
Theses and Dissertations

Fall 2012

Looking beyond social support: examining dimensions of relationship quality in kidney transplant recipients

Quinn Dione Kellerman
University of Iowa

Copyright 2012 Quinn Dione Kellerman

This dissertation is available at Iowa Research Online: <http://ir.uiowa.edu/etd/3481>

Recommended Citation

Kellerman, Quinn Dione. "Looking beyond social support: examining dimensions of relationship quality in kidney transplant recipients." PhD (Doctor of Philosophy) thesis, University of Iowa, 2012.
<http://ir.uiowa.edu/etd/3481>.

Follow this and additional works at: <http://ir.uiowa.edu/etd>

 Part of the [Psychology Commons](#)

LOOKING BEYOND SOCIAL SUPPORT: EXAMINING DIMENSIONS OF
RELATIONSHIP QUALITY IN KIDNEY TRANSPLANT RECIPIENTS

by
Quinn Dione Kellerman

An Abstract

Of a thesis submitted in partial fulfillment
of the requirements for the Doctor of
Philosophy degree in Psychology
in the Graduate College of
The University of Iowa

December 2012

Thesis Supervisor: Professor Alan J. Christensen

ABSTRACT

Perceived availability or receipt of tangible or instrumental social support has generally been associated with favorable outcomes in kidney transplant recipients, yet there has been insufficient attention in the literature to other social relationship processes beyond support that may contribute to mental and physical health. The overall objective of the current study was to examine whether specific dimensions of relationship quality, such as emotional closeness, sexual relations, support transactions, respect/acceptance, and conflict/negative communication, within the context of a close interpersonal relationship, were associated with psychosocial and medical outcomes in kidney transplant recipients when accounting for the effects of global social support. Participants had received a living or deceased donor kidney transplant and were 6 months – 5 years post-surgery at the time of enrollment in the study. A total of 93 participants completed self-report measures and a semi-structured clinical interview via telephone that assessed each of the aforementioned dimensions with regard to a specified relationship. A subsample of 67 participants were married or involved in a committed dating relationship and responded to interview questions with their partner in mind; the remaining participants selected the person to whom they felt closest over the preceding 6 months (e.g., friend, sibling, parent).

Structural equation modeling and linear regression were used to analyze the data. Results suggested that the distinct yet highly correlated dimensions reflected an underlying ‘relationship quality’ construct. Poorer relationship quality was associated with increased symptoms of depression, decreased feelings of well-being, and worse mental health-related quality of life for both the full sample and the subsample of

participants in a romantic relationship. The path between relationship quality and depression remained significant for romantic relationship participants when global social support was included in the model, but global social support was more strongly associated with depression, well-being, and health-related quality of life for all participants. Relationship quality was not associated with adherence or graft function in this sample. However, interesting interaction effects were found, such that high conflict and lack of emotional intimacy were more strongly associated with poorer self-reported adherence in women. In addition, women who reported higher conflict in their relationship also endorsed increased depression, decreased well-being, and worse mental health-related functioning compared to men. These findings are consistent with previous research that has cited the importance of global social support for patients who have received a kidney transplant. The present study also provides novel evidence that other dimensions of relationship quality contribute to outcomes in this population. A comprehensive assessment of recipients' close relationships throughout the transplant process, particularly of conflict and emotional intimacy in women, would allow clinicians to recommend psychosocial interventions that could improve patient outcomes.

Abstract Approved:

Thesis Supervisor

Title and Department

Date

LOOKING BEYOND SOCIAL SUPPORT: EXAMINING DIMENSIONS OF
RELATIONSHIP QUALITY IN KIDNEY TRANSPLANT RECIPIENTS

by
Quinn Dione Kellerman

A thesis submitted in partial fulfillment
of the requirements for the Doctor of
Philosophy degree in Psychology
in the Graduate College of
The University of Iowa

December 2012

Thesis Supervisor: Professor Alan J. Christensen

Graduate College
The University of Iowa
Iowa City, Iowa

CERTIFICATE OF APPROVAL

PH.D. THESIS

This is to certify that the Ph.D. thesis of

Quinn Dione Kellerman

has been approved by the Examining Committee
for the thesis requirement for the Doctor of Philosophy
degree in Psychology at the December 2012 graduation.

Thesis Committee: _____
Alan J. Christensen, Thesis Supervisor

Jody Jones

Susan Lutgendorf

Kristian Markon

Michael O'Hara

ABSTRACT

Perceived availability or receipt of tangible or instrumental social support has generally been associated with favorable outcomes in kidney transplant recipients, yet there has been insufficient attention in the literature to other social relationship processes beyond support that may contribute to mental and physical health. The overall objective of the current study was to examine whether specific dimensions of relationship quality, such as emotional closeness, sexual relations, support transactions, respect/acceptance, and conflict/negative communication, within the context of a close interpersonal relationship, were associated with psychosocial and medical outcomes in kidney transplant recipients when accounting for the effects of global social support. Participants had received a living or deceased donor kidney transplant and were 6 months – 5 years post-surgery at the time of enrollment in the study. A total of 93 participants completed self-report measures and a semi-structured clinical interview via telephone that assessed each of the aforementioned dimensions with regard to a specified relationship. A subsample of 67 participants were married or involved in a committed dating relationship and responded to interview questions with their partner in mind; the remaining participants selected the person to whom they felt closest over the preceding 6 months (e.g., friend, sibling, parent).

Structural equation modeling and linear regression were used to analyze the data. Results suggested that the distinct yet highly correlated dimensions reflected an underlying ‘relationship quality’ construct. Poorer relationship quality was associated with increased symptoms of depression, decreased feelings of well-being, and worse mental health-related quality of life for both the full sample and the subsample of

participants in a romantic relationship. The path between relationship quality and depression remained significant for romantic relationship participants when global social support was included in the model, but global social support was more strongly associated with depression, well-being, and health-related quality of life for all participants. Relationship quality was not associated with adherence or graft function in this sample. However, interesting interaction effects were found, such that high conflict and lack of emotional intimacy were more strongly associated with poorer self-reported adherence in women. In addition, women who reported higher conflict in their relationship also endorsed increased depression, decreased well-being, and worse mental health-related functioning compared to men. These findings are consistent with previous research that has cited the importance of global social support for patients who have received a kidney transplant. The present study also provides novel evidence that other dimensions of relationship quality contribute to outcomes in this population. A comprehensive assessment of recipients' close relationships throughout the transplant process, particularly of conflict and emotional intimacy in women, would allow clinicians to recommend psychosocial interventions that could improve patient outcomes.

TABLE OF CONTENTS

LIST OF TABLES	vi
LIST OF FIGURES	vii
CHAPTER	
I. INTRODUCTION	1
Overview of End-Stage Organ Diseases and Transplantation.....	3
Social Support, General Health Outcomes, and Transplant Populations	6
Review of Existing Literature in Transplant Populations	8
Summary and Critique.....	13
Other Relationship Domains and Health	16
Conflict/Negative Communication.....	17
Emotional Closeness/Intimacy	20
Respect/Acceptance.....	22
Sexual Relations	23
Conceptualization of Relationship Domains in the Present Study	25
Study Objectives and Hypotheses	27
Primary Objective (1).....	27
Secondary Objective (2).....	28
Secondary Objective (3).....	28
II. METHODS	32
Participant Sample	32
Recruitment Procedure	32
Assessment Procedure	34
Measures	34
Demographic and Clinical Variables.....	34
Relationship Quality Interview (RQI)	35
Interpersonal Support Evaluation List (ISEL).....	41
Inventory of Depression and Anxiety Scales (IDAS)	42
12-Item Short-Form Health Survey (SF-12)	42
Transplant Effects Questionnaire Adherence Scale (TxEQ).....	43
Secondary Medical Outcome Measures	44
III. RESULTS	45
Participants	45
Data Analytic Strategy.....	47
Preliminary Analyses.....	47
Primary Analyses.....	51
Secondary Analyses: Medical Outcomes	56
Secondary Analyses: Gender Moderation	56
IV. CONCLUSIONS AND DISCUSSION	76
Limitations.....	80
Clinical Implications.....	82

Future Directions	84
APPENDIX.....	87
REFERENCES	117

LIST OF TABLES

Table

1. Demographic Characteristics (N=93)	59
2. Clinical Characteristics (N=93)	60
3. Descriptive Statistics: Relationship Quality and Outcomes for Romantic Subsample (N=67)	61
4. Descriptive Statistics: Relationship Quality and Outcomes for Full Sample (N = 93).....	62
5. Correlations Among Observed Variables for Romantic Subsample (N = 67)	63
6. Correlations Among Observed Variables for Full Sample (N = 93).....	64

LIST OF FIGURES

Figure

1.	Conceptual diagram of social support components	30
2.	Conceptual diagram of the constructs of interest in the present study	31
3.	CFA to establish adequacy of the measurement model in the subsample of participants who were in a romantic relationship (N = 67)	65
4.	CFA to establish adequacy of the measurement model in the full sample of participants (N = 93)	66
5.	Influence of relationship quality on psychosocial outcomes in the subsample of participants in a romantic relationship (N = 67).....	67
6.	Influence of relationship quality on psychosocial outcomes in the full sample of participants (N = 93).....	68
7.	Influence of relationship quality and global social support on psychosocial outcomes in the subsample of participants in a romantic relationship (N = 67)	69
8.	Influence of relationship quality and global social support on psychosocial outcomes in the full sample of participants (N = 93)	70
9.	Moderating effects of gender on conflict in predicting symptoms of depression in the romantic subsample of participants (N = 67)	71
10.	Moderating effects of gender on conflict in predicting feelings of well-being in the romantic subsample of participants (N = 93).....	72
11.	Moderating effects of gender on conflict in predicting feelings of mental health-related quality of life in the romantic subsample of participants (N = 67)	73
12.	Moderating effects of gender on conflict in predicting adherence in the full sample of participants (N = 93)	74
13.	Moderating effects of gender on emotional closeness in predicting adherence in the full sample of participants (N = 93).....	75

CHAPTER 1

INTRODUCTION

The field of transplantation is rapidly advancing and offers a promising treatment for many individuals with end-stage organ disease. Based on data from the United Network for Organ Sharing (UNOS, 2012), over 125,000 patients in the U.S. have been recipients of kidney, liver, heart, or lung transplants within the last five years, and this number is expected to increase exponentially given technological developments and the use of living donors. Considering that the demand for organs continues to exceed the supply, however, just allocation of scarce organs is a highly relevant issue within the transplant community and, in part, influences the strong emphasis on inclusion of a psychological evaluation during the pre-transplant assessment of potential candidates that is required prior to listing. Similar to the purpose of the medical guidelines developed by the American Society of Transplantation (Kasiske et al., 2001), the goal of the pre-transplant psychological evaluation is to identify patients who are at high risk for unfavorable outcomes post-transplant (e.g., nonadherence with the post-operative immunosuppressant regimen, relapse to substance abuse) so that appropriate interventions and clinical management of these patients can be implemented (Olbrisch, Benedict, Ashe, & Levenson, 2002).

One aspect of the psychosocial evaluation for pre-transplant patients is an assessment of availability of social support. Extensive empirical evidence demonstrates that social relations are immensely important to psychological and physical health outcomes across healthy individuals and chronically ill patients (Cohen, 2004; Cohen, Gottlieb, & Underwood, 2000; Reblin & Uchino, 2008; Schwarzer & Leppin, 1989;

Uchino, Cacioppo, & Kiecolt-Glaser, 1996). Previous research specific to transplant populations suggests that perceived availability or receipt of tangible or instrumental support is generally associated with favorable outcomes, including abstinence from substance use, adherence to medical treatment recommendations, reduced psychological distress, and improvements in social functioning. However, several authors have noted that our understanding of this link is limited by inconsistent results, flawed methodology, and insufficient attention to other social relationship processes beyond support that may also have important implications for health (Bohachick, Taylor, Sereika, Reeder, & Anton, 2002; Frazier, Tix, Klein, & Arikian, 2003; Howard, Williams, & Fahy, 1994). In the broader relationship literature, additional aspects of close relationships (e.g., conflict, negative communication, respect, acceptance, and emotional closeness) have demonstrated meaningful associations with physical health (e.g., cardiovascular and immune functioning, mortality; Kiecolt-Glaser, Glaser, Cacioppo, & Malarkey, 1998; Kiecolt-Glaser & Newton, 2001; Kimmel et al., 2000), and psychological health (e.g., depression, emotional distress; Cranford, 2004; Druley, Stephens, & Coyne, 1997; Fincham, 2003) outcomes as well, yet these qualities have received scant attention in the transplant literature. While perceived availability or receipt of support is clearly an important area of study, developing our understanding of how these other relationship qualities impact transplant patients has the potential to address the gaps in our knowledge and to enable us to identify previously unexamined factors that may increase patients' risk for unfavorable outcomes. Thus, the *overall objective of the present study* is to test whether conflict, negative communication, emotional closeness, respect, and acceptance, within the context of a close interpersonal relationship, contribute uniquely to and/or

enhance the effects of general perceived availability of social support on psychosocial and medical outcomes in kidney transplant patients.

A review and critique of the relevant literature is presented in the following sections. First, a general overview of influential factors in end-stage kidney disease and transplantation is provided. Second, a review of the general social support and health literature as well as the existing data specific to transplant populations is presented. Third, a review of how other important aspects of close interpersonal relationships have been associated with health outcomes is provided. Fourth, a conceptual overview of how relationship quality domains were operationalized in the present study is presented. Finally, objectives and study hypotheses are described.

Overview of End-Stage Organ Diseases and Transplantation

End-stage disease occurs when the functional capacity of an organ system declines, ultimately requiring the affected individual to begin a treatment regimen. The most commonly affected organs are the kidneys, liver, heart, and lungs. Throughout the United States, kidney transplants are performed with far greater frequency compared to liver, heart, and lung transplants (UNOS, 2012). As a result, issues of feasibility, insufficient numbers of potential participants, and difficulty comparing across type of transplant precluded the use of liver, heart, and lung transplant patients in the present study. The following review therefore focuses on kidney transplantation, with inclusion of some studies related to liver, heart, bone marrow, or lung recipients where relevant.

End-stage kidney disease often manifests as a secondary condition resulting from poorly managed diabetes or hypertension, but may also be caused by an autoimmune disease known as glomerulonephritis or genetic abnormalities such as polycystic kidney

disease. For many individuals, kidney disease is a gradual progression that, in the early stages, does not necessitate treatment. However, once end-stage disease is reached, treatment initiation in the form of dialysis or transplantation is required in order to sustain life. While dialysis is a viable option for many patients, kidney transplantation offers many advantages over dialysis including increased survival and significant improvements in quality of life (Cameron, Whiteside, Katz, & Devins, 2000; Dew et al., 1997; Pesavento, 2009; Szeifert et al., 2010).

According to the Organ Procurement and Transplantation Network (OPTN, 2010), an average of 16,700 kidney transplants have been performed annually over the last five years, with approximately 65% from deceased donors and 35% from living donors. Graft survival rates across donor type are relatively high for kidney transplant recipients (i.e., 1-year = 92%, 3-year = 82%, and 5-year = 71%), and living donor grafts tend to fare better than deceased donor grafts. Currently, there are approximately 85,000 patients listed and awaiting either a living or deceased donor kidney transplant in the United States (OPTN, 2010).

Although transplantation is a successful treatment for end-stage disease in many cases, there remain a significant percentage of patients who experience unfavorable outcomes, including death, graft failure, nonadherence to the immunosuppressant medication regimen, and depression, following the procedure. Virzi et al. (2007) found that 32% of kidney transplant recipients continued to report symptoms of depression post-transplant. Many of the same behavioral risk factors that contribute to the development of end-stage organ disease have been hypothesized to negatively influence patient outcomes post-transplant, including history of nonadherence to medical treatment,

and active psychopathology (e.g., substance use) (Jowsey, Taylor, Schneekloth, & Clark, 2001). Although further exploration of these risk factors and their effects on transplant outcomes is clearly an important area of research, the influence of social support in this patient population has emerged as one of the primary concerns within the transplant community (e.g., Jowsey et al., 2001; Olbrisch et al., 2002). Social support is arguably one of the most frequently examined psychosocial variables in the health-related literature, and research suggests that this factor has important implications for patient outcomes across illness populations, including transplantation.

Some researchers have begun to speculate about how social support exerts its influence on transplant outcomes. For example, support providers may encourage patients to follow post-operative requirements, such as adherence to immunosuppressant medications (i.e., poor support is associated with nonadherence; Bunzel & Laederach-Hofmann, 2000), and/or are able to assist in minimizing complications that could result from a pre-existing psychiatric or neurological condition (Carrasco et al., 2009). Although we know that social support is generally helpful to transplant patients, considerable gaps remain in our knowledge of other relationship factors that might meaningfully contribute to outcomes. Thus, examination of social support is necessary but not sufficient to fully understand the effects of close interpersonal relationships on these patients. More detailed analyses of the specific components of close relationships in this population are needed in order to progress our ability to intervene appropriately and enhance patient outcomes. Given that the majority of the work has focused on social support, however, the following review begins with an overview of the relevant literature in this area before an examination of more specific relationship components is provided.

Social Support, General Health Outcomes, and Transplant Populations

Extensive empirical attention has been devoted to studying the role of social support in physical health (e.g., Cohen, Gottlieb, & Underwood, 2000; Uchino, Cacioppo, & Kiecolt-Glaser, 1996) and psychological adjustment to life-threatening and chronic illnesses (e.g., Dohrenwend & Dohrenwend, 1978; Reblin & Uchino, 2008; Schwarzer & Leppin, 1989). In the health-related literature, social support has been conceptualized as an overarching, broad construct that encompasses integration into a larger social network (i.e., involvement with a broad range of activities or relationships and identifying with social roles; Brissette, Cohen, & Seeman 2000), marital status, and qualities of specific dyadic relationships including spouses, parents, children, and friends (refer to Figure 1).

Cutrona (1996), among others, has argued that the construct of social support is multidimensional, including both qualities of interactions (e.g., expression of love and empathy, respect for others) and overt behaviors (e.g., provision of information or resources, assistance with tasks). Researchers have assessed both the *structure/form* of one's social network (i.e., presence or absence of individuals that one can contact to have needs met) as well as the *function* of social support (i.e., perceived availability or receipt of particular supportive behaviors from others). In his review of the literature, Cohen (2004) concluded that social support may influence health through the direct effects of social integration (independent of the individual's level of stress), through the buffering or protective effects of supportive relationships in times of stress, or via the negative qualities of relationships that have physiological and psychological consequences.

A meta-analysis and qualitative review of the literature by Uchino, Cacioppo, and Kiecolt-Glaser (1996) found that social support and physiological processes are linked in important ways, with the primary beneficial effects of support relating to cardiovascular, endocrine, and immune functioning. As previously noted, a major limitation of this early work, as well as more recent work in the field, relates to the inconsistent conceptualization and measurement of the social support construct (Sarason & Sarason, 2006; Sarason, Sarason, & Gurung, 2001). In an updated review by Reblin and Uchino (2008), the significant protective effects that social support has over individuals' physical health was again demonstrated, yet it was noted that the mechanisms by which social support exerts its influence on health outcomes continue to require further delineation.

In addition to linking social support to physiological outcomes, the influence of support on adaptation following major surgery and survival in patients with heart disease and breast cancer has also been reviewed and inconsistent findings were reported (Reifmann, 1995). One example included in Reifmann's (1995) review was an early study that attempted to explicate the link between spousal support behaviors and patient' post-operative recovery following coronary bypass surgery was conducted by Kulik and Mahler (1989). Their measure of social support was an index of the number of times the spouse visited the patient while he was hospitalized during the recovery period. Outcomes included amount of pain medication needed, ability to ambulate and engage in physical activity, and time to discharge from the surgical intensive care unit following bypass surgery. As expected, greater social support was associated with more favorable post-operative outcomes. Contrary to Kulik and Mahler's (1989) predictions, however, was the lack of a significant interaction between the patients' report of their marital

relationship quality and the beneficial effects of social support. A possible explanation for this null finding is the inadequate assessment of relationship quality. Patients were instructed to provide a general rating, ranging from “excellent” to “poor” on how they perceived their marriage. This measure likely did not capture the breadth or depth of quality components that exist in a relationship and may have been subject to different interpretations by each individual due to its lack of definition and specificity. Similar limitations across studies in this review may have contributed to the lack of robust, consistent findings.

