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Knowledge and Attitudes Toward Renal Transplantation in Individuals Undergoing Transplant Evaluation

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Knowledge and Attitudes Toward Renal Transplantation
in Individuals Undergoing Transplant Evaluation

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Table of Contents

Abstract.....	4
Introduction.....	5
Problem Statement.....	5
Purpose.....	6
Research Questions.....	6
Hypotheses.....	7
Review of Evidence.....	7
End-Stage Renal Disease.....	7
Definition.....	7
Prevalence.....	7
End-Stage Renal Disease Treatment Options.....	8
Dialysis.....	8
Transplant.....	9
Comparison of treatment options.....	9
Knowledge.....	10
Attitudes.....	11
Impact of Knowledge on Attitudes.....	13
Theoretical Model.....	14
Project Design.....	16
Overview.....	16
Clinical Setting.....	16
Population.....	17
Methods.....	17
Instrumentation.....	17
Data collection process.....	19
Survey response.....	20
Statistical analysis.....	21
Missing data.....	22

Results	22
Socio-demographic Characteristics	22
Knowledge and Attitude Score Comparison.....	22
Baseline Attitude Scores	23
Discussion	24
Effect of Education on Knowledge and Attitudes	24
Baseline Attitude Scores and Socio-demographic Characteristics	25
Connection to the Theory of Planned Behavior.....	27
Strengths and Limitations	27
Implications for Future Practice.....	28
Conclusion	29
References.....	30
Figure 1	36
Table 1.....	37
Table 2.....	38
Table 3.....	39
Table 4.....	40
Table 5.....	41
Table 6.....	41
Appendix A: K-TUT Scoring Tool	42
Appendix B: Attitudes Scoring Tool	46
Appendix C: Letter of Invitation to Participate in Research	47
Appendix D: Pre-Survey	48
Appendix E: Post-Survey	55
Appendix F: Gift Card Drawing Sign-Up Sheet	60

Abstract

Background: The underutilization of kidney transplant as the preferred treatment for end-stage renal disease is influenced by a lack of knowledge, poor attitudes toward transplantation, and various socio-demographic characteristics amongst the patient population. Negative attitudes toward renal transplant disengages the patient from the evaluation process and often hinders their likelihood of receiving a transplant. **Purpose:** The purpose of this scholarly project was to determine if patients undergoing transplant evaluation had more positive attitudes and greater levels of knowledge about renal transplantation after attending a standardized educational session. **Project Design:** This project was a cross-sectional study that utilized a pre-test/post-test design to assess attitudes and knowledge toward renal transplant before and after an educational session. **Methods:** The pre- and post-surveys were distributed to a convenience sample of 341 and 115 patients, respectively, between the months of September and December 2019. **Results:** Exposure to kidney transplant education resulted in greater levels of knowledge ($p = .019$, $d = 0.334$). The following socio-demographic characteristics were significantly associated with more negative baseline attitude scores: end-stage renal disease duration less than one year ($p = .011$, $R^2 = 0.943$) and no college education ($p = .048$, $d = 0.382$). **Conclusion:** More longitudinal research should be utilized to explore how level of knowledge, attitudes toward transplant, and certain socio-demographic characteristics impact a patient's intention to pursue kidney transplant. Uncovering reasons as to why certain populations of individuals have more negative baseline attitudes toward kidney transplant may also provide clinicians with valuable information on how pre-transplant education can be tailored to meet the needs of specific populations.

Keywords: attitudes, perceptions, willingness, knowledge, kidney transplant, renal transplant, transplant education, end-stage renal disease

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Introduction

Currently in the United States there are 113,684 individuals who are patiently waiting for a life-saving organ transplant (Organ Procurement and Transplantation Network [OPTN], 2019a). Of those individuals, 94,851 are waiting for a single kidney transplant, and an additional 1,635 are awaiting a simultaneous pancreas-kidney transplant (OPTN, 2019a). Renal transplant is one of two mainstay treatment options available to patients with end-stage renal disease (ESRD). Compared to dialysis, renal transplant is viewed as being the more superior of the two treatment options due to its more positive impact on life expectancy and quality of life (McDonald, Powell, Perryman, Thompson, & Arriola, 2013). Despite the positive implications of renal transplant, there are still over 468,000 individuals in the United States who are undergoing dialysis to treat their ESRD (National Kidney Foundation [NKF], 2016). The underutilization of transplant as a treatment for ESRD is not only because of a large organ supply and demand imbalance, but a lack of knowledge and poor attitudes toward organ transplantation among the patient population (Peipert, Hays, Kawakita, Beaumont, & Waterman, 2019).

Problem Statement

The research efforts of this project stemmed from the lack of literature that currently exists to explain the relationship between level of knowledge and a potential recipient's attitude toward kidney transplant. The limited evidence available in the literature suggests that poor attitudes toward renal transplant reinforce fears, worries, and false information that may negatively impact a patient's treatment decisions (Vamos et al., 2009). Additionally, various socio-demographic variables may also play a role in negatively impacting attitudes toward

transplant (Alansari, Almalki, Sadagah, & Alharthi, 2017; Gillespie et al., 2014; Navaneethan & Singh, 2006; Tan et al., 2017). Persistent fears and negative attitudes toward renal transplant result in patients constructing a negative image about transplantation which completely disengages the patient from the evaluation process and hinders their likelihood of receiving a transplant (Vamos et al., 2009; Waterman et al., 2013).

Purpose

The purpose of this scholarly project was to determine if ESRD patients undergoing transplant evaluation at a large academic medical center located in the southeastern United States have more positive attitudes and greater levels of knowledge about renal transplantation after attending a standardized educational session. By directly measuring attitudes toward renal transplant and knowledge before and after the educational session, the investigators were able to determine if the standardized education resulted in an increased level of knowledge and more positive attitudes toward transplant. A lack of statistical findings may signify that other factors may be impacting the attitudes and knowledge that potential recipients have toward receiving a kidney transplant. Poor knowledge scores may be used to prompt a more thorough evaluation of the educational program or highlight specific topics that may require further instruction. However, high knowledge scores will indicate to the program directors that their method of providing crucial information to potential renal transplant recipients is successful.

Research Questions

Based on the existing literature and the purpose outlined above, the investigators sought to complete this scholarly project to answer the following research questions:

1. Do patients display higher levels of knowledge and more positive attitudes toward renal transplant after attending a standardized educational session?

2. Which demographic variables are associated with more negative baseline attitude scores?

Hypotheses

Based on the current literature and the purpose of this project, the investigators hypothesized the participants would display more positive attitudes toward renal transplant and higher levels of knowledge following the standardized educational session. Additionally, the researchers speculated more negative baseline attitudes would be displayed by African Americans, females, older adults, and those with an extended history of ESRD.

Review of Evidence

End-Stage Renal Disease

Definition. ESRD, or kidney failure, is defined as the permanent cessation of kidney function which requires the patient to undergo a regular course of long-term dialysis or kidney transplant to maintain life (Centers for Medicare and Medicaid Services [CMS], 2013). Kidney failure is determined by assessing glomerular filtration rate (GFR) which is a mathematically derived value based on the patient's serum creatinine level, age, sex, and race (Renal Association, n.d.). A normal GFR is greater than 90 mL/min, however, kidney failure is not diagnosed until the GFR decreases to less than 15 mL/min (Renal Association, n.d.). A GFR of this value translates to only 10% of the failed kidney working at its normal capacity (Mayo Clinic, 2019).

Prevalence. According to data gathered by the National Institute of Diabetes and Digestive and Kidney Diseases [NIDDK] (2016), approximately 661,000 people are being treated for ESRD in the United States. Of these patients, 468,000 are receiving dialysis and approximately 193,000 are living with a functioning kidney transplant (NIDDK, 2016).

End-Stage Renal Disease Treatment Options

Dialysis and transplant are the two mainstay treatments for ESRD. The type of treatment that is chosen is dependent on the patient's prognosis and acuity, lifestyle, and personal preference (NKF, 2013). The pros and cons of each treatment modality are also considered when deciding which option is more suitable for a patient with ESRD.

Dialysis. The two methods of dialysis include hemodialysis (HD) and peritoneal dialysis (PD). Both methods involve the filtering of the patient's blood to remove extra fluid and byproducts that the failing kidneys are no longer able to excrete. However, each differ in terms of the mechanics of the filtering process. HD utilizes an external dialysis machine, or dialyzer, which acts as an artificial kidney (NKF, 2013). The patient's blood is pumped through the dialyzer, filtered, and then returned into their bloodstream through a series of different tubes (NKF, 2013). Occurring approximately three days a week, each HD treatment lasts roughly three to five hours (NKF, 2013). The amount of travel and time spent at dialysis may be perceived as a disadvantage to some, especially if it equates to a decline in quality of life. The initiation of HD also requires a surgery to create an arteriovenous fistula that is used by the dialysis center to frequently access the patient's bloodstream (NIDDK, 2018a). Conversely, PD utilizes the patient's peritoneum as a natural filter by pumping dialysate solution into the abdomen which pulls extra fluid and byproducts from the patient's bloodstream into their peritoneum (NKF, 2013). After the dialysate solution has remained in the abdomen for several hours it is extracted through a catheter and replaced with fresh dialysate fluid (NKF, 2013). This process is repeated until a specified number of exchanges are completed. PD is a preferred treatment choice for patients who do not live near a dialysis center or those who desire a sense of control over their dialysis schedule as this process is almost always completed at home (NKF, 2013). HD has the

potential to be completed at home, however, most patients receive treatments at dialysis centers (NKF, 2013).

Transplant. A more long-term treatment option for ESRD is transplant. Patients who receive a kidney transplant will accept a kidney that has been donated by either a deceased or living organ donor. The recovery period after transplant averages five to seven days and most patients are discharged from the hospital without the need for dialysis (NIDDK, 2018b). To prevent rejection of the transplanted organ, the patient will require lifelong immunosuppressant medications and undergo frequent lab monitoring to assess for organ rejection (NIDDK, 2018b).

