Attitudes to Organ Donation and Knowledge of Donation and Transplantation among University of Auckland Medical Students

Lindsey Harbour¹, Cayley Ingham¹, Stephen Streat²-³ and Warwick Bagg⁴

¹University of Auckland, Auckland, New Zealand. ²Auckland District Health Board, Auckland, New Zealand. ³Organ Donation New Zealand, New Zealand. ⁴Faculty of Medical and Health Sciences, University of Auckland, Auckland, New Zealand.

ABSTRACT

AIMS: To explore organ donation and transplantation knowledge and attitudes among medical students at the University of Auckland.

METHOD: A validated web-based questionnaire consisting of 42 questions in five categories was anonymously administered to all enrolled medical students at the Faculty of Medical and Health Sciences, University of Auckland, in September 2012.

RESULTS: In all, 419 out of 989 (42%) Year 2–6 students responded. A total of 99.3% of medical students supported organ donation, but knowledge was limited (mean score 7.54/15±2.26). A total of 38% of students reported having participated in organ donation learning. A total of 96% of students believed that organ donation information should be available in primary care settings. A total of 69% of students reported that if a patient asked a question about organ donation that they did not know the answer to, they also would not know where to source the correct information from.

CONCLUSION: This study demonstrates that although medical students support organ donation, they lack the knowledge required to facilitate informative discussions with patients. Enhanced organ donation education in medical programs may enable students to develop skills and knowledge allowing them to better discuss donation with patients.

KEYWORDS: organ donation and transplantation, medical education, curriculum

Introduction

Rates of deceased organ donation in Australia and New Zealand (NZ) are low, at 14.9 and 8.6 donors per million per year, respectively, and are significantly behind European countries, some of which achieve >30 donors per million per year. As NZ rates of non-communicable disease increase, organ donation waitlists grow, resulting in unmet needs.

Previous research has demonstrated that medical professionals’ knowledge of and attitudes toward donation have an impact on donation rates.¹² It is possible that these attitudes and knowledge are molded pre-graduation. As such, educating medical students may be an important factor in increasing organ donation. Currently, University of Auckland medical students learn about aspects of organ donation in Years 2–3 of the undergraduate medical program. In Years 4–6, students learn in clinical environments, where they are likely to come in contact with patients who have had transplants or, potentially, in contact with donors. This study explored the attitudes and knowledge about organ donation at the University of Auckland. To our knowledge, this is the first research of its kind within Australasia.
Methods

Questionnaire. A questionnaire developed and validated by Essman and Thornton to assess the knowledge and attitudes of American medical students about organ donation and transplantation was adapted with permission for NZ medical students. This adaptation was minor in nature, with changes to ensure that questions reflected NZ law and medical practice. Specifically, questions regarding organ donation cards, which are relevant for an American cohort, were removed or edited to reflect the lack of organ donation cards in NZ. For example, the statement, “A person must carry a signed organ donor card before they can become an organ donor” was changed to “A person must be recorded as donor on their driver’s license before they can become an organ donor.” Demographic questions were also adapted to be consistent with standard NZ statistical nomenclature.

The anonymous, 20-minute, web-based questionnaire consisted of 42 questions, which collected information in five categories: demographics, knowledge, donation concerns, students’ viewpoints, and personal experience of organ donation and transplantation. It contained several question types, including yes/no and Likert scales (strongly agree to strongly disagree; less likely to more likely). Factual knowledge about organ donation and transplantation was assessed according to the knowledge questions developed by Thornton et al, who validated the questions through pilot testing with focus groups. Again, minor adaptations were made to ensure questions reflected NZ law, medical practice, and demographics. In total, there were 3 multiple-choice and 12 true/false/do not know knowledge questions allowing assessment of factual knowledge about organ donation and transplantation to be made on a 15-point scale. The knowledge section covered basic areas, including definition of brain death, numbers and categories of organ donors in NZ, the proportion of those on the transplant waiting list who receive organs, and legal and medical aspects of transplantation.