Although previous research has documented important positive associations between social integration and support and health-related outcomes such as reduced emotional distress, improvements in quality of life, and increased life expectancy (e.g., Antonucci, Fuhrer, & Dartigues, 1997; Cohen, 2004; Uchino, 2004), several studies have also reported no association or unexpected inverse relations between social support and health outcomes (Antonucci, Birditt, & Webster, 2010). For example, Dalgard and Haheim (1998) failed to find an association between emotional support and mortality, and other researchers have reported that positive support from others can actually *increase* risk of mortality in older adults (Walter-Ginzburg, Blumstein, Chetrit, & Modan, 2002). In addition, Bolger, Foster, Vinokur, and Ng (1996) found that social support from significant others *did not* reduce distress or facilitate recovery of physical functioning in women with breast cancer.

Review of Existing Literature on Social Support in Transplant Populations

Similar to the broader health literature, social support has been conceptualized and measured in a variety of different ways in the transplant literature as well. The

transplant populations are typically examined separately, with a few notable exceptions that have examined multiple solid organ types in a single sample (Cetingok, Hathaway, & Winsett, 2007; Goetzmann, et al., 2007; Perez-San-Gregorio, Martin-Rodriguez, Galan-Rodriguez, & Borda-Mas, 2009; Wilks, Spivey, & Chisholm-Burns, 2010). Given that the present study focuses on kidney transplantation, greater attention is paid to studies examining social support in kidney patients in this review. However, it is important to note that there has been some work on the value of the social support network in managing distress among lung transplant patients (Bright, Craven, & Kelly, 1990) and the experience of stress among well spouses of patients awaiting a lung transplant (McCausland, Kurz, & Cavanaugh, 2001). There have also been several relevant studies conducted with heart transplant recipients. Jaloweic, Grady, and White-Williams (2007) found that heart transplant patients who reported higher satisfaction with support resources exhibited more effective coping during the pre-transplant period. In addition, greater number of social resources defined as availability of tangible assistance, network size and helpfulness, has been associated with longer survival (Harper, Chacko, Kotik-Harper, Young, & Gotto, 1998), less depression (Spaderna et al., 2009), and improved functioning (Bohachick et al., 2002) following heart transplant. Similarly, a lack of pre-transplant social support has been identified as a potential risk factor for earlier mortality in liver transplant recipients (e.g., Kober et al., 1990).

In addition to general network support, social support from primary caregivers has also been an important predictor of outcomes in transplant patients. Dew et al. (1994) found that lower levels of pre-transplant support from primary caregivers predicted unremitting high levels of anxiety and depression over the course of the post-transplant

period in heart recipients. In a longitudinal study of liver transplant patients, family support was related to psychological functioning and the caregiver-specific relationship was associated with improvements in clinical markers relevant to liver graft function (Stilley et al., 2010).

Finally, although inclusion of research related to social support in hematopoietic stem cell transplantation is beyond the scope of the present study, it is important to acknowledge that relevant work has also been conducted in this area. Enduring psychological distress (e.g., symptoms of anxiety and depression) is prevalent in as many as 40% of survivors even years following stem cell transplant (see Mosher, Redd, Rini, Burkhalter, & DuHamel, 2009, for a review), and there is recent evidence to suggest that the quality of support from an intimate partner has meaningful associations with distress (Rini et al, 2011). Specifically, survivors who were 1-3 years post-transplant and received higher quality/effective support from their partner endorsed fewer symptoms of distress. Interestingly, when partner support was effective, the quantity of support received was not associated with distress; however, when participants indicated that their partner's support was of lower quality/ineffective, a greater amount of this support was related to significantly higher levels of distress (Rini et al., 2011). These results point to the importance of assessing whether there exists a match between the type of support individuals desire from their partners and the type of support that is received.

Kidney Transplant

In the transplant work reviewed thus far, social support has been conceptualized as a relatively broad construct. Several studies with kidney transplant patients, however, have examined more specific aspects of social support including expressiveness,

cohesion, and conflict in the family environment. For example, Moran, Christensen, Ehlers, and Bertolatus (1999) recognized that although the association between social and family support variables and psychological adjustment in patients with medical conditions has been well documented in the literature, the mechanisms by which support influences favorable outcomes require further delineation. These investigators used the Family Relationship Index, a composite of items from the Family Environment Scale (FES; Moos & Moos 1986) as a measure of family support in a sample of pre-transplant patients with kidney disease. Specifically, this study examined how intrusive thoughts about patients' impending transplant might contribute to the link between expressiveness within the family and patients' symptoms of anxiety and depression. Results indicated that intrusive thoughts partially mediated this association.

The association between family relationships and the post-transplant patient's quality of life in both living and deceased donor kidney recipients has also been considered (Christensen, Raichle, Ehlers, & Bertolatus, 2002). In this prospective study, family support was conceptualized as the degree of cohesion, expressiveness, and conflict within the home environment and was measured with the Family Relationship Index of the FES (Moos & Moos, 1986) as described above. The findings indicated that patients who reported a higher degree of pre-transplant family support evidenced fewer depressive symptoms, as well as improvements in mobility and social functioning post-transplant. Interestingly, these results were only significant for patients whose transplant was from a living donor source; family support was not a relevant predictor of quality of life outcomes in recipients of deceased donor transplants.

Most of the work on social support with kidney (and other transplant patients) has focused on the patient's perception of received or availability of support from interpersonal relationships and patient outcomes only. With the exception of Frazier et al. (1995; 2000; 2003), studies in general have not directly assessed the support provider's perception of the relationship. One of the studies that did assess the other member of the relationship dyad found a significant stress-by-support interaction, such that kidney transplant patients who reported higher levels of transplant-related stress experienced greater benefit from support received from their spouses, providing evidence for Cohen & Wills' (1985) buffering hypothesis (Frazier, Davis-Ali, & Dahl, 1995). In other words, highly stressed patients who received helpful spousal support reported greater marital satisfaction and less depression than those patients who perceived their spouses' support behaviors to be unhelpful. Furthermore, spouses' level of reported stress was negatively correlated with their provision of helpful (versus unhelpful) support behaviors to patients.

Later work by Frazier, Tix, Klein and Arikian (2000) focused on the relations among social support and coping strategies, considering both the patient's (received support) and significant others' (enacted support) perspectives. In addition, Frazier, Tix, and Barnett (2003) examined relationship satisfaction as a potential moderator of the link between enacted support behaviors and patient distress in two studies with kidney transplant patients. The first study focused on the marital relationship, whereas instructions in the second study allowed post-transplant patients to select any individual who was closest to them during the transplant experience. Results indicated that there

was a significant association between patient distress and relationship dissatisfaction, yet supportive behaviors were not related to either outcome.

While the majority of research in transplant populations has focused exclusively on the study of social support, neglecting to examine other close interpersonal relationship qualities, the following study is a notable exception. Einollahi et al. (2009) measured marital relationship domains with the Revised-Dyadic Adjustment Scale (RDAS; Busby, Christensen, Crane, & Larson, 1995) as they related to patients' adjustment following kidney transplantation. Both the total RDAS score (where lower scores represented a more distressed relationship), as well as scores for each of the scale components: dyadic consensus, affective expression, satisfaction, and cohesion were included. Regarding the specific quality domains, the findings suggested that greater marital satisfaction and cohesion were associated with increased health-related quality of life, and lower dyadic consensus was related to increased symptoms of anxiety post-transplant. Of note, marital adjustment scores were not significantly associated with several important demographic and clinical variables, including gender, age, source of donor graft, etiology and duration of kidney disease, and depression.

Summary and Critique

In sum, the presence of a supportive person and/or perceived availability of social support in transplant patients' lives have been associated with survival, adherence, reduced psychological distress, and improvements in health-related quality of life including social functioning. Although some authors have investigated other relationship domains such as conflict and expressive communication within the larger family environment, and some specific aspects of the marital relationship, the majority of the

work in transplant populations has focused on patients' perceptions of general social support availability.

While general social support (i.e., not specific to a particular dyadic relationship) is important to examine and often demonstrates beneficial effects, there is growing evidence to suggest that support does not fully explain the variability in individual outcomes. For example, Cranford (2004) found that the negative aspects of relationships, including expressions of anger, dislike, critical evaluations, and deterring one's spouse from reaching his or her goals (i.e., social undermining; Vinokur, Price, & Caplan, 1996), moderated the association between perceived stress and depressive symptoms in healthy adults, while social support had no significant effects. Thus, while previous research in transplant populations has highlighted the beneficial or protective aspects of social support, insufficient attention has been devoted to other negative or detrimental components of close interpersonal relationships that have been associated with health outcomes (Birditt & Antonucci, 2008; Birmingham et al., 2009). Furthermore, interventions that have aimed to enhance social support in various populations in order to facilitate health-promoting effects have yielded inconsistent findings and limited support for such efforts (Cohen, 2004; Hogan, Linden, & Najarian, 2002). Although results of earlier studies appeared promising, more recent trials with increased methodological rigor have reported that social support interventions do not have an effect on morbidity or mortality in cardiovascular disease (e.g., ENRICHD Investigators; 2003; Frasure-Smith et al., 1997) or metastatic breast cancer (e.g., Cunningham et al., 1998; Goodwin et al., 2001). Cohen (2004) suggested several reasons for this, including an emphasis on increasing general peer support versus improving the quality of existing close

relationships. However, an additional limitation of these interventions is their focus on one relationship domain (i.e., support) to the exclusion of other important domains. Given the success of couple therapy focusing on other relationship domains (e.g., acceptance; Christensen & Jacobsen, 2000), it is possible that targeting domains that are distinct from yet related to social support may yield promising results within transplant populations.

Drawing from existing theoretical models of relationship dysfunction (e.g., social learning or behavioral models, vulnerability-stress-adaptation models of marriage) in the marital and relationship literature, various domains or components of dyadic behaviors have been identified as important contributors to relationship quality. For example, emotional closeness/intimacy and conflict/negative communication have received considerable attention in the relationship literature (Barnes & Sternberg, 1997; Karney & Bradbury, 1995; Lawrence et al., 2008; Laurenceau, Barrett, & Rovine, 2005). It is likely that these other relationship components are relevant in transplant populations and may enhance the explanatory power of social support or demonstrate unique effects in the prediction of outcomes. Examining specific dimensions of relationship quality in transplant populations may not only contribute to our understanding of the broader construct of social support, but may also enhance our knowledge regarding how qualities directly influence relationship outcomes (e.g., satisfaction, adjustment, and functioning), as well as individual outcomes (e.g., physical and psychological health outcomes). Therefore, a comprehensive understanding of these other relationship dimensions is necessary in order to progress our ability to enhance patient outcomes.

Other Relationship Domains and Health

Lawrence et al. (2008) conducted a comprehensive review of the relationship literature across multiple disciplines (e.g., clinical and social psychology, family studies, sociology, communication studies) and identified five primary relationship quality dimensions that have demonstrated significant associations with marital satisfaction, adjustment, and other important outcomes. These dimensions comprise their recently published assessment tool, the Relationship Quality Interview (RQI; Lawrence et al., 2009; 2011) and include: support transactions, conflict/problem-solving, emotional intimacy/closeness, respect/acceptance/control, and sexual relations. Each of these dimensions has been examined to some extent in the health-related literature, yet it is notable that the conflict domain has received the considerably greater attention than other areas. The relevant literature for each domain is reviewed in the next sections.

While the majority of the work has focused on marital or dating relationships and has failed to assess all of these dimensions in one study, there are a few notable exceptions. For example, Schramm, Marshall, Harris, and Lee (2005) found that displays of respect, appreciation, commitment, trust, affection, and effective communication in the marital relationship was predictive of greater satisfaction and adjustment, even when problems existed in other domains of the relationship. These findings underscore the importance of taking a nuanced, comprehensive approach in our examinations of close interpersonal relationships and their associations with important outcomes such as health. As mentioned previously, this approach has rarely been implemented; rather, the majority of the work on how social relationships influence health has focused on the broader construct of social support or on one specific relationship dimension. Although most of

the research described below has emphasized the marital relationship, it is important to note that these processes (excluding the sexual dimension) are also relevant for other types of close interpersonal relationships and may contribute meaningfully to health outcomes.

Conflict/Negative Communication

Interpersonal conflict and negative communication comprise one quality dimension that has been associated with a couple's satisfaction and adjustment over the course of their relationship. Conflict interactions in an intimate relationship have been defined based on the duration and frequency of arguments, characteristic behaviors during disagreements such as patterns of aggression or withdrawal, and how the couple recovers following an argument (Lawrence et al., 2011). Negative communication that occurs during conflict is often characterized by expressions of hostility or criticism. Christensen (1987) described the demand/withdrawal communication pattern in couples which involves one partner communicating via criticism, blame, and threats while the other partner responds with avoidance or withdrawal behaviors. This type of communication pattern during conflicts has been linked to poor relationship outcomes including marital dissatisfaction and divorce (Caughlin & Huston, 2002; Heavey, Christensen, & Malamuth, 1995)

In general, conflict and negative interactions predict poor outcomes, although these results vary as a function of individual (e.g., gender, personality; Fincham, 2003) and relationship (e.g., degree of couple distress; Sher & Baucom, 1993) characteristics. In the health-related literature, conflict and negative communication have been directly linked to cardiovascular, endocrine, and immune functioning, as well as indirectly

associated with health outcomes through depression and health behaviors such as adherence (Kiecolt-Glaser & Newton, 2001). Feeling criticized in an intimate relationship has been linked to increased physiological stress and lower self-rated health (Antonucci, 2001; Bolger, DeLongis, Kessler, & Shilling, 1989; Kiecolt-Glaser et al., 1997; Newsom, Nishishiba, Morgan, & Rook, 2003). Kiecolt-Glaser, Glaser, Cacioppo, and Malarkey (1998) found that marital conflict involving an exchange of hostile behaviors or other negative interactions was correlated with increased production of stress hormones and changes in immune functioning over the course of the following day for both newlywed and older married couples. Notably, there were significant gender differences in this finding, such that wives' physiological response to conflict was greater than husbands.

Significant gender differences have also been demonstrated in other studies examining physiological responses to a conflict interaction. Heffner, Kiecolt-Glaser, Loving, Glaser, and Malarkey (2004) reported that satisfaction with spousal support served as a protective factor for women, such that cortisol changes resulting from conflict were smaller when support satisfaction was high. When satisfaction with support was low, increases in cortisol production were prevalent only for men. High satisfaction was associated with decreased blood pressure following conflict for both men and women (Heffner, Kiecolt-Glaser, Loving, Glaser & Malarkey, 2004). Results of a later study that did not examine satisfaction with spousal support found that cortisol responses to perceptions of negative communication behaviors during conflict (i.e., demands made by the wife that resulted in withdraw patterns from the husband over the course of marriage) was significant for women only (Heffner et al., 2006).

Similarly, findings of work by Kimmel et al. (2000) also suggested that the role of relationship satisfaction and conflict in predicting health outcomes differs based on gender. In this study, relationship quality was assessed in a sample of urban, African American patients being treated with hemodialysis for end-stage renal disease. Results indicated that women who endorsed a higher degree of relationship satisfaction and lower levels of conflict within their marriage evidenced a significant reduction in mortality risk, whereas these factors were unrelated to survival in men. Notably, these psychosocial variables held the same degree of power in predicting survival as known medical risk factors.

The role of relationship conflict in predicting psychological and medical outcomes in transplant populations has received scant attention in the literature. Despite its potential contribution to important outcomes, this dimension of relationship quality has been largely ignored. The work by Kiecolt-Glaser and colleagues relating marital conflict to immunological functioning may have direct implications for transplant patients when considering their post-operative treatment context. In other words, recipients are required to adhere to a life-long regimen of medications including those that suppress the immune system in order to prevent the body from rejecting the foreign (transplanted) organ. Thus, patients are constantly susceptible to the sequelae of a weakened immune system (e.g., infection), providing a context in which individuals may be more vulnerable to the effects of interpersonal relationship conflict on immune functioning compared to other patient populations. Given that evidence exists to suggest that relational conflict exacerbates maladaptive health practices such as nonadherence (e.g., Kiecolt-Glaser & Newton, 2001), the immunological effects would be particularly

salient if conflict affected immunosuppressant regimen adherence. This underscores the importance of explicitly assessing interpersonal relationship conflict and negative communication in transplant patients so that appropriate interventions to reduce risk for unfavorable health outcomes can be implemented.

Emotional Closeness/Intimacy

The quality of emotional closeness or intimacy in a relationship is another dimension that has been associated with both relationship and individual outcomes in the literature (e.g., Barnes & Sternberg, 1997; Cordova, Gee, & Warren, 2005; Laurenceau, Barrett, & Rovine, 2005). This construct has been conceptualized as the degree to which members of a dyad feel connected to one another, via feelings of trust, demonstrations of warmth and affection, comfort in expressing emotional vulnerability and disclosing about oneself to the other, and displays of love and attention toward each other (Kreilkamp, 1984; Lawrence et al., 2011; Timmerman, 1991).

In the health-related literature, the construct of emotional closeness has been used to develop intimacy models of interaction that may facilitate our understanding of chronic pain behavior in the context of the marital relationship. Cano and Williams (2010) draw on Reis and Shaver's (1988) interpersonal process model of intimacy to describe how a chronic pain patient's emotional self-disclosure via verbal communications of pain-related distress may elicit either validating or invalidating responses (as expressed by the degree of empathy and concern) from the partner. These responses, in turn, have effects on relationship closeness and psychological outcomes. For instance, if a patient's disclosure about pain-related emotions is met with invalidation by the spouse – including hostility, ignoring, disregarding, or rejecting behaviors – this will have negative effects

on the patient's psychological well-being. Dyadic interactions characterized by sadness and anger have been correlated with increased depression and indicators of pain severity in patients with chronic pain (Johansen & Cano, 2007).

The degree to which emotional closeness in marriage contributes to long-term survival as well as to recurrence of illness has also been examined. Tower, Kasl, and Darefsky (2002) investigated the link between this relationship dimension and 6-year survival in a community sample of older adults. The authors' operationalized closeness as whether or not the spouse was identified as a source of emotional support and/or someone that provides a comfortable environment for self-disclosure to occur. Results of this study indicated that being identified as close to your spouse, but not naming your spouse as a primary source of support, was associated with increased survival for both men and women.

In addition, a lack of emotional intimacy in a close relationship, as measured by perceived inability to disclose or discuss important matters with one's spouse, has been associated with increased rehospitalization rates following myocardial infarction among cardiac patients (Hegleson, 1991). It would be important to examine whether emotional closeness is related to outcomes in patients following transplantation, given that rehospitalization due to post-operative complications is common in this population (e.g., Nemati, et al., 2007). Moreover, Druley, Stephens, and Coyne (1997) found that women with lupus who avoided physical intimacy and self-disclosure about symptoms with their partner experienced high levels of negative affect. Emotional intimacy in the marital relationship has also been associated with diabetes regimen adherence (i.e., following physician recommendations for diet and exercise; Trief, Ploutz-Snyder, Britton, &

Weinstock, 2004). Based on the existing literature, one might expect that similar relations would emerge when testing this link in transplant patients, yet this assertion remains to be explicitly examined. Future studies on emotional intimacy in transplant populations are needed to enhance our understanding of the variables that contribute to successful outcomes.

Respect/Acceptance

In recent years, there has been a surge of research on the process of acceptance within the context of interpersonal relationships (Doss & Christensen, 2006). This construct has been conceptualized as a stance towards one's partner that reflects unconditional regard and a willingness to respond to positive and negative events or interactions in an adaptive manner. In other words, it involves being okay with one's partner as they are, without engaging in efforts to change the person. Increasing acceptance in relationships has become an important focus in clinical interventions for couples experiencing marital distress. To this end, couples learn skills that facilitate a change in their experience of unpleasant, undesirable, and/or problematic partner behavior that allow them to respond in more productive and valued ways that, in turn, improves their relationship.

The importance of acceptance in interpersonal relationships was emphasized in early work by Sarason, Pierce, and Sarason (1990). These authors noted that a sense of acceptance was integral to the perception of social support availability. Upon review of several measures attempting to assess perceived social support, the degree to which an individual felt unconditionally accepted by others, loved, valued, and able to

communicate openly in their intimate relationships emerged as common thread among these instruments.

The processes of acceptance, empathy, validation, and emotional intimacy have also been investigated within the context of couples coping with chronic physical pain (Cano & Leonard, 2006). Evidence suggests that individuals with chronic pain feel as though their experience of pain and related emotional distress is not understood by others (Herbette & Rime, 2004) or receives punishing responses such as lack of empathy when expressed (Morley, Doyle, & Beese, 2000). Thus, Cano and Leonard (2006) have recommended use of clinical interventions that emphasize behavior change strategies focused on increasing acceptance and empathy in chronic pain couples.