Comparison of treatment options. When both treatment modalities are compared, many experts advocate for kidney transplant as the more superior option. Patients who undergo transplant often have more positive prognoses and survival rates along with perceived increases in quality of life (Kabbali et al., 2014; Qiao, Liu, Liu, & Xie, 2016). This statement is supported by a five-year survival rate of 72.4% following a deceased donor kidney transplant and 84.6% after a living donor transplant (Wang, Skeans, & Israni, 2016). The five-year survival rate for patients solely on dialysis is 35% (United State Renal Data System [USRDS], 2018). In addition to survival rates, Held, McCormick, Ojo, and Roberts (2016) completed a cost-benefit analysis comparing both modalities and determined transplantation to be the more cost-effective option. Its cost-effectiveness was determined by calculating a value for quality-adjusted life years (QALY). The estimated QALY for transplantation was \$49,000 and \$186,000 for dialysis (Held et al., 2016). Although there may be some instances where dialysis is the treatment of choice, these statistics certainly support the notion that transplantation is the more superior option of the two.

Knowledge

Knowledge and how it individually influences outcomes related to the transplant evaluation process, self-care management, and transplant success, is widely represented in the literature. Knowledge about dialysis and transplantation plays a vital role in ensuring patients are making evidence-based and informed decisions about their care (Timmerman et al., 2015). When independently considering the impact of transplant-related knowledge, a lack of information creates disparities in access to transplantation (McPherson, Hamoda, & Patzer, 2019; Rosaasen et al., 2017). Without information about what to expect before, during, and after a renal transplant, patients may be more comfortable with continuing their current treatment regimen of dialysis or conservative management instead of pursuing transplant (Waterman et al., 2013). Ensuring individuals have an appropriate level of knowledge regarding all treatment options is important to foster informed decision making (McPherson et al., 2019; Timmerman et al., 2015).

Aside from assisting patients with making informed decisions about their treatment, increased levels of knowledge contribute to more positive evaluation and transplant outcomes (Jones et al., 2016; Rosaasen et al., 2017; Waterman et al., 2013). Higher levels of knowledge encourage patients to remain motivated to pursue transplantation which ultimately allows them to successfully complete the evaluation process and increase their chances of receiving a kidney transplant (Waterman et al., 2013). Following transplantation, patients are required to take immunosuppressant medications and undergo frequent testing to prevent and assess for organ rejection. Higher levels of knowledge about post-transplant care not only increase patient adherence to immunosuppressant therapy but also increase the likelihood of a successful transplant (Jones et al., 2016; Rosaasen et al., 2017).

Attitudes

Vamos et al. (2009) define attitude as a construct that influences how individuals feel about a given topic, and more specifically, whether they tend to like or dislike the topic. Some common factors that influence attitudes toward renal transplant include an individual's socio-demographic characteristics, past transplant and dialysis experience, and the perceived benefits of transplant (Alansari et al., 2017; Gillespie et al., 2014; Ilori et al., 2015; Iqbal et al., 2018; McDonald et al., 2013; Qiao et al., 2016; Rodrigue et al., 2015; Tan et al., 2017; Vamos et al., 2009).

Of the numerous socio-demographic characteristics, age, gender, and race are the three that have been studied the most in terms of how they relate to attitudes and willingness to pursue kidney transplant. Findings from surveys administered by Alansari et al. (2017) and Tan et al. (2017) concluded that increasing age resulted in more negative attitudes toward kidney transplant in patients with ESRD. Furthermore, the researchers determined the self-reported decline in health status and multiple comorbidities amongst the older participants were also believed to influence this negative perception (Tan et al., 2017). Age, in combination with female gender, was determined to negatively impact attitudes toward transplantation in a study completed by Gillespie et al. (2014). Whereas Qiao et al. (2016) found a significant positive relationship between male gender and overall interest in pursuing kidney transplant. A patient's race also influences their willingness to choose transplant over dialysis or conservative management. A systematic review of the literature completed by Navaneethan and Singh (2006) discovered that African Americans tend to have more negative attitudes toward kidney transplant. They concluded this negative relationship was a result of various personal and religious beliefs, in

addition to physician assumptions of African Americans being less likely to prefer kidney transplant compared to Caucasians (Navaneethan & Singh, 2006).

In addition to the aforementioned socio-demographic characteristics, level of income, amount of formal education, and employment status have also been shown to influence a patient's willingness to pursue kidney transplant. Perceived financial strain and the cost of immunosuppressant medications following transplant has been found to foster more negative attitudes toward kidney transplant in those with a lower socioeconomic status (SES) (Manton & Poulton, 2013; Qiao et al., 2016). In terms of employment status, the negative impact of dialysis on a patient's work or school success has been found to motivate the individual to find a more permanent treatment option for their ESRD (Qiao et al., 2016; Vamos et al., 2009). Finally, individuals with more formal education are more willing to pursue kidney transplant over dialysis (Qiao et al., 2016; Tan et al., 2017). Although partly intuitive, this characteristic often overlaps with level of income as an individual's SES is positively associated with level of education.

The impact of socio-demographics on attitudes toward renal transplant are largely present in the literature, however, sources also argue that previously receiving a failed kidney transplant results in more positive attitudes and an increased likelihood of receiving a second transplant (Dudley, Johnson, Thomas, Ravanan, & Ansell, 2009). The length of dialysis treatment also plays a role in predicting an individual's willingness to consider transplant as a treatment option. Alansari et al. (2017) and Qiao et al. (2016) determined that more positive attitudes toward renal transplant were reported by individuals with shorter durations of dialysis. This finding is supported by the desire of newly diagnosed ESRD patients to find a more long-term solution that involves limited lifestyle changes and a significant decline in quality of life (Alansari et al.,

2017; Qiao et al., 2016). Lastly, the belief that kidney transplant will significantly improve quality of life was found to increase willingness to undergo evaluation and kidney transplant by more than five times (Ilori et al., 2015).

Impact of Knowledge on Attitudes

As previously mentioned, an individual's attitude toward renal transplant can be influenced by a plethora of environmental, social, and personal factors, including level of knowledge. Although the impacts of knowledge within the evaluation and transplant process have been widely studied, the current body of literature does not paint a clear picture about how level of knowledge influences attitudes amongst ESRD patients undergoing evaluation for transplant. The limited evidence that is available suggests that a patient's attitude toward kidney transplant becomes more favorable after exposure to education (Gordon et al., 2014; Manton & Poulton, 2013). In fact, Evans and Kelley (2014) believe knowledge is the single most important factor that influences supportive attitudes toward kidney transplant. Conversely, a lack of knowledge allows for false information to reinforce fears which ultimately results in more negative attitudes (Vamos et al., 2009).

Although there is a lack of literature supporting the relationship between knowledge and attitudes in the kidney transplant realm, there is ample evidence in the organ donation literature to support the argument that increased levels of knowledge result in more positive attitudes. Due to the large gap between organ supply and demand, a plethora of research was conducted to assess the impact that organ donation education had on donor registration rates. This research discovered that when individuals were educated about the details of organ donation, and misconceptions were dispelled, they were more likely to have positive attitudes toward organ donation and register to become donors (Dubay et al., 2014; Morgan, Kenten, & Deedat, 2013;

Newton, 2011). Suggestions for improving attitudes toward organ donation have involved various outreach and educational programs with the sole purpose of increasing awareness and knowledge about organ donation (Novotney, 2011).

Based on the success of linking attitudes and level of knowledge amongst the organ donation literature, the idea is that increasing knowledge about renal transplant will also result in improved attitudes and acceptance of transplant as the mainstream treatment option for ESRD. Much like an increase in knowledge has resulted in more positive attitudes within the organ donation realm. Therefore, the hope is that more positive attitudes toward renal transplant will translate into more individuals choosing transplantation as their preferred treatment modality. In turn, this will reduce the number of individuals receiving dialysis and ultimately improve the outcomes and life expectancy of individuals living with ESRD.

Theoretical Model

The Theory of Planned Behavior (TPB) was used as the theoretical framework for this scholarly project. Originally created by Icek Ajzen, the TPB evolved from the Theory of Reasoned Action (TRA) and focuses on the relationship between behavior, beliefs, attitudes, subjective norms, and intentions (Butts & Rich, 2018). The TPB is widely represented as the theoretical framework of choice for various disciplines, including organ donation and transplantation, as it assumes attitudes toward a behavior, subjective norms, and perceived behavioral control influence behavioral intention (Asare, 2015). Additionally, the theory posits the stronger the intention to engage in a specific behavior, the more likely the individual is to perform that behavior (Ajzen, 1991). Attitude is defined as the degree to which an individual has a favorable or unfavorable opinion of the behavior in question (Ajzen, 1991). The alleged social pressure to perform or not to perform a behavior is defined as the subjective norm, and the

suspected ease or difficulty of performing a behavior is described as perceived behavioral control (Ajzen, 1991).

The association between an individual's attitudes and the intention to perform a behavior, rather than the combination of the theory's three variables, was the focus of this scholarly project. As previously mentioned, a patient's attitude toward kidney transplant is influenced by their level of knowledge and various socio-demographic variables (Alansari et al., 2017; Dudley et al., 2009; Evans & Kelley, 2014; Gillespie et al., 2014; Gordon et al., 2014; Ilori et al., 2015; Navaneethan & Singh, 2006; Qiao et al., 2016; Tan et al., 2017; Vamos et al., 2009). The positive impacts of these variables may translate to an increased intention to pursue kidney transplant, whereas more negative effects may result in the patient avoiding transplant as a viable treatment option for their ESRD. Although the investigators of this scholarly project did not measure level of intention to pursue kidney transplant, the use of the TPB allowed them to assume that providing standardized education would result in an increase in knowledge, attitudes, and behavioral intention.

