

Perspectives of Renal Healthcare Professionals about Deceased Organ Donation

Ann M. Andrews, MPH; Caitlin Loughery, MPH, National Kidney Foundation of Michigan, Ann Arbor, MI; Nanhua Zhang, PhD, Division of Biostatistics & Epidemiology, Cincinnati Children's Hospital Medical Center, University of Cincinnati College of Medicine, Cincinnati, OH; Allyce Haney Smith, MSW; Holly Jenkins Riley, MSW; Caitlin Loughery, MPH, National Kidney Foundation of Michigan, Ann Arbor, MI; Sheri Stav, MSW, Greenfield Health Systems, Bingham Farms, MI; Ken Resnicow, PhD, Department of Health Behavior & Health Education, University of Michigan School of Public Health, Ann Arbor, MI; Remonia Chapman, BS, Minority Organ and Tissue Transplant Education Program, Gift of Life Michigan, Ann Arbor, MI; Jerry Yee, MD, Division of Nephrology and Hypertension, Henry Ford Hospital, Detroit, MI and Greenfield Health Systems, Bingham Farms, MI

Little is known about the attitudes of renal healthcare professionals (HCPs) toward deceased donation. We surveyed 222 renal HCPs from 12 dialysis units in southeast Michigan about their attitudes toward organ donation as part of a cluster-randomized, intervention study. Factor analysis identified three subscales: general benefits (alpha .88), general barriers (alpha .80), and staff dialysis barriers (alpha .79). We compared subscale values with two variables: enrollment status in the state donor registry (DR) and intentions for future DR enrollment. Higher scores on all three scales were positively associated with DR enrollment. Mean scores varied by HCP role within the dialysis unit. Tailoring donation education to a role and focusing on the benefits may have an effective impact on HCP attitudes. Results from this study can inform future interventions to improve promotion of organ donation amongst professionals working in dialysis units.

BACKGROUND

An aging U.S. population combined with increasing rates of chronic disease and increases in life expectancy have created a demand that exceeds the supply of organs available for transplantation. The U.S. population age 65 and over was 15% in 2014 and is expected to grow to 17% in 2020 and 21% by 2030 (Colby & Ortman, 2017). Since 2008, the prevalence of chronic disease among U.S. adults over age 18 has remained constant at 42%. However, these rates increase with age: among U.S. adults 45–64 years old, 47% of the women and 54% of the men have multiple chronic conditions, and among adults 65 and over, 81% of the women and 82% of the men have multiple chronic conditions (Buttorff, Ruder, & Bauman, 2017). Nationally, life expectancy increased from 72.6 years in 1975 to 78.8 years in 2015 (National Center for Health Statistics, 2017). The number of people on the U.S. organ transplant waiting list exceeded 115,000, based on Organ Procurement and Transplantation Network data as of 12/28/17. The growth of the transplant waiting list has prompted revision of policies for organ allocation and exploration of new sources of donations (Hirth, Pan, Schaubel, & Merion, 2010).

A review of donor data in Michigan from 2004 to 2008 supported the use of brain-dead donors with end-stage renal disease (ESRD) as a source of liver donation; 35% of liver-alone donors had ESRD (Stoll et al., 2010). Utilization of extended-criteria liver donors can reduce wait-time without negatively affecting survival after transplant (Tector et al., 2006). In addition to being liver donors, individuals with

ESRD can serve as tissue donors. However, these individuals, and the renal healthcare professionals (HCPs) providing their care, may believe they are unable to donate their organs and tissue after death. Many older adults have the perception that they are unable to donate organs after death as the result of having a medical condition (Downing & Jones, 2008; Health Resources and Services Administration [HRSA], 2013; Quick, Reynolds-Tylus, Fico, & Feeley, 2016).

Research suggests that the attitudes of HCPs toward organ donation and end-of-life issues as well as patient-HCP communication regarding end-of-life issues and advance directives (ADs) have an impact on patient attitudes and actions (Black, 2007; Nam, Chesla, Stotts, Kroon, & Janson, 2011). The 2012 National Survey of Organ Donation Attitudes and Behaviors found that 31.5% of adults cited a medical professional, clinic, or doctor's office as an "important source of information" about organ donation (HRSA, 2013). Thornton, Curtis, and Allen (2006) found that having signed a living will and talking with a physician about donation were both associated with willingness to become a donor and thus recommended that primary care physicians integrate organ donation into end-of-life discussions. Patients with kidney disease prefer to receive end-of-life information from their nephrology staff (Davison, 2010). Perry and colleagues reported that individuals with ESRD were more likely to complete ADs when they felt dialysis staff members were comfortable discussing the decision (Perry, Buck, et al., 1995; Perry, Swartz, Smith-Wheelock, Westbrook, &

Corresponding author: Ann Andrews, MPH; aandrews@nkfm.org; 734-222-9800 ext. 204

Buck, 1996). Comfort level differed among professional disciplines, and support from supervisory staff encouraged discussion within a dialysis unit (Perry, Schwartz, et al., 1996). The attitudes of HCPs toward kidney transplant also affected patients waiting to get on the transplant waiting list; a positive attitude toward transplant among dialysis center staff improved the center's performance on the measure of kidney transplant wait-listing (Gander et al., 2015).

Trust issues regarding the healthcare system are multifaceted and often measured broadly (Robinson, Perryman, Thompson, Lamonte Powell, & Jacob Arriola, 2015). Racial differences in trust often reflect the cultural experiences of a racial group, personal experiences with the healthcare system, and expectations of treatment based on race (Boulware, Cooper, Ratner, LaVeist, & Powe, 2003; Hammond, 2010). A study among African Americans with ESRD found evidence of a relationship between attitudes toward living donor transplantation and trust (McDonald, Powell, Perryman, Thompson, & Jacob Arriola, 2013). The authors measured trust in several dimensions: trust in the healthcare system in general, trust in doctors, trust in the donation/allocation system, and trust in the racial equity of treatment. They found a strong positive association between trust in physicians and positive organ donation attitudes, while they found no association between trust in the healthcare system and donation attitudes.

