve the issue, as the witness might not outlive the donor, but even a low percentage uptake would help boost donor numbers. In the case of executors or solicitors, it is usually too late when they are informed of a death and then locate the information that the individual consented to body donation. Ideally, there would be an automated system of notification of a body donors' death, however there is currently no

functionality in the National Health Service and the Death Registration Service and the Medical Schools who sit outside both for this feature to occur.

Comparison to previous survey in the UK and Ireland (Richardson and Hurwitz, 1995) demonstrates a wider awareness of what body donation might involve, with a change from 42% to 92% believing body donation would involve 'experiments'. Potential donors in 2019 were also more likely to know someone who had donated (40%) compared to 25% in 1995. In exploring the reasons for donating, the main reasons for donating in both surveys highlight 'medical progress', 'benefits to society'. However, in 1995 6% mentioned avoiding expense, whereas 24 years later this had increased to 28%, possibly suggesting a shift in attitude or necessity. One factor that has not changed is the mean age of potential donors from 66.6 years in 1995 to 70 in 2019.

Limitations of the study

The current survey was undertaken before the onset of the Covid-19 pandemic resulted in closure and disruption to body donation (Brassett et al., 2020; Longhurst et al., 2020; Moszkowicz et al., 2020; Pather et al., 2020). In the UK, there has been substantial support for the National Health Service during the pandemic, a change in beliefs or attitudes towards body donation may have occurred. A change in attitude may also have affected the perceptions of body donors. It is also important to note that the sample population may not have been representative of the general population; since they were enquiring about body donation, they are likely to have formed opinions about it already.

CONCLUSION

The findings suggest that motivations for body donation are predominantly prosocial. The present study has highlighted two previously unreported reasons for donation, financial and convenience, which may be linked to changing societal values. In summary, the beliefs of body donors may be classified under four factors: (1). Contribution (improve education, improve health, help science, and contribute to the general good); (2). Personal benefit (comfort relatives, good end to life, leaves a legacy, pay back medical practice, contribute to the greater good); (3). Consideration (save relatives inconvenience and money, avoid ceremonial practices, and to reduce relatives' stress): and (4).Beliefs (that donation risks afterlife, violates beliefs or risks one's body being treated with disrespect).

For the UK and Ireland, this study has provided a unique insight into donors' perceptions. The authors recommend that with regulators, donor information packs and consent forms are examined to ensure all current possible donor activities and processes are included. It is also recommended that anatomists explore with the regulators how information and awareness of body donation can be increased. Anatomists and doctors need to continue to support socially acceptable, ethical, sustainable donation practices to ensure that future supply and demand is met.

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Tables

Table 1. Information on the four donation centers.

	London Anatomy Office	University of Dundee	Cardiff University	Trinity College Dublin
Mean number of donation packs sent out in 12 months	1,000	120	80	70
Mean number of donors in 12 months (except covid)	400	85	65	30

Table 2. Breakdown of demographics by geographical location

	N= 843	**Mean age n (± SD) n= 833**	**Gender n (%) n= 840**		**Religious status n (%) n= 821**		**Relationship status n (%) n= 831**		**Organ donor n (%) n= 729**		**Blood donor n (%) n= 814**	
			Male	Female	Religious	Non-religious	In a relationship	Not in a relationship	Yes	No	Yes	no
Cardiff	165	69.06 (12.29)	78 (47.27)	87 (52.73)	79 (50.97)	76 (49.03)	84 (52.50)	76 (47.50)	109 (75.69)	35 (24.31)	98 (60.49)	64 (39.51)
Dundee	173	64.36 (13.31)	74 (42.78)	99 (57.22)	82 (47.40)	91 (52.60)	98 (56.65)	75 (43.35)	106 (68.39)	49 (31.61)	97 (57.74)	71 (42.26)
London	473	72.05 (11.45)	202 (42.98)	268 (57.02)	256 (55.41)	206 (44.59)	227 (48.61)	240 (51.39)	191 (47.63)	210 (52.37)	228 (50.33)	225 (49.67)
Trinity	32	64.14 (12.92)	18 (56.25)	14 (43.75)	25 (80.65)	6 (19.35)	15 (48.39)	16 (51.61)	16 (55.17)	13 (44.83)	18 (58.06)	13 (41.94)
Total	843	69.57 (12.47)	372 (44.29)	468 (55.71)	442 (53.84)	379 (46.16)	424 (51.02)	407 (48.98)	422 (57.89)	307 (42.11)	441 (54.18)	373 (45.82)