Understanding how level of knowledge and socio-demographics influence an individual's attitude toward renal transplant is important in breaking the cycle of transplant underutilization. Furthermore, recognizing the influence of attitudes, subjective norms, and behavioral control allows researchers to implement interventions, such as educational sessions, to modify how these variables influence an individual's intent to pursue kidney transplant. Theoretically, improving the aforementioned variables will decrease the prevalence of negative influences that undermine the importance of renal transplant as the more superior treatment option for ESRD. Refer to Figure 1 for a visual representation of the TPB.

Project Design

Overview

This project was a cross-sectional study that utilized a pre-test/post-test design to assess attitudes and knowledge toward renal transplant before and after an educational session. The pre-surveys were mailed to the patients and completed prior to the educational session, whereas the post-surveys were distributed and completed following the educational session. Data was collected between the months of September and December 2019. The scholarly project was verified as exempt by the Institutional Review Board at Belmont University and the academic medical center at which the project was conducted.

Clinical Setting

In 2019, 261 kidney transplants were completed at the large academic medical center in which this scholarly project was completed (OPTN, 2020). The high-volume nature of the renal transplant program made the selected institution an ideal setting to perform this research as it allowed for easy accessibility to a potentially large study population. The first step in this medical center's renal transplant evaluation process is to provide each potential recipient with educational materials about live kidney donation and the transplant process. The live kidney donation content provided participants with information about how a live kidney is procured, expectations prior to and following surgery, follow-up that is required of live kidney donors and recipients, and the common emotions that may be felt by live donors and transplant recipients throughout the process. The transplant related materials consisted of information regarding surgery and recovery expectations, required follow-up care, potential complications that may occur, and detailed content about anti-rejection medications and ways to maximize the life of the patient's transplant. Given the preliminary nature of the educational session, it was assumed that

many of the participants had a minimal level of knowledge regarding the transplant process prior to attending. Therefore, the researchers believed that collecting pre-survey data would result in establishing baseline attitudes and levels of knowledge. Additionally, collecting post-survey data allowed the researchers to determine if the educational sessions resulted in more positive attitudes and greater levels of knowledge about kidney transplant. The educational sessions were taught by one of eight nurses or transplant coordinators every Tuesday through Friday at the institution. Given the educational sessions were not created or implemented by the investigators of this project, the delivery of the educational materials was consistent with the pre-specified curriculum established by the transplant experts at the institution.

Population

The sample population for this scholarly project consisted of ESRD patients who were pursuing kidney transplantation at a large academic medical center located in the southeastern United States. Convenience sampling was used to determine the study population for this project as the researchers wanted to obtain a largely inclusive study sample. To be considered for inclusion, the participant was required to be 18 years or older and English speaking. With an average of 20 subjects expected to attend one of the four educational sessions each week, the potential sample size was calculated to be approximately 300. A power analysis determined that 44 paired tests would be required to have an 80% chance of detecting a moderate effect size.

Methods

Instrumentation. A validated knowledge assessment tool was used to assess the participants level of kidney transplant knowledge. Developed by Rosaasen et al. (2017), the Kidney Transplant Understanding Tool (K-TUT) asked participants a variety of true/false and select all that apply questions about topics related to kidney transplant outcomes, post-transplant

follow-up care, and immunosuppressant medications. Each of the questions within the tool were cross-referenced with the material the participants received the day of the educational session to ensure the tool was an accurate measure of the participant's knowledge. Refer to Table 1 for the psychometric properties of this tool.

Responses to the K-TUT were scored based on the number of correct responses selected by the participant (Appendix A). Each correct response was assigned one point, whereas incorrect responses were assigned zero points. The total number of points were summed to obtain a single knowledge score with the highest possible score being 69. Unanswered questions were scored using the assumption that the participant felt all responses were false. Given the survey asked the participant to select each true answer, the investigators were unable to determine whether the unanswered questions were skipped or whether the participant believed all the answers to be false. Therefore, points were still awarded for the unanswered responses that were truly false based on the grading key provided by the original authors of the K-TUT. This scoring method made the knowledge scores a continuous variable with higher scores representing higher levels of knowledge about renal transplant.

The attitudes scale utilized in this study was not previously validated, however, the questionnaire was modified during its development by two focus groups that consisted of dialysis patients, nephrologists, psychiatrists, and dialysis nurses (Vamos et al., 2009). The original scale was developed to contain a total of 16 questions to address attitudes toward transplant, information and knowledge about transplant, and perceptions about transplant and dialysis (Vamos et al., 2009). Each question included in the original scale was reviewed by the present investigators to determine relevancy to the current research question. Five of the original questions were removed from the survey after that review. In addition, two of the original

questions were restructured to obtain a Likert-type response to maintain consistency amongst variables. Permission for use was obtained from the corresponding authors of both assessment tools.

The attitudes assessment tool gathered responses using a Likert-type scale. 10 of the questions provided the participants with five possible answers ranging from “fully agree” to “fully disagree” and “don’t know”. One of the questions consisted of five answers ranging from “excellent” to “poor”. Responses of “fully agree” were assigned a value of four, “mostly agree” a value of three, “mostly disagree” a value of two, “fully disagree” a value of one, and “don’t know” a value of zero. Responses of “excellent” were assigned a value of five, “good” a value of four, “fair” a score of three, “poor” a score of two, and “very poor” a value of one. The responses were summed, and a single value was used to assess the participants attitudes toward renal transplant with the highest possible score being 45. The resultant value created a continuous variable with higher values indicating more positive attitudes and lower scores representing more negative attitudes toward renal transplant. Refer to Appendix B for a visual representation of the scoring tool used to assess the participant’s responses to the attitudes scale.

In addition to the knowledge and attitudes scales, the investigators collected data related to the following socio-demographic variables: age, sex, race, ethnicity, level of education, organ donor registration status, employment status, annual household income, health insurance status, marital status, and duration of end-stage renal disease. These variables were chosen based on past research completed with similar populations.

Data collection process. A letter of invitation to participate in research (Appendix C), along with a numbered pre-survey (Appendix D), was sent to each participant assigned to a kidney transplant educational session between the months of September and December 2019.

The survey and letter were included in a pre-transplant information packet that was mailed by the medical center. The invitation letter provided an introduction of the principal investigator and faculty advisors, and information about the purpose of the scholarly project. The letter also informed the potential participant that their responses would be completely anonymous, confidential, and not impact their future eligibility for a kidney transplant or treatment at the participating academic medical center. Participants who chose to complete the pre-surveys did so at home and brought them to their assigned educational session to be collected by the principal investigator. At that time, the principal investigator wrote the number of the pre-survey on the upper right-hand corner of the post-survey (Appendix E) and handed it to the participant along with completion instructions and a manila envelope. Furthermore, the investigator provided each participant with the opportunity to write their email address or phone number on a gift card sign-up sheet (Appendix F) to be entered in a drawing for a chance to win one of three \$50 Walmart store gift cards. The pre- and post-surveys were paired using a numbering system to allow for each survey to be coupled to its match without collecting patient identifiers. The post-survey completion instructions asked the participant to complete the survey after the educational session, seal it in the provided manila envelope, and hand it to their assigned social worker at the end of the day. Finally, the paper survey responses were transferred to an Excel document to allow for organization of the responses and calculation of overall knowledge and attitudes scores prior to statistical analysis.

Survey response. A total of 341 pre-surveys were mailed to individuals scheduled for kidney transplant educational sessions. Of those 341 pre-surveys, 115 of them were completed and returned to the primary investigator prior to the start of the educational session. Therefore, a total of 115 post-surveys were distributed to the individuals by the primary investigator. 53 of

those 115 participants completed and returned the post-survey to their assigned kidney transplant social worker following the educational session. During the data collection period, there were a total of 105 pre-surveys that were unable to be collected because of no shows, cancellations, and lack of social support attendance. 44 patients failed to attend their scheduled session and 58 patients cancelled their appointment. Additionally, three participants presented to the medical center the morning of their scheduled session without social support. Attending the educational sessions with at least one companion is a requirement of the program. If a participant presented without support, they were required to reschedule their educational session appointment but were permitted to continue with the rest of their evaluation appointments arranged for the remainder of that day.

Statistical analysis. A paired samples *t*-test was used to compare the pre- and post-educational session knowledge and attitude scores. An independent samples *t*-test was completed to compare baseline attitudes to the following socio-demographic variables: gender, race, age, ESRD duration, employment status, and level of education. The association between level of income and baseline attitude scores was also analyzed using a one-way analysis of variance (ANOVA). Additionally, univariate analyses using General Linear Model (GLM) procedures were completed to control for the effects of the socio-demographic variables on the baseline attitude scores of the ESRD duration and race groups. Descriptive statistics were also used to analyze the socio-demographic data and determine the percentage of missing data for each socio-demographic variable being analyzed. Performing a paired samples *t*-test allowed the researchers to determine if there was a statistically significant change in knowledge and attitude scores from pre- to post-educational session. An alpha level of $p < 0.05$ was used and all statistical analyses were conducted using IBM Statistical Package for Social Sciences (SPSS) version 26 software.

Normality was assessed using skewness and kurtosis statistics along with visual inspection of the data's distribution.

Missing data. Almost all the participants provided responses for the socio-demographic questions pertaining to age and race except for one. The percentage of missing data for both socio-demographic variables was calculated at 0.9% and the series mean was imputed for each missing data point. 8.7% of the data for the question pertaining to ESRD duration and 9.6% of the data pertaining to level of income was missing. Given these percentages were greater than 5%, the investigator chose to use listwise deletion to remove the attitude scores of those respondents prior to performing the independent samples *t*-test and one-way ANOVA.