Studies suggest that healthcare professionals can inform the attitudes of their patients and the community at large in regard to organ donation (Jawoniyi, Gormley, McGleenan, & Noble, 2018; Radunz, Juntermanns, et al., 2012; Symvoulakis et al., 2012). Studies regarding attitudes of a variety of categories of HCPs toward deceased organ donation conducted worldwide reveal knowledge gaps among HCPs about donation despite overall support for donation (Burker et al., 2015; Matten et al., 1991; Radunz, Juntermanns, et al., 2012; Zambudio, Martinez-Alarcon, Parrilla, & Ramirez, 2009). Several studies found that an understanding of brain death affects attitudes toward organ donation (DuBois & Anderson, 2006; Jelinek, Marck, Weiland, Neate, & Hickey, 2012). A study in 11 countries showed that the attitudes and donation-related skills of critical-care staff correlated positively with national donation rates (Roels, Spaight, Smits, & Cohen, 2010). A 2014 review of studies conducted among HCPs showed that most organ donation interventions among HCPs were not based on theoretical frameworks and did not measure the intervention's impact on HCP behavior (Douville, Godin, & Vézina-Im, 2014).

Research conducted on renal HCP attitudes has focused on living donation, the processes for evaluating and listing individuals for deceased donor transplant, and such end-of-life issues as discontinuation of dialysis, decisions about care, AD, and organ allocation and procurement (Ayanian et al., 2004; Davison, Kromm, & Currie, 2010; Waterman et al., 2013). However, little research has focused on the attitudes of renal HCPs regarding deceased donation or the

concept of dialysis patients donating organs and tissue after death. A Turkish study of nurses and physicians working in dialysis and transplant units found sufficient knowledge and positive attitudes about organ donation among the group and recommended group members act as role models to improve attitudes among the general public toward organ donation (Demir, Selimen, Yildirim, & Kucuk, 2011). Therefore, an examination of attitudes among renal HCPs is warranted.

Our group developed a three-factor organ-donation scale for HCPs that addressed common beliefs with respect to deceased donation and beliefs about whether individuals on dialysis could donate organs. In this study, we expanded on previous work by adapting an existing organ-donation attitude scale to assess the attitudes of renal HCPs toward deceased donation. The new survey instrument was administered to nonphysician renal staffs at 12 dialysis units in metropolitan Detroit. The goal of this study was to examine the attitudes of renal healthcare professionals about deceased organ donation and validate a new organ-donation attitude scale for renal HCPs.

STUDY DESIGN

The data reported herein came from the baseline assessment of a group-randomized intervention trial that tested the effectiveness of using lay health advisors (termed peer mentors) with individuals on dialysis in order to increase enrollment in the Michigan Organ Donor Registry. Baseline data were collected after randomization but prior to the initiation of any intervention activities. Data collection was done by 222 staff members from 12 dialysis units in southeast Michigan between June 2011 and September 2013.

SETTING AND PARTICIPANTS

The National Kidney Foundation of Michigan (NKFM) received funding from the Health Resources and Services Administration (HRSA), Healthcare Systems Bureau, Division of Transplantation, to implement an organ donation intervention in 12 dialysis units in southeast Michigan. Of the 12 units, 11 were hemodialysis units, the majority of which also had a peritoneal dialysis component. One unit was a home only program. The NKFM partnered with the University of Michigan, Gift of Life Michigan/Minority Organ and Tissue Transplant Education Program, Henry Ford Hospital, and Greenfield Health Systems to design the intervention. The social work manager for the units prioritized the order in which paired units would implement the study, taking into account staffing levels and other ongoing projects. The baseline survey instrument was completed by 222 renal HCPs in southeast Michigan between June 2011 and September 2013. The study was approved by the Henry Ford Health System Institutional Review Board and the University of Michigan Health Sciences Institutional Review Board.

METHODOLOGY

The attitude scale used in this study was adapted from a similar instrument used by our group in three prior organ donation studies among clients of African American hair stylists, members of African American churches, and members of historically African American Greek Letter Organizations (Andrews, Zhang, Beuchley, et al., 2016; Andrews, Zhang, Magee, et al., 2012; Loughery et al., 2017; Resnicow, Andrews, Beach, et al., 2010; Resnicow, Andrews, Zhang, et al., 2012). The scale was adapted for use among renal HCPs, including nurses, social workers, dietitians, technicians, and administrative staff. One item was added to further probe about brain death, and five items were added to address the ability of hemodialysis or peritoneal dialysis patients to donate organs after death and the appropriateness or “cruelty” of discussing this topic. The questions were tested with renal HCPs and individuals on dialysis and revised iteratively.

The baseline survey comprised 32 items and assessed renal HCP barriers and benefits to organ donation. All items were scaled 1 (strongly disagree) to 7 (strongly agree). Higher scores indicated more positive attitudes about donation. Items that assessed barriers to donation were reverse coded so that higher scores were considered more positive, pro-donation attitudes. Barriers included family disapproval, cost, religious and spiritual beliefs, misconceptions about the donation process, and what was called ick and jinx factors (respectively, a negative emotional reaction to the idea of the organ donation and superstitions about harm or premature death occurring as a result of signing up on a donor registry). Ick factors capture the feeling of disgust some experience regarding the organ donation and transplant process and cutting or “mutilating” the body. Jinx factors capture feelings of anxiety, fear, or superstition about what will happen if one actually registers on a donor registry (Morgan, Stephenson, Harrison, Afifi, & Long, 2008). Benefits to organ donation included altruism, providing comfort to family members after death, and religious beliefs.