Although respect and acceptance within the context of interpersonal relationships has not been explicitly examined in the transplant literature, existing data in related fields provide support for the need to further our understanding of how acceptance in close relationships contributes to patient adaptation in this population. Specifically, feeling accepted by a spouse or in a close family relationship has been shown to predict abstinence from substance use (Booth, Russell, Soucek, & Laughlin, 1992). Given that the prevalence of substance use in pre-transplant patients is high (e.g., DiMartini et al., 2004), an understanding of how acceptance functions for these patients would have important implications for relapse prevention as a component of pre- and post-transplant care.

Sexual Relations

Similar to the other dimensions, the quality of a couple's sexual relationship has also demonstrated meaningful associations with marital satisfaction and individual

outcomes (Sprecher & Cate, 2004). This domain includes the frequency of and satisfaction with sexual interactions, comprised of sexual intercourse as well as intimate, sensual behaviors such as hugging, touching, and cuddling (Lawrence et al., 2011). Interview measures such as the Relationship Quality Interview (RQI; Lawrence et al., 2009; 2011) also inquire about whether the individual or partner is experiencing sexual difficulties or a diagnosable sexual dysfunction, and these responses are considered when making ratings about the quality of the sexual relationship. The latter point may be of particular relevance to individuals managing a chronic illness, given that there is a high prevalence of sexual side effects associated with treatments for various medical conditions (Fisher, Graham, Duffecy, & McAnulty, 2006).

This dimension of intimate relationships has been examined within the context of many chronic illness conditions, including cancer (e.g., Garos, Kluck, & Aronoff, 2007), HIV (e.g., Rose, Peake, Ennis, Pereira, & Antoni, 2005), fibromyalgia (e.g., Kool, Woertman, Prins, van Middendorp, & Geenen, 2006), and diabetes (e.g., Harland & Huws, 1997). In a study examining prostate cancer patients and their intimate partners, couples endorsed higher levels of depression, poorer quality of communication regarding sex, and lower sexual and general relationship satisfaction compared to the general population. Patients' ratings of communication and satisfaction were largely determined by the level of general and sex life-specific depression reported by their partners (Garos et al., 2007).

Examining correlates of the sexual relationship has received considerably greater attention in the transplant literature as compared to the aforementioned domains in patients' intimate relationships. It is important to note the distinction between reports of

sexual dysfunction, which are relatively high in both kidney (e.g., 50%; Muehrer, 2009) and liver (e.g., (e.g., 32%; Ho et al., 2006) recipients, and ratings of the overall quality of a couple's sexual relationship. Sexual dysfunction does not necessarily preclude a high quality, satisfying sexual relationship (Ho et al., 2006; Parolin et al., 2004; Raggi et al., 2012). The quality of a transplant patient's sexual relationship is important to examine, considering that higher sexual relationship satisfaction has been associated with better physical health and functioning in male kidney patients and greater frequency of sexual activity has been correlated with general physical and mental health in female patients (Tavallai et al., 2007). Further research in this area is needed to expand our understanding of how the quality of the sexual relationship influences psychological and physical health outcomes in transplant recipients.

Conceptualization of Relationship Domains in the Present Study

One of the primary concerns when attempting to integrate findings from the social support and relationship literatures relates to the variability in the way constructs have been operationalized and measured. This suggests a need to explicitly describe the constructs of interest and provide an overview of how dimensions will be operationalized in future research. Thus, the diagram below (refer to Figure 2) illustrates how the relevant dimensions of relationship quality were conceptualized and guided the present study. It was derived from prior research described above as well as from a comprehensive measure of relationship quality (RQI; Lawrence et al., 2009; 2011) discussed earlier. The primary objective of the present study was to examine the unique and/or overlapping effects of the previously described relationship quality domains with social support on psychosocial and medical outcomes in kidney transplant recipients.

Each of the domains in this conceptualization has demonstrated effects in previous health-related research. Based on the review above, it is evident that social support has important effects on patient outcomes. Specific to transplant populations, perception of general social support availability and/or the presence of a supportive person in patients' lives have been significantly related to less psychological distress, adherence to medications, survival, and improvements in health-related quality of life including social functioning. Drawing on work from the broader relationship literature, other relationship domains that are distinct yet related to social support also have emerged as predictors of important outcomes. Conflict and negative communication have been directly associated with physiological processes, depression, and maladaptive health behaviors such as nonadherence, outcomes of high importance in transplant populations. A lack of emotional closeness in an intimate relationship has been shown to influence depression, pain severity, mortality risk, and rehospitalization rates. Nonacceptance and low respect in couples exerts significant influence on relationship distress and relapse to substance use. Finally, sexual dysfunction and the quality of patients' sexual relationship with their intimate partner have demonstrated effects on physical and psychological well-being.

While there is evidence to support these associations in the existing literature, what remains unknown is whether the aforementioned relationship domains contribute meaningfully to outcomes in recipients of organ transplants. Relationship qualities have predicted outcomes in other populations that are particularly relevant to transplant patients, including depression, mortality risk, adherence, substance abuse, and rehospitalization, which underscores the need to understand how these aspects of close

relationships affect transplant recipients. In addition, it is important to determine whether these dimensions have independent and/or additive effects (while accounting for social support) in influencing outcomes. It is especially important to elucidate the link between relationship processes and negative or unfavorable outcomes so that this data can guide implementation of appropriate clinical interventions.

Study Objectives and Hypotheses

Primary Objective (1)

To examine the relative influence of specific close relationship processes on psychosocial outcomes in kidney transplant recipients. Objective 1 allowed for an analysis of how the specified relationship quality dimensions related to *psychosocial* outcomes in patients who were 6 months – 5 years post-transplant. Both the collective and unique effects of each domain were examined.

Hypothesis 1a: Higher levels of conflict/negative communication, lower levels of emotional closeness/intimacy, less respect/acceptance, lower support transactions within the close relationship, and poorer sexual relationship quality were hypothesized to be associated with greater (concurrently assessed) **depression and well-being** in post-transplant patients.

Hypothesis 1b: Higher levels of conflict/negative communication, lower levels of emotional closeness/intimacy, less respect/acceptance, lower support transactions within the close relationship, and poorer sexual relationship quality were hypothesized to be associated with greater (concurrently assessed) **physical and mental health-related quality of life (QoL)** in post-transplant patients.

Hypothesis 1c: It was hypothesized that these dimensions would explain unique significant variance in psychosocial outcomes when global perceived availability of social support was included in the model.

Secondary Objective (2)

To examine, as secondary outcomes, the relative influence of specific close relationship processes on medical outcomes in kidney transplant recipients.

Objective 2 allowed for an analysis of how the specified relationship quality dimensions related to *medical* outcomes in patients who were 6 months – 5 years post-transplant.

Hypothesis 2a: Higher levels of conflict/negative communication, lower levels of emotional closeness/intimacy, less respect/acceptance, lower support transactions within the close relationship, and poorer sexual relationship quality were hypothesized to be associated with self-reported adherence to the immunosuppressant regimen, poor graft function as measured by serum creatinine levels, and biopsy-confirmed acute or chronic rejection episodes.

Hypothesis 2b: It was hypothesized that these dimensions would explain unique significant variance in medical outcomes when global perceived availability of social support was included in the model.

Secondary Objective (3)

To explore whether gender moderates the association between specific close relationship processes and outcomes in transplant recipients. Given that differential effects based on gender have been demonstrated in prior research, Objective 3 allowed for a secondary/exploratory analysis of whether gender moderated the effects of

conflict/negative communication, emotional intimacy, and sexual relations on psychosocial and medical outcomes.

Hypothesis 3a: It was hypothesized that higher levels of conflict/negative communication, as well as lower emotional closeness/intimacy would be more strongly associated with poorer psychosocial and medical outcomes described above in female kidney transplant recipients.

Hypothesis 3b: It was hypothesized that poorer sexual relationship quality would be more strongly associated with worse psychosocial and medical outcomes described above in male kidney transplant recipients.

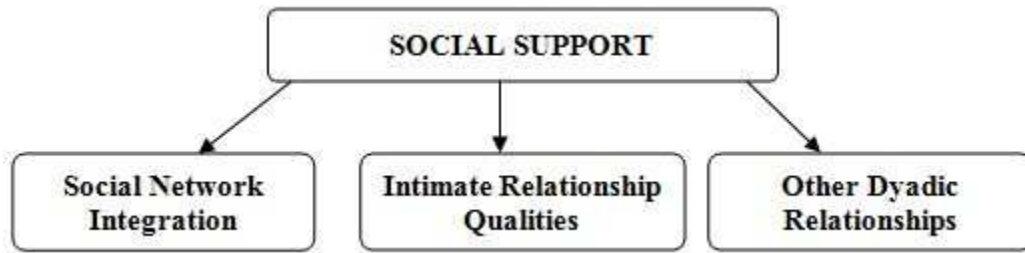


Figure 1. Conceptual diagram of social support components.

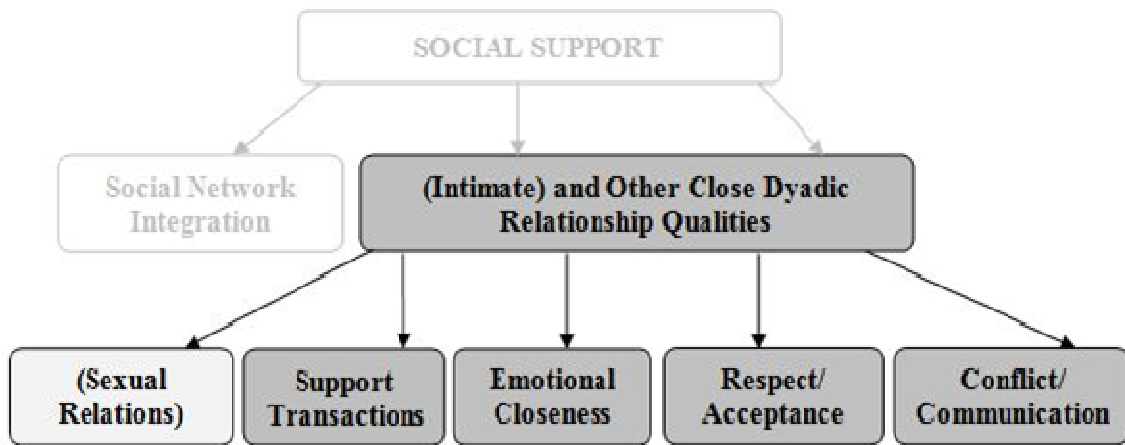


Figure 2. Conceptual diagram of the constructs of interest in the present study.

CHAPTER II

METHODS

Participant Sample

Research participants were recruited from the transplant clinic at the University of Iowa Hospitals and Clinics (UIHC). This study was approved by the University of Iowa's institutional review board for the protection of human research subjects and individuals were compensated \$20 for the completion of study measures. Eligibility criteria included having received a living or deceased donor kidney transplant at UIHC, being between 6 months and 5 years post-transplant at the time of enrollment in the study, and age over 18 years. Individuals within the first 6 months post-transplant were not included in order to avoid confounding with the sequelae of the post-operative period. To ensure that all participants were able to give informed consent and answer the interview and self-report questions, patients who were non-English speaking or evidenced severe cognitive impairment (e.g., dementia, psychotic symptoms) as indicated in the medical record were also excluded. Individuals who had experienced a graft failure since the transplant and were currently receiving treatment with dialysis were eligible to participate in the study, though no one who met this criterion was enrolled. In addition, individuals did not need to be involved in a romantic relationship to participate in the study.

Recruitment Procedure

The principal investigator collaborated with the kidney transplant coordinator at UIHC to identify individuals who were eligible to participate in the study. Electronic medical record lists with patient names who met eligibility criteria were compiled and

cross-referenced with the United Network for Organ Sharing (UNOS, 2012)'s publicly accessible comprehensive data report of patients receiving kidney transplants within the specified time period. Eligible participants were mailed a packet of materials including a letter inviting them to participate in a project conducted by researchers from the University of Iowa, Department of Psychology in collaboration with the transplant program, two copies of the informed consent document, and the self-report questionnaire measures. As indicated in the recruitment letter (see Appendix), individuals were encouraged to discuss the study with family and friends and consider their decision to participate for as much time as was needed. Individuals were also assured that declining participation in the study would in no way affect the medical care they received from the transplant team. Interested individuals were instructed to sign one of the informed consent documents, fill out the questionnaire packet, and return the completed materials to the research office in the enclosed stamped envelope at their earliest convenience. They were asked to keep the second copy of the informed consent document for their records.

If individuals were not interested in participating in the study and did not wish to be called by the research team, they were provided with an opt-out option. In this case, they were instructed to return the blank packet to the research office in the enclosed stamped envelope and to write "not interested" on the consent document. If potential participants did not opt-out and did not return the consent document and/or the questionnaire packet to the research office within two weeks of mailing, they were contacted via phone to ensure that the information was received and to discuss their participation in the study. The research staff attempted to re-contact potential

participants three times via phone if they were not reached on the first call. If interested participants returned the consent document without the questionnaires or vice versa, a member of the research team member called to remind them to send back the missing materials and re-sent documents as necessary. Recruitment and phone interviews (described below) took place concurrently from January – September 2011.

Assessment Procedure

Once the signed consent document and questionnaire packet was received by the research office, a member of the research team called each participant to schedule a time to conduct the phone interview. The Relationship Quality Interview (RQI) was administered during this scheduled call, which lasted an average of 60 minutes and ranged in duration from 30-90 minutes. Of note, participants were forewarned that they would be asked to share intimate details of their relationship and they were assured that confidentiality would be maintained. Suicidality was not specifically assessed in any of the interviews, though evidence of suicidality did not become apparent during any interaction with participants.

By signing the informed consent document, participants gave the research team permission to conduct comprehensive chart reviews to obtain the relevant study variables described in the Measures section below. The principal investigator ascertained these data from participants' medical record following their completion of the phone interview.

Measures

Demographic and Clinical Variables

Sociodemographic information, including gender, age, race, ethnicity, relationship status, level of education, employment status, and yearly income was

collected via a self-report measure. Participants were also asked to report on transplant and related medical information, including the date of their most recent transplant, etiology of their end-stage disease (e.g., diabetes mellitus, hypertension, etc.), previous treatment with dialysis, donor source, confirmed acute or chronic rejection episodes, and medical comorbidities. In addition, participants provided information about prior transplants including the number, dates, time to graft failure(s), and reason for rejection(s).

Relationship Quality Interview (RQI)

The RQI (Lawrence et al., 2009; 2011) is a semi-structured interview designed to yield interviewer ratings of the quality of a couple's intimate relationship across five dimensions over the past six months. The interview takes approximately 60 minutes to administer to each participant via phone. The following are descriptions and sample questions for each of the quality domains:

- 1) *Quality of Emotional Intimacy in the Relationship (Intimacy)* includes expressions of love and affection, willingness and comfort with self-disclosure and being emotionally vulnerable with each other, etc. Sample questions include, "How close do you feel with your partner?" and "Are there any specific personal (i.e., non-relationship) topics that either of you avoid talking about with the other?"
- 2) *Quality of the Couple's Sexual Relationship (Sex)* includes frequency and quality of sexual interactions, congruence of preferences for initiation and participation in sexual activities, etc. Sample items from this domain include,

“How satisfied are you with your sexual relationship?” and “During or after sex, do you feel any negative emotions such as fear, shame, guilt, or disgust?”

3) *Quality of Support Transactions (Support)* includes types of support received or provided between partners, including emotional, tangible, informational, and esteem support, congruence between received and preferred support, etc. Sample questions include, “Does your partner try to support you by spending a lot of time talking with you when you have a problem?” and “Can your partner tell when you are feeling down or need support, even if you don’t say anything?”

4) *Quality of Couple’s Respect for, Acceptance of, and Control Over Each Other in the Relationship (Respect & Control)* includes recognition of each partner as a competent adult, expression of understanding and positive regard for each other, etc. Sample items include, “Is your partner accepting of the kind of person you are and things you do?” and “When the two of you disagree, does your partner still show respect and acceptance for you?”

5) *Quality of Conflict/Problem-Solving Interactions in the Relationship (Conflict)* includes frequency and length of arguments, emotions and behaviors typically expressed during conflict, etc. Sample questions include, “About how often do you and your partner argue?” and “When the two of you have argued in the last 6 months or so, have either of you said things that might be hurtful, called each other names, put the other person down, things like that?”

For each of the domains, the interviewer asked open ended questions followed by a series of closed ended questions, to obtain important contextual information. In addition, probes such as “What makes you say that?”, “Can you give me an example of

what you mean?”, “How do you feel about that?”, and “Can you tell me more about that?” were used to obtain more detailed descriptions of each relationship quality dimension. The interview is sufficiently flexible, such that the interviewer can ask follow-up questions based on participants’ responses, or omit questions if they are clearly not applicable based on a previous response (e.g., frequency of sexual intercourse would not be asked if the participant had already indicated that he/she had not had sex in the last year).

Regarding the scoring of the RQI, the questions in each domain (including consideration of the contextual information) were rated on a scale from 1-5, with half-point (e.g., 3.5) scores permissible. The rating scale below was used for each of the individual item ratings per the author’s scoring instructions (Lawrence et al., 2011).

1 = Participant or partner absolutely never engages in this behavior (if it’s a positive/desired behavior) or always engages in this behavior (if it’s an aversive behavior). Participant is completely/extremely dissatisfied with partner/relationship in this area. (This is meant to be an extreme rating.)

2 = Poor functioning in this area. Participant or partner engages in this behavior rarely/occasionally (if it’s a desired/positive behavior) or frequently/often (if it’s an aversive behavior). Participant is somewhat dissatisfied with partner/relationship in this area.

3 = Participant or partner engages in this behavior about half of the time.

Participant is satisfied with partner’s behavior in this area about half of the time or is indifferent on the matter.

4 = Good functioning in this area. Participant or partner engages in this behavior frequently/often (if it's a desired/positive behavior) or rarely/occasionally (if it's an aversive behavior). Participant is satisfied with partner/relationship in this area.

5 = Participant or partner always engages in this behavior (if it's a positive/desired behavior) or absolutely never engages in this behavior (if it's an aversive behavior). Participant is completely/extremely satisfied with partner/relationship in this area. (This is meant to be an extreme rating.)

These individual scale scores were then used to determine the interviewer's global rating of each relationship quality domain on a 1-5 scale (with half-point scores again being permissible); the global ratings served as the index scores in the analyses. A sample global rating scale for the conflict/negative communication scale is as follows (see Appendix for a full description of each global rating scale):

1 = Major arguments occur often (e.g., several times a week). All/almost all disagreements escalate into major arguments. Conflict regularly includes verbal aggression and/or physical aggression along with a multitude of negative emotions. Couple has poor conflict management skills. The argument may end, but the issue is not resolved.

2 = Major arguments are common (e.g., weekly). Disagreements often escalate into major arguments. Conflict often includes verbal aggression and may sometimes include "moderate" physical aggression. Couple has poor conflict management skills. Couple typically takes hours to days to recover from an argument, and disagreements are rarely resolved.

3 = Major arguments occur occasionally (e.g. once a month). Minor arguments (bickering) occur regularly (e.g. weekly). Major arguments include some negative affect with occasional verbal aggression, but no severe physical aggression. Conflict resolution takes a long time, but issues are typically resolved in some way. One person tends to facilitate the process of getting back to normal more than the other.

4 = Major arguments are rare. Minor arguments occur occasionally. There is absolutely no psychological or physical aggression (but the couple may express some degree of negative affect during arguments). Couple has good conflict management skills, and issues are almost always resolved.

5 = Absolutely no major arguments. No psychological or physical aggression. Very rarely have minor arguments (bickering). Couple is good at resolving conflict and exhibits good conflict management skills. Disagreements are typically resolved with healthy communication and do not escalate into arguments.

The RQI has demonstrated strong internal consistency reliability, with inter-rater agreement above .7 for studies with married couples as well as with couples in committed dating relationships. Correlations among the RQI scales (ranging from .2 to .6) suggested that the domains are not redundant with one another and represent distinct yet related dimensions of relationship quality. In addition, the RQI has shown good convergent and divergent validity based on correlations with self-report measures of related relationship constructs, behavioral observation tasks, global relationship satisfaction measures, and individual difference measures of related constructs. There are norms for this interview

in community and clinical samples of married couples and dating partners (Lawrence et al., 2008; 2009; 2011). The following ranges of means and standard deviations across relationship domains in married couples and dating partners have been reported: emotional intimacy: 3.40-4.20 (.39-.65); sexual relations: 3.36-3.92 (.64-.66); support transactions: 3.63-3.97 (.49-.50); respect and control: 3.36-4.01 (.51-.69); and conflict: 3.35-3.78 (.67-.83) (Lawrence et al., 2011).