Results

Socio-demographic Characteristics

More detailed information regarding the socio-demographic characteristics of the sample are displayed in Table 2. Many of the 115 participants that completed the pre-survey were male (67.0%, $n = 77$). The age range of the respondents was 23 to 74 years ($M = 53.1$, $SD = 13.8$) with 36.5% ($n = 42$) of patients reporting they were 60 years of age or older. A majority of the participants were White (60.0%, $n = 69$) with 36.5% ($n = 42$) of the patients reporting they were African American. 74.3% ($n = 78$) of the patients reported being diagnosed with ESRD one or more years ago.

Knowledge and Attitude Score Comparison

A paired samples *t*-test was conducted to determine if participants had more positive attitudes and higher levels of kidney transplant knowledge after attending a standardized educational session. The results indicated high evidence to support a positive difference in knowledge scores following the educational session ($M = 53.9$, $SD = 6.9$, $p = .019$, $d = 0.334$).

Conversely, there was little evidence to support a positive difference in attitude scores following exposure to standardized kidney transplant education ($M = 36.1$, $SD = 5.5$, $p = .361$, $d = 0.127$).

Refer to Table 3 for more detailed results of the paired samples t -test.

Baseline Attitude Scores

An independent samples t -test indicated little difference in baseline attitude scores between the group of participants who were less than 60 years of age ($M = 34.3$, $SD = 9.5$) and the 60 years of age and older group ($M = 32.4$, $SD = 12.6$, $p = .370$; $d = 0.180$). Additionally, the difference in baseline attitude scores between males ($M = 34.9$, $SD = 9.3$) and females ($M = 31.1$, $SD = 12.8$, $p = .110$, $d = 0.340$) was also found to be minimal. Although not statistically significant, there is evidence to support a relationship between employment status and baseline attitude scores with employed patients having more positive attitudes toward renal transplant ($M = 36$, $SD = 8.7$, $p = .098$, $d = 0.345$). The difference in pre-survey attitudes among African Americans and non-African Americans ($M = 32.1$, $SD = 11.8$) provided the investigators with evidence that the African American respondents had more positive baseline attitudes ($M = 36.3$, $SD = 7.9$, $p = .041$, $d = 0.418$). Furthermore, participants who reported being diagnosed with ESRD one or more years ago ($M = 36.6$, $SD = 7$) displayed baseline attitudes that were more positive than those who were diagnosed less than one year ago ($M = 31.9$, $SD = 10$, $p = .028$, $d = 0.545$). After the GLM univariate analyses, the investigators found that the baseline attitude scores of African American participants were still more positive, but this difference was no longer significant after controlling for the effects of the other socio-demographic variables ($M = 36.7$, $p = .264$, $R^2 = .943$). Conversely, the amount of evidence supporting a relationship between ESRD duration and baseline attitude scores increased after the univariate analysis indicating that individuals with an ESRD duration of one year or longer have more positive pre-education

attitudes toward kidney transplant ($M = 36.6$, $p = .011$, $R^2 = .943$). Finally, higher levels of education were found to be associated with more positive baseline attitude scores ($M = 35.3$, $SD = 10.9$, $p = .048$, $d = 0.382$). Refer to Tables 4, 5, and 6 for more detailed statistics pertaining to the independent samples t -test, one-way ANOVA, and GLM results.

Discussion

Understanding how knowledge and various socio-demographic characteristics impact an individual's attitude toward kidney transplant is an important first step to increasing the utilization of transplant as the mainstream treatment option for ESRD. The purpose of this scholarly project was to determine if a standardized educational intervention resulted in greater levels of knowledge and more positive attitudes toward kidney transplant. Additionally, baseline attitude scores were analyzed to assess which socio-demographic variables were associated with more negative attitude scores.

Effect of Education on Knowledge and Attitudes

The results of this project demonstrate that exposure to a standardized educational session results in greater levels of knowledge pertaining to kidney transplant ($M = 53.9$, $SD = 6.9$, $p = .019$, $d = 0.334$). While statistically insignificant, the investigators also discovered an increase in post-educational session attitude scores ($M = 36.1$, $SD = 5.5$, $p = .361$, $d = 0.127$). These knowledge-related findings are similar to past studies by Gordon et al. (2014) and Weng, Peipert, Holland, Brown, and Waterman (2017) which revealed an increase in knowledge after exposure to transplant education. Although an increase in knowledge following an educational intervention is a predictable finding, the impact of education on attitudes toward a specific topic is not as intuitive. The amount of literature linking the impact of knowledge on attitudes toward kidney transplant is minimal, however, past researchers have largely speculated a positive

connection between the two (Evans & Kelley, 2014; Vamos et al., 2009). Of the studies that specifically measured the connection between knowledge and attitudes, Gordon et al. (2014) found that their patient's attitudes toward live kidney donation and transplant became significantly more favorable after exposure to educational sessions. These results are in line with the findings of the current scholarly project even though statistical significance was not achieved ($p = .361$, $d = 0.127$).

Baseline Attitude Scores and Socio-demographic Characteristics

In terms of socio-demographic variables, the results of this scholarly project suggest the following characteristics are associated with more negative baseline attitude scores: ESRD duration less than one year ($M = 32.1$, $p = .011$, $R^2 = 0.943$) and a high school diploma or less level of education ($M = 31.3$, $SD = 10$, $p = .048$, $d = 0.382$). The findings of this scholarly project align with past research by Qiao et al. (2016) and Tan et al. (2017) who discovered individuals that completed higher levels of formal education were more willing to pursue kidney transplant ($M = 35.3$, $SD = 10.9$, $p = .048$, $d = 0.382$). The present association between more negative baseline attitudes and shorter ESRD duration times ($M = 32.1$, $p = .011$, $R^2 = 0.943$), however, differs from previous research. Much of the kidney transplant literature supports the notion that shorter durations of ESRD and less time on dialysis is linked with greater willingness to choose kidney transplant as an early treatment option (Alansari et al., 2017; Qiao et al., 2016). Researchers have attributed these previous findings to assumptions that newly diagnosed individuals are more willing to find the best and most long-term solution for their ESRD in hopes of avoiding the lifestyle changes and restrictions associated with hemodialysis (Alansari et al., 2017; Qiao et al., 2016). One explanation for the present findings could be that individuals with

longer duration of ESRD understand the burden of dialysis and are more willing to pursue transplant as a way of relieving the strain that dialysis has placed on their lifestyle.

Individuals who were non-African American, female, age 60 years and older, unemployed, and of lower income brackets displayed more negative baseline attitudes toward kidney transplant; however, their associated alpha values did not meet statistical significance. The results of the independent samples *t*-test for race was originally significant with African Americans reporting more positive attitudes ($M = 36.3$, $SD = 7.9$, $p = .041$, $d = 0.418$), however, this significance changed when the effects of the other socio-demographic variables were controlled ($M = 36.7$, $p = .264$, $R^2 = 0.943$). These findings suggest that external factors were impacting the results of the independent samples *t*-test and that the attitude scores for this population should be interpreted with this information in mind. A systematic review of the literature completed by Navaneethan and Singh (2006) found that African Americans often display more negative attitudes toward transplant because of various personal and religious beliefs.

The remaining results of this scholarly project are consistent with past research. Gillespie et al. (2014) and Qiao et al. (2016) found females were less willing to pursue both live donor and deceased donor kidney transplant options. Individuals of advanced age have also been found to possess more negative perceptions about kidney transplant (Alansari et al., 2017; Tan et al., 2017). Explanations of these findings include a negative perception of health outcomes following transplant and the belief that advancing age represents weakness and the inability to withstand the transplantation procedure (Tan et al., 2017). In relation to employment status, Qiao et al. (2016) and Vamos et al. (2009) found that employed individuals were more motivated to pursue transplant because of the strain that dialysis placed on their ability to maintain employment.

Another explanation for these findings may be that individuals receiving disability benefits to attend frequent dialysis treatments fear losing their benefits following transplant. Finally, individuals who belong to lower income brackets have been found to display more negative attitudes toward kidney transplant as a result of the perceived financial strain associated with transplant and long-term immunosuppressant medications (Manton & Poulton, 2013; Qiao et al., 2016).

Connection to the Theory of Planned Behavior

The TPB theorizes that an individual's attitude, perceived behavioral control, and subjective norms influence behavioral intention (Asare, 2015). Although the investigators of this scholarly project did not measure behavioral intention, data pertaining to the impacts of knowledge and various socio-demographic variables on attitudes toward kidney transplant was collected. The findings of this project suggest that multiple socio-demographic characteristics including length of ESRD duration, level of education, annual income, gender, race, employment status, and age have the potential to negatively impact attitudes toward kidney transplant. In order to combat the underutilization of kidney transplant as the mainstream treatment option for ESRD, the connection between knowledge, socio-demographic characteristics, attitudes, and behavioral intention should be further explored.

Strengths and Limitations

This scholarly project had several strengths pertaining to its design. The knowledge assessment tool (K-TUT) used for measuring the participant's kidney transplant-related knowledge has been repeatedly tested and supported as a valid and reliable measure (Rosaasen et al., 2017). The high-volume nature of the transplant center in which the project was implemented allowed for the distribution of 341 surveys which provided the investigators with the potential

for a large sample size. With 115 pre-surveys and a total of 53 paired pre- and post-surveys the sample size goal of 44 pairs was comfortably surpassed. Finally, the use of a widely utilized theoretical framework provided a foundation and guidance throughout the planning and implementation phases of the project.

