Correlations Between Demographics, Knowledge, Beliefs, and Attitudes Regarding Organ Transplantation Among Academic Students in Poland and Their Potential Use in Designing Society-wide Educational Campaigns

P. Koźlik[a,*], R. Pfitzner[b], E. Nowak[c], A. Kozynacka[a], Ł. Durajski[a], Ł. Janik[b], and P. Przybyłowski[b]

[a]Cardiosurgical Students' Scientific Group of the Jagiellonian University Medical College, Kraków, Poland; [b]Department of Cardiovascular Surgery and Transplantology, Jagiellonian University, John Paul II Hospital, Kraków, Poland; and [c]Department of Internal Medicine and Angiology, Brothers Hospitallers' of St John of God Hospital, Kraków, Poland

ABSTRACT

Background.   Family objection precludes 10% of cadaveric donations in Poland. Academic students represent a socially influential demographic group. Educational campaigns improving their attitudes may increase overall donation rates. The aim of this study was to assess correlations between knowledge, beliefs, and attitudes regarding organ transplantation and the identification of the most critical factors affecting one's donation preferences.

Methods.   Eight hundred students from 4 public universities in Krakow, Poland, participated in the study; participants were diverse in age, sex, hometown population, and academic discipline (400 medical, 400 non-medical). This cross-sectional study was conducted with the use of a group-administered questionnaire inquiring into demographics, general and professional knowledge, beliefs, and attitudes toward organ transplantation.

Results.   Attitudes toward organ donation correlate positively with beliefs ($\rho = 0.36$), general knowledge ($\rho = 0.48$), and professional knowledge ($\rho = 0.23$) scores. Beliefs were proven to correlate with general ($\rho = 0.21$) and professional ($\rho = 0.26$) knowledge as well. Misconceptions about the medical criteria allowing cadaveric organ recovery, distrust for brain death reliability, fear of "do not resuscitate" approach toward Organ Donor Card holders, a strong belief in organ trafficking, and unawareness of family members' attitudes are the most important factors influencing one's refusal/uncertainty to donate.

Conclusions.   Knowledge, attitudes, and refusal rates differ, depending on the academic discipline as well as other demographics, indicating a need for a specifically targeted approach in designing educational campaigns. Sources of knowledge are related to donation rates, with pre-academic education evaluated as unfavorable, as opposed to healthcare providers and the media.

FAMILY objection precludes 10% of cadaveric donations in Poland, contributing significantly to all nonmedical causes of potential donor losses [1]. Polish academic students represent a demographic group characterized by a strong social impact, being directly involved in their families' decision-making, and altering public awareness by presenting altruistic commitment during social events and for numerous institutions [2]. Educational campaigns improving their knowledge and therefore attitudes [3] may consequently increase the overall donation rates.

Furthermore, medical students—as future doctors—will play an important role in the evolution of Polish transplantology, being more or less directly involved in its procedures, as transplantation coordinators or operating team members, by identifying potential donors and recipients [4]. Healthcare professionals are also expected to provide reliable information and communicate transplantology-

*Address correspondence to Paweł Koźlik, ul. Skarżyńskiego 6/7, 31-866, Kraków, Poland. E-mail: pawelkozlik89@gmail.com

favorable attitudes to the patients, their families, the general society and the media [5]. Their proper knowledge and motivation are therefore necessary for effective organ procurement and allocation [4,5].

The aim of this study was to (1) establish relations between demographic characteristics such as sex, age, hometown population, disciplines and years of studies with knowledge, beliefs, and attitudes toward transplantology, (2) evaluate correlations between knowledge, beliefs, and attitude statements, (3) identify critical factors independently related to the rate of refusal or uncertainty about organ donation, and (4) identify most frequently exploited sources of knowledge and their influence on one's donation readiness to design and deploy more effective, audience-targeted public awareness strategies.

METHODS

This cross-sectional study was conducted over a time frame of 4 semesters (academic years 2010/2011, 2011/2012) with the use of a group-administered questionnaire.

Sample

The sample size required to provide a 95% confidence level with a 5% margin error and the population size of academic students in Kraków of 207,649 [6] was estimated at 384, through the use of the Raosoft sample size calculator. To account for missing data, a total of 400 questionnaires from non-medical students were collected. For means of comparison, another sample of 400 medical students was gathered. Subgroup characteristics included.

- Medical students (M): n = 400, M/F/no data: 37.25%/62.25%/ 0.5%; ages 18 to 28 years, average 21.8 ± 1.85; mostly living in a city (80%); first to sixth year of medicine, Jagiellonian University Medical College; the number of students from each year was comparable (14.29% ± 6.36%; analysis of variance $P = .9345$).
- Non-medical students (NM): n = 400, M/F: 24.5%/75.5%; ages 19 to 28 years, average 21.4 ± 1.32; mostly living in a city (67%); first to fifth year of studies, Jagiellonian University (42%), Pedagogical University of Kraków (24%), Kraków University of Economics (22%), and AGH University of Science and Technology (12%). The number of students from humanistic and scientific fields of studies was equal (50%/50%).