The RQI was modified for use with individuals who were not married or in a committed dating relationship at the time of enrollment in the study. Specifically, if participants were not in an intimate relationship, they were instructed to identify the person who had been the closest to them during the transplant process (e.g., their primary support provider), or if this person was no longer in their life, to identify the person they felt closest to over the previous six months, and to answer the RQI with this person in mind. Questions reflecting intimate relationship processes that are not applicable in these cases were excluded (i.e., all questions [S1-S4] in the ‘Sexuality/Sensuality’ section and all ‘Decision-Making and Control’ questions [R4-R12] in the ‘Respect and Control’ section). Please refer to the Appendix to review these questions in detail.

Training of Interviewers

Interviewers for the proposed study were the principal investigator and an advanced undergraduate research assistant with interviewing experience. Interviewers underwent comprehensive training by another graduate student, who is an expert at administering the RQI and hold authorship on its original manuscripts, to ensure adequate understanding of the constructs targeted in each domain, to learn the important conceptual differences across the relationship dimensions assessed, and to become skilled

at eliciting the information necessary to validly code the interviews. Training consisted of listening to previously coded interviews from Dr. Lawrence's lab, practice administration of mock interviews, and comprehensive review of how the coding of interviews was to be conducted. All interviews in the study were digitally recorded (with the participants' permission), and inter-rater reliability was assessed by having a second interviewer code 15% of a random sample of recorded interviews. Intraclass correlations ranged from .79 to .98.

Interpersonal Support Evaluation List (ISEL)

The ISEL (Cohen, Mermelstein, Kmack, & Hoberman, 1985) is a 40-item self-report measure of global perceived social support availability across four domains (belonging, esteem, appraisal, and tangible assistance). Participants were instructed to respond to each item on a 4-point Likert-type scale (0 = "definitely false," 1 = "probably false," 2 = "probably true," and 3 = "definitely true"). Sample items include, "There is at least one person I know whose advice I really trust," "When I need suggestions on how to deal with a personal problem, I know someone I can turn to," and "If I were sick and needed someone (friend, family member, or acquaintance) to take me to the doctor, I would have trouble finding someone." The ISEL has demonstrated adequate test-retest reliability, with correlations reported at .87 for the full measure and ranging from .71-.87 for the subscales (Cohen & Hoberman, 1983). The measure also shows good internal consistency reliability, with coefficient alphas ranging from .88-.90. In addition, moderate correlations have been reported between the ISEL and self-report measures of related constructs, demonstrating good convergent validity (Cohen & Hoberman, 1983). The total ISEL score representing global perceived social support availability was used in

the present study. This measure had excellent internal consistency reliability, with an alpha of .94.

Inventory of Depression and Anxiety Scales (IDAS)

The IDAS (Watson et al., 2007) is a factor analytically derived, multidimensional, 64-item self-report inventory used to assess symptoms of depression and anxiety over the previous two weeks. Participants responded to each item on a 5 point Likert-type scale (1 = “not at all” to 5 = “extremely”). The IDAS contains two broad scales assessing general depression and dysphoria, as well as ten specific symptom subscales relating to suicidality, lassitude, sleep and appetite disturbance, ill-temper, general well-being, panic, social anxiety, and traumatic memories. These scales have demonstrated strong internal consistency reliability, with coefficient alphas ranging from .82 to .89 (Watson et al., 2007). In addition, the IDAS has shown good convergent and discriminant validity with diagnoses and self-report measures, as well as good short-term test-retest reliability in a psychiatric sample (Watson et al., 2008; Watson et al., 2007). The general depression ($\alpha = .94$) and well-being ($\alpha = .77$) subscale scores from this measure were used in the present study.

12-Item Short-Form Health Survey (SF-12)

The SF-12 (Ware, Kosinski, & Keller, 1996) was derived from the Medical Outcomes Study 36-Item Short-Form Health Survey (SF-36; Ware & Sherbourne, 1992) and is used to measure physical and psychological aspects of health-related quality of life. This shortened version has been found to decrease respondent burden while maintaining accuracy in depicting the constructs intended by the original SF-36 (Ware, Kosinski, & Keller, 1996). The SF-12 is comprised of 12 questions that cover eight

domains of health status and can be summarized in two broad categories: Physical and Mental Health Component summary scales. Participants were instructed to answer questions about how they have been feeling and the extent to which their usual activities have been limited over the past four weeks. Sample items include: “During the past four weeks, have you had any of the following problems with your work or regular activities *as a result of your physical health*: Accomplished less than you would like? Were limited in the kind of work or other activities?” and “During the past four weeks, how much of the time has your *physical health or emotional problems* interfered with your social activities (like visiting with friends, relatives, etc.)?” The SF-12 has demonstrated good test-retest reliability for the Physical Component Scale ($r = .89$) and Mental Component Scale ($r = .76$), as well as adequate internal consistency reliability and validity (Ware, Kosinski, & Keller, 1996).

Transplant Effects Questionnaire Adherence Scale (TxEQ)

The 5-item Adherence Scale from the TxEQ (Ziegelmann et al., 2002) was used as a self-report measure of participants’ adherence to the immunosuppressant medication regimen, a necessary component of post-operative care for all transplant recipients. Participants were instructed to respond to each of items on a 5-point Likert-type scale (1 = “strongly agree” to 5 = “strongly disagree”). Sample questions include, “Sometimes I forget to take my anti-rejection medicines,” and “Sometimes I think I do not need my anti-rejection medicines.” The TxEQ Adherence Scale has demonstrated adequate one month test-retest reliability ($r = .78$) and internal consistency reliability ($\alpha = .79$). The measure demonstrated good internal consistency reliability in the present study, with an alpha of .86.

Secondary Medical Outcome Measures

In addition to the aforementioned measures, secondary medical outcome measures were obtained from a review of the participant's hospital record. Serum creatinine levels, a commonly used clinical marker of graft function in kidney transplant recipients (e.g., Bohlke et al., 2009), was collected over the six months prior to the RQI administration. To capture fluctuations in these values over time, the average of two values over these six months was used in secondary data analyses. In addition, biopsy-confirmed acute and/or chronic rejection episodes over the previous six months were documented and used in secondary data analyses.

CHAPTER III

RESULTS

Participants

Based on the recruitment procedure described above, 308 post-kidney transplant patients were determined to be eligible and were contacted about participating in the study. One hundred two patients (33.1%) agreed to be enrolled and completed the questionnaire packet. Nine participants were excluded from statistical analyses for the following reasons: one participant was mistakenly recruited and determined to be ineligible during the phone interview (his transplant date was documented as 2010 in his UIHC medical record, but the participant reported that his transplant was performed in another state in 2000), one participant returned the questionnaire packet but neglected to sign the informed consent document and did not respond to the research team's request for this form despite several attempts to contact her via phone and mail, and seven participants returned the consent document and questionnaire packet but were unable to be reached to administer the RQI. Thus, the final sample consisted of 93 participants.

The demographic characteristics of the sample are presented in Table 1 and the clinical characteristics are presented in Table 2. In sum, the participants were predominantly White non-Hispanic (89.2%), male (55.9%), married or in a committed dating relationship (72.0%), ranged in age from 20-81, and had some college education. All romantic relationships were heterosexual. Participants were an average of 2.4 years post-transplant and the majority had received their kidney from a deceased donor (67.7%). All of the participants had a functioning graft and were not receiving treatment with dialysis at the time of enrollment in the study.

Participants in this study were similar to the larger population of patients who received a kidney transplant at UIHC during the specified time period (2006-2011), from which this sample was drawn. The Organ Procurement and Transplantation Network (OPTN), sponsored by the U.S. Department of Human Services Health Resources and Services Administration (HRSA), provides annual data reports accessible to the public that include information on ethnicity, gender, age, and donor type for kidney recipients by transplant center. Based on these data, the entire population of 2006-2011 UIHC kidney recipients was 84.2% White non-Hispanic (compared to 89.2% of study participants), 65.3% male (compared to 55.9% of study participants), predominately in the 50-64 year-old age range (44.7%, compared to 45.2% of study participants), and had received their kidney from a deceased donor (64.6%, compared to 67.7% of study participants) (OPTN, 2012). Data on other variables such as relationship status was not available through OPTN's publicly accessible data reports and permission to access medical records of non-responders was not granted by the institutional review board. However, given that available demographic and clinical characteristics were comparable between the study participants and the aggregate population of UIHC kidney recipients during the specified time frame, it is reasonable to conclude that the study participants were a representative sample of the larger population. In addition, a recent study examining solid organ and bone marrow transplant recipients reported that 67% of their (combined transplant type) sample was married, which is comparable to the 72% who were married or in a committed dating relationship in the present study (Goetzmann et al., 2008).

Data Analytic Strategy

Composite scores for the relevant self-report measures were computed if more than 75% of the scale was completed, and there was minimal missing data on these variables. There was no missing data on the RQI or on the clinical data obtained from the participants' medical record reviews. Structural equation modeling (SEM) was used to test the hypotheses in the present study. SEM is a robust method for analyzing multivariate data and allows for an examination of complex relationships among variables. Analyses were conducted in AMOS and the Maximum Likelihood estimation (ML) was used. Researchers have suggested that overall fit indices are more realistic and parameter values less biased (if the hypothetical model overlaps with the observed model) when using ML, compared to other estimation methods (e.g., Olsson, Foss, Troye, & Howell, 2000).

Descriptive statistics to test for problematic skewness or kurtosis among the relevant variables were computed, given that the ML estimation is sensitive to violations of normality. While some of the statistics representing skewness and kurtosis were outside of the -1.0 to 1.0 index range, visual inspection of histograms and boxplots did not indicate any severe deviation from normality and none of the distributions were represented as a binomial split. Based on these observations, transformations of the data were deemed unnecessary.

Preliminary Analyses

Means and standard deviations for the measures, as well as correlations among the observed variables were first calculated for the subsample of participants who were married or in a romantic relationship (N = 67) and then for the full sample of participants

(N = 93). These results can be found in Tables 3-6. In sum, correlations among the domains of relationship quality ranged from .3 - .7, which is consistent with previous findings.

Zero order correlations among variables likely to influence the psychosocial and medical outcomes such as gender, age, race/ethnicity, education, employment status, income, elapsed time since transplant, etiology of kidney disease, donor source, prior transplants, and medical comorbidities were also examined for the romantic relationship subsample as well as the full sample. For only participants who were married or in a committed dating relationship, general depression was correlated with income ($r = -.278$, $p = .03$); well-being was correlated with income ($r = .257$, $p = .04$) and race/ethnicity ($r = -.258$, $p = .04$); physical health-related quality of life was correlated with age ($r = -.295$, $p = .02$), employment status ($r = -.525$, $p < .001$), living donor source ($r = .322$, $p = .01$), and comorbid diabetes ($r = -.404$, $p = .001$) and cardiovascular disease ($r = -.310$, $p = .012$); and mental health-related quality of life was correlated with gender ($r = -.264$, $p = .03$), race/ethnicity ($r = -.258$, $p = .02$), and income ($r = .346$, $p = .006$). In addition, average creatinine was correlated with gender ($r = -.263$, $p = .031$). The pattern and magnitude of the correlations was nearly identical in the full sample of participants. See below for how significant demographic and clinical variables were tested in the measurement model.

In order to address the primary aim of the study and examine how the aforementioned relationship quality dimensions relate to psychosocial outcomes in patients who are 6 months – 5 years post-transplant, preliminary analyses were first conducted to determine if the domains reflected an underlying construct. In other words, the conflict/negative communication, emotional closeness, respect/control, support

transactions, and sexual relations variables were estimated as indicators of a reflective 'relationship quality' latent variable. Confirmatory factor analyses (CFA) were conducted to establish the adequacy of the measurement model. The first CFA was performed with the sample of participants who were either married or in a committed dating relationship and had data on all five of the domains (N = 67). The model was identified and minor re-specification by allowing relevant error terms to co-vary (based on theoretical information and correlational data) was necessary.

Multiple fit indices were used to evaluate the fit of the model including the chi-square test statistic (p values should be non-significant to confirm the null hypothesis, meaning there are no significant differences between the hypothetical model and the observed model), the Comparative Fit Index (CFI), Normed Fit Index (NFI), Tucker-Lewis Index (TLI), and the Root Mean Square Error of Approximation (RMSEA). The following guidelines were used to determine adequacy of fit, based on Hu and Bentler's (1999) recommendations: 1) CFI, NFI, and TLI values above .90 represent good model fit, and $\geq .95$ represent an excellent model fit; 2) RMSEA values below .05 represent good fit, and values ranging from .06 to .08 represent adequate model fit. Other researchers have argued that these cut-offs are too stringent, and that more liberal cut-offs (e.g., .08 to .10 for RMSEA) may be more appropriate in some cases (Marsh, Hau, & Wen, 2004). These recommendations were considered when evaluating goodness of fit of the models described below.

An examination of fit indices for the first CFA ($\chi^2 = 2.54$, $p = .281$; CFI = .997; NFI = .987; TLI = .985; RMSEA = .06), suggested that the model was a good fit for the

data (see Figure 3). In other words, the five dimensions adequately represented the relationship quality latent construct for participants in a romantic relationship.

A second CFA was conducted with the entire sample (N = 93), wherein only the relevant relationship quality indicators (excluding the sexual relations and decision-making/control questions) were used to construct the relationship quality latent variable. The model was identified and minor re-specification by allowing relevant error terms to co-vary was necessary. Indices confirmed that this model was an excellent fit for the data ($\chi^2 = .296$, $p = .586$; CFI = 1.000; NFI = .998; TLI = 1.026; RMSEA = .00) (see Figure 4). The four quality domains represented the relationship quality construct for all participants who were either in romantic or non-romantic relationships.

As mentioned above, the next models were tested to determine whether relevant demographic and clinical variables significantly contributed to the outcomes, such that they should be included in the primary analyses. Given that age, gender, and income were correlated with at least one of the psychosocial outcomes, and that time since transplant has been associated with outcomes in previous research, these variables were first modeled with the relationship quality construct using the subsample of participants in a romantic relationship. Examination of fit indices suggested that the model did *not* adequately fit the data ($\chi^2 = 91.05$, $p = .000$; CFI = .860; NFI = .787; TLI = .711; RMSEA = .127). This model was then tested with the full sample of participants, and while overall fit indices suggested that the model was a good fit for the data in this case ($\chi^2 = 43.74$, $p = .207$; CFI = .980; NFI = .895; TLI = .958; RMSEA = .045), paths from age, gender, and time since transplant to the outcome variables were not significant and their

inclusion rendered subsequent models less parsimonious. Thus, none of the demographic or clinical variables were retained in the primary analyses.

Primary Analyses

Given that the CFA models were supported by the data and the indicators adequately represented the latent variable in the preliminary analyses, the next models addressed the primary aim of the study and examined the influence of the relationship quality construct on the *psychosocial* outcomes, including general depression, well-being, physical health-related quality of life and mental health-related quality of life. The first model, depicted in Figure 5, represented the subsample of participants who were married or in a committed dating relationship (N = 67). Indices of component fit suggested that the overall model was a good fit for the data ($\chi^2 = 28.06$, $p = .138$; CFI = .974; NFI = .912; TLI = .945; RMSEA = .07). Path coefficients (standardized beta weights) were examined, and the results indicated that the relationship quality construct was a significant predictor of general depression (standardized $\beta = -.391$, $p = .002$), well-being (standardized $\beta = .249$, $p = .05$), and mental health-related quality of life (standardized $\beta = .248$, $p = .05$). Poorer relationship quality, which represents the collective effects of the five quality dimensions, was associated with increased depression symptoms, decreased feelings of well-being, and worse mental health functioning in the sample of participants who were involved in a romantic relationship. The standardized multiple correlations (R^2) suggest that romantic relationship quality accounted for 15% of the variance in general depression, 6% of the variance in well-being, and 6% of the variance in mental health-related quality of life.

A subsequent model displayed in Figure 6 included the entire sample of participants (N= 93) and the relationship quality latent construct comprised of the relevant observed variables. Results suggested that the overall model was an excellent fit for the data ($\chi^2 = 18.97$, $p = .270$; CFI = .990; NFI = .943; TLI = .977; RMSEA = .045). Analogous to the findings reported above, relationship quality significantly predicted general depression (standardized $\beta = -.311$, $p = .008$), well-being (standardized $\beta = .220$, $p = .05$), and mental health-related quality of life (standardized $\beta = .233$, $p = .047$). In this case, poorer relationship quality represented the collective effects of the four quality dimensions relevant for participants in both romantic and non-romantic relationships, and continued to be associated with more depression symptoms, decreased feelings of well-being, and worse mental health-related functioning. The standardized multiple correlations (R^2) suggest that relationship quality in this model accounted for 10% of the variance in general depression, 5% of the variance in well-being, and 5% of the variance in mental health-related quality of life.

An additional aspect of this study's primary aim was to determine the relative influence of relationship quality on depression, well-being, and health-related quality of life when global social support was included in the model. Figure 7 represents this model for the subsample of participants who were married or in a committed dating relationship (N = 67). Overall fit indices suggested that the model was a good fit for the data ($\chi^2 = 30.53$, $p = .205$; CFI = .981; NFI = .913; TLI = .959; RMSEA = .058). Based on examination of path coefficients (standardized beta weights), the relationship quality construct remained a unique significant predictor of general depression when global social support was included in the model (standardized $\beta = -.271$, $p = .027$). However,

well-being and mental health-related quality of life were no longer significant in this case. Comparison of the beta weights and significance levels indicated that the global social support measure was a stronger predictor of general depression (standardized $\beta = -.342$, $p = .004$), well-being (standardized $\beta = .558$, $p < .001$), and mental health-related quality of life (standardized $\beta = .360$, $p = .003$). Less global social support was associated with increased depression symptoms, decreased feelings of well-being, and poorer mental health functioning in the sample of participants who were involved in a romantic relationship. The standardized multiple correlations (R^2) suggest that the combined effects of romantic relationship quality and global social support accounted for a total of 26% of the variance in general depression, a total of 33% of the variance in well-being, and a total of 18% of the variance in mental health-related quality of life.

These analyses were repeated with the full sample of participants who were in both romantic and non-romantic relationships ($N = 93$) (see Figure 8). Based on examination of the component fit indices, the model was an excellent fit for the data ($\chi^2 = 23.89$, $p = .200$; CFI = .985; NFI = .937; TLI = .965; RMSEA = .053). Contrary to hypotheses, however, the relationship quality construct was not a significant predictor of the psychosocial outcomes for all participants when global social support was in the model, though the path to depression trended in the expected direction (standardized $\beta = -.196$, $p = .096$). As in the previous model with only participants in romantic relationships, global social support continued to predict general depression (standardized $\beta = -.310$, $p = .003$), well-being (standardized $\beta = .566$, $p < .001$), and mental health-related quality of life (standardized $\beta = .349$, $p = .001$) in this model with the full sample. Again, less global social support was related to more depression symptoms, decreased

feelings of well-being, and poorer mental health-related functioning. The standardized multiple correlations (R^2) suggest that the combined effects of romantic relationship quality and global social support accounted for a total of 18% of the variance in general depression, a total of 33% of the variance in well-being, and a total of 16% of the variance in mental health-related quality of life in this model with the full sample of participants.

It was also of interest to examine the unique effects of each of the relationship quality domains on psychosocial outcomes. Therefore, path analyses for the subsample of participants in a romantic relationship, as well as for the full sample of participants including romantic and non-romantic relationships, were conducted wherein the relevant relationship quality domains were treated independently as observed variables and, with the global social support variable, were regressed on depression, well-being, and physical and mental health-related quality of life. In both of these cases, examination of fit indices suggested that the models *did not* adequately fit the data (romantic subsample: $\chi^2 = 10.07$, $p = .018$; CFI = .972; NFI = .968; TLI = .495; RMSEA = .203; full sample: $\chi^2 = 11.17$, $p = .018$; CFI = .979; NFI = .974; TLI = .684; RMSEA = .160). Based on estimates for the model with only those participants in a romantic relationship, the poorer sexual relationship quality significantly predicted worse physical health-related quality of life ($p = .043$) and trended toward significance in predicting decreased feelings of well-being ($p = .058$). Less global social support significantly predicted higher levels of depression ($p = .002$), decreased well-being ($p < .001$) and poorer mental health-related quality of life ($p = .003$). The only significant paths in the model with the full sample of participants were from global social support to depression ($p = .002$), well-being ($p < .001$), and mental

health-related quality of life ($p < .001$). However, caution is warranted in interpreting these significant paths given that the overall models were determined to be an inadequate fit for the data.