Although this scholarly project had several strengths, the results must also be considered in the context of its limitations. The assessment tool used to assess attitudes toward kidney transplant was developed by content experts, however, it is not a validated measure and several questions were altered by the investigators to allow for ease of scoring. Additionally, many of the participants were scheduled to undergo various testing and attend appointments with members of their care team following the morning educational session. Not only did this potentially prevent patients from completing the post-survey immediately after the educational session, but it may have exposed the participants to additional education provided by members of their care team. Lastly, the multiple appointments following the morning educational sessions may have contributed to survey response fatigue and skewed responses to the knowledge and attitude post-survey questions.

Implications for Future Practice

Aside from the need for further research, the results of this project add to the present body of literature and emphasize the importance of patient education. With the positive impact that transplant can have on a patient's quality of life and prognosis, it is important that potential transplant candidates be provided with the information that is needed for them to make informed decisions regarding their care and treatment options. Given the positive impact of education on transplant-specific knowledge, incorporating educational opportunities sooner and more

frequently may assist with debunking common transplant and organ donation myths that continue to exist (Peipert et al., 2019).

Conclusion

In summary, the findings of this scholarly project demonstrate that exposure to kidney transplant-specific education results in higher levels of knowledge pertaining to kidney transplant outcomes, post-transplant follow-up care, and immunosuppressant medications. Individuals with an ESRD duration of less than one year and those with no college education were also found to demonstrate more negative baseline attitudes toward kidney transplant. The data collected by the investigators of this scholarly project assists with further explaining the relationship between a patient's demographics, level of knowledge, and attitudes toward kidney transplant following a standardized educational session. However, this information pertains to only one piece of the puzzle. Based on the information learned through the completion of this project, more longitudinal research should be utilized to explore how the impact of these variables translates to behavioral intention to pursue kidney transplant evaluation. The existing literature would also benefit from additional data describing how knowledge, attitudes, and socio-demographic characteristics influence evaluation and transplant outcomes. Lastly, uncovering the reasons as to why certain populations of individuals have more negative baseline attitudes toward kidney transplant may provide researchers and clinicians with valuable information on how pre-transplant education can be tailored to meet the needs certain of populations.

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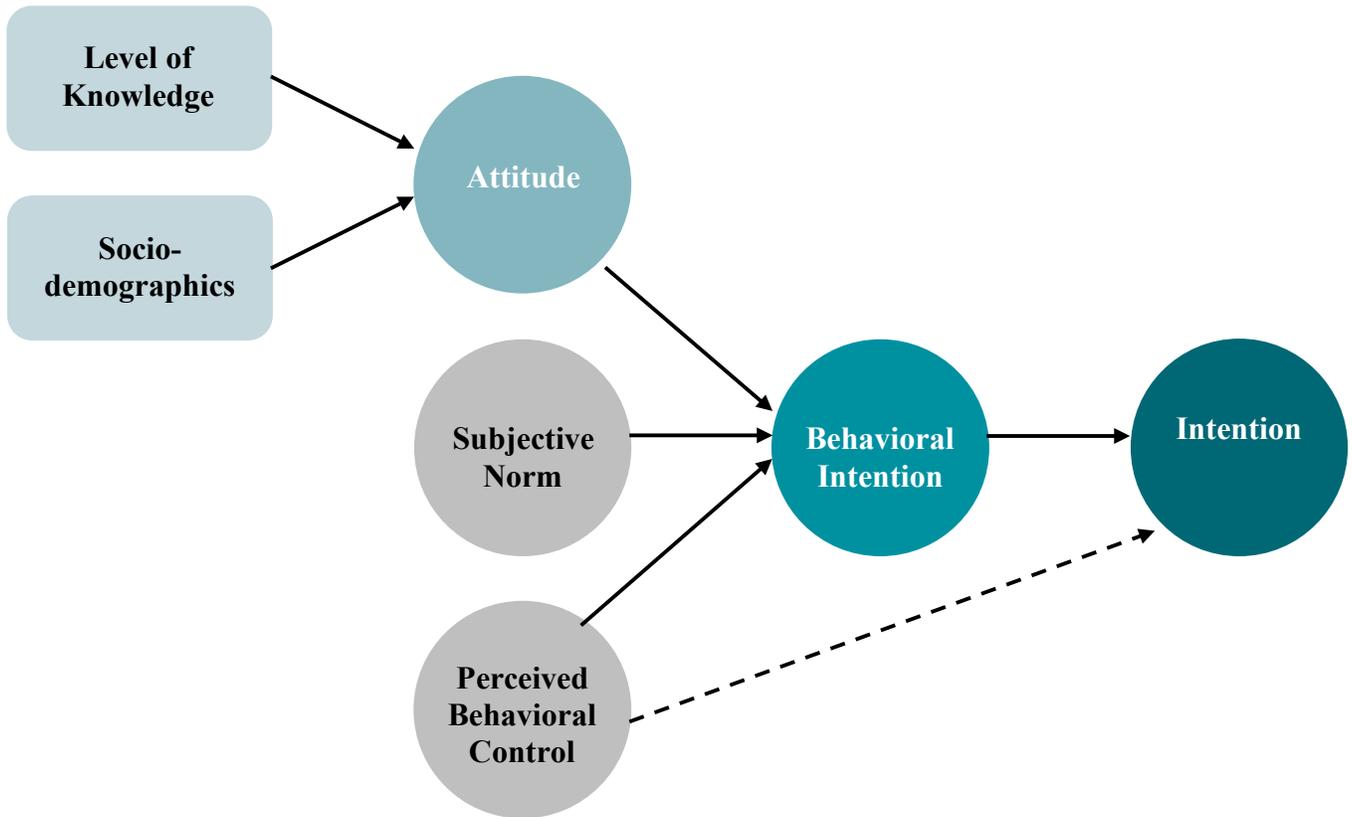


Figure 1. Visual representation of the TPB. Note subjective norm and perceived behavioral control are in gray to denote that they were not the focus of this scholarly project. Adapted from “The Theory of Planned Behavior,” by I. Ajzen, 1991, *Organizational Behavior and Human Decision Processes*, 50, p. 182.

Table 1

K-TUT Psychometric Data

Type of validity testing	Methods	Outcome
Content validity	Review by transplant professionals and transplant recipients	Positive (content verified)
Internal consistency	Cronbach α performed in pretransplant and posttransplant cohorts	Cronbach α was >0.7 in all samples
Construct validity	K-TUT compared to health literacy scores in pretransplant cohort	K-TUT correlated with health literacy
Reproducibility	Test-retest performed in 24% of the pretransplant and 22% of posttransplant sample	Interclass correlation coefficient (ICC) between test and retest scores was >0.75 in both cohorts. The majority of the items exhibited positive κ values and % agreement.
Floor and ceiling effects	Percentage of participants that achieved the highest score calculated in both pretransplant and posttransplant cohorts (maximum score, 69)	No ceiling and floor effects present (pretransplant score range, 44-62; posttransplant score range, 56-67)

Note. Data from “Development and Validation of the Kidney Transplant Understanding Tool (K-TUT)” by N. Rosaasen, J. Taylor, D. Blackburn, R. Mainra, A. Shoker, and H. Mansell, 2017, *Transplantation Direct*, 3, p. 9.

Table 2

Socio-demographic Characteristics of the Sample

Characteristic	<i>n</i> (%) or Mean (<i>SD</i>)
Age (<i>N</i> = 115) (years)	53.1 (13.8)
Gender (<i>N</i> = 115)	
Male	77 (67.0%)
Female	38 (33.0%)
Race (<i>N</i> = 115)	
White	69 (60.0%)
American Indian or Alaska Native	2 (1.7%)
Black or African American	42 (36.5%)
Other	2 (1.7%)
Hispanic or Latino ethnicity (<i>N</i> = 110)	
Yes	3 (2.6%)
No	107 (93.0%)
Highest level of education completed (<i>N</i> = 115)	
Some high school	9 (7.8%)
GED	4 (3.5%)
High school diploma	34 (29.6%)
Some college	33 (28.7%)
Associate's degree	10 (8.7%)
Bachelor's degree	19 (16.5%)
Master's degree	4 (4.3%)
PhD	1 (0.9%)
Registered organ donor (<i>N</i> = 114)	
Yes	29 (25.2%)
No	70 (60.9%)
I don't know	15 (13.0%)
Current employment status (<i>N</i> = 115)	
Employed full-time (30 or more hours a week)	28 (24.3%)
Employed part-time (less than 30 hours a week)	9 (7.8%)
Retired	24 (20.9%)
Receiving disability benefits	50 (43.5%)
Full-time homemaker by choice	3 (2.6%)
Full-time student	1 (0.9%)
Annual household income (<i>N</i> = 104)	

Less than \$20,000	27 (23.5%)
\$20,000 - \$39,000	27 (23.5%)
\$40,000 - \$59,000	18 (15.7%)
\$60,000 - \$79,000	16 (13.9%)
\$80,000 - \$99,000	8 (7.0%)
Greater than \$100,000	8 (7.0%)

Current health insurance type (*N* = 114)

Medicare only	37 (32.5%)
Medicaid only	4 (3.5%)
Private insurance only	29 (25.4%)
Medicare and Medicaid	11 (9.6%)
Medicare and private insurance	27 (23.7%)
Medicare and Veteran's benefits	4 (3.5%)
Medicare, Medicaid, and private insurance	1 (0.9%)
Medicare, private insurance, and Veteran's benefits	1 (0.9%)

Marital status (*N* = 110)

Married	64 (55.7%)
Divorced	13 (11.3%)
Separated	1 (0.9%)
Widowed	4 (3.5%)
Domestic partnership	1 (0.9%)
Single	27 (23.5%)

Duration of ESRD (*N* = 105)

Less than 1 year	27 (23.5%)
1 to 4 years	45 (39.1%)
5 to 9 years	15 (13.0%)
Greater than 10 years	18 (15.7%)

Table 3

Paired samples t-test Results for Attitude and Knowledge

Outcome	Pre-test		Post-test		<i>n</i>	95% CI for Mean Difference	<i>t</i>	<i>df</i>	<i>p</i>	<i>d</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>						
Attitude	35.1	7.9	36.1	5.5	53	-1.19, 3.24	.922	52	.361	0.127
Knowledge	50.5	8.3	53.9	6.9	53	0.59, 6.24	2.43	52	.019*	0.334

Note. *M* = average; *SD* = standard deviation; *n* = frequency; CI = confidence interval; *t* = computed test statistic; *df* = degrees of freedom; *d* = Cohen's *d*.