Study population. In September 2012, all 989 currently enrolled medical students (MBChB, Years 2–6) at the Faculty of Medical and Health Sciences, University of Auckland were invited via email to complete the questionnaire. Every student was emailed a unique link to the survey. To increase participation, a researcher spoke to each class once, giving a brief overview of the study. One further request to complete the questionnaire was sent via email to all students 10 days after the initial invitation.

The electronic questionnaire was open for students to complete between September and October 2012. As an incentive to complete the questionnaire, 13 randomly selected students received a $50 food or petrol voucher. Ethical approval for this study was granted by the University of Auckland Human Participants Ethics Committee.

Statistical analysis. SPSS and R were used for statistical analysis. ANOVA and chi-squared tests of independence were used, and the level of significance value was set at 0.05.

Thematic analysis. Two of the researchers (LH and CI) independently read and reread comments made by students in a free text box of the questionnaire in response to the statement “organ donation conflicts with my beliefs in a way not otherwise specified and/or I have other concerns—please briefly explain in the space below.” Each researcher independently identified what she thought to be the most prominent themes within the data set using cross-sectional thematic analysis. The researchers then compared their findings and identified three distinct major themes. Discrepancies were resolved with discussion and negotiation, and consensus was reached.

Results

Of the 989 enrolled students, 419 completed the questionnaire, a 42% response rate. Response rates varied by year, from 31.2% (Year 4) to 57.8% (Year 3) (Table 1). Most respondents (59%) were between the ages of 20 and 23 years; 60% were women and 57.5% were born in NZ (Table 2).

The majority of respondents identified themselves as NZ European (59%); 22.2% identified themselves as Other, 16.7% identified themselves as Chinese, 11.9% identified themselves as Maori, 5% identified themselves as Indian, 2.6% identified themselves as Samoan, 1.7% identified themselves as Cook Island Maori, 1% identified themselves as Tongan, and 0.2% identified themselves as Niuean.

Most students reported that they support organ donation (99.3%). However, only 79% reported that they would like to donate organs in the event of their death, and 72% had recorded donor on their driver license (2.9% reported not having a license) (Table 3).

Of those who are not currently recorded as a donor on their license, 33.9% reported that they would change this to

| YEAR OF MEDICAL PROGRAM ENROLLMENT | ENROLLED | RESPONDED | RESPONSE RATE, % |
|------------------------------------|----------|-----------|-----------------|
| Year 2                             | 235      | 97        | 41.3            |
| Year 3                             | 204      | 118       | 57.8            |
| Year 4                             | 202      | 63        | 31.2            |
| Year 5                             | 186      | 80        | 43.0            |
| Year 6                             | 162      | 61        | 37.7            |
| All years                          | 989      | 419       | 42.4            |
donor if they had the opportunity. The odds of wanting to become an organ donor in the event of their death were more than two times higher for NZ-born respondents when compared to those who were born overseas (204/241 vs 125/178, OR 2.312, 95% CI 1.4–3.7). There were insufficient data to determine whether or not this varied by overseas country of origin. Interestingly, the odds of wanting to become an organ donor were almost two and a half times higher for respondents who reported having donated blood within the last year compared to those who did not (98/111 vs 226/300, OR 2.468, 95% CI 1.3–4.6). This possibly represents an extension of the wish to donate, and similar values have been reported by others.3

Although 96% of students responded that general practitioners should have organ donation information available in their practices, only 77% were of the opinion that general practitioners should talk about organ donation with their patients (Table 3).

Several variables were associated with significantly different knowledge scores. Students in Years 2–3 were found to have significantly lower scores than students in Years 4–6, with a mean of 7.033 vs 8.083 out of 15 (P < 0.001) (Table 4). NZ-born students had significantly higher knowledge scores than those born overseas, a mean of 7.747 vs 7.256 (P = 0.028).