Additional analyses to determine if the individual relationship quality domains were significantly associated with the psychosocial outcomes in both the romantic subsample and the full sample of participants were conducted using basic linear regression in SPSS version 20. Results for the romantic subsample indicated that, when analyzed individually, lower levels of emotional closeness/intimacy ($p = .03$), respect/control ($p = .002$), support transactions ($p = .02$), and higher levels of conflict/negative communication ($p = .001$) each significantly predicted higher general depression scores. In addition, poorer sexual relationship quality significantly predicted lower physical health-related quality of life ($p = .02$) and higher levels of conflict/negative communication significantly predicted decreased mental health-related quality of life ($p = .05$). It is important to note, however, that when all of the relationship quality domains were included in the model with global social support simultaneously (controlling for the effects of each other), none of the unique effects remained significant in predicting any of the psychosocial outcomes.

A similar, though not identical pattern emerged when linear regression analyses were conducted with the full sample of participants. In this case, lower levels of emotional closeness/intimacy ($p = .007$), support transactions ($p = .007$), and higher levels of conflict/negative communication ($p = .027$) significantly predicted increased general depression. Lower levels of emotional intimacy/closeness ($p = .006$) and support transactions ($p = .045$) predicted decreased well-being, and lower levels of emotional

closeness/intimacy ($p = .037$) significantly predicted decreased mental-health related quality of life. Congruent with findings above, however, no unique effects remained significant when all relationship quality domains and global social support were regressed simultaneously on the psychosocial outcomes.

Secondary Analyses: Medical Outcomes

To examine the relative influence of the relationship quality domains on the secondary medical outcomes, each of the analyses described in the previous section were repeated with adherence and graft function (as measured by the average of two creatinine values) as the variables being predicted. Given that there was minimal variability in the categorical rejection episodes variable (i.e., only 2 participants had a biopsy-confirmed rejection episode during the specified time frame), this outcome was excluded from the analyses. Based on examination of model fit indices, it was determined that none of the models using both the romantic subsample as well as the full sample of participants were an adequate fit for the data. When the relationship quality latent variable (with and without global social support included) was regressed on the medical outcomes, there was no significant association with adherence or graft function. Similarly, when each of the relationship quality domains were treated independently as observed variables in subsequent models and regressed on the medical outcomes in both samples, none of the variables significantly predicted adherence or graft function.

Secondary Analyses: Gender Moderation

To explore whether gender moderated the association between specific close relationship processes and outcomes, several hierarchical regression analyses were performed in SPSS, first with the subsample of participants in a romantic relationship and

then with the full sample of participants. Previous research has suggested that the conflict, emotional intimacy, and sexual aspects of intimate relationships have differential effects on outcomes by gender, so these dimensions were used in subsequent analyses. First, in the romantic subsample, the main effects of conflict and gender were entered into the first step of the hierarchical regression, followed by the interaction of gender and conflict in the second step. Analyses were repeated with general depression, well-being, physical health-related quality of life, mental health-related quality of life, adherence, and graft function each serving as the dependent variable. Results indicated that there was a significant interaction between gender and conflict in predicting symptoms of depression ($F_{3, 66} = 5.87$, standardized $\beta = -1.28$, $p = .034$), feelings of well-being ($F_{3, 66} = 3.20$, standardized $\beta = 1.28$, $p = .043$), and mental health-related quality of life ($F_{3, 66} = 5.41$, standardized $\beta = 1.72$, $p = .008$). There was no significant interaction between gender and conflict for physical health-related quality of life, graft function, or adherence, though adherence did approach significance ($p = .067$). These findings suggest that for women, higher levels of conflict in the intimate relationship were more strongly associated with increased symptoms of depression (refer to Figure 9), decreased feelings of well-being (refer to Figure 10), and worse mental health-related functioning (refer to Figure 11) compared to men in this sample.

Analyses were repeated to test the interaction of gender and emotional intimacy, as well as gender and sexual relations, in the romantic subsample of participants. Results did not show evidence of a significant interaction for gender with emotional intimacy or sexual relations and any of the psychosocial or medical outcomes. In other words, men and women did not differ on how emotional intimacy or the sexual relationship

influenced depression, well-being, physical or mental health-related quality of life, adherence or graft function.

A final set of analyses were conducted using data from the full sample of participants. In this case, the interaction between gender and conflict in predicting feelings of well-being ($F_{3, 92} = 2.48$, standardized $\beta = 1.08$, $p = .055$) and mental health-related functioning ($F_{3, 92} = 3.89$, standardized $\beta = 1.10$, $p = .062$) approached significance in the same direction as above (with stronger associations for women), and the interaction term was no longer a significant predictor of symptoms of depression. Interestingly, the interaction between gender and conflict significantly predicted adherence in this sample ($F_{3, 90} = 1.94$, standardized $\beta = 1.31$, $p = .023$), as did the interaction between gender and emotional closeness ($F_{3, 90} = 2.52$, standardized $\beta = 1.25$, $p = .045$). Although the main effects of conflict and emotional closeness did not significantly predict adherence, results suggested that these relationship domains differentially predicted adherence depending on gender. Women reported slightly poorer adherence when conflict in the close relationship was high (refer to Figure 12) and when emotional closeness was low (see Figure 13). In contrast, adherence behavior appears to be less affected by the level of conflict and emotional intimacy in the relationship for men. Finally, there was no evidence of a significant interaction for gender with emotional intimacy on any other outcomes, and men and women did not differ on how the quality of the sexual relationship influenced depression, well-being, physical or mental health-related quality of life, adherence or graft function.

Table 1. Demographic Characteristics (N = 93)

	Number (%)	Mean (SD)	Range
Age		53.2 (14.7)	20.2 – 81.2
Years of Education		14.4 (2.9)	6.0 – 23.0
Years in Relationship (N = 67)		25.1 (17.1)	.3 – 61.0
<i>Gender</i>			
Male	52 (55.9)		
Female	41 (44.1)		
<i>Race/Ethnicity</i>			
White (non-Hispanic)	83 (89.2)		
White (Hispanic)	4 (4.3)		
African American/Black	3 (3.2)		
Asian/Pacific Islander	2 (2.2)		
Other (Biracial)	1 (1.1)		
<i>Marital Status</i>			
Married	52 (55.9)		
Committed Relationship	15 (16.1)		
Widowed	5 (5.4)		
Divorced	10 (10.8)		
Separated	1 (1.1)		
Never Married	10 (10.8)		
<i>Employment Status</i>			
Employed Full-Time	25 (26.9)		
Employed Part-Time	9 (9.7)		
Unemployed	9 (9.7)		
On Disability	38 (40.9)		
Retired	12 (12.9)		
<i>Yearly Income</i>			
Under \$25,000	41 (44.1)		
\$25,000 - \$50,000	24 (25.8)		
\$50,000 - \$75,000	9 (9.7)		
\$75,000 - \$100,000	11 (11.8)		
Over \$100,000	5 (5.4)		

Table 2. Clinical Characteristics (N = 93)

	Number (%)	Mean (SD)	Range
Years Since Transplant		2.4(1.4)	.5 – 5.2
<i>Prior Dialysis</i>			
Yes	66 (71.0)		
No	27 (29.0)		
<i>Cause of ESRD</i>			
Diabetes	35 (37.6)		
Hypertension	10 (10.8)		
Glomerulonephritis	6 (6.5)		
Polycystic Kidney Disease	9 (9.7)		
Other Nephropathy	9 (9.7)		
Other	23 (24.7)		
Unknown	1 (1.1)		
<i>Donor Source</i>			
Deceased Donor	63 (67.7)		
Living Donor	30 (32.3)		
<i>Living Donor Relationship</i>			
Spouse/Life Partner	2 (2.2)		
Parent	1 (1.1)		
Child	8 (8.6)		
Sibling	9 (9.7)		
Other Relative	4 (4.3)		
Unrelated	5 (5.4)		
Anonymous	1 (1.1)		
<i>Number of Previous Transplants</i>			
One	6 (6.5)		
Two	5 (5.4)		
Three	1 (1.1)		
<i>Comorbidities</i>			
Diabetes	39 (41.9)		
Hypertension	48 (51.6)		
Cardiovascular Disease	22 (23.7)		
Cancer	4 (4.3)		
Chronic Pain	14 (15.1)		

Table 3. Descriptive Statistics: Relationship Quality and Outcomes for Romantic Subsample (N = 67)

	Mean	SD	Actual Range	Reference Range
EMO	3.99	.70	1.50 – 5.00	1.00 – 5.00
SEX	3.18	1.17	1.00 – 5.00	1.00 – 5.00
SUP	3.87	.72	1.50 – 5.00	1.00 – 5.00
R&C	4.06	.53	2.50 – 5.00	1.00 – 5.00
CON	3.77	.75	2.00 – 5.00	1.00 – 5.00
ISEL	96.56	15.75	59.49 – 120.00	0.00 – 120.00
DEP	36.95	11.26	20.00 – 70.00	20.00 – 100.00
W-B	25.27	3.78	19.00 – 33.00	8.00 – 40.00
PC12	41.87	10.53	21.69 – 59.45	0.00 – 100.00
MC12	52.66	9.63	24.26 – 66.06	0.00 – 100.00
CREA	1.38	.38	.80 – 2.40	0.50 – 1.20
ADHERE	22.92	4.32	5.00 – 25.00	5.00 – 25.00

EMO = Emotional Intimacy; SEX = Sexual Relations; SUP = Support Transactions; R&A = Respect & Acceptance; CON = Conflict; ISEL = Interpersonal Support Evaluation List; DEP = General Depression; W-B = Well-Being; PC12 = Physical Component Scale; MC12 = Mental Health Component Scale; CREA = Creatinine; ADHERE = Adherence

Table 4. Descriptive Statistics: Relationship Quality and Outcomes for Full Sample (N = 93)

	Mean	SD	Actual Range	Reference Range
EMO	3.97	.67	1.50 – 5.00	1.00 – 5.00
SUP	3.89	.70	1.50 – 5.00	1.00 – 5.00
R&A	3.85	.54	1.50 – 5.00	1.00 – 5.00
CON	3.91	.74	2.00 – 5.00	1.00 – 5.00
ISEL	93.28	18.89	35.68 – 120.00	0.00 – 120.00
DEP	38.29	12.06	20.00 – 70.00	20.00 – 100.00
W-B	24.64	3.93	17.00 – 33.00	8.00 – 40.00
PC12	41.51	10.95	21.69 – 60.32	0.00 – 100.00
MC12	51.20	10.08	20.12 – 66.06	0.00 – 100.00
CREA	1.39	.40	.70 – 2.40	0.50 – 1.20
ADHERE	23.16	3.92	5.00 – 25.00	5.00 – 25.00

EMO = Emotional Intimacy; SUP = Support Transactions; R&A = Respect & Acceptance; CON = Conflict; ISEL = Interpersonal Support Evaluation List; DEP = General Depression; W-B = Well-Being; PC12 = Physical Component Scale; MC12 = Mental Health Component Scale; CREA = Creatinine; ADHERE = Adherence

Table 5. Correlations Among Observed Variables for Romantic Subsample (N = 67)

	EMO	SEX	SUP	R&C	CON	ISEL	DEP	W-B	PC12	MC12
EMO	---	.535**	.728**	.680**	.595**	.316*	-.264*	.202	.145	.183
SEX	.535**	---	.515**	.427**	.345**	.239	-.081	-.027	.286*	.031
SUP	.728**	.515**	---	.736**	.680**	.248*	-.292*	.221	.155	.147
R&C	.680**	.427**	.736**	---	.722**	.329**	-.366**	.224	.062	.209
CON	.595**	.345**	.680**	.722**	---	.308*	-.387**	.219	.197	.244
ISEL	.316*	.239	.248*	.329**	.308*	---	-.446**	.584**	.189	.398**
DEP	-.264*	-.081	-.292*	-.366**	-.387**	-.466**	---	-.515**	-.343**	-.717**
W-B	.202	-.027	.221	.224	.219	.584**	-.515**	---	.118	.540**
PC12	.145	.286*	.155	.062	.197	.189	-.343**	.118	---	.124
MC12	.183	.031	.147	.209	.244	.398**	-.717**	.540**	.124	---

*p = .05 **p = .01

EMO = Emotional Intimacy; SEX = Sexual Relations; SUP = Support Transactions; R&C = Respect & Control; CON = Conflict; ISEL = Interpersonal Support Evaluation List; DEP = General Depression; W-B = Well-Being; PC12 = Physical Component Scale; MC12 = Mental Health Component Scale

Table 6. Correlations Among Observed Variables for Full Sample (N = 93)

	EMO	SUP	R&A	CON	ISEL	DEP	W-B	PC12	MC12
EMO	---	.740**	.541**	.513**	.445**	-.279**	.285**	.013	.221*
SUP	.740**	---	.567**	.576**	.338**	-.279**	.216*	.025	.183
R&A	.541**	.567**	---	.591**	.225*	-.175	.128	.119	.130
CON	.513**	.576**	.591**	---	.185	-.229*	.153	.041	.129
ISEL	.445**	.338**	.225*	.185	---	-.389**	.586**	.104	.377**
DEP	-.279**	-.279**	-.175	-.229*	-.389**	---	-.548**	-.236*	-.767**
W-B	.285**	.216*	.128	.153	.586**	-.548**	---	.096	.536**
PC12	.013	.025	.119	.041	.104	-.236*	.096	---	.055
MC12	.221*	.183	.130	.129	.377**	-.767**	.536**	.055	---

*p = .05 **p = .01

EMO = Emotional Intimacy; SUP = Support Transactions; R&A = Respect & Acceptance; CON = Conflict; ISEL = Interpersonal Support Evaluation List; DEP = General Depression; W-B = Well-Being; PC12 = Physical Component Scale; MC12 = Mental Health Component Scale

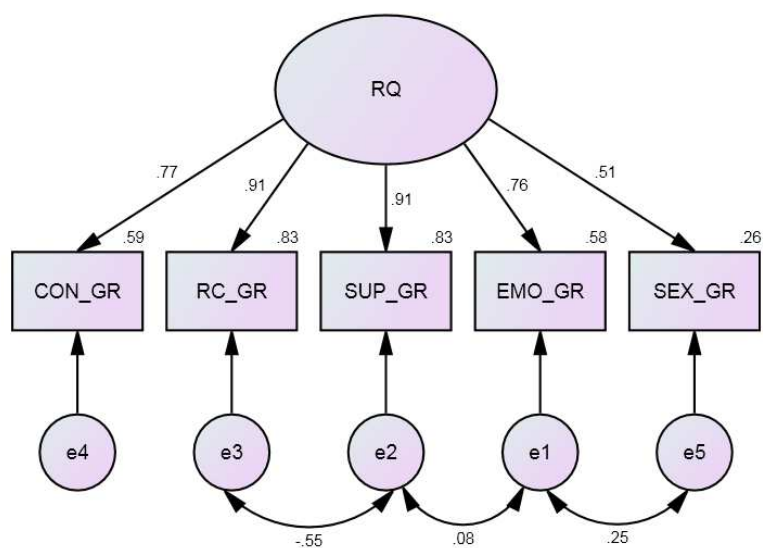


Figure 3. CFA to establish adequacy of the measurement model in the subsample of participants who were in a romantic relationship (N = 67). Path coefficients represent standardized beta weights.

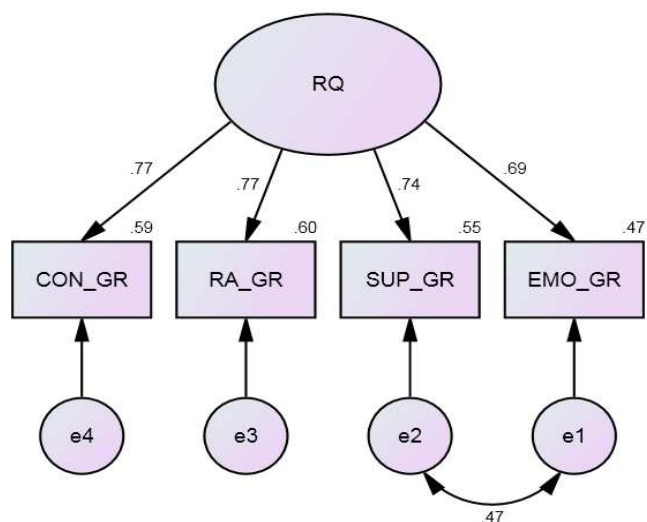


Figure 4. CFA to establish adequacy of the measurement model in the full sample of participants (N = 93). Path coefficients represent standardized beta weights.

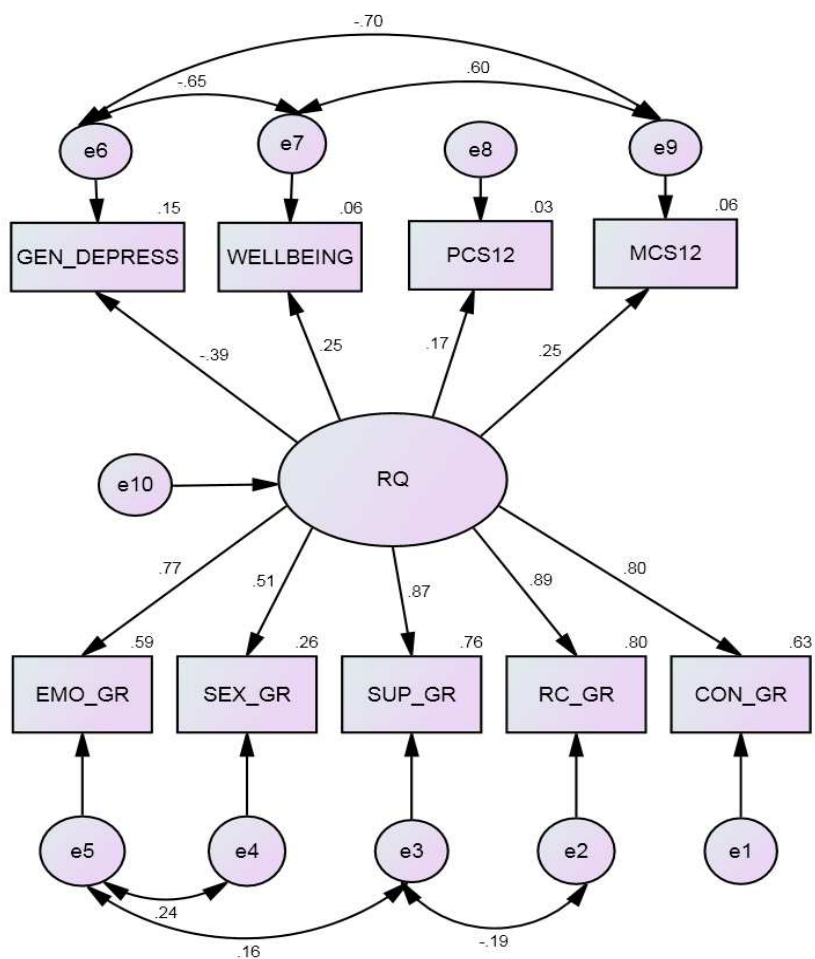


Figure 5. Influence of relationship quality on psychosocial outcomes in the subsample of participants in a romantic relationship ($N = 67$). Path coefficients represent standardized beta weights.