Enrollment status on the Michigan Organ Donor Registry was assessed by the question, “Have you ever signed up to donate your organs?” A response of yes indicated positive “donor registry enrollment status.” Follow-up questions asked people which method was used to register them and whether they had a red heart sticker on their driver’s license, an indicator of having signed up on the registry in Michigan. For those who had indicated they had not enrolled in the donor registry enrollment, we assessed their intent to do so with the question, “How likely are you to sign up as an organ donor?” Response options were scaled 1 (not at all likely) to 10 (very likely). We designed three categories “high” (8–10), “medium” (4–7), and “low” (1–3) to delineate gradations of “intended donor registry enrollment status.” Positive donor registry enrollment status and intended donor registry enrollment status were used to assess the validity of the

attitude scale, with the assumption that more positive attitudes would be associated with higher likelihood of donor registration and higher intention among those not enrolled.

Respondents were asked, “Have you talked to your family members about whether or not you want to donate your organs?” Personal connection to organ donation was assessed through three yes/no questions, which asked the respondent if they knew anyone who needed an organ transplant, had received an organ transplant, or had donated an organ. Additional questions asked, “Have you ever heard of the Michigan Organ Donor Registry?” and “How likely are you to donate a kidney to a family member who needed one?” Again, we used a scale from 1 (not at all likely) to 10 (very likely).

Demographic data included age, sex, race/ethnicity, education, and income. Age was obtained by asking for the participant’s date of birth. Educational status was determined by asking, “What is the highest grade or degree you have completed?” Response categories were “Some high school or less,” “High school graduate or GED,” “Some college or 2-year degree,” “4-year college graduate,” “Master’s degree” and “Doctoral or professional degree.” To measure household income, we queried “What is your current total yearly household income before taxes? (Please include income from all sources in your home.)” Response categories were “Under \$10,000”; “\$10,000–\$19,999”; “\$20,000–\$39,999”; “\$40,000–\$59,999”; “\$60,000–\$79,999”; “\$80,000–\$99,999”; “\$100,000–\$149,999”; “\$150,000–\$199,999”; and “>\$200,000.” Response options were collapsed for data analysis. Staff roles in dialysis units were determined by the question, “What is your role in the dialysis unit?” Response categories were “social worker,” “nephrologist,” “dialysis technician,” “reuse staff,” “registered dietitian,” “registered nurse,” “administrative staff,” and “other.”

Prior to implementation in a given dialysis unit, study staff met with the clinic manager, social worker, and local leadership personnel to provide a study overview/timeline, gain buy-in, discuss preferences for patient recruitment, and schedule staff training. Study staff led the 30-minute staff training, which included a study overview, the staff’s role in the study, and basic facts about organ donation. The training was held on two consecutive days to reach all staff.

We administered the baseline survey at start of training to assess staff attitudes and beliefs about organ donation. Participation was voluntary. A positive introduction of the study by the nurse manager facilitated staff completion of the survey. All data collection for these analyses occurred before any intervention activity was initiated in the unit. Each questionnaire contained a unique participant code that indicated the unit in which the staff member worked. The participant’s name and address were associated with the unique participant code on the cover sheet and in a separate database of cover sheet information. The survey responses were stored separately from the staff contact information to protect confidentiality.

ANALYTICAL APPROACH

Factor analysis, with varimax rotation, was used to identify potential subscales. After identifying a three-factor solution based on eigenvalues >1 , factor loadings >0.35 , and face validity of subscales, we computed internal consistency of each scale (Cronbach's alpha), and examined the relationship between scale scores and demographics, self-reported enrollment status, and intended enrollment status. Multivariate analyses included age, gender, income, and education as covariates. Because we collected the data in dialysis units, we used a mixed-effects model to account for the potential nonindependence of response by individuals in the same unit. We adjusted p values for intraclass correlation coefficients (ICCs) because of the design effect of sampling individuals within units. The ICCs of the three scales identified ranged from 0.008 to 0.024. The data analysis for this paper was generated using Proc Mixed in SAS software, Version 9.1.3. (SAS Institute Inc., Cary, NC, USA).

RESULTS

A total of 222 renal staff members completed the baseline survey. This represented 65.5% of all nonphysician staff at the 12 dialysis units. Three subscales were identified as shown in **Table 1**: general benefits (alpha .88), general barriers (alpha .80), and staff dialysis barriers (alpha .79). The general benefits scale contains 9 items, the general barriers scale contains 11, and the staff dialysis barriers contains 4. In general, there were no items whose removal would have increased the internal consistency on any scale.

Staff demographics.

As shown in **Table 2**, the average number of staff members completing a survey per dialysis unit was 19, with a range of 5 to 34. Most were under the age of 45 (63%), with 32% between 45 and 60, and 5% over the age of 60. Most (80%) were female. Race/ethnicity broke down as follows: 40% White, 32% Black, 21% Asian/Pacific Islander, 4% other, and 3% Latino/Hispanic. More than half (59%) had received a 4-year college education or above. By income, slightly more than half (54%) reported income of \$20,000–\$59,999, while 4% reported income of less than \$20,000 and 42% reported income of \$60,000 or more. The most prominent staff roles were nursing staff (33%), dialysis technician (33%), and social worker (10%). Other roles included reuse staff/equipment technician, registered dietitian, administrative, and other. Nephrologists were invited but did not attend the training and complete the survey. Consequently, they are not included in the sample. The intervention group differed from the control group in having a larger percentage who identified as Black, while the control group had more staff who identified as White.

Association of scale scores and demographics.