Regularly reading articles about organ donation (mean 8.170 vs 7.462, P = 0.033) was associated with higher knowledge scores, as was having cared for a transplant patient (mean 8.259 vs 7.271, P < 0.001). Those students who had participated in the medical decision making for a loved one were more knowledgeable than those without a similar experience, with an average

| SURVEY QUESTION | RESPONSE | NUMBER OF RESPONDENTS | PERCENTAGE OF RESPONDENTS |
|-----------------|----------|------------------------|---------------------------|
| I support organ donation (n = 417) | Yes | 414 | 99.3% |
| In the event of my death (n = 419) | I would like to become an organ donor | 331 | 78.8% |
| I am unsure if I would like to become an organ donor | 78 | 18.6% |
| I would not like to become an organ donor | 10 | 2.4% |
| I am recorded as an organ DONOR on my driver’s license (n = 419) | Yes | 303 | 72.3% |
| No | 97 | 23.2% |
| Don’t have a license | 12 | 2.9% |
| Don’t know | 7 | 1.7% |
| I am not recorded as a donor on my license, but given the chance I would change this (n = 109) | Yes | 37 | 33.9% |
| No | 26 | 23.9% |
| Maybe | 46 | 42.2% |
| Donated blood within the last year (n = 411) | Yes | 111 | 27% |
| No | 300 | 73% |
| GPs should have organ donation information in their practices (n = 419) | Yes | 404 | 96.2% |
| GPs should talk about organ donation with their patients (n = 418) | Yes | 322 | 77.0% |
| No | 96 | 23.0% |
knowledge score of 8.259 vs 7.271 (P=0.009). Knowing an organ donor or knowing an organ recipient was associated with higher knowledge scores, with a mean of 8.280 vs 7.450 (P = 0.015) and 8.011 vs 7.406 (P = 0.02), respectively. Those who reported having participated in formal coursework or training on organ donation during and/or prior to medical school had significantly higher knowledge scores than those who had not had such training, with a mean of 8.119 vs 7.172 (P < 0.01). Gender, ethnicity, and self-reported strength of religious beliefs were not found to have significant associations with knowledge scores.

Those students who had discussed their wishes regarding organ donation with their families had slightly higher knowledge scores (mean 7.750 vs 7.302, P = 0.045). There was an association between the belief that organs will be allocated fairly and increasing knowledge levels. Those who agreed organ allocation was fair had higher knowledge scores than those who were neutral (mean 7.729 vs 7.068, P = 0.019). In a similar association, it was seen that those students who disagreed that having donor written on their driver’s license would lead to insufficient medical care tended to have higher knowledge levels than those who answered agree or neutral: disagree group (mean = 7.845) scored significantly higher than the neutral group (mean = 6.333, P < 0.001) and the agree group (mean = 6.805, P = 0.012) (Table 5).

Willingness to donate organs after their death was less common (51/81, 63%) in those who considered themselves moderately religious than in those whose religious beliefs were either strong (very or extremely religious; 72/86, 84%) or weak (slightly or not at all religious; 198/242, 82%) (P = 0.002). There were no other significant associations found between religion or ethnicity, and the willingness to donate organs after death.

**Qualitative results.** There were 74 comments made in the free text box questions. Within these, three distinct major themes emerged from the data set collected in response to the statement “organ donation conflicts with my beliefs in a way not otherwise specified and/or I have other concerns—please briefly explain in the space below.” These themes were:

1. Organ donation is against my family’s beliefs, but not against my beliefs.
2. Not wanting to become an organ donor if it would upset family members.
3. Concern about quality of medical care and validity of brain death if known to be a potential organ donor.

With regard to theme one, students made comments revealing that their own views are sometimes at opposition with the views of their families, eg., “[organ donation] conflicts with my whanau’s (family) belief, but not with my own personal beliefs” or “I do not mind if I die prematurely and my organs are donated to another person in need. However my mum, due to her upbringing … does not want me to.”