* Significant at *p* < .05.

Table 4

Independent samples t-test Baseline Attitude Scores by Group

Group	<i>n</i>	<i>M</i>	<i>SD</i>	<i>t</i>	<i>df</i>	<i>p</i>	Cohen's <i>d</i>
Age							
Less than 60 years old	73	34.4	9.4	0.90	68	.370	0.180
60 years and older	42	32.4	12.6				
Gender							
Male	77	34.9	9.3	1.62	57	.110	0.340
Female	38	31.1	12.8				
Race							
Non-African American	73	32.1	11.8	-2.07	113	.041*	0.418
African American	42	36.3	7.9				
ESRD duration							
Less than 1 year	27	31.9	10	-2.29	35	.028*	0.545
1 year and longer	78	36.6	7				
Employment Status							
Employed †	37	36	8.7	1.67	113	.098	0.345
Other ††	78	32.5	11.4				
Level of Education							
High school diploma and less	47	31.3	10	-1.99	113	.048*	0.382
Some college and more	68	35.3	10.9				

Note. *n* = frequency; *M* = average; *SD* = standard deviation; *t* = computed test statistic; *df* = degrees of freedom.

* Significant at $p < .05$.

† Employed full or part-time.

†† Retired, receiving disability benefits, full-time homemaker by choice, full or part-time student.

Table 5

One-Way Analysis of Variance of Baseline Attitudes by Level of Income

Level of Income	<i>n</i>	<i>M</i>	<i>SD</i>	<i>F</i>	<i>p</i>	η^2
Less than \$20,000	27	33.9	8.4	.569	.723	.028
\$20,000 - \$39,000	27	32	12.6			
\$40,000 - \$59,000	18	34.3	10.2			
\$60,000 - \$79,000	16	35.5	6.4			
\$80,000 - \$99,000	8	36.1	8.8			
Greater than \$100,000	8	38	15.5			

Note. *n* = frequency; *M* = average; *SD* = standard deviation; *F* = computed test statistic; η^2 = eta squared.

Table 6

Adjustment of Co-factors and Covariate on Baseline Attitude Scores Using GLM Procedures

Group	<i>n</i>	<i>M</i>	<i>F</i>	<i>p</i>	R ²
Race					
Non-African American	55	34.8	1.40	.264	.943
African American	33	36.7			
ESRD Duration					
Less than 1 year	19	32.1	9.85	.011*	.943
1 year and longer	69	36.6			

Note. *n* = frequency; *M* = average; *F* = computed test statistic; R² = goodness-of-fit. Co-factors = gender, race, level of education, employment status, level of income, and ESRD duration. Covariate = age.

* Significant at $p < .05$.

Appendix A: K-TUT Scoring Tool

To score the K-TUT, a point is given for each correct answer to equal a total maximum score of 69. X=correct, F=false, T=True.

- 1. Every person who receives a kidney transplant feels better than they did before the transplant.**
 True (0) False (1)
- 2. Transplant pills must be taken to help prevent rejection.**
 True (1) False (0)
- 3. Some diseases that cause kidney failure can come back in the kidney transplant.**
 True (1) False (0)
- 4. Anti-rejection medications are also called immunosuppressants.**
 True (1) False (0)
- 5. Your kidney transplant is also called a graft.**
 True (1) False (0)
- 6. You should always take your anti-rejection medications unless instructed by your transplant team.**
 True (1) False (0)
- 7. You will need to do blood testing at least monthly for as long as the kidney transplant is functioning.**
 True (1) False (0)
- 8. Herbal supplements are generally safe to take with your transplant, since they are natural.**
 True (0) False (1)
- 9. Most people can to return to work after receiving a kidney transplant.**
 True (1) False (0)
- 10. When thinking about herbal or traditional therapies, which of the following are true?
(Circle all the correct answers)**
 - A. F (1) T (0) Traditional treatments are safe for a kidney transplant because they are natural.
 - B. F (1) T (0) Herbal medications recommended in the media (ie, internet, TV) are generally safe for your transplant.

- C. F (1) T (0) Pills that boost your immune system are safe for people with a transplant.
- D. F (0) T (1) Family and friends may suggest herbal remedies or natural products - you should check with your transplant team before trying them out.

11. Which statements are true regarding anti-rejection medication? (Circle all the correct answers)

- A. F (0) T (1) Anti-rejection medications increase the risk of infection.
- B. F (1) T (0) Anti-rejection medications can be stopped if the transplant kidney is working well in ten years.
- C. F (0) T (1) Anti-rejection medications increase the risk of cancer.
- D. F (1) T (0) Anti-rejection medications can be stopped if side effects are too bad.
- E. F (0) T (1) Anti-rejection medications can sometimes be changed if side effects are too bad.

12. If you are experiencing a side effect from your anti-rejection pills, what should you do? (Circle all the correct answers)

- A. F (0) T (1) Continue taking the pills as prescribed.
- B. F (0) T (1) Contact your transplant team.
- C. F (1) T (0) Decrease the dose of your anti-rejection pills to see if that helps.
- D. F (1) T (0) Stop your anti-rejection pills until you can see your doctor.
- E. F (1) T (0) Try to manage the side effects with over the counter medications.

13. What precautions should you take to prevent colds or flu illness? (Circle all the correct answers)

- A. F (0) T (1) Wash your hands.
- B. F (0) T (1) Get vaccinations such as your yearly flu shot.
- C. F (0) T (1) Avoid unnecessary contact with others who are unwell.
- D. F (1) T (0) Quit your job because at work you are with sick people.
- E. F (1) T (0) Wear a mask when out in a crowd.

14. It is important to tell all your doctors that you received a kidney transplant because: (Circle all the correct answers)

- A. F (0) T (1) Other pills may not mix well with anti-rejection pills.
- B. F (0) T (1) Anti-rejection pills make it easier for you to catch infections.

- C. F (0) T (1) Anti-rejection pills increase your cancer risk, so regular checkups are important.
- D. F (0) T (1) Some pills may harm your transplant.
- E. F (0) T (1) Anti-rejection pills may affect how you heal after surgery.
- F. F (1) T (0) You do not need to tell your doctors that you have a transplant.

15. It is important to tell your pharmacist that you received a kidney transplant because:

(Circle all the correct answers)

- A. F (0) T (1) Other pills may not mix well with anti-rejection pills.
- B. F (0) T (1) Your pharmacist can help you decide if you should treat common problems (like heartburn or cold sores) with over the counter medications.
- C. F (0) T (1) Some over the counter medications can harm your transplant.
- D. F (1) T (0) You do not need to tell your pharmacist that you have a transplant.

16. Which statements are true about creatinine? (Circle all the correct answers)

- A. F (0) T (1) Creatinine is measured by a blood test.
- B. F (0) T (1) Creatinine levels can tell us how your kidney is working.
- C. F (1) T (0) Your creatinine will always be normal after your kidney transplant.
- D. F (1) T (0) If your creatinine goes up, it always means there is rejection.

17. When thinking about transplant rejection, which of the following are true? (Circle all the correct answers)

- A. F (1) T (0) Rejection cannot be treated.
- B. F (0) T (1) Stronger anti-rejection pills can sometimes treat rejection.
- C. F (1) T (0) You have a good match, so rejection cannot occur.
- D. F (1) T (0) If you take your anti-rejection pills correctly, rejection will not occur.
- E. F (1) T (0) You will know if you have rejection because you will feel sick.

18. In the first few months after your kidney transplant, which of the following are true?

(Circle all the correct answers)

- A. F (0) T (1) You can catch infections easier because your anti-rejection pills are stronger.
- B. F (0) T (1) You should avoid changes to your glasses or contact lenses because your eyesight may change.
- C. F (1) T (0) Regular blood testing is not important.

D. F (1) T (0) Out of country travel is encouraged.

19. Years after your kidney transplant, which of the following are true? (Circle all the correct answers)

A. F (0) T (1) Some anti-rejection pills can hurt the kidney transplant.

B. F (0) T (1) High blood pressure can hurt the kidney transplant.

C. F (0) T (1) More pills may be needed to treat complications from the transplant.

D. F (0) T (1) Your transplant team may decrease your anti-rejection pills.

E. F (0) T (1) Your transplant team may need to increase your anti-rejection pills.

20. Which statements are true about pregnancy in women who have received a kidney transplant? (Circle all the correct answers)

A. F (0) T (1) Some anti-rejection pills can cause birth defects.

B. F (1) T (0) Anti-rejection pills can be stopped during pregnancy.

C. F (0) T (1) Pregnancy may cause an increase in creatinine.

D. F (1) T (0) A kidney transplant will always make it possible to have a baby.

E. F (0) T (1) You should discuss your wish to become pregnant with your transplant team.

21. Which statements are true about men who have received a kidney transplant? (Circle all the correct answers)

A. F (1) T (0) A kidney transplant will always let you father a child.

B. F (1) T (0) A kidney transplant will always fix your erection problems.

C. F (0) T (1) Some pills taken by the father may harm the baby.

D. F (0) T (1) You should discuss your wish to father a child with your transplant team.

22. When thinking about sexually transmitted infections (STIs) after kidney transplant, which of the following are true? (Circle all the correct answers)

A. F (1) T (0) Birth control pills can prevent STIs.

B. F (1) T (0) Condoms can prevent all types of STIs.

C. F (1) T (0) All sexually transmitted infections can be cured.

D. F (0) T (1) Anti-rejection pills increase the risk of catching STIs during sexual activity.

Appendix B: Attitudes Scoring Tool**Attitudes**

For the following questions, please select the answer that is most applicable to yourself. There are no right or wrong answers.