Questionnaire

The questionnaire was divided into 3 (non-medical students) or 4 (medical students) sections inquiring into demographics and sources of knowledge (Table 1), general and professional (medical students only) knowledge (Table 2), beliefs, opinions (Tables 3 and 4), and attitudes toward organ transplantation (Table 5), with single- and multiple-choice questions. Respondents' knowledge and attitudes were graded according to the total score received. Readiness to donate was assessed by means of the Likert scale (1 to 5 points; 1: explicit unreadiness to donate, 2: moderate unreadiness to donate, 3: no opinion, 4: moderate readiness to donate, 5: explicit readiness to donate). Refusal/uncertainty was defined as readiness-to-donate score <4.

Statistical Analysis

Only fully completed questionnaires were included in the general linear model and multiple logistic regression analysis (302 non-medical and 335 medical). Demographic characteristics with

Table 1. Demographics, Declared Sources of Knowledge, and Their Impact on Refusal/Uncertainty Rate

Demographic Characteristics (Non-medical Students)	Odds Ratios of Refusal or Uncertainty to Donate (95% Confidence Interval)	
Factor/Answers	Respondent's Own Organs (AOR)	Family Member's Organs (AOR)
Sex		
Male[‡]	2.33 (1.17–4.65)	2 (1.04–3.84)
Female[*]	1	1
Academic discipline		
Philosophy[‡]	24.41 (2.44–244.6)	17.32 (3.55–84.59)
Polish philology[‡]	14.51 (1.38–152.39)	8.19 (1.71–39.21)
European studies	3.32 (0.27–41.09)	4.34 (0.68–27.76)
International relations	1.12 (0.07–19.05)	3.45 (0.43–27.61)
Management	2.61 (0.21–32.89)	3.11 (0.48–19.8)
Chemistry	18.75 (0.29–1205.04)	0.78 (0.13–4.72)
Mathematics	5.67 (0.1–297)	0.68 (0.13–3.41)
Law and administration[*]	1	1
Hometown population		
City. >500k population[‡]	1.13 (0.5–2.5)	1.2 (0.56–2.57)[‡]
City. 100–500k population	1.08 (0.43–2.7)	1.35 (0.58–3.16)
City. 20k to 100k population	1.23 (0.46–3.25)	3.4 (1.45–7.97)
Village[*]	1	1
Sources of knowledge (non-medical students; multiple-choice question)		
Healthcare providers[‡]	0.3 (0.07–1.33)	0.27 (0.98–0.05)[‡]
Internet	0.86 (0.46–1.62)	0.68 (0.38–1.23)
The media[‡]	0.37 (0.19–0.7)[‡]	0.32 (0.18–0.58)[‡]
Pre-academic education[‡]	2.38 (1.16–4.87)[‡]	2.8 (1.43–5.47)[‡]
Academic education	0.6 (0.24–1.5)	0.82 (0.37–1.8)
Family, friends	0.49 (0.23–1.08)	1.39 (0.75–2.58)
Clergymen	1.24 (0.25–6.13)	0.3 (0.04–2.43)
Other	0.56 (0.15–2.02)	0.47 (0.13–1.69)
Sources of knowledge (medical students; multiple-choice question)		
Healthcare providers	0.51 (0.12–2.16)	1.13 (0.46–1.79)
Internet[‡]	0.26 (0.07–1.00)	0.41 (0.17–0.96)[‡]
The media	0.69 (0.18–2.6)	1.13 (0.48–2.68)
Pre-academic education	–[†]	0.4 (0.09–1.81)
Academic education[‡]	0.26 (0.08–0.91)[‡]	0.28 (0.12–0.66)[‡]
Family, friends	3.13 (0.7–13.88)	2.54 (0.89–7.3)
Clergymen	–[†]	–[†]
Other	3.65 (0.59–22.59)	1.94 (0.38–10)

Year of studies and age are not included in this table because they are not significantly independent factors.

AOR, adjusted odds ratio (adjusted for all demographics).

[*]Reference answers (odds ratio = 1).

[†]Insufficient data.

[‡]Significant odds ratios.

significant differences in mean knowledge, attitude, or beliefs scores were included in the regression models to adjust for confounding. Statements expressing knowledge, beliefs, and opinions as well as ways of expressing donation preferences were included in multiple logistic regression analysis to assess their impact on odds of refusal/ uncertainty to donate and adjust for confounding. The Pearson's χ^2 test was implemented to evaluate dependence of nominal variables. Spearman's rank-order correlation coefficient (ρ) was used to assess correlations between knowledge, beliefs, and attitudes. All presented results are considered significant at $P < .05$. Statistical