Theme two was predominantly seen in co-occurrence with theme one, that is in students who recognized a conflict between their own and their family’s beliefs. However, theme two was also seen to occur independently of theme one, with some students noting that their own views on donation were primarily based on the impact it might have on their family, with the lack of conflict between views being the differentiating factor. In theme two, students reflected that the views of their families were of greater priority than their own. Comments made to this end included, “If I were to die before the people of this generation I would want them to discuss it and decide, rather than having my wishes followed to the letter and causing a family rift” and the acknowledgment that in situations where beliefs conflict, “it is a balance between potentially benefiting an organ recipient and how my parents may feel (as they are the living left behind) after my pre-mature death.” Overall, multiple respondents expressed the view that they would rather their families made, their families made “the decision that was best for them at the time.”

The third theme touched on the concerns of the validity and robustness of brain death, with the issue of organs being taken in situations where the person was not actually dead or in such a way that their life was shortened. There was a concern that being a potential organ donor could lead to a conflict of interest and insufficient medical care in the event of life-threatening illness or injury.

**Discussion**

Our research has indicated that University of Auckland medical students are overwhelmingly in favor of organ donation. The majority who support organ donation similarly wish to become donors in the event of their death, and perceive organ donation as a topic that has a place for discussion in general practice. We hypothesized that students at a clinical level (Years 4–6) may have higher knowledge scores than those at a preclinical level (Years 2–3), as exposure to transplant patients is not likely to occur until the clinical years. Additionally,

---

**Table 4. Knowledge score by year level.**

| YEAR   | MAXIMUM SCORE (OUT OF 15) | MEDIAN  | MEAN   | SD    | MINIMUM SCORE (OUT OF 15) | n   |
|--------|---------------------------|---------|--------|-------|---------------------------|-----|
| MBchB 2| 12                        | 6.00    | 6.44   | 2.22  | 1                         | 97  |
| MBchB 3| 12                        | 8.00    | 7.52   | 2.27  | 1                         | 118 |
| MBchB 4| 11                        | 7.00    | 7.22   | 1.92  | 0                         | 63  |
| MBchB 5| 14                        | 9.00    | 8.43   | 1.99  | 4                         | 80  |
| MBchB 6| 13                        | 9.00    | 8.52   | 2.13  | 4                         | 61  |
Attitudes towards and knowledge of donation and transplantation

there is no specific medical student attachment that guarantees exposure to transplant patients; thus, increasing knowledge scores from Years 4 to 6 is likely a reflection of the increasing chance with time that a student has been exposed to transplant patients. Indeed, increasing knowledge was associated with being in later stages of the program, having participated in formal organ donation learning, being born in NZ, and having experience in organ donation-related matters, whether as part of medical education or as personal experience outside of the medical school, although statistically different. Those students with higher knowledge scores were more likely to have discussed their wishes regarding organ donation with their family, and they were more likely to trust in fair allocation of organs and less likely to believe that declared donors would receive inadequate medical care. However, while the differences in knowledge scores were found to be statistically significant, the absolute changes in score are small.

Table 5. Factors potentially associated with knowledge.

|               | MEAN KNOWLEDGE SCORE | NUMBER OF RESPONDENTS | P VALUE |
|---------------|----------------------|-----------------------|---------|
| Year 2–3      | 7.033                | 215                   |         |
| Year 4–6      | 8.083                | 204                   | <0.001  |
| NZ-born       | 7.747                | 241                   |         |
| Overseas-born | 7.256                | 176                   | 0.028   |
| Regularly reads articles about organ donation | 8.170 | 53 |         |
| Does not regularly read articles about organ donation | 7.462 | 364 | 0.033 |
| Have cared for a transplant patient | 8.259 | 116 |         |
| Have not cared for a transplant patient | 7.271 | 303 | <0.001 |
| Have participated in the medical decision making of a loved one | 8.308 | 52 |         |
| Have not participated in the medical decision making of a loved one | 7.437 | 364 | 0.009 |
| Know an organ donor | 8.280 | 50 |         |
| Do not know an organ donor | 7.450 | 367 | 0.015 |
| Know an organ recipient | 8.011 | 92 |         |
| Do not know an organ recipient | 7.406 | 325 | 0.023 |
| Participated in formal organ donation learning | 8.119 | 168 |         |
| Have not participated in formal organ donation learning | 7.172 | 250 | <0.001 |
| Talked with family regarding donation wishes | 7.750 | 224 |         |
| Have not talked with family regarding donation wishes | 7.7302 | 192 | 0.045 |
| Trust that organs will be allocated fairly | | | |
| Agree | 7.729 | 299 |         |
| Neutral | 7.068 | 88 | 0.041 |
| Are concerned that having DONOR on their license will lead to insufficient medical care | | | |
| Disagree | 7.845 | 323 |         |
| Neutral | 6.333 | 54 |         |
| Agree | 6.805 | 41 |         |
| Disagree > Neutral | 0.001 | 0.001 |
| Disagree > Agree | 0.012 | 0.012 |