As shown in **Table 3**, scores did not differ by age, education, or income for any of the three scales. For scale 1 (general benefits), females had significantly higher scores than did males; scores on scale 2 (general barriers) and scale 3 (staff dialysis barriers) did not differ by gender. All three scales showed significant differences by race. On scale 1, White respondents had significantly greater attitudes favoring donation than Hispanic/Latino and Asian/Pacific Islander respondents. On scale 2, Whites had significantly higher mean scores than staff of all other racial groups; Black respondents also had significantly higher mean scores on scale 2 than Asian/Pacific Islander respondents. On scale 3, Whites again reported significantly higher pro-donation attitudes than staff who were Hispanic/Latino and Asian/Pacific Islander; likewise, Blacks again reported significantly higher mean scores than Asian/Pacific Islander respondents.

Association of scale scores and donor registry enrollment status.

On all three scales, as shown on **Table 3**, staff members who reported they had enrolled on the donor registry had higher mean scores than those who reported they had not enrolled. Intended enrollment was measured for those who indicated they were not already enrolled. In partial and fully adjusted analyses, higher mean scale scores were associated with greater intent to enroll. On scale 1, all pairwise comparisons were significant in univariate and multivariate analyses across levels of intention. On scale 2, the pairwise comparison between high intention and medium intention was significant. On scale 3, the pairwise comparison between high intention and low intention was significant, as was the pairwise comparison between medium intention and low intention. As shown on **Table 4**, all three scales were positively associated with current enrollment on the donor registry. For each 1 point of increase in the mean score on the scale, the odds of indicating enrollment increased by 2.81 times on scale 1, by 2.52 times on scale 2, and by 0.34 times on scale 3.

Association of scales scores and staff role

On scale 1, there were no significant differences in mean attitude score between staff categories as shown on **Table 3**. On scale 2, the pairwise comparisons between social worker and dialysis technician, between social worker and reuse staff, and between social worker and other staff were all significant; in all cases social workers had higher scores indicating more favorable attitudes toward donation. On scale 3, the pairwise comparisons between social worker and dialysis technician were significant as were pairwise comparisons between registered dietitian and dialysis technician, with social workers and registered dietitians each having higher scale scores than dialysis technicians.

Table 1. Survey questions, subscale grouping, and factor loading

		Rotated factor loading
Scale 1 General benefits <i>alpha 0.88</i>	Organ donation is an act of charity.	.47
	Organ donation allows something positive to come out of a person's death.	.63
	Signing up to donate my organs is a way I can do something good for others.	.73
	Signing up to donate my organs will allow my family to carry out my wishes.	.83
	Signing up now to donate my organs can help my family by removing the stress of making that decision.	.76
	Donating my organs allows me to help others to live.	.78
	Donating my organs may provide my family with some comfort.	.76
	Donating my organs can help my family cope with their grief.	.73
	Donating my organs is consistent with my religious tradition.	.57
Scale 2 General barriers <i>alpha 0.80</i>	If I signed up to donate my organs, my family members would not approve.*	.39
	If a person has donated his or her organs, it is impossible for that person to have a regular funeral service.*	.47
	It costs a donor family money to donate organs.*	.66
	Organ donation is against the rules of my religion.*	.47
	It is possible for a brain dead person to recover from their injuries.*	.40
	A person needs to have all of their parts in order to go to heaven.*	.69
	It would be weird to have my organs inside someone else.*	.50
	Even thinking about death could bring about bad things.*	.71
	I can't decide whether I want to donate my organs until I know more about brain death.*	.56
	If a person has signed the organ donor registry, doctors won't try as hard to save that person's life. *	.52
	Organs can be bought and sold in the United States.*	.39
Scale 3 Staff dialysis barriers <i>alpha 0.79</i>	Dialysis patients cannot donate any organs at all.*	.66
	Dialysis patients are too sick to donate their organs.*	.80
	It is inappropriate to talk with dialysis patients about donating their organs.*	.76
	It is cruel to talk with dialysis patients about donating their organs.*	.75

*Items were reverse coded so that higher scores indicate more positive feelings toward donation

Table 2. Staff demographics and baseline[^] information

	Intervention (n=125)	Control (n=97)	Total (n=222)
Age group			
45 or younger	60.40	58.76	63.06
45-60	27.20	38.14	31.98
>60	6.40	3.09	4.95
Gender (Female %)	78.23	83.33	80.45%
Race/ethnicity			
Black	40.80	21.65	32.43%
Latino/Hispanic	3.20	2.06	2.70%
White	29.60	52.58	39.64%
Asian/Pacific Islander	22.40	19.59	21.17%
Other	4.00	4.12	4.05%
Education			
Some high school or less	0	0	0
High school or GED	5.60	5.15	5.41
Some college or 2-year degree	33.60	39.18	36.04
4-year college or above	60.8	55.67	58.56
Income			
\$20,000 or less	3.53	4.41	3.92%
\$20,000–\$60,000	56.47	50.00	53.59%
\$60,000 or more	40.00	45.59	42.48%
Mean scale 1: General benefits (sd)	5.54 (1.13)	5.63 (1.21)	5.58 (1.17)
Mean scale 2: General barriers* (sd)	5.72 (1.02)	5.88 (0.97)	5.79 (1.00)
Mean scale 3: Staff dialysis barriers* (sd)	5.48 (1.53)	5.69 (1.39)	5.57 (1.47)
Rate of positive donor registry enrollment status	49.59	48.42	49.07%
Positive intended donor registry enrollment status**			
Low (1–3)	13.85	23.53	18.10%
Medium (4–7)	61.54	50.98	56.90%
High (8–10)	24.62	25.49	25.00%
Number of staff members per unit (mean, range)	21.00 (8-34)	16.17 (5-29)	18.50 (5-34)
Staff role			
Social worker	9.60	11.36	10.33%
Dialysis technician	32.80	34.09	33.33%
Reuse staff/Equipment Technician	4.80	2.27	3.76%
Registered dietitian	6.40	5.68	6.10%
Registered nurse	29.60	38.64	33.33%
Administrative staff	0.80	2.27	1.41%
Other	16.00	5.68	11.74%

[^] Hybrid of baseline. After randomization but before any intervention activity as is common in group randomized trials due to logistics.