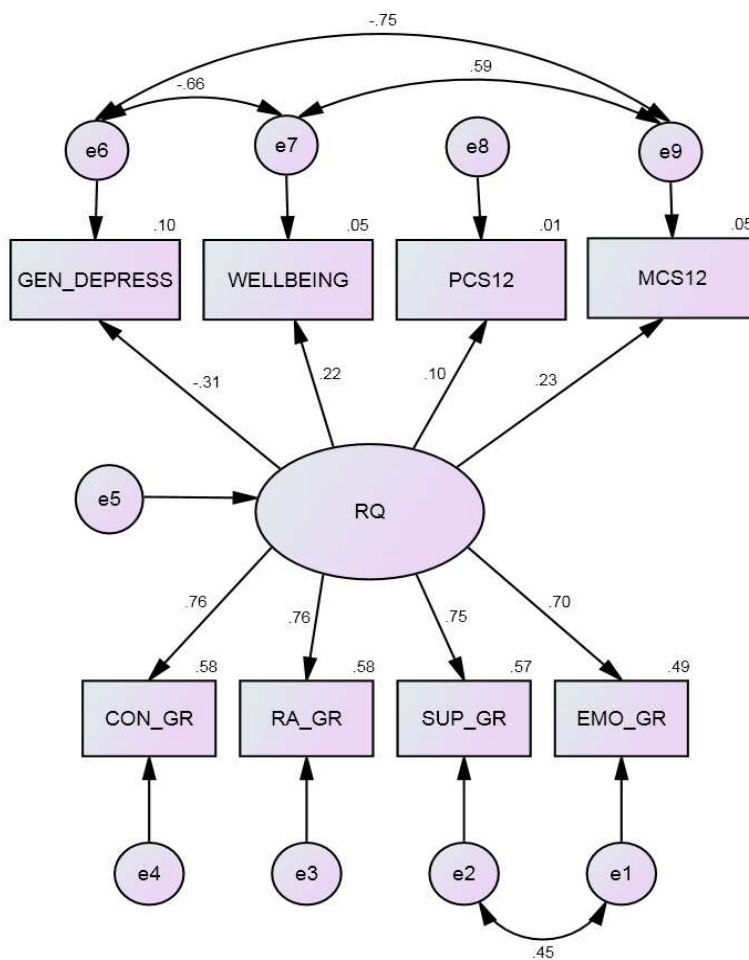


Figure 6. Influence of relationship quality on psychosocial outcomes in the full sample of participants (N = 93). Path coefficients represent standardized beta weights.

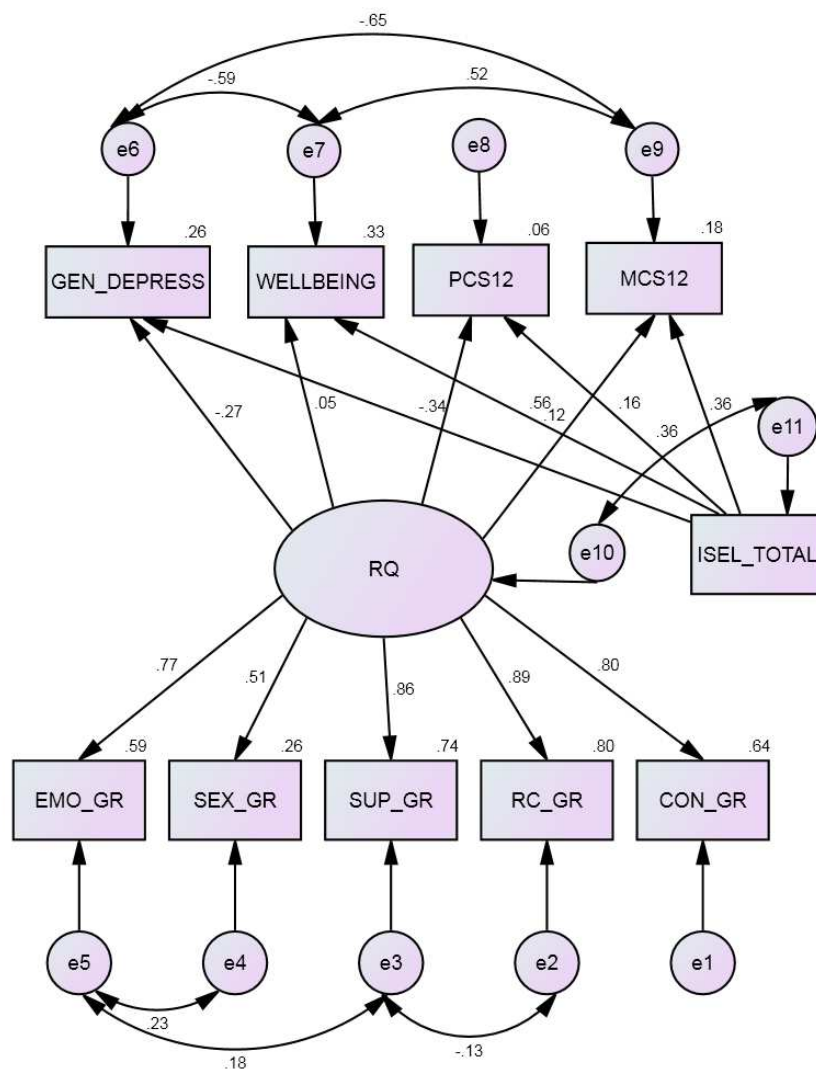


Figure 7. Influence of relationship quality and global social support on psychosocial outcomes in the subsample of participants in a romantic relationship (N = 67). Path coefficients represent standardized beta weights.

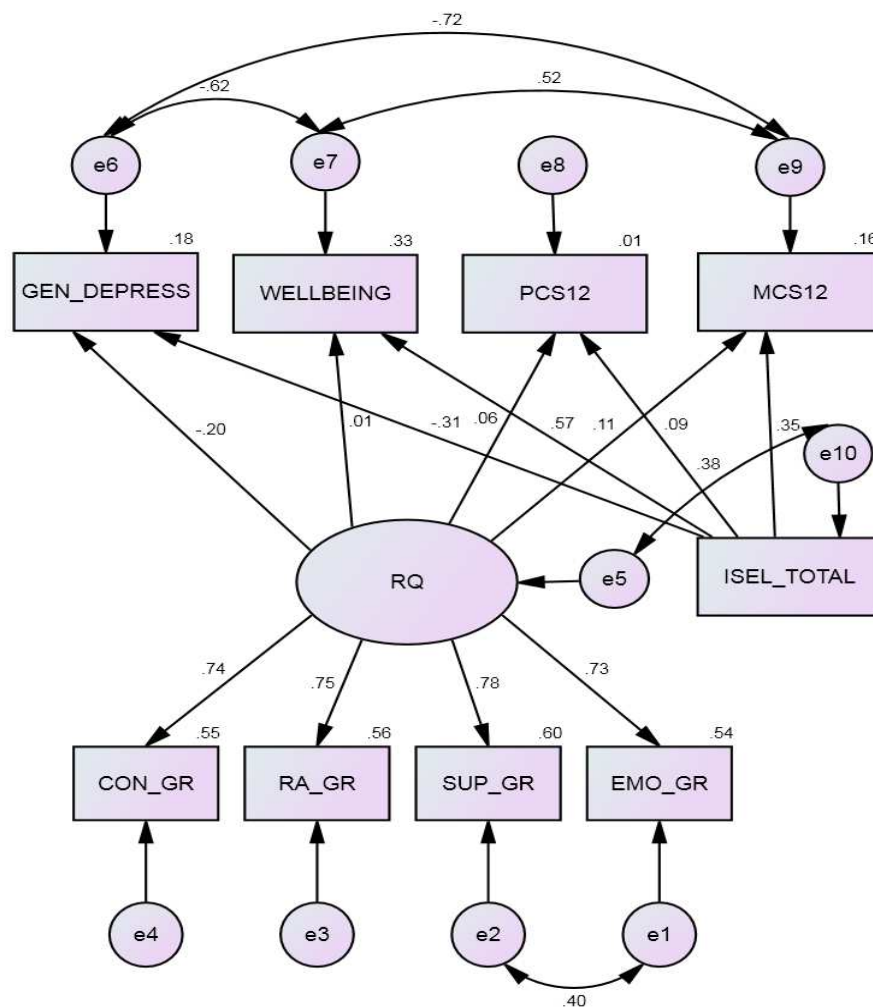


Figure 8. Influence of relationship quality and global social support on psychosocial outcomes in the full sample of participants (N = 93). Path coefficients represent standardized beta weights.

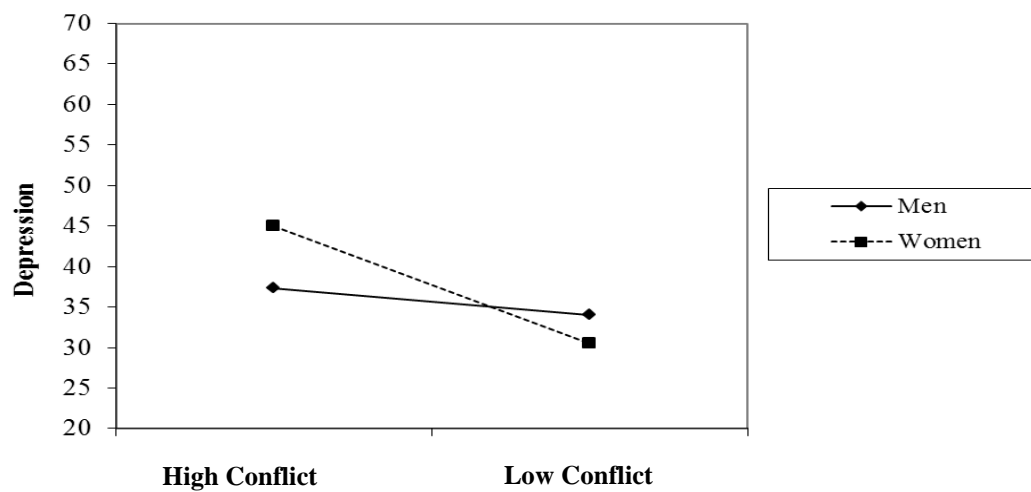


Figure 9. Moderating effects of gender on conflict in predicting symptoms of depression in the romantic subsample of participants (N = 67).

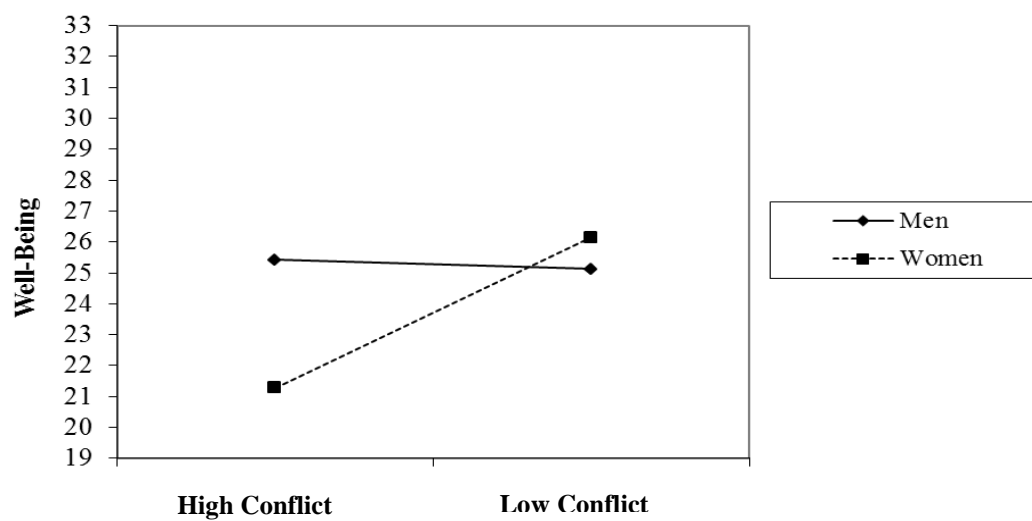


Figure 10. Moderating effects of gender on conflict in predicting feelings of well-being in the romantic subsample of participants (N = 67).

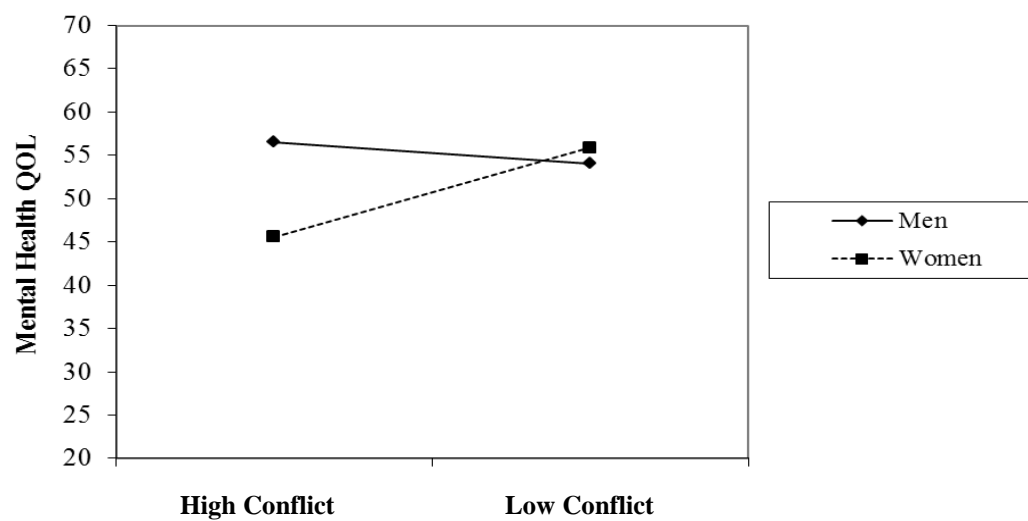


Figure 11. Moderating effects of gender on conflict in predicting feelings of mental health-related quality of life in the romantic subsample of participants (N = 67).

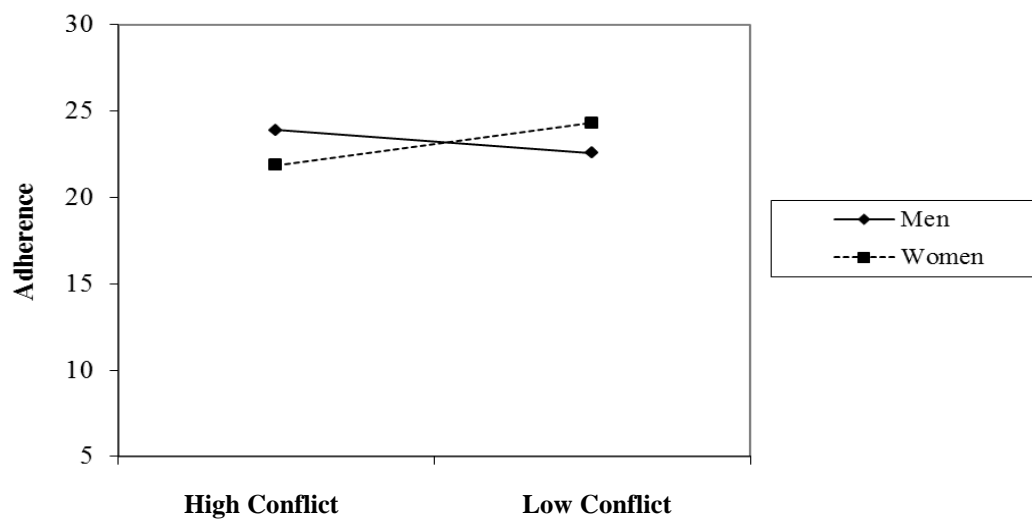


Figure 12. Moderating effects of gender on conflict in predicting adherence in the full sample of participants (N = 93).

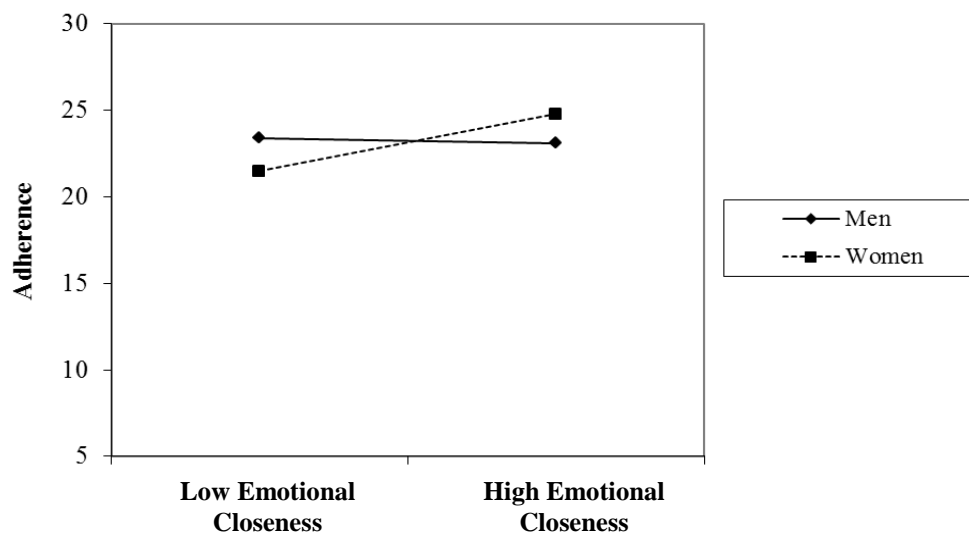


Figure 13. Moderating effects of gender on emotional closeness in predicting adherence in the full sample of participants (N = 93).

CHAPTER IV

CONCLUSIONS AND DISCUSSION

The overall objective of the present study was to examine the relative influence of close interpersonal relationship quality dimensions, including conflict/negative communication, emotional closeness, respect and acceptance, and sexual relations (when appropriate), on psychosocial and medical outcomes in kidney transplant recipients. Participants in the study were between 6 months and 5 years post-transplant and were able to identify a specific individual with whom they were involved in either a romantic (e.g., spouse or dating partner) or non-romantic close relationship (e.g., parent, child, friend). The aforementioned relationship quality domains were assessed via clinical interview in the context of that one identified relationship, wherein participants were asked to characterize these aspects of their relationship over the preceding 6 months. Participants also completed a self-report measure of global social support which measured perceived availability of social support from their larger social network. In addition to determining the collective and unique influence of relationship quality on depression, well-being, physical and mental health-related quality of life, adherence, and graft function, it was also of interest to understand whether these relationship dimensions contributed uniquely to outcomes when accounting for the effects of global social support.

All analyses were first conducted with the only the subsample of participants who were married or involved in a committed dating relationship and subsequently repeated with the full sample, which included all types of close relationships. Several significant findings emerged that provided partial support for the primary hypotheses. First, factor

analyses confirmed that the highly correlated individual domains reflected an unobserved latent construct of ‘relationship quality’ in both samples. Poorer ‘relationship quality’ was comprised of the collective effects of higher conflict/negative communication, lower levels of emotional closeness/intimacy, less respect/acceptance, fewer support transactions within the close relationship, and poorer sexual relationship quality (where relevant). Second, the influence of relationship quality on concurrently assessed psychosocial outcomes was examined, and results fully supported hypothesis 1a and partially supported hypothesis 1b. Specifically, poorer relationship quality was associated with higher levels of depression, decreased feelings of well-being, and lower mental health-related quality of life in both the romantic subsample and full sample of participants. These findings are consistent with previous research, in which conflict, negative communication, respect, acceptance, and emotional closeness have individually demonstrated associations with depression and emotional distress (e.g., Cranford, 2004; Druley, Stephens, & Coyne, 1997; Fincham, 2003). The present study extends these findings by accounting for the overlapping effects of these distinct yet highly correlated domains and using robust statistical analyses in order to better understand how the relationship quality construct is linked to outcomes.

A third hypothesis tested under the primary objective was also partially supported. It was expected that relationship quality would continue to be significantly associated with the psychosocial outcomes when accounting for the effects of global perceived availability of social support. This was, in part, the case for participants who were married or dating; poorer relationship quality remained a significant predictor of increased depression when global support was included in the model (though global

support demonstrated stronger associations with this outcome). Relationship quality was no longer significantly associated with well-being and mental health-related functioning as it had been in the previous iteration of this model before global support was added. In addition, when data from participants in non-romantic relationships was included, relationship quality did not significantly predict any of the psychosocial outcomes when accounting for the effects of global perceived availability of social support.

A recent study by Cornwell (2012) may shed some light on the interpretation of these findings. In this study, nearly 1,500 married older adults were assessed with regard to their degree of closeness with their spouse (including willingness to disclose emotional and/or health-related information) spousal support, number and frequency of contacts with other confidants in their social network, and degree of overlap between social networks of both spouses. Results indicated that the degree of overlap in spousal networks was associated with increased perceptions of the effectiveness of spousal support and higher levels of intimate disclosures (i.e., better relationship quality). This suggests that there may be a strong association between high levels of global social support and relationship quality if the spouses are connected to each other's networks and thus better able to understand each other's needs in the close relationship and act accordingly. It is possible that additional unmeasured variables, such as the degree of integration and coordination between the partner and the recipient's social networks, may account for the present study findings described above.

The secondary objectives of the present study were to examine the relative influence of relationship quality and global social support on medical outcomes in kidney transplant recipients, as well as to explore whether gender moderated the association

between relationship quality and outcomes. Contrary to hypotheses, the relationship quality construct, representing the collective effects of the aforementioned domains, did not predict self-reported adherence to the immunosuppressant regimen, graft function as measured by serum creatinine values, or biopsy-confirmed acute or chronic rejection episodes in either the romantic subsample or the full sample of participants.