1. I have received insufficient information regarding kidney transplant.

(1) Fully agree (2) Mostly agree (3) Mostly disagree (4) Fully disagree (0) Don't know

2. I would like to receive a kidney transplant.

(4) Fully agree (3) Mostly agree (2) Mostly disagree (1) Fully disagree (0) Don't know

3. If offered, I would accept a kidney transplant right now.

(4) Fully agree (3) Mostly agree (2) Mostly disagree (1) Fully disagree (0) Don't know

4. I have seen many sad and unsuccessful cases after transplant.

(1) Fully agree (2) Mostly agree (3) Mostly disagree (4) Fully disagree (0) Don't know

5. I have seen many successful cases after transplant.

(4) Fully agree (3) Mostly agree (2) Mostly disagree (1) Fully disagree (0) Don't know

6. Transplant is the best possible solution for a patient on dialysis.

(4) Fully agree (3) Mostly agree (2) Mostly disagree (1) Fully disagree (0) Don't know

7. One can start a new life after transplant.

(4) Fully agree (3) Mostly agree (2) Mostly disagree (1) Fully disagree (0) Don't know

8. Transplant causes more problems than benefits for the patient.

(1) Fully agree (2) Mostly agree (3) Mostly disagree (4) Fully disagree (0) Don't know

9. I am afraid of the transplant surgery.

(1) Fully agree (2) Mostly agree (3) Mostly disagree (4) Fully disagree (0) Don't know

10. I am concerned about the medical treatment following transplant.

(1) Fully agree (2) Mostly agree (3) Mostly disagree (4) Fully disagree (0) Don't know

11. What do you think your overall health will be like one year after kidney transplant?

(5) Excellent (4) Good (3) Fair (2) Poor (1) Very Poor

Appendix C: Letter of Invitation to Participate in Research*Belmont University Institutional Review Board***Letter of Invitation to Participate in Research****Knowledge and Attitudes Toward Renal Transplantation
in Individuals Undergoing Transplant Evaluation**

We invite you to participate in a research study conducted by Cassandra Bruns, a student in Belmont University's Doctor of Nursing Practice program. The faculty advisors overseeing Cassandra's project include Dr. Jeannie Giese, Dr. David Phillippi, and Dr. Elizabeth Hall.

The purpose of this study is to examine the knowledge and attitudes of individuals attending a live kidney donor and kidney transplant education session at Vanderbilt University Medical Center. You are eligible to participate in this study if you are: pursuing evaluation for kidney transplant, 18 years of age or older, English speaking, and able to complete the surveys individually.

We will ask you to complete two different surveys. One survey, which will take approximately 20 minutes, will be completed by you at home before the educational session. The second survey, which will also take approximately 20 minutes, will be completed by you after the educational session. Both surveys contain information about your knowledge and attitudes toward kidney transplant. Your responses will be completely anonymous and confidential and will in no way impact your future eligibility for a kidney transplant or treatment at Vanderbilt University Medical Center. **Please do not write any identifying information (your name, address, phone number etc.) on your survey.**

Your participation in this study is completely voluntary. If you choose to participate you may choose to discontinue participation at any time and you may choose any of the survey questions that you do not wish to answer. Your completion of the survey and returning it to the investigator indicates your consent to participate in this study.

If you choose to participate and complete both surveys, you will have the opportunity to be placed in a drawing to win one of three \$50 Walmart store gift cards.

Appendix D: Pre-Survey

Pre-test Survey

This survey will take approximately 20 minutes to complete. Your responses will be completely anonymous and confidential and will in no way impact your future eligibility for a kidney transplant or treatment at Vanderbilt University Medical Center. **Please do not write any identifying information (your name, address, phone number etc.) on your survey.**

Your participation in this study is completely voluntary. If you choose to participate you may choose to discontinue participation at any time and you may choose any of the survey questions that you do not wish to answer. Your completion of the survey and returning it to the investigator indicates your consent to participate in this study.

Please bring this completed survey to the educational session that you are signed up to attend. The investigator will collect the survey from you prior to the start of the educational session.

Demographic Information

Age: _____ years

What is your sex?

- Male Female

What is your race?

- White
 American Indian or Alaska Native
 Asian
 Black or African American
 Native Hawaiian or other Pacific Islander
 Other

Are you Hispanic or Latino?

- Yes No

What is the highest level of education you have completed?

- Some high school GED High school diploma Some college
 Associate's degree Bachelor's degree Master's degree PhD

Are you a registered organ donor?

- Yes No I don't know

What is your current employment status?

- Employed full time (30 or more hours a week)
- Employed part time (less than 30 hours a week)
- Retired
- Receiving disability benefits
- Full-time homemaker by choice
- Full-time student
- Part-time student

What is your estimated annual household income?

- Less than \$20,000
- \$20,000 - \$39,000
- \$40,000 - \$59,000
- \$60,000 - \$79,000
- \$80,000 - \$99,000
- Greater than \$100,000

What is your current health insurance status?

- Medicare
- Medicaid/TennCare
- Private insurance
- Veteran's insurance
- None

What is your current marital status?

- Married
- Divorced
- Separated
- Widowed
- Domestic Partnership
- Single

How long have you had end-stage renal disease (ESRD)?

- Less than 1 year
- 1 to 4 years
- 5 to 9 years
- Greater than 10 years

Attitudes

For the following questions, please select the answer that is most applicable to yourself. There are no right or wrong answers.

12. I have received insufficient information regarding kidney transplant.

- Fully agree
- Mostly agree
- Mostly disagree
- Fully disagree
- Don't know

13. I would like to receive a kidney transplant.

- Fully agree Mostly agree Mostly disagree Fully disagree Don't know

14. If offered, I would accept a kidney transplant right now.

- Fully agree Mostly agree Mostly disagree Fully disagree Don't know

15. I have seen many sad and unsuccessful cases after transplant.

- Fully agree Mostly agree Mostly disagree Fully disagree Don't know

16. I have seen many successful cases after transplant.

- Fully agree Mostly agree Mostly disagree Fully disagree Don't know

17. Transplant is the best possible solution for a patient on dialysis.

- Fully agree Mostly agree Mostly disagree Fully disagree Don't know

18. One can start a new life after transplant.

- Fully agree Mostly agree Mostly disagree Fully disagree Don't know

19. Transplant causes more problems than benefits for the patient.

- Fully agree Mostly agree Mostly disagree Fully disagree Don't know

20. I am afraid of the transplant surgery.

- Fully agree Mostly agree Mostly disagree Fully disagree Don't know

21. I am concerned about the medical treatment following transplant.

- Fully agree Mostly agree Mostly disagree Fully disagree Don't know

22. What do you think your overall health will be like one year after kidney transplant?

- Excellent Good Fair Poor Very Poor

Knowledge

For the first 9 questions, please choose either True or False as your answer.

1. Every person who receives a kidney transplant feels better than they did before the transplant.

- True False

2. Transplant pills must be taken to help prevent rejection.

- True False

3. Some diseases that cause kidney failure can come back in the kidney transplant.

- True False

4. **Anti-rejection medications are also called immunosuppressants.**
 True False
5. **Your kidney transplant is also called a graft.**
 True False
6. **You should always take your anti-rejection medications unless instructed by your transplant team.**
 True False
7. **You will need to do blood testing at least monthly for as long as the kidney transplant is functioning.**
 True False
8. **Herbal supplements are generally safe to take with your transplant, since they are natural.**
 True False
9. **Most people can to return to work after receiving a kidney transplant.**
 True False

For the remaining questions, please circle the correct answers. You may choose more than one answer.

- 10. When thinking about herbal or traditional therapies, which of the following are true?**

(Circle all the correct answers)

- A. Traditional treatments are safe for a kidney transplant because they are natural.
- B. Herbal medications recommended in the media (ie, internet, TV) are generally safe for your transplant.
- C. Pills that boost your immune system are safe for people with a transplant.
- D. Family and friends may suggest herbal remedies or natural products - you should check with your transplant team before trying them out.

- 11. Which statements are true regarding anti-rejection medication? (Circle all the correct answers)**

- A. Anti-rejection medications increase the risk of infection.
- B. Anti-rejection medications can be stopped if the transplant kidney is working well in ten years.
- C. Anti-rejection medications increase the risk of cancer.

- D. Anti-rejection medications can be stopped if side effects are too bad.
- E. Anti-rejection medications can sometimes be changed if side effects are too bad.

12. If you are experiencing a side effect from your anti-rejection pills, what should you do?

(Circle all the correct answers)

- A. Continue taking the pills as prescribed.
- B. Contact your transplant team.
- C. Decrease the dose of your anti-rejection pills to see if that helps.
- D. Stop your anti-rejection pills until you can see your doctor.
- E. Try to manage the side effects with over the counter medications.

13. What precautions should you take to prevent colds or flu illness? (Circle all the correct answers)

- A. Wash your hands.
- B. Get vaccinations such as your yearly flu shot.
- C. Avoid unnecessary contact with others who are unwell.
- D. Quit your job because at work you are with sick people.
- E. Wear a mask when out in a crowd.

14. It is important to tell all your doctors that you received a kidney transplant because:

(Circle all the correct answers)

- A. Other pills may not mix well with anti-rejection pills.
- B. Anti-rejection pills make it easier for you to catch infections.
- C. Anti-rejection pills increase your cancer risk, so regular checkups are important.
- D. Some pills may harm your transplant.
- E. Anti-rejection pills may affect how you heal after surgery.
- F. You do not need to tell your doctors that you have a transplant.