*:Reverse coded so that higher scores reflected more positive attitudes toward donation.

**Positive intended donor registry enrollment status among subjects who are not signed up on the registry.

Table 3. Predictors/correlates of attitudes toward donation—Staff (n=222)

	Mean attitude (1: General Benefits)	Mean Attitude (2: General Barriers) *	Mean Attitude (3: Staff Dialysis Barriers) *
Age group			
45 or younger	5.53	5.74	5.52
45-60	5.72	5.85	5.72
>60	5.36	6.00	5.28
Gender			
Male	5.10¹	5.66	5.38
Female	5.70¹	5.82	5.61
Race/ethnicity			
Black	5.56	5.72¹	5.65¹
Latino/Hispanic	4.79¹	5.24²	4.63²
White	5.89^{1,2}	6.19^{1,2,3}	5.95^{2,3}
Asian/Pacific Islander	5.16²	5.24¹	4.90^{1,3}
Other	5.35	5.48³	5.36
Education			
High school or GED	5.42	5.84	5.50
Some college or 2-year degree	5.70	5.93	5.77
4-year college or above	5.52	5.71	5.46
Income			
\$20,000 or less	5.92	5.69	5.51
\$20,000–\$59,999	5.47	5.84	5.61
\$60,000 or more	5.53	5.68	5.49
Positive donor registry enrollment status			
Yes	6.09¹	6.17¹	5.86¹
No	5.11¹	5.43¹	5.28¹
Intended donor registry enrollment among non-enrolled			
Low (1–3)	3.99¹	5.21	4.31^{1,2}
Medium (4–7)	5.09¹	5.31¹	5.40¹
High (8–10)	5.98¹	5.82¹	5.79²
Staff role			
Social worker	5.50	6.45^{1,2,3}	6.30¹
Dialysis technician	5.59	5.74¹	5.24^{1,2}
Reuse staff/Equipment Technician	5.63	5.31²	5.31
Registered dietitian	6.05	6.01	6.19²
Registered nurse	5.52	5.70	5.62
Administrative staff	6.41	6.14	5.42
Other	5.32	5.63³	5.41

*Items were reverse coded so that higher scores indicate more positive feelings toward donation.

Common superscript indicates groups significantly different in pairwise comparison with p value < .05 based on mixed effect modeling on the mean scales accounting for correlation of subjects in the same center.

Table 4. Association of Staff Attitudes and Donor Status:

	Odds Ratio	95% CI	P-Value
General benefits (scale 1)	2.81	(1.95, 4.04)	< .0001
General barriers (scale 2)*	2.52	(1.74, 3.64)	< .0001
Staff dialysis barriers (scale 3)*	1.34	(1.10, 1.64)	.0046

*Items were reverse coded so that higher scores indicate more positive feelings toward donation

LIMITATIONS

The study has several limitations. Data were self-reported and enrollment status on the donor registry was not validated. In addition, the sample was not randomly drawn, so selection bias may be present. Staff members were aware of their randomization condition at the time they completed the baseline survey, which may have influenced their responses. However, scores in the attitude scales are not very different, nor is the rate of positive enrollment; it doesn't appear that knowledge of treatment group impacted their attitudes. The sample had 42% who had an annual income of \$60,000 or more, 59% of the sample had a college degree or above, and 80% was female. The survey was voluntary for staff. By virtue of their willingness to participate, staff members who responded may be more supportive of organ donation than those who did not agree to participate. Thus, our results may not be generalizable to the larger renal staff population. Furthermore, the presence of a vocal staff member who was either supportive or against organ donation may have affected results. The clinic manager introduced the study staff and the introduction varied based on that manager's support for the study and organ donation in general.

The study was conducted in 12 units of a regional dialysis provider located in the metropolitan Detroit area, so results may not be generalizable to rural areas or larger, national dialysis providers. We did not ask how long the renal staff member was employed (a) in the given unit or (b) worked in renal care. In this study, we did not directly ascertain contact time between staff members and patients. All renal staff, including the nephrologists, were invited to attend the lunch training sessions; however, physicians did not and so did not complete the survey. We administered the survey on two separate days, so second-day participants may have discussed the content with participants from the first day. The study was cross-sectional, and therefore we cannot assume a causal relationship between attitudes and positive enrollment status. Longitudinal studies examining the association of attitudes and donation behaviors are needed to verify the findings observed here.

CONCLUSIONS

We examined the attitudes of renal HCPs toward deceased donation and tested the psychometric properties of a new scale measuring those attitudes. We found that more positive attitudes were associated with those already enrolled in a donor program and that mean scale scores differed by race and staff role. The first factor (general benefits scale) contained the same questions and had a similar alpha as our work in the sorority-fraternity population and supports the validity of the scale (Andrews, Zhang, Buechley, et al., 2016). The second factor (general barriers scale) contained similar questions to surveys used in our previous work in other settings but the factors loaded differently. The third factor (dialysis barriers scale) contributes new knowledge to the field by providing insight into the current beliefs and attitudes about the practice of asking individuals who are on

dialysis about donating organs after death. This finding can have an impact on epidemiological studies to help understand the relationship between patient behavior and staff attitudes. Additionally, the measures can be used to identify intervention targets and measure intervention effectiveness in a pretest and posttest design.