Thematic analysis revealed three key themes. The ideas of conflict within families with regard to donation, and whether the donor’s or the family’s wishes should be paramount, portrayed a similar underlying issue that the decision to donate organs affects the donor family more than the potential donor themselves. In the analysis of these comments, it was seen that the individuals’ main priority was not simply that their own wishes be followed, but to ensure that the decision made was the one their family felt comfortable with. Views on organ donation were often noted to be a conflict occurring along generational lines, with the younger generations being more supportive and stating that the older generations hold objections to donation. Additionally, the belief that one should be buried with all organs intact was mentioned several times. It is noted that a skepticism surrounding brain death and organ procurement was shown to still exist, even in a medical student population. Stories in the media about false diagnoses of brain
death support this fear, though in NZ we can be assured that the process is robust; education around these areas may assist in reducing distrust.

A limitation of this study is the response rate. As response was voluntary, the participants may not be representative of the wider student population. However, there was a wide range of knowledge scores, suggesting that the respondents were not only those students who were knowledgeable about organ donation.

Research worldwide has shown that while medical students are generally supportive of organ donation and transplantation, they may be lacking in basic knowledge on the topic. In an attempt to address this issue, one university introduced an educational program involving pre-reading, an one-hour lecture, and a further one-hour small group discussion using a trained simulated patient. Pre- and post-intervention assessments showed significant increases in the students’ knowledge about donation, self-rated confidence toward interaction with patients regarding donation, and communication with their own families about their wishes. However, this was only measured four months after the intervention, and it is uncertain if the effect would be sustained. Nevertheless, similar programs have supported this, showing increases in students’ knowledge, and excellent ratings by students with consequent high demand and attendance.

Our study suggests that medical students at the University of Auckland would be receptive to further organ donation education. The next step in this project will be to determine what the curriculum of such education should include, how it should be delivered, and at what stage of learning it would be most effective.

Acknowledgements

Thanks to Vernon Mogol for his help with statistical analysis.

Author Contributions

Conceived and designed the experiments: LH, CI, WB, SS. Analyzed the data: LH, CI. Wrote the first draft of the manuscript: LH, CI. Contributed to the writing of the manuscript: LH, CI, WB. Agree with the manuscript results and conclusions: LH, CI, WB, SS. Jointly developed the structure and arguments for the paper: LH, CI. Made critical revisions and approved final version: LH, CI, WB. All authors reviewed and approved of the final manuscript.