Interestingly, however, results revealed a significant interaction between gender and conflict and gender and emotional closeness in predicting adherence in the full sample of participants. Higher levels of conflict and lack of emotional intimacy were more strongly associated with poorer self-reported adherence to the immunosuppressant medication regimen for women recipients in this study. These findings are consistent with hypotheses and previous research demonstrating that women are more likely to experience physiological arousal in response to interpersonal relationship conflict (Heffner et al., 2006) and that conflict exacerbates maladaptive health practices such as nonadherence (e.g., Kiecolt-Glaser & Newton, 2001). In addition, lower levels of emotional intimacy in the marital relationship have been associated with poorer adherence to the diabetes treatment regimen (Trief, Ploutz-Snyder, Britton, & Weinstock, 2004), although it is unclear whether gender moderated this association. Finally, women participants were more likely to endorse symptoms of depression, decreased feelings of well-being, and poorer mental health-related quality of life when conflict in the close relationship was high. This is again consistent with previous research and study hypotheses.

Contrary to expectations and previous findings, worse functioning in the sexual relations domain did not differentially relate to outcomes based on gender. Some

research has suggested that greater satisfaction with the sexual relationship has been linked to improved physical health and functioning in male kidney transplant recipients (Tavallai et al., 2007), and it was expected that poorer sexual relationship quality would have a stronger influence on outcomes in men in the present study. Interestingly, neither the relationship quality construct nor global social support significantly predicted physical health-related quality of life in the analyses. The mean physical component scores of the quality of life measure were somewhat higher (41.87) than normative data on participants with serious physical health problems (38.75) reported by the original authors (Ware, Kosinski, & Keller, 1996), suggesting that the present study participants were, on average, reasonably high functioning despite their post-transplant status and the fact that 80% of the sample was also diagnosed with at least one additional medical condition.

Limitations

The present study has several important limitations. First, the relationship quality dimensions and global social support were measured concurrently with the psychosocial and medical outcomes which preclude any causal interpretation of the association between these variables. In other words, it is possible that poorer relationship quality leads to increases in symptoms of depression or that emotional distress in participants leads to feelings of detachment (e.g., lack of emotional intimacy) and greater conflict in intimate relationships. It is interesting to note, however, that although participants were instructed to characterize aspects of their identified relationship over the last six months, 75% of the romantic sample had been committed to their partner for over 10 years; thus their responses may have been unintentionally confounded by the relationship history

and, in part, reflected a time frame prior to the one in which they used when endorsing depression, well-being, and quality of life. Regardless, the study was not prospective in design, so the direction of prediction remains unknown.

Second, assessment of the psychosocial outcomes was limited by use of self-report instruments; the use of structured clinical interviews for outcomes (i.e., to distinguish sub-threshold depressive symptoms from diagnosable disorders) would enhance methodological rigor. In addition, the participant sample was relatively well-adapted with reasonably high functional abilities compared to distressed groups of transplant recipients (e.g., Goetzmann et al., 2008), and the mean depression score for the full sample (36.95) was lower than the normative mean for community adults (44.99) reported by the authors of this measure (Watson et al., 2007). This limits generalizability of the present findings to other samples with a broader range of psychological and functional impairment. However, poorer relationship quality did still predict depression (albeit at subclinical levels), suggesting that it may be even more important to examine relationships and network support in patients who have increased psychological distress and lower quality of life post-transplant.

Third, although study participants were likely representative of the population of kidney transplant recipients in Iowa, the sample was relatively homogeneous with regard to demographic characteristics, which limits generalizability to populations with greater diversity. In addition, patients who experienced graft failure and returned to or initiated treatment with dialysis following their transplant did not participate in the present study. Although graft survival rates at 1 year post-transplant (92%) and 5 years post-transplant (71%) are high (OPTN, 2010), there remains a minority of patients whose transplant no

longer functions and may be at increased risk for depression (e.g., Goetzmann, et al., 2008; Szeifert et al., 2010). It would be interesting to examine how relationship quality and global social support influence outcomes under these circumstances, given that the present study results may not generalize to this population of patients.

Fourth, the present study was limited by low enrollment relative to number of kidney transplant recipients that were eligible to participate in the study which may have decreased power to detect additional significant findings. Although the study sample was likely representative of the larger population of patients from a demographic perspective, it is also possible that there was selection bias in that those patients who were experiencing clinically significant depression, relationship dysfunction, or transplant-related complications elected not to participate in the study. Finally, it is important to note that although there is minimal agreement on recommendations for sample sizes in SEM (Sivo, Fan, Witt, & Willse, 2006; Tomarken & Waller, 2005), analyses in the present study were limited by the particularly small subsample of participants who were involved in romantic relationships per guidelines set forth by some authors (e.g., Jackson, 2001; MacCallum, Browne, & Sugawara, 1996). This warrants cautious interpretation of the data and points to the importance of replicating these findings in a considerably larger sample of transplant recipients.

Clinical Implications

Despite its limitations, the present study has several strengths including use of a novel, comprehensive, simultaneous assessment of multiple clearly defined relationship quality dimensions, and robust statistical procedures that allowed for an analysis of the complex relationships among predictors and outcomes. The findings also have direct

relevance to and implications for clinical practice. It has become increasingly common for potential candidates to participate in a pre-transplant psychosocial evaluation that includes assessment of the patient as well as an identified support person who has agreed to provide care to the patient throughout the transplant process. The purpose of this evaluation is to select patients who are most likely to incur the benefits of this treatment and to identify those who might be at risk for unfavorable outcomes so that appropriate interventions can be implemented both before and after transplantation (Jowsey et al., 2001; Olbrisch et al., 2002). Results of the present study indicate that, in addition to assessing availability of social support, a more comprehensive evaluation of the quality of patients' relationships with their romantic partner should be incorporated at several points throughout the transplant process in order to enhance our ability to detect who is at increased risk for depression. It appears to be particularly important to screen women for problems in the conflict and emotional intimacy domains of their close relationship, as these areas were more strongly associated with symptoms of depression, decreased feelings of well-being, poorer mental health-related quality of life, and adherence in female study participants.

Several evidence-based interventions exist for the treatment of clinically significant relationship distress (e.g., Integrative Behavioral Couple Therapy (IBCT); Jacobson et al., 2000) that might be helpful for patients and their partners to improve relationship quality at any point throughout the transplant process. However, based on findings from the present study, not all kidney recipients are experiencing clinical levels of relationship dysfunction. It may be the case, for example, that conflict in the relationship has not escalated to the point where the couple is considering dissolution, but

improving relationship quality would still be beneficial for the patient's overall health. Recommendations to participate in an early intervention program for couples who may be at risk for future problems and/or are resistant to traditional couple therapy (e.g., Marriage Checkup; Cordova et al., 2005; Cordova, Warren, & Gee, 2001) is one alternative option for these patients. The Marriage Checkup is a brief, two-session assessment and feedback intervention that has demonstrated efficacy for at-risk couples who are not specifically seeking relationship treatment. This could be particularly relevant for kidney transplant patients in light of the present study results, given that the intervention has been found to deepen emotional intimacy, increase acceptance, and boost motivation for focusing on improving the overall quality of the romantic relationship (Cordova et al., 2005). Considering that transplant patients, (who may also be managing other chronic health conditions) likely have several competing life demands, this brief intervention may be a more reasonable way to facilitate improvements in relationship quality and associated psychosocial outcomes.

Future Directions

Although perceived availability of global support had stronger associations with the mental health outcome variables, relationship quality did uniquely contribute to symptoms of depression for kidney transplant recipients who were married or involved in a committed dating relationship. This study extends previous work in transplantation and begins to fill gaps in our knowledge of other relationship factors that are meaningfully associated with important psychosocial outcomes in this population. Present findings also point to the importance of future work in this area. In order to overcome limitations of this study, it would be interesting to use a prospective design in which relationship

quality and global social support variables are assessed prior to transplant, patients are followed throughout the transplant process, and outcomes are collected at multiple time points, so that determination of causal associations is possible.

It would also be important to expand our understanding of what mediates the link between relationship quality, global social support, and mental health outcomes to transplant populations such that effective interventions can be implemented. Cohen (2004) presented three possible pathways by which social support may influence physical health: through the effects of social integration; through the buffering or protective effects of high quality supportive relationships in times of stress; or via negative relationship qualities (e.g., conflict) that have physiological and psychological consequences. Empirical testing of these pathways is necessary to increase our knowledge of how relationship quality and global support exert their influence on depression, well-being, and health-related quality of life in kidney transplant recipients, including those with more severe levels of psychopathology and relationship dysfunction.

Future research should also examine the effects of relationship quality dimensions on liver, heart, lung, and stem cell transplant recipients. It would be important to understand how these variables uniquely contribute to outcomes, given that high levels of psychological distress have been reported in these patients (e.g., Barbour, Blumenthal, & Palmer, 2006; Jowsey et al., 2001; Mosher et al., 2009). There are also varying contextual factors, such as increased stress due to the higher demands of the post-transplant regimen (e.g., rehabilitation for heart and lung recipients), that may interact with relationship quality to differentially predict outcomes in these other transplant populations.

Although it was not feasible to assess the other member of the dyad in the present study, this may be an interesting avenue for future work. A study by Rodrigue et al. (2010) found that, compared to other transplant caregivers and normative adult data, spouses of kidney transplant recipients endorsed overall high quality of life and psychological functioning. However, these spouses also reported substantial strain related to their caregiving responsibilities both before and after the transplant procedure. It is possible that this caregiving strain could increase conflict in intimate relationships which, in turn, may contribute to unfavorable psychosocial outcomes in transplant patients, particularly for women.

Finally, the present study did not have sufficient power to conduct analyses with only participants who reported on a non-romantic relationship, such as with a friend, sibling, or child. It would be fruitful for later work to include more stringent comparisons to determine the relative importance of these domains across a variety of close relationships. Results of this study suggest that comprehensive assessment of relationship quality dimensions in transplant recipients is a worthwhile endeavor that has the potential to enhance our clinical practice and improve mental health and quality of life in broad range of patients who are at risk for unfavorable outcomes.

APPENDIX

Recruitment Cover Letter

Date

Patient Name

Street Address

City, State, Zip Code

Dear Patient Name,

You are receiving this letter because we would like to invite you to participate in a research project being conducted by faculty and staff members at the University of Iowa. The purpose of this study is to gain a better understanding of how specific aspects of close, personal relationships affect psychological, social, and medical outcomes in patients who have received a kidney transplant. The study is being conducted by Quinn Kellerman and Dr. Alan Christensen from the Departments of Internal Medicine and Psychology, both of whom work closely with the transplant team at the University of Iowa Hospitals and Clinics (UIHC).

Patients who had either a living or deceased donor kidney transplant at UIHC within the last 5 years and are at least 6 months post-surgery are being invited to participate. We obtained your name from the records of persons who received care at the UIHC transplant clinic. Please note that you are still eligible to participate even if your kidney is not currently functioning. Enclosed with this letter are two copies of an Informed Consent Document with additional information about your project. Please read the enclosed consent document. If you would like to participate, please sign both copies of the consent document attached to the questionnaire packet and then complete the questionnaires. Completing the materials usually takes approximately 30 minutes. We have included an addressed, postage-paid envelope for your convenience. Return one

copy of the signed Informed Consent Document and the questionnaires in the enclosed envelope. You may keep the other signed copy of the consent document for your records.

Once we receive your signed consent document and completed questionnaires, a member of our research team will call you about the second part of our project. You will be asked to answer interview questions over the phone about a current relationship you have in your life, such as with a spouse, sibling, or friend. This interview will last approximately 60 minutes and will be scheduled at a time that is most convenient for you. If you decide to participate and you complete the study, you will be paid \$20 as a thank you for your time.

If you choose not to participate and do not wish to be called by a member of our research team, please return the blank study materials in the enclosed envelope and write “not interested” on the top of the consent document.

If you have any questions about this research, please contact the principal investigator, Quinn Kellerman, at (319) 335-3768. If we do not hear from you in two weeks, we will call you to answer any questions you may have. We may attempt to contact you up to 3 times by phone if we are unable to reach you on the first call. Thank you for considering participation in our project!

Sincerely,

Quinn D. Kellerman, M.A.

Questionnaire Packet

Sociodemographic Information

1. What is your gender?

- Male (1)
 Female (2)

2. What is your date of birth? ___/___/_____

3. What is your ethnicity/race?

- White (non-Hispanic) (1)
 White (Hispanic) (2)
 African American/Black (3)
 Asian/Pacific Islander (4)
 Other (5): _____

4. What is your current marital status?

- Married (1)
 In a committed dating relationship (2)
 Widowed (3)
 Divorced (4)
 Separated (5)
 Never Married (6)

5. How long have you been in your current relationship? (Mark N/A and move to Question 7 if not in a relationship.)

_____ (Number of years)

6. Are you currently living with your partner?

- Yes (1)
 No (2)

7. How many years of education have you completed?

_____ (Number of years)

8. What is your employment status?

- Employed full-time (1)
 Employed part-time (2)
 Unemployed (3)
 On disability (4)
 Retired (5)

9. What is your yearly income?

- Under \$25,000 (1)
 \$25,000 – \$50,000 (2)

- \$50,000 – \$75,000 (3)
 \$75,000 – \$100,000 (4)
 Over \$100,000 (5)

Transplant and Related Medical Information

10. When did you receive your most recent kidney transplant? ___/___/___

(Note: The following questions are about the *most recent* transplant only. Information about previous transplants will be obtained in Questions 18-19.)

11. To your knowledge, what caused your end-stage kidney disease?

- N/A
 Diabetes (1)
 Hypertension (2)
 Glumerulonephritis (3)
 Polycystic Kidney Disease (4)
 Other: _____ (5)
 Unknown (6)

12. Were you treated with dialysis prior to receiving your kidney transplant?

- Yes (1)
 No (2)

13. What was the source of your donor organ?

- Deceased donor (1)
 Living donor (2)

14. If you received an organ from a living donor, what is your relationship to this person?

- N/A
 Spouse/Life Partner (1)
 Parent (2)
 Child (3)
 Sibling (4)
 Other Relative (5)
 Unrelated (e.g., friend, coworker) (6)
 Anonymous (7)

15. Did you experience acute and/or chronic rejection episodes following your transplant?

- Yes (1)
 No (2)

16. Is your most recent transplant currently functioning?

- Yes (1)

_____ No (2) → When did your most recent transplant fail? ____/____/____

17. Are you currently being treated with dialysis?

- _____ Yes (1)
_____ No (2)

18. Have you received more than one transplant?

- _____ Yes (1) → How many transplants have you had? _____
_____ No (2)

19. I'd like to gather some information about your prior transplant (Mark N/A and move to Question 20 if no prior transplants).

_____ N/A

Ask for each one:

- a. When did you receive your prior transplant? ____/____/____
b. When did this transplant fail? ____/____/____
c. To your knowledge, what was the reason for the prior transplant graft failure?

20. Do you have any other medical conditions besides kidney disease?

- _____ None
_____ Diabetes
_____ Hypertension
_____ Cardiovascular Disease
_____ Cancer
_____ Chronic Pain
_____ Other: _____

Interpersonal Support Evaluation List (ISEL)

This scale is made up of a list of statements each of which may or may not be true about you. For each statement answer "definitely true" if you are sure it is true about you and "probably true" if you think it is true but are not absolutely certain. Similarly, you should check "definitely false" if you are sure the statement is false and "probably false" if you think it is false but are not absolutely certain.

0	1	2	3
Definitely False	Probably False	Probably True	Definitely True

_____ 1. There are several people that I trust to help solve my problems.

_____ 2. If I needed help fixing an appliance or repairing my car, there is someone who would help me.

_____ 3. Most of my friends are more interesting than I am.

- ___ 4. There is someone who takes pride in my accomplishments.
- ___ 5. When I feel lonely, there are several people I can talk to.
- ___ 6. There is no one that I feel comfortable with talking about intimate personal problems.
- ___ 7. I often meet or talk with family or friends.
- ___ 8. Most people I know think highly of me.
- ___ 9. If I needed a ride to the airport very early in the morning, I would have a hard time finding someone to take me.
- ___ 10. I feel like I'm not always included by my circle of friends.
- ___ 11. There really is no one who can give me an objective view of how I'm handling my problems.
- ___ 12. There are several different people I enjoy spending time with.
- ___ 13. I think that my friends feel that I'm not very good at helping them solve their problems.
- ___ 14. If I were sick and needed someone (friend, family member, or acquaintance) to take me to the doctor, I would have trouble finding someone.
- ___ 15. If I wanted to go on a trip for a day (e.g., to the mountains, beach, or country), I would have a hard time finding someone to go with me.
- ___ 16. If I needed a place to stay for a week because of an emergency (for example, water or electricity out in my apartment or house), I could easily find someone who would put me up.
- ___ 17. I feel that there is no one I can share my most private worries and fears with.
- ___ 18. If I were sick, I could easily find someone to help me with my daily chores.
- ___ 19. There is someone I can turn to for advice about handling problems with my family.
- ___ 20. I am as good at doing things as most other people are.
- ___ 21. If I decide one afternoon that I would like to go to a movie that evening, I

could easily find someone to go with me.

____ 22. When I need suggestions on how to deal with a personal problem, I know someone I can turn to.

____ 23. If I needed an emergency loan of \$100, there is someone (friend, relative, or acquaintance) I could get it from.

____ 24. In general, people do not have much confidence in me.

____ 25. Most people I know do not enjoy the same things that I do.

____ 26. There is someone I could turn to for advice about making career plans or changing my job.

____ 27. I don't often get invited to do things with others.

____ 28. Most of my friends are more successful at making changes in their lives than I am.

____ 29. If I had to go out of town for a few weeks, it would be difficult to find someone who would look after my house or apartment (the plants, pets, garden, etc.).

____ 30. There really is no one I can trust to give me good financial advice.

____ 31. If I wanted to have lunch, I could easily find someone to join me.

____ 32. I am more satisfied with my life than most people are with theirs.

____ 33. If I was stranded 10 miles from home, there is someone I could call who would come and get me.

____ 34. No one I know would throw a birthday party for me.

____ 35. It would be difficult to find someone who would lend me their car for a few hours.

____ 36. If a family crisis arose, it would be difficult to find someone who could give me good advice about how to handle it.

____ 37. I am closer to my friends than most other people are to theirs.

____ 38. There is at least one person I know whose advice I really trust.

____ 39. If I needed some help in moving to a new house or apartment, I would have a

hard time finding someone to help me.

____ 40. I have a hard time keeping pace with my friends.

Inventory for Depression and Anxiety Symptoms (IDAS)

Below is a list of feelings, sensations, problems, and experiences that people sometimes have. Read each item to determine how well it describes your recent feelings and experiences. Then select the option that best describes how much you have felt or experienced things this way **during the past two weeks, including today**. Use this scale when answering the following questions:

1	2	3	4	5
Not at all	A little bit	Moderately	Quite a bit	Extremely

____ 1. I was proud of myself.

____ 2. I felt exhausted.

____ 3. I felt depressed.

____ 4. I felt inadequate.

____ 5. I slept less than usual.

____ 6. I felt fidgety, restless.

____ 7. I had thoughts of suicide.

____ 8. I slept more than usual.

____ 9. I hurt myself purposely.

____ 10. I slept very poorly.

____ 11. I blamed myself for things.

____ 12. I had trouble falling asleep.

____ 13. I felt discouraged about things.

____ 14. I thought about my own death.

____ 15. I thought about hurting myself.

____ 16. I did not have much of an appetite.

____ 17. I felt like eating less than usual.

____ 18. I thought a lot about food.

- ____ 19. I did not feel much like eating.
- ____ 20. I ate when I wasn't hungry.
- ____ 21. I felt optimistic.
- ____ 22. I ate more than usual.
- ____ 23. I felt that I had accomplished a lot.
- ____ 24. I looked forward to things with enjoyment.
- ____ 25. I was furious.
- ____ 26. I felt hopeful about the future.
- ____ 27. I felt that I had a lot to look forward to.
- ____ 28. I felt like breaking things.
- ____ 29. I had disturbing thoughts of something bad that happened to me.
- ____ 30. Little things made me mad.
- ____ 31. I was enraged.
- ____ 32. I had nightmares that reminded me of something bad that happened.
- ____ 33. I lost my temper and yelled at people.
- ____ 34. I felt like I had a lot of interesting things to do.
- ____ 35. I felt like I had a lot of energy.
- ____ 36. I had memories of something scary that happened.
- ____ 37. I felt self-conscious knowing that others were watching me.
- ____ 38. I felt a pain in my chest.
- ____ 39. I was worried about embarrassing myself socially.
- ____ 40. I felt dizzy or light headed.
- ____ 41. I cut or burned myself on purpose.
- ____ 42. I had little interest in my usual hobbies or activities.
- ____ 43. I thought that the world would be better off without me.
- ____ 44. I felt much worse in the morning than later in the day.
- ____ 45. I felt drowsy, sleepy.