We also examined the association of scale score with the status of donor registry enrollment and intended donor registry enrollment among renal HCPs. Self-reported enrollment status and high-intention to sign up to donate organs were both associated with more positive attitudes toward organ donation on each subscale. These findings suggest validity of the instrument as the attitudes were associated in the expected direction with positive enrollment status.

Mean scores differed by race on all three scales. The instrument has been previously administered in studies that comprised more than 90% African American participants, so we cannot compare to past studies. The current study of renal HCPs was a more racially/ethnically diverse group: 40% White, 32% Black, 21% Asian/Pacific Islander, 4% other, and 3% Latino/Hispanic. However, the fact that the general benefits scale included the same questions with a similar alpha (.88 in current study vs .87 in sorority-fraternity) implies that the benefits of organ donation are viewed the same across races. Thus, the measures are generalizable across ethnic populations.

Mean scale scores also differed by staff role. While social workers had the highest mean scores on the two barriers scales, the associated, respective mean scores for the general benefits scale were lower. Furthermore, the differences between the various staff roles in the scores for the general benefits scale were not significant, suggesting that perhaps renal HCPs do not see the benefits of organ donation. They are often witnesses to individuals returning to dialysis after a failed transplant but may not see transplant success stories as frequently. Waterman, Goalby, Hyland, McCabe, and Dinkel (2012) surveyed dialysis clinic managers in a Midwest ESRD network and determined that knowledge of kidney transplant was inadequate. Over 70% of respondents did not know that a living kidney transplant can last 15–20 years, and that most kidney transplants are functioning one year after transplantation. Waterman, Dew et al. (2013) also found that positive attitudes toward transplant and facility policies supportive of transplant education at the highest levels of administration contributes to dialysis staff educating patients about transplant. Education that focuses on the benefits of organ donation would be a useful intervention for all levels of renal HCPs.

The role and amount of interaction that a staff member has with the individual on dialysis may have an impact on patient attitudes. Staff role could also be a proxy for education, although there were no differences in scale scores by education. Education of HCPs regarding organ donation is one component that can increase the number of organs avail-

able for transplant (Jawoniyi et al., 2018). Using a single educational approach for all staff, such as the typical lecture, may not be as effective as tailoring education for HCPs based on factors such as staff role or barriers. A review article showed that interventions tailored on barriers can change professional practice, although the effect is variable and tends to be small to moderate (Baker, 2015). Current evidence is inconclusive on the best methods for tailoring.

Strategies targeted at renal HCPs may be more effectively designed using behavioral theories and behavior change strategies similar to how interventions for “patients” are created and generate customized interventions. However, “there is a lack of sound theoretical interventions aimed at improving professional practices regarding the donation process or at increasing donation rates” (Douville, Goudin, & Vézina-Im, 2014). A study investigating the impact of a training program for nurses on organ donation rates mentioned the use of the change theory but did not explain how the theory was used (Taylor, Young, & Kneteman, 1997).

Looking outside the realm of organ donation, one study confirmed that the theory of planned behavior (TPB) variables were associated intention to use clinical practice guidelines for patient care among HCPs (Kortteisto, Kaila, Komulainen, Mäntyranta, & Rissanen, 2010). The TPB suggests that an individual's behavior is determined by his or her behavioral intention, which is shaped by attitude toward behavior, subjective norms, and perceived behavioral control. The authors suggested that different strategies should be used to target physicians, nurses, or other HCPs.

A theory-led, systematic review of interventions targeting HCP behavior change found that interventions that modify peer group norms through action (such as reminders or audit and feedback) and educational outreach tend to be more successful than those based on persuasion (Johnson & May, 2015). Multiple interventions packaged together were more effective than single interventions. The authors suggested that interventions in professional healthcare settings should focus on a collective rather than individual action, which can lead to normative and relational restructuring.

Furthermore, targeting healthcare professionals for educational campaigns on transplantation and organ donation is recommended because they can act as role models who have a positive impact on attitudes of the general public (Demir, Selimen, Yildirim, & Kucuk, 2011). Medical school is also a viable setting for educating future physicians to become disseminators of organ donation information (Radunz, Benkő et al., 2015; Radunz, Juntermanns et al., 2012). Radunz, Benkő, et al. (2015) found that a 45-minute lecture for fourth-year medical students improved their attitude toward donation

Our findings suggest that it may be beneficial to address the benefits of organ donation and transplant among renal HCP educators as they often do not witness the successful outcome of a transplant. Intervention messages that empha-

size a prosocial, transcendent benefit may be effective in this population. Studies to identify effective messaging and development of tailored interventions for HCPs are warranted. Previous studies have not looked at race-specific benefits and racial salience in relation to organ donation and this represents a direction for future study. Finally, researchers and practitioners are encouraged to use the measure presented herein, and adapt it as needed.

Author Note

This project is supported by Grant no. R39OT18281 from the Health Resources and Services Administration (HRSA), Healthcare Systems Bureau, Division of Transplantation. Address correspondence to Primary Author, Ann M. Andrews, MPH at aandrews.nkfm.org.