SD = standard deviation

Table 3. Understanding donors' intentions towards donation

Question	N=	Yes n (%)	No n (%)
Q9, Have you known someone who became a body donor?	826	331 (40.07)	495 (59.93)
Q10, Do you have a friend or family member who is currently registered as a body donor?	817	224 (27.42)	593 (72.58)
Q11, Who have you discussed the possibility of potentially becoming a body donor with? e.g. partner, friend, medical professional.	834	819 (98.20)	15 (1.80)
Q12, Have you completed a body donation Consent Form?	730	708 (96.99)	22 (3.01)
Q13, Have you placed a restriction on the length of time that your body can be retained for Anatomical Examination? (NOT applicable in Scotland)	713	56 (7.85)	657 (92.15)
Q14, Have you given consent for retention of body parts?	762	721 (94.62)	41 (5.38)
Q15, Have you given consent for images of your body to be taken?	773	742 (95.99)	31 (4.01)
Q16, Are you aware that it may not be possible for the donation to be accepted?	818	802 (98.04)	16 (1.96)

FIGURE LEGENDS

Figure 1.

Bar chart showing attitudes of potential body donors regarding a variety of donation attitudes. Becoming a body donor would: participants were asked to rate the statements from extremely unlikely (1) to extremely likely (7). The responses demonstrate that potential body donors are predominantly in agreement regarding all the attitudes covered in the figure. Error bars are standard error of the mean. N= 559-824.

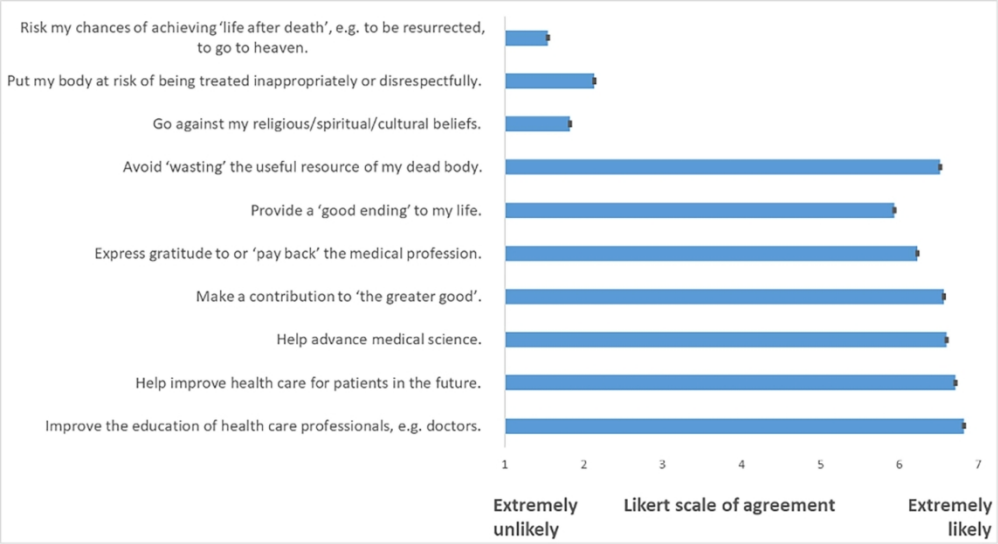
Figure 2.

Bar chart showing the varied responses of potential body donors regarding four specific donation attitudes. Becoming a body donor would: participants were asked to rate the statements from extremely unlikely (1) to extremely likely (7). For all four attitudes examined, the data is mixed with large standard deviation error bars which demonstrate a bimodal distribution of responses and a split interpretation of the attitudes assessed. Error bars are standard deviation. N= 770-791.

Figure 3.

Bar chart evaluating four specific donation beliefs and desires. Participants were asked to circle the response that they most concurred with relating to each statement. The responses highlight that there is a high level of agreement with cremation, a mixed response on their bodies not being accepted, and a mixed response to thinking about what will happen to their bodies. Most

agreed that a relative should sign to say that they will notify the institution of a death. Error bars are standard deviation. N= 778-799.



Bar chart showing attitudes of potential body donors regarding a variety of donation attitudes. Becoming a body donor would: participants were asked to rate the statements from extremely unlikely (1) to extremely likely (7). The responses demonstrate that potential body donors are predominantly in agreement regarding all the attitudes covered in the figure. Error bars are standard error of the mean. N= 559-824.