REFERENCES

1. Almeida RAM, Quireze C Jr, de Faria WML, dos Santos DF, Dias RV, Maynarde IG. Organ donation and transplantation from medical students’ perspective: introducing the experience from an academic league in Brazil. Transplant Proc. 2011;43(4):1311–1312.
2. Bardell T, Hunter DJW, Kent WDT, Jain MK. Do medical students have the knowledge needed to maximize organ donation rates? Can J Surg. 2003;46(6):453–457.
3. Essman C, Thornton J. Assessing medical student knowledge, attitudes, and behaviors regarding organ donation. Transplant Proc. 2006;38(9):2745–2750.
4. Thornton JD, Wong KA, Cardenas V, Curtis JR, Spigner C, Allen MD. Ethnic and gender differences in willingness among high school students to donate organs. J Adolesc Health. 2006;39(2):266–274.
5. IBM Corp. IBM SPSS Statistics for Windows, Version 19.0 Released. Armonk, NY: IBM Corp; 2010.
6. R Core Team. R: A Language and Environment for Statistical Computing. Vienna, Austria: R Foundation for Statistical Computing; 2012. Available at http://www.R-project.org/.
7. Morse J, Field P. Qualitative Research Methods for Health Professionals. 2nd ed. London: Sage Publications; 1995.
8. Merriam S. Qualitative Research in Practice: Examples for Discussion and Analysis. San Francisco: Jossey-Bass; 2002.
9. Tracy S. Qualitative Research Methods: Collecting Evidence, Crafting Analysis, Communicating Impact. Chichester: Wiley-Blackwell; 2013.
10. Bardell T, Childs AL, Hunter DJ. Organ donation: a pilot study of knowledge and attitudes and arguments for the paper: LH, CI. Made critical revisions and approved final version: LH, CI, WB. All authors reviewed and approved of the final manuscript.

Author Contributions

Conceived and designed the experiments: LH, CI, WB, SS. Analyzed the data: LH, CI. Wrote the first draft of the manuscript: LH, CI. Contributed to the writing of the manuscript: LH, CI, WB. Agree with the manuscript results and conclusions: LH, CI, WB, SS. Jointly developed the structure and arguments for the paper: LH, CI. Made critical revisions and approved final version: LH, CI, WB. All authors reviewed and approved of the final manuscript.

REFERENCES

1. Almeida RAM, Quireze C Jr, de Faria WML, dos Santos DF, Dias RV, Maynarde IG. Organ donation and transplantation from medical students’ perspective: introducing the experience from an academic league in Brazil. Transplant Proc. 2011;43(4):1311–1312.
2. Bardell T, Hunter DJW, Kent WDT, Jain MK. Do medical students have the knowledge needed to maximize organ donation rates? Can J Surg. 2003;46(6):453–457.
3. Essman C, Thornton J. Assessing medical student knowledge, attitudes, and behaviors regarding organ donation. Transplant Proc. 2006;38(9):2745–2750.
4. Thornton JD, Wong KA, Cardenas V, Curtis JR, Spigner C, Allen MD. Ethnic and gender differences in willingness among high school students to donate organs. J Adolesc Health. 2006;39(2):266–274.
5. IBM Corp. IBM SPSS Statistics for Windows, Version 19.0 Released. Armonk, NY: IBM Corp; 2010.
6. R Core Team. R: A Language and Environment for Statistical Computing. Vienna, Austria: R Foundation for Statistical Computing; 2012. Available at http://www.R-project.org/.
7. Morse J, Field P. Qualitative Research Methods for Health Professionals. 2nd ed. London: Sage Publications; 1995.
8. Merriam S. Qualitative Research in Practice: Examples for Discussion and Analysis. San Francisco: Jossey-Bass; 2002.
9. Tracy S. Qualitative Research Methods: Collecting Evidence, Crafting Analysis, Communicating Impact. Chichester: Wiley-Blackwell; 2013.
10. Bardell T, Childs AL, Hunter DJ. Organ donation: a pilot study of knowledge and attitudes among medical and other university students. Ann R Coll Physicians Surg Can. 2002;35(2):77–80.
11. Chung CK, Ng CW, Li JY, et al. Attitudes, knowledge, and actions with regard to organ donation among Hong Kong medical students. Hong Kong Med J. 2008;14(4):278–285.
12. Edwards TM, Essman C, Thornton JD. Assessing racial and ethnic differences in medical student knowledge, attitudes and behaviors regarding organ donation. J Natl Med Assoc. 2007;99(2):131–137.
13. Feeley TH, Tamburlin J, Vincent DE. An educational intervention on organ and tissue donation for first-year medical students. Prog Transplant. 2008;18(2):103–108.
14. Essman CC, Lebovitz DJ. Donation education for medical students: enhancing the link between physicians and procurement professionals. Prog Transplant. 2005;15(2):124–128.