REFERENCES

- Andrews, A. M., Zhang, N., Buechley, C., Chapman, R., Guillen, J. L., Magee, J. C., & Resnicow, K. (2016). Organ donation attitudes and practices among African Americans: An adapted measurement instrument. *Journal of Health Care for the Poor and Underserved, 27*(3), 1397–1410. doi:10.1353/hpu.2016.0118
- Andrews, A. M., Zhang, N., Magee, J. C., Chapman, R., Langford, A. T., & Resnicow, K. (2012). Increasing donor designation through Black churches: Results of a randomized trial. *Progress in Transplantation, 22*(2), 161–167. doi:10.7182/pit2012281
- Ayanian, J. Z., Cleary, P. D., Keogh, J. H., Noonan, S. J., David-Kasdan, J. A., & Epstein, A. M. (2004). Physicians' beliefs about racial differences in referral for renal transplantation. *American Journal of Kidney Diseases, 43*(2), 350–357.
- Black, K. (2007). Health care professionals' death attitudes, experiences, and advance directive communication behavior. *Death Studies, 31*(6), 563–572. doi:10.1080/07481180701356993
- Boulware, L. E., Cooper, L. A., Ratner, L. E., LaVeist, T. A., & Powe, N. R. (2003). Race and trust in the health care system. *Public Health Reports, 118*(4), 358–365. doi:10.1093/phr/118.4.358
- Burker, E. J., Fingerhut, D., Ebnetter, D., Giza, M., Espey Weber, R., Noone, P. G., & Egan, T. M. (2015). Emergency medical services knowledge and attitudes about non-heart-beating donors: Effect of an educational intervention. *Journal of Heart and Lung Transplantation, 34*(2), 204–212. doi:10.1016/j.healun.2014.09.020
- Buttorff, C., Ruder, T., & Bauman, M. (2017). *Multiple chronic conditions in the United States*. Santa Monica, CA: Rand Corporation.

- Colby, S. L., & Ortman, J. M. (2015). Projections of the size and composition of the US population: 2014 to 2060: Population estimates and projections (Current Population Report P25-1143). Washington, DC: U.S. Census Bureau.
- Davison, S. N. (2010). End-of-life care preferences and needs: Perceptions of patients with chronic kidney disease. *Clinical Journal of the American Society of Nephrology*, 5(2), 195–204. doi:10.2215/CJN.05960809
- Davison, S. N., Kromm, S. K., & Currie, G. R. (2010). Patient and health professional preferences for organ allocation and procurement, end-of-life care and organization of care for patients with chronic kidney disease using a discrete choice experiment. *Nephrology Dialysis Transplantation*, 25(7), 2334–2341. doi:10.1093/ndt/gfq072
- Demir, T., Selimen, D., Yildirim, M., & Kucuk, H. F. (2011). Knowledge and attitudes toward organ/tissue donation and transplantation among health care professionals working in organ transplantation or dialysis units. *Transplantation Proceedings*, 43(5), 1425–1428. doi:10.1016/j.transproceed.2011.01.167
- Douville, F., Godin, G., & Vézina-Im, L. A. (2014). Organ and tissue donation in clinical settings: A systematic review of the impact of interventions aimed at health professionals. *Transplantation Research*, 3(1), 8. doi:10.1186/2047-1440-3-8
- Downing, K., & Jones, L. L. (2008). Designing an educational strategy for increasing organ donor registration among older adults. *Progress in Transplantation*, 18(4), 290–296.
- DuBois, J. M., & Anderson, E. E. (2006). Attitudes toward death criteria and organ donation among healthcare personnel and the general public. *Progress in Transplantation*, 16(1), 65–73.
- Gander, J., Browne, T., Plantinga, L., Pastan, S. O., Sauls, L., Krisher, J., & Patzer, R. E. (2015). Dialysis facility transplant philosophy and access to kidney transplantation in the Southeast. *American Journal of Nephrology*, 41(6), 504–511. doi:10.1159/000438463
- Hammond, W. P. (2010). Psychosocial correlates of medical mistrust among African American men. *American Journal of Community Psychology*, 45(1-2), 87–106. doi:10.1007/s10464-009-9280-6
- Health Resources & Services Administration, Healthcare Systems Bureau, Division of Transplantation (2013). *2012 National survey of organ donation attitudes and behaviors*. Rockville, MD: U.S. Department of Health and Human Services.
- Hirth, R. A., Pan, Q., Schaubel, D. E., & Merion, R. M. (2010). Efficient utilization of the expanded criteria donor (ECD) deceased donor kidney pool: An analysis of the effect of labeling. *American Journal of Transplantation*, 10(2), 304–309.
- Jawoniyi, O., Gormley, K., McGleenan, E., & Noble, H. R. (2018). Organ donation and transplantation: Awareness and roles of healthcare professionals—A systematic literature review. *Journal of Clinical Nursing*, 27(5-6), e726–e738.
- Jelinek, G. A., Marck, C. H., Weiland, T. J., Neate, S. L., & Hickey, B. B. (2012). Organ and tissue donation-related attitudes, education and practices of emergency department clinicians in Australia. *Emergency Medicine Australasia*, 24(3), 244–250.
- Johnson, M. J., & May, C. R. (2015). Promoting professional behaviour change in healthcare: What interventions work, and why? A theory-led overview of systematic reviews. *BMJ Open*, 5 (9), <http://dx.doi.org/10.1136/bmjopen-2015-008592>.
- Kortteisto, T., Kaila, M., Komulainen, J., Mäntyranta, T., & Rissanen, P. (2010). Healthcare professionals' intentions to use clinical guidelines: A survey using the theory of planned behaviour. *Implementation Science*, 5(1), 51.
- Loughery, C., Zhang, N., Resnicow, K., Chapman, R., Magee, J. C., & Andrews, A. M. (2017). Peer leaders increase organ donor designation among members of historically African American fraternities and sororities. *Progress in Transplantation*, 27(4), 369–376. doi:10.1177/1526924817732022
- Matten, M. R., Sliepecevic, E. M., Sarvela, P. D., Lacey, E. P., Woehlke, P. L., Richardson, C. E., et al. (1991). Nurses' knowledge, attitudes, and beliefs regarding organ and tissue donation and transplantation. *Public Health Reports*, 106(2), 155–166.
- McDonald, E. L., Powell, C. L., Perryman, J. P., Thompson, N. J., & Jacob Arriola, K. R. (2013). Understanding the relationship between trust in health care and attitudes toward living donor transplant among African Americans with end-stage renal disease. *Clinical Transplantation*, 27(4), 619–626. doi:10.1111/ctr.12176
- Morgan, S. E., Stephenson, M. T., Harrison, T. R., Afifi, W. A., & Long, S. D. (2008). Facts versus 'feelings': How rational is the decision to become an organ donor? *Journal of Health Psychology*, 13(5), 644–658.
- Nam, S., Chesla, C., Stotts, N. A., Kroon, L., & Janson, S. L. (2011). Barriers to diabetes management: Patient and provider factors. *Diabetes Research and Clinical Practice*, 93(1), 1–9. doi:10.1016/j.diabres.2011.02.002
- National Center for Health Statistics (2017). *Health, United States, 2016* (DHHS Publication No. 2017-1232). Washington, DC: U.S. Government Printing Office.