15. It is important to tell your pharmacist that you received a kidney transplant because:

(Circle all the correct answers)

- A. Other pills may not mix well with anti-rejection pills.
- B. Your pharmacist can help you decide if you should treat common problems (like heartburn or cold sores) with over the counter medications.
- C. Some over the counter medications can harm your transplant.
- D. You do not need to tell your pharmacist that you have a transplant.

16. Which statements are true about creatinine? (Circle all the correct answers)

- A. Creatinine is measured by a blood test.
- B. Creatinine levels can tell us how your kidney is working.
- C. Your creatinine will always be normal after your kidney transplant.
- D. If your creatinine goes up, it always means there is rejection.

17. When thinking about transplant rejection, which of the following are true? (Circle all the correct answers)

- A. Rejection cannot be treated.
- B. Stronger anti-rejection pills can sometimes treat rejection.
- C. You have a good match, so rejection cannot occur.
- D. If you take your anti-rejection pills correctly, rejection will not occur.
- E. You will know if you have rejection because you will feel sick.

18. In the first few months after your kidney transplant, which of the following are true? (Circle all the correct answers)

- A. You can catch infections easier because your anti-rejection pills are stronger.
- B. You should avoid changes to your glasses or contact lenses because your eyesight may change.
- C. Regular blood testing is not important.
- D. Out of country travel is encouraged.

19. Years after your kidney transplant, which of the following are true? (Circle all the correct answers)

- A. Some anti-rejection pills can hurt the kidney transplant.
- B. High blood pressure can hurt the kidney transplant.
- C. More pills may be needed to treat complications from the transplant.
- D. Your transplant team may decrease your anti-rejection pills.
- E. Your transplant team may need to increase your anti-rejection pills.

20. Which statements are true about pregnancy in women who have received a kidney transplant? (Circle all the correct answers)

- A. Some anti-rejection pills can cause birth defects.
- B. Anti-rejection pills can be stopped during pregnancy.
- C. Pregnancy may cause an increase in creatinine.

- D. A kidney transplant will always make it possible to have a baby.
- E. You should discuss your wish to become pregnant with your transplant team.

21. Which statements are true about men who have received a kidney transplant? (Circle all the correct answers)

- A. A kidney transplant will always let you father a child.
- B. A kidney transplant will always fix your erection problems.
- C. Some pills taken by the father may harm the baby.
- D. You should discuss your wish to father a child with your transplant team.

22. When thinking about sexually transmitted infections (STIs) after kidney transplant, which of the following are true? (Circle all the correct answers)

- A. Birth control pills can prevent STIs.
- B. Condoms can prevent all types of STIs.
- C. All sexually transmitted infections can be cured.
- D. Anti-rejection pills increase the risk of catching STIs during sexual activity.

Appendix E: Post-Survey

Post-test Survey

This survey will take approximately 20 minutes to complete. Your responses will be completely anonymous and confidential and will in no way impact your future eligibility for a kidney transplant or treatment at Vanderbilt University Medical Center. **Please do not write any identifying information (your name, address, phone number etc.) on your survey.**

Your participation in this study is completely voluntary. If you choose to participate, you may choose to discontinue participation at any time and you may choose any of the survey questions that you do not wish to answer. Your completion of the survey and returning it to the social worker indicates your consent to participate in this study.

When you are finished with this survey please place it in the provided manila envelope and seal the envelope. Please hand the sealed envelope to your social worker.

Attitudes

For the following questions, please select the answer that is most applicable to yourself. There are no right or wrong answers.

1. I have received insufficient information regarding kidney transplant.

Fully agree Mostly agree Mostly disagree Fully disagree Don't know

2. I would like to receive a kidney transplant.

Fully agree Mostly agree Mostly disagree Fully disagree Don't know

3. If offered, I would accept a kidney transplant right now.

Fully agree Mostly agree Mostly disagree Fully disagree Don't know

4. I have seen many sad and unsuccessful cases after transplant.

Fully agree Mostly agree Mostly disagree Fully disagree Don't know

5. I have seen many successful cases after transplant.

Fully agree Mostly agree Mostly disagree Fully disagree Don't know

6. Transplant is the best possible solution for a patient on dialysis.

Fully agree Mostly agree Mostly disagree Fully disagree Don't know

7. One can start a new life after transplant.

Fully agree Mostly agree Mostly disagree Fully disagree Don't know

8. Transplant causes more problems than benefits for the patient.

Fully agree Mostly agree Mostly disagree Fully disagree Don't know

9. I am afraid of the transplant surgery.

- Fully agree Mostly agree Mostly disagree Fully disagree Don't know

10. I am concerned about the medical treatment following transplant.

- Fully agree Mostly agree Mostly disagree Fully disagree Don't know

11. What do you think your overall health will be like one year after kidney transplant?

- Excellent Good Fair Poor Very Poor

Knowledge

For the first 9 questions, please choose either True or False as your answer.

1. Every person who receives a kidney transplant feels better than they did before the transplant.

- True False

2. Transplant pills must be taken to help prevent rejection.

- True False

3. Some diseases that cause kidney failure can come back in the kidney transplant.

- True False

4. Anti-rejection medications are also called immunosuppressants.

- True False

5. Your kidney transplant is also called a graft.

- True False

6. You should always take your anti-rejection medications unless instructed by your transplant team.

- True False

7. You will need to do blood testing at least monthly for as long as the kidney transplant is functioning.

- True False

8. Herbal supplements are generally safe to take with your transplant, since they are natural.

- True False

9. Most people can return to work after receiving a kidney transplant.

- True False

For the remaining questions, please circle the correct answers. You may choose more than one answer.

10. When thinking about herbal or traditional therapies, which of the following are true?

(Circle all the correct answers)

- A. Traditional treatments are safe for a kidney transplant because they are natural.
- B. Herbal medications recommended in the media (ie, internet, TV) are generally safe for your transplant.
- C. Pills that boost your immune system are safe for people with a transplant.
- D. Family and friends may suggest herbal remedies or natural products - you should check with your transplant team before trying them out.

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- A. Anti-rejection medications increase the risk of infection.
- B. Anti-rejection medications can be stopped if the transplant kidney is working well in ten years.
- C. Anti-rejection medications increase the risk of cancer.
- D. Anti-rejection medications can be stopped if side effects are too bad.
- E. Anti-rejection medications can sometimes be changed if side effects are too bad.

12. If you are experiencing a side effect from your anti-rejection pills, what should you do?

(Circle all the correct answers)

- A. Continue taking the pills as prescribed.
- B. Contact your transplant team.
- C. Decrease the dose of your anti-rejection pills to see if that helps.
- D. Stop your anti-rejection pills until you can see your doctor.
- E. Try to manage the side effects with over the counter medications.

13. What precautions should you take to prevent colds or flu illness? (Circle all the correct answers)

- A. Wash your hands.
- B. Get vaccinations such as your yearly flu shot.
- C. Avoid unnecessary contact with others who are unwell.
- D. Quit your job because at work you are with sick people.

E. Wear a mask when out in a crowd.

14. It is important to tell all your doctors that you received a kidney transplant because:

(Circle all the correct answers)

- A. Other pills may not mix well with anti-rejection pills.
- B. Anti-rejection pills make it easier for you to catch infections.
- C. Anti-rejection pills increase your cancer risk, so regular checkups are important.
- D. Some pills may harm your transplant.
- E. Anti-rejection pills may affect how you heal after surgery.
- F. You do not need to tell your doctors that you have a transplant.

15. It is important to tell your pharmacist that you received a kidney transplant because:

(Circle all the correct answers)

- A. Other pills may not mix well with anti-rejection pills.
- B. Your pharmacist can help you decide if you should treat common problems (like heartburn or cold sores) with over the counter medications.
- C. Some over the counter medications can harm your transplant.
- D. You do not need to tell your pharmacist that you have a transplant.

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- D. If your creatinine goes up, it always means there is rejection.

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- C. You have a good match, so rejection cannot occur.
- D. If you take your anti-rejection pills correctly, rejection will not occur.
- E. You will know if you have rejection because you will feel sick.

18. In the first few months after your kidney transplant, which of the following are true?

(Circle all the correct answers)

- A. You can catch infections easier because your anti-rejection pills are stronger.

- B. You should avoid changes to your glasses or contact lenses because your eyesight may change.
- C. Regular blood testing is not important.
- D. Out of country travel is encouraged.

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- B. High blood pressure can hurt the kidney transplant.
- C. More pills may be needed to treat complications from the transplant.
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- E. Your transplant team may need to increase your anti-rejection pills.

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- A. Some anti-rejection pills can cause birth defects.
- B. Anti-rejection pills can be stopped during pregnancy.
- C. Pregnancy may cause an increase in creatinine.
- D. A kidney transplant will always make it possible to have a baby.
- E. You should discuss your wish to become pregnant with your transplant team.

21. Which statements are true about men who have received a kidney transplant? (Circle all the correct answers)

- A. A kidney transplant will always let you father a child.
- B. A kidney transplant will always fix your erection problems.
- C. Some pills taken by the father may harm the baby.
- D. You should discuss your wish to father a child with your transplant team.

22. When thinking about sexually transmitted infections (STIs) after kidney transplant, which of the following are true? (Circle all the correct answers)

- A. Birth control pills can prevent STIs.
- B. Condoms can prevent all types of STIs.
- C. All sexually transmitted infections can be cured.
- D. Anti-rejection pills increase the risk of catching STIs during sexual activity.

Appendix F: Gift Card Drawing Sign-Up Sheet

Gift Card Drawing Sign Up

As a token of thanks for completing both surveys, please write **either your phone number OR email address** below to be entered into a drawing to win ONE OF THREE Walmart gift cards.

Phone: _____ Email: _____

Phone: _____ Email: _____