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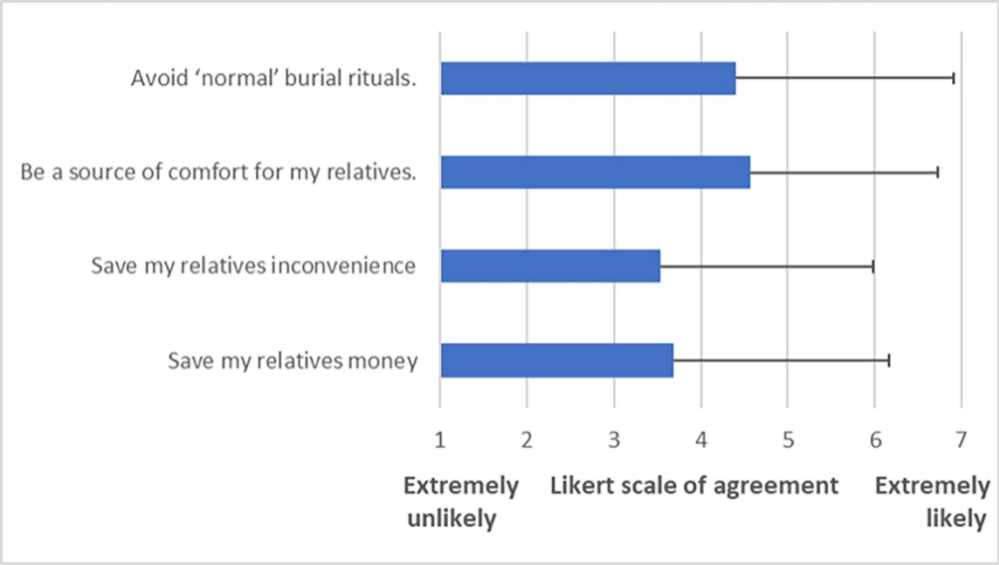
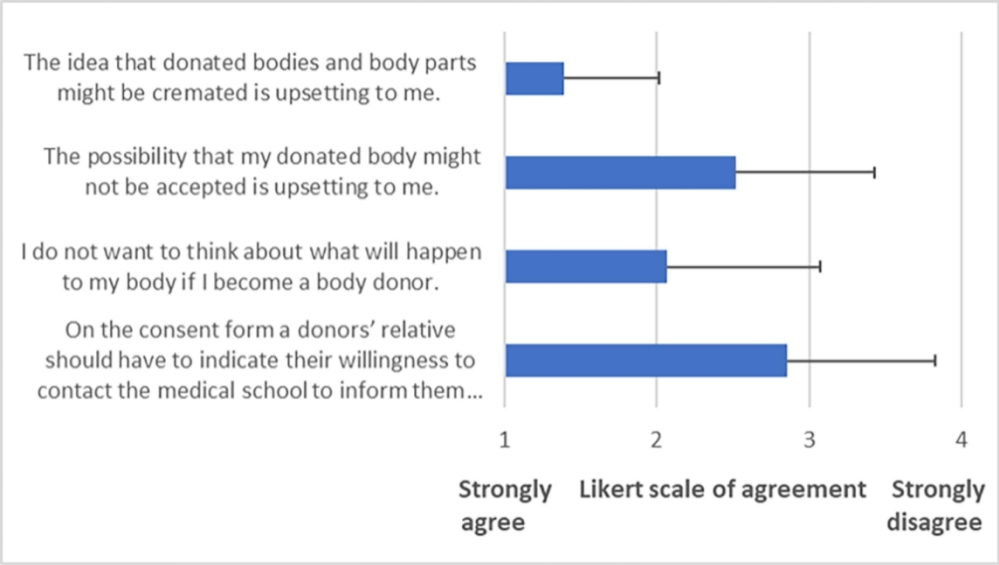


Bar chart showing the varied responses of potential body donors regarding four specific donation attitudes. Becoming a body donor would: participants were asked to rate the statements from extremely unlikely (1) to extremely likely (7). For all four attitudes examined, the data is mixed with large standard deviation error bars which demonstrate a bimodal distribution of responses and a split interpretation of the attitudes assessed. Error bars are standard deviation. N= 770-791.

127x72mm (300 x 300 DPI)



Bar chart evaluating four specific donation beliefs and desires. Participants were asked to circle the response that they most concurred with relating to each statement. The responses highlight that there is a high level of agreement with cremation, a mixed response on their bodies not being accepted, and a mixed response to thinking about what will happen to their bodies. Most agreed that a relative should sign to say that they will notify the institution of a death. Error bars are standard deviation. N= 778-799.

127x72mm (300 x 300 DPI)