- Perry, E., Buck, C., Newsome, J., Berger, C., Messina, J., & Swartz, R. (1995). Dialysis staff influence patients in formulating their advance directives. *American Journal of Kidney Diseases*, 25(2), 262–268.
- Perry, E., Swartz, R., Smith-Wheelock, L., Westbrook, J., & Buck, C. (1996). Why is it difficult for staff to discuss advance directives with chronic dialysis patients? *Journal of the American Society of Nephrology*, 7(10), 2160–2168.
- Quick, B. L., Reynolds-Tylus, T., Fico, A. E., & Feeley, T. H. (2016). Source and message framing considerations for recruiting mature adults as organ donors through direct mail campaigns. *Progress in Transplantation*, 26(4), 309–313.
- Radunz, S., Benkö, T., Stern, S., Saner, F. H., Paul, A., & Kaiser, G. M. (2015). Medical students' education on organ donation and its evaluation during six consecutive years: Results of a voluntary, anonymous educational intervention study. *European Journal of Medical Research*, 20(1), 23.
- Radunz, S., Juntermanns, B., Heuer, M., Frühauf, N. R., Paul, A., & Kaiser, G. M. (2012). The effect of education on the attitude of medical students towards organ donation. *Annals of Transplantation*, 17(1), 140–144.
- Resnicow, K., Andrews, A. M., Beach, D. K., Kuhn, L., Krein, S. L., Chapman, R., et al. (2010). Randomized trial using hair stylists as lay health advisors to increase donation in African Americans. *Ethnicity & Disease*, 20(3), 276–281.
- Resnicow, K., Andrews, A. M., Zhang, N., Chapman, R., Beach, D. K., Langford, A. T., et al. (2012). Development of a scale to measure African American attitudes toward organ donation. *Journal of Health Psychology*, 17(3), 389–398. doi:10.1177/1359105311412836
- Robinson, D. H., Perryman, J. P., Thompson, N. J., Lamonte Powell, C., & Jacob Arriola, K. R. (2015). Exploring donation-related knowledge attitudes, beliefs and distrust among African Americans. *Journal of the National Medical Association*, 107(3), 42–50. doi:10.1016/S0027-9684(15)30050-X
- Roels, L., Spaight, C., Smits, J., & Cohen, B. (2010). Critical care staffs' attitudes, confidence levels and educational needs correlate with countries' donation rates: Data from the donor action database. *Transplant International*, 23(8), 842–850. doi:10.1111/j.1432-2277.2010.01065.x
- Stoll, C., Punch, J. D., Kowalczyk, A., Fenton, L., Gray, J., & Pietroski, R. (2010). A business case for supporting liver alone organ donors: 2434. *Transplantation*, 90, 251.
- Symvoulakis, E. K., Tsimtsiou, Z., Papaharitou, S., Palitzika, D., Markaki, A., Stavroulaki, E., . . . Jones, R. (2012). Kidney organ donation knowledge and attitudes among health care professionals: Findings from a Greek general hospital. *Applied Nursing Research*, 25(4), 283–290. doi:10.1016/j.apnr.2012.05.001
- Taylor, P., Young, K., & Kneteman, N. (1997). Intensive care nurses' participation in organ procurement: Impact on organ donation rates. *Transplantation Proceedings*, 29(8), 3646–3648.
- Tector, A. J., Mangus, R. S., Chestovich, P., Vianna, R., Fridell, J. A., Milgrom, M. L., . . . Kwo, P. Y. (2006). Use of extended criteria livers decreases wait time for liver transplantation without adversely impacting posttransplant survival. *Annals of Surgery*, 244(3), 439–450. doi:10.1097/01.sla.0000234896.18207.fa
- Thornton, J. D., Curtis, J. R., & Allen, M. D. (2006). Completion of advanced care directives is associated with willingness to donate. *Journal of the National Medical Association*, 98(6), 897–904.
- Waterman, A. D., Dew, M. A., Davis, C. L., McCabe, M., Wainright, J. L., Forland, C. L., et al. (2013). Living-donor follow-up attitudes and practices in U.S. kidney and liver donor programs. *Transplantation*, 95(6), 883–888. doi:10.1097/TP.0b013e31828279fd
- Waterman, A. D., Goalby, C., Hyland, S., McCabe, M., & Dinkel, K. (2012). Transplant education practices and attitudes in dialysis centers: Dialysis leadership weighs in. *Journal of Nephrology & Therapeutics*, S4:007.
- Zambudio, A. R., Martinez-Alarcon, L., Parrilla, P., & Ramirez, P. (2009). Attitude of nursing staff toward organ donation in a Spanish hospital with a solid-organ transplant program. *Progress in Transplantation*, 19(4), 371–377.