- _____ 46. I woke up early and could not get back to sleep.
- _____ 47. I had trouble concentrating.
- _____ 48. I had trouble making up my mind.
- _____ 49. I talked more slowly than usual.
- _____ 50. I had trouble waking up in the morning.
- _____ 51. I found myself worrying all the time.
- _____ 52. I woke up frequently during the night.
- _____ 53. It took a lot of effort for me to get going.
- _____ 54. I woke up much earlier than usual.
- _____ 55. I was trembling or shaking.
- _____ 56. I became anxious in a crowded public setting.
- _____ 57. I felt faint.
- _____ 58. I found it difficult to make eye contact with people.
- _____ 59. My heart was racing or pounding.
- _____ 60. I got upset thinking about something bad that happened.
- _____ 61. I found it difficult to talk with people I did not know well.
- _____ 62. I had a very dry mouth.
- _____ 63. I was short of breath.
- _____ 64. I felt like I was choking.

12-Item Short-Form Health Survey (SF-12)

The following questions will provide more information about how you've been feeling and how well you are able to do your usual activities. This is about your general health, not specific to your transplant. If you are unsure how to answer a question, please give the best answer you can.

1. In general, would you say your health is:
- _____ Excellent (1)
- _____ Very Good (2)
- _____ Good (3)
- _____ Fair (4)
- _____ Poor (5)

The following two questions are about activities you might do during a typical day. Does YOUR HEALTH NOW LIMIT YOU in these activities? If so, how much?

2. MODERATE ACTIVITIES, such as moving a table, pushing a vacuum cleaner, bowling, or playing golf:

- Yes, limited a lot (1)
 Yes, limited a little (2)
 No, not limited at all (3)

3. Climbing SEVERAL flights of stairs:

- Yes, limited a lot (1)
 Yes, limited a little (2)
 No, not limited at all (3)

During the PAST 4 WEEKS, have you had any of the following problems with your work or other regular activities AS A RESULT OF YOUR PHYSICAL HEALTH?

4. ACCOMPLISHED LESS than you would like:

- Yes (1)
 No (2)

5. Were limited in the KIND of work or other activities:

- Yes (1)
 No (2)

During the PAST 4 WEEKS, were you limited in the kind of work you do or other regular activities AS A RESULT OF ANY EMOTIONAL PROBLEMS (such as feeling depressed or anxious)?

6. ACCOMPLISHED LESS than you would like:

- Yes (1)
 No (2)

7. Didn't do work or other activities as CAREFULLY as usual:

- Yes (1)
 No (2)

8. During the PAST 4 WEEKS, how much did PAIN interfere with your normal work (including both work outside the home and housework)?

- All of the time (1)
 Most of the time (2)
 A good bit of the time (3)
 Some of the time (4)
 A little of the time (5)

_____ None of the time (6)

The next three questions are about how you feel and how things have been DURING THE PAST 4 WEEKS. For each question, please give the one answer that comes closest to the way you have been feeling. How much of the time during the PAST 4 WEEKS –

9. Have you felt calm and peaceful?

- _____ All of the time (1)
 _____ Most of the time (2)
 _____ A good bit of the time (3)
 _____ Some of the time (4)
 _____ A little of the time (5)
 _____ None of the time (6)

10. Did you have a lot of energy?

- _____ All of the time (1)
 _____ Most of the time (2)
 _____ A good bit of the time (3)
 _____ Some of the time (4)
 _____ A little of the time (5)
 _____ None of the time (6)

11. Have you felt downhearted and blue?

- _____ All of the time (1)
 _____ Most of the time (2)
 _____ A good bit of the time (3)
 _____ Some of the time (4)
 _____ A little of the time (5)
 _____ None of the time (6)

12. During the PAST 4 WEEKS, how much of the time has your PHYSICAL HEALTH OR EMOTIONAL PROBLEMS interfered with your social activities (like visiting with friends, relatives, etc.)?

- _____ All of the time (1)
 _____ Most of the time (2)
 _____ A good bit of the time (3)
 _____ Some of the time (4)
 _____ A little of the time (5)
 _____ None of the time (6)

Transplant Effects Questionnaire (TxEQ): Adherence Scale

1	2	3	4	5
Strong Agree	Agree	Uncertain	Disagree	Strong Disagree

_____ 1. Sometimes I do not take my anti-rejection medicines.

_____ 2. Sometimes I forget to take my anti-rejection medicines.

_____ 3. When I am too busy I may forget my anti-rejection medicines.

_____ 4. Sometimes I think I do not need my anti-rejection medicines.

_____ 5. I find it difficult to adjust to taking my prescribed anti-rejection drug regimen.

Relationship Quality Interview (RQI)

ID # _____

Date of interview _____

Interviewer _____

Date coded _____

Coder _____

This interview is designed to get an in depth understanding of a specific close relationship in your life. First, I'd like to determine which relationship you will be referring to when answering the questions. Remember that we do not want to collect any identifying information about the person you will be referring to, so please don't tell me his/her name.

Ask participants if they are currently married or involved in a dating relationship. If they respond yes, ask them to answer the following questions about their relationship with their current spouse or dating partner.

If participants are not currently married or involved in a dating relationship, ask them to identify the person who has been closest to them during the transplant process (e.g., their primary support provider), or if this person is no longer in their lives, the person who has been closest to them over the last 6 months. Only ask for the type of relationship this is (e.g., sister, brother, friend) and have participants answer the following questions about this person.

[Important note to interviewers: If participants are NOT answering the questions about their spouse or dating partner, the FOLLOWING QUESTIONS SHOULD BE EXCLUDED: All questions [S1-S4] in the 'Sexuality/Sensuality' section and all 'Decision-Making and Control' questions [R4-R12] in the 'Respect and Control' section**]**

In a lot of studies, researchers have people fill out questionnaires, which can be frustrating, because you are forced to answer questions in a Yes/No or True/False format, without having the chance to explain what you mean in your own words. So the purpose of this interview is for you to have a chance to talk about different aspects of your relationship in your own words.

As mentioned in the consent document you received, this interview will be audiotaped. We tape record the interview so that we don't have to take a lot of notes and waste a lot of your time.

I want to assure you that no one except the research team will have access to the tapes and any information you provide us is confidential. We will NOT be interviewing the person you refer to in this interview, and we will NEVER share any information you provide during the questionnaire or the interview session with him/her. I also want to reiterate that we will not be sharing any information you provide with the transplant team and your responses will not affect your healthcare in any way. In addition to confidentiality, your privacy is very important to us. We will keep the tapes and questionnaires locked up and you will only be identified by a random ID number.

Do you have any questions before we begin?

QUALITY OF EMOTIONAL INTIMACY IN THE RELATIONSHIP

Possible Probes for All Sections:

- *What makes you say that?*
- *Can you give me an example of what you mean?*
- *How do you feel about that?*
- *Can you tell me more about that?*

Now I'd like to get a better sense of the level of closeness and trust you have in your relationship. I'd like to try to focus on the last 6 months or so of your relationship, so since about _____.

E1: EMOTIONAL CLOSENESS

How close do you feel to _____?

(Overall sense of closeness, sense of warmth, affection, interdependence, spending a lot of time together, talking/listening, feeling emotionally connected)

- What about times when you don't feel close to _____?

E2: TRUST

To what extent do you feel you can trust _____?

(Specifically emotional trust; trust s/he won't lie, betray, abandon or hurt her/him, how much does s/he trust him/her to help maintain the intimate bond of the relationship?)

- What about times when you don't feel like you can trust _____? *(e.g., Are there limits to what s/he can trust him/her with? Does s/he not like to trust or count on anyone?)*

E3: FUN AND FRIENDSHIP

How good of a friend would you say that _____ is to you?

(Feels that partner is his/her best friend, has fun with him/her, likes to spend free time with him/her)

- What about times when s/he is not a good friend?

SELF-DISCLOSURE/EMOTIONAL VULNERABILITY

E4: How often do you confide in him/her, or disclose personal or important things to him/her? For example, how comfortable are you talking to _____ about your most private feelings or thoughts?

(Disclosure of emotional, difficult-to-share information that is not typically talked about in other relationships)

- How comfortable are you talking about important issues in your relationship?
- What about times when you don't feel comfortable confiding in your partner? Can you tell me about that? *(e.g., Wishes s/he could disclose more? Feel more comfortable? Does s/he dislike the way the other person responds? Does s/he feel uncomfortable confiding in anyone?)*

E5: How does _____ typically respond when you (try to) disclose personal or important things to him/her?

(Trying to get a sense of what it's like for the participant to disclose, does the other person encourage disclosure? What specific behaviors are typical of him/her in response to disclosure? Is it an emotionally safe environment for disclosure? Consider the long-term and short-term effect (learning) of the partner's response. Is the disclosure punished or reinforced overall?)

E6: How often do you avoid talking about specific topics with _____?

- What topics do you avoid?

E7: How much do you feel s/he confides in you, or discloses personal or important things to you? For example, his/her most private feelings and thoughts?

E8: VERBAL AND PHYSICAL LOVE/AFFECTION

How often does _____ show love or affection towards you?

(Trying to get a sense of quantity as well as quality of love/affection expressed by the other person, including both verbal and physical expressions of love)

- Is there anything you don't like about his/her expression of love or affection? For example, the way s/he expresses these feelings or how often? *(e.g., Does s/he wish the other person would show more or less, does s/he dislike the way the other person shows love? Get examples of sources of dissatisfaction.)*

Is there anything else about trust and closeness in your relationship that is important to you or that we haven't talked about?

QUALITY OF SEXUALITY/SENSUALITY IN THE RELATIONSHIP

Now I'd like to ask you about your sexual relationship. How has that been going for the past 6 months or so?

SEXUALITY

S1: About how frequently do the two of you have sex?

(Note: You may have to ask about norms here more than you would for another section)

- Would you prefer it be more or less frequent?
- Who usually initiates having sex?

S2: How satisfied are you with your sexual relationship?
(*You are getting at quality/satisfaction here, not frequency*)

- Do you have any concerns about your sexual relationship or is there anything you would like to change? (*If yes, specify*)
- During sex, do you ever feel any negative emotions? (*If participant doesn't spontaneously offer an answer, say...*) For example, do you ever feel any fear, shame, guilt or disgust during or after sex?

SENSUALITY

S3: Do the two of you engage in sensual behaviors together, such as touching, cuddling, hugging, or massage?

- Does this kind of touching typically lead to sex? (*It is not considered ideal for any physical contact to always lead to sex*)
- I'm also wondering if the two of you typically engage in these same kinds of behaviors after having sex? (*If necessary, add...*) For example, do the two of you tend to engage in touching, cuddling, hugging, massage, things like that?

SEXUAL DIFFICULTIES/DIAGNOSABLE SEXUAL DYSFUNCTIONS

(*For men: premature ejaculation, erectile dysfunction. For women: excessive dryness, tightness, pain, difficulty having an orgasm. We are asking about ongoing sexual difficulties in the relationship. If participant says yes, or you think there is more to say, ask follow-up questions about the nature of the problem, whether they've tried anything to change things (e.g., self-help books, seeing a doctor, medications)*)

S4: Are you experiencing any sexual difficulties?

What about _____? Is s/he experiencing any difficulties?
(*Specify for either person*)

Is there anything else about your sexual relationship or sensuality in your relationship that is important to you or that we haven't talked about?

QUALITY OF SUPPORT TRANSACTIONS IN THE RELATIONSHIP

The next area I'd like to ask you about is _____'s ability to support you when you have had a bad day, are feeling down, or have a problem, in the last 6 months or so. *If participant reports that s/he never receives a specific type of support, but that that is a good thing (and you believe him or her based on voice tone, etc.), it is appropriate to give a 3.5 or 4.*

In general, how well does _____ support you in situations such as these?

- Is there anything you don't like about how _____ supports you? *(e.g., not providing enough support)*

Now I'm going to ask you about a number of different types of support that may or may not apply to your relationship. *(Get answers for each type of support. You're trying to separate out the type of support the other person offers and type of support participant wants.)*

P1: EMOTIONAL SUPPORT

First, to what extent does _____ provide emotional support, like talking and listening to you, holding your hand, hugging you, letting you know that s/he understands you, things like that when you have had a bad day, are feeling down, or have a problem?

P2: TANGIBLE SUPPORT

What about tangible support, such as taking care of things for you or helping you directly or indirectly?

(Helping directly means helping to solve the problem or make the situation better him/herself. Helping indirectly means providing time or resources so that the participant is better able to help solve the problem him/herself, e.g., providing childcare so participant can work on the problem.)

- So, for example, if you have a problem with your (car, landlord, etc.) would s/he try to take care of it for you, or would s/he cover for you so that you had time to deal with the problem yourself?
- Is there anything you don't like about how s/he provides this type of support? *(e.g., not providing enough support, providing a type of support that isn't wanted)*

****REMEMBER:** *We want supportive behaviors in response to a problem/bad day/feeling down.*

P3: INFORMATIONAL SUPPORT

How often does s/he provide you with information you need, help you think about a problem in a new way, or things like that?

- Is there anything you don't like about how _____ provides this kind of support? (e.g., not providing enough support, providing a type of support that isn't wanted)

P4: ESTEEM SUPPORT

What about expressing confidence in your ability to handle things, telling you you're not at fault for a problem, things like that?

- Is there anything you don't like about how he provides this kind of support? (e.g., not providing enough support, providing a type of support that isn't wanted)

P5: NETWORK SUPPORT

What about offering to spend extra time with you when you've had a bad day?

What about encouraging you to talk with other friends/family?

- Is there anything that you don't like about how _____ provides this kind of support? (e.g., not providing enough support, providing a type of support that isn't wanted)

Thinking back over these different types of support, which type of support is most important to you? (We want to determine what type of support is most commonly reported as a preferred type of support once s/he has been primed to consider all types of support.)

- In other words, how would you like to be supported in an ideal world?

Are there ways _____ could support you that you would prefer? (We want to get a spontaneous response about what type of support is most in need of changing. The participant may suggest changes in each area as s/he goes through the interview, but now we want to know whether there is one area that is particularly important (e.g., I just want him to convey he believes in me.))

- For example, providing more or less of a certain type of support?
- What, if anything, would you like to change about how _____ supports you?

Is there anything else about support in your relationship that is important to you or that we haven't talked about?

QUALITY OF RESPECT AND CONTROL IN THE RELATIONSHIP

Now I'd like to ask you a little bit about respect and decision-making in your relationship over the last 6 months or so. Let's start with respect.

RESPECT AND ACCEPTANCE

R1: How much does _____ respect you?

(You are trying to get at whether the other person treats the participant like s/he's a competent and independent person, based on their perspective.)

- For example, is s/he respectful of who you are as a person, your abilities, and the decisions that you make, or does s/he treat you as if you were a child rather than an equal partner in the relationship?
- How about times when s/he is less respectful than you'd like him/her to be?
- Another example: Looking through your cell phone to see who you've called or checking your email?

R2: How about acceptance? Is s/he accepting of the kind of person you are and the things you do?

(You are trying to get at whether the other person accepts the participant for who s/he is as a person, the kinds of things s/he likes to do.)

R3: How about when the two of you disagree? Does s/he still show respect and acceptance for you?

(When they disagree on something, does the other person belittle the participant's opinion or allow the participant to have an opinion, even if it's different?)

- For example, during an argument, is s/he respectful and accepting of your opinions and your side of the argument, or does s/he belittle you for your opinions?

DECISION-MAKING

R4: How about decision-making? Who tends to make most of the decisions in the relationship?

R5: Are you satisfied with that? Are you comfortable with the amount of decision-making done by each of you?

What are some areas in which decision-making becomes an issue? *(Areas in the relationship or in their day-to-day life – don't code, just write in answer)*

CONTROL

(For the following: probe for each type of control. You're trying to see if the participant behaves in the ways s/he describes because s/he will have "hell to pay" if s/he doesn't, not because s/he is being respectful/considerate, responsible)

R6: To what extent does one of you have more control over certain aspects of the relationship?

I'd like to go over some specific areas that may or may not apply to your relationship...

R7: How much freedom do you feel like you have to schedule your own day and engage in activities without _____? *(Use general probes if you get a one-word answer)*

- To what extent does _____ limit your freedom to do the things you really want to do?

R8: Is having the job or career or education that you want to have ever an issue for the two of you?

- To what extent does _____ limit your freedom to pursue your career or educational goals?

R9: What about issues around who controls the money?

- To what extent does _____ limit your freedom to spend money when there is something that you would like to purchase?

R10: How much freedom do you have to spend time with your family?

- To what extent does _____ limit your freedom to be with your family?

R11: What about friends of the same sex?

- To what extent does _____ limit your freedom to be with your [male/female] friends?

R12: What about friends of the opposite sex?

- To what extent does _____ limit your freedom to be with your [male/female] friends?

Is there anything else about respect, acceptance, decision-making, or control in your relationship that is important to you or that we haven't talked about?

QUALITY OF COMMUNICATION AND CONFLICT IN THE RELATIONSHIP

Now I'd like to talk a little bit about your arguments/disagreements over the last 6 months or so.

C1: ARGUMENTS

- About how often do you and _____ argue?
- What kinds of things do you typically argue about?
- About how long do your arguments usually last? (*Referring to actively arguing*)
- How do you and s/he typically feel or behave during your arguments?
- How do your arguments usually end?
- When the two of you have argued over the last 6 months or so, have either of you said things that might be hurtful, called each other names, put the other person down, things like that (*psychological aggression*)? (*If yes, find out who did it and get an example or two*)
- What about destroying the other person's property, throwing something across the room, things like that (*threats of physical aggression*)? (*If yes, find out who did it and get an example or two*)
- What about throwing things at, or pushing the other person, grabbing the other person's arm, things like that (*physical aggression*)? (*If yes, find out who did it and get an example or two*)

C2: CONFLICT RESOLUTION/RECOVERY

Let's talk about what happens after the two of you have had an argument/disagreement, particularly if it's been a heated one. How do the two of you get over a heated argument together? What do you do to try to get back to normal?

- For example, does one of you apologize for the fighting in general? Do you apologize for specific things that were said or done? Does one of you buy flowers or a gift or do something particularly sweet for the other person? Do you pretend it never happened? Do you take time to calm down and then discuss the issue again calmly? Do you typically have sex afterwards? Does one of you give in more than the other?
(You are trying to get examples of what either or both people do so that they can recover. An example such as, "I go for a run to calm down and then I'm over it" is more about how the individual recovers, not the two of them together.)
- Do these things work? *(Are they really helpful for feeling closer to each other, according to the participant? If the participant says they help get past the fight in a superficial way but don't really foster greater intimacy, you would think about these efforts as not being effective.)*
- Does one of you work to resolve things more than the other? *(If yes) Which one of you? (Get specifics)*
- How long does it usually take to get back to normal? *(How long does the tension last?)*

Is there anything else about conflict in your relationship that is important to you or that we haven't talked about yet?

That concludes our interview. I would like to thank you for taking the time to talk with me today, I know that many of the things we have discussed are difficult to talk about and I want to thank you for being so open and willing to share your experiences. The information you have provided will be very important for helping us understand how relationships are important for people who have experienced a kidney transplant.

You should receive your compensation check for participating in the study in the next few weeks. If you do not receive this check within the next month, please feel free to contact our research office at (319) 335-3768. Thank you again for your participation.

RQI Romantic Relationship Coding Sheet

ID # _____

Date of interview _____

Interviewer _____

Date coded _____

Coder _____

QUALITY OF EMOTIONAL INTIMACY IN THE RELATIONSHIP

E1: Closeness	1	2	3	4	5
E2: Trust	1	2	3	4	5
E3: Friendship	1	2	3	4	5
E4: Self-disclosure	1	2	3	4	5
E5: Partner Response	1	2	3	4	5
E6: Avoiding Topics	1	2	3	4	5
E7: Partner's Self-disclosure	1	2	3	4	5
E8: Love and Affection	1	2	3	4	5

Global Rating – Emotional Intimacy:	1	2	3	4	5
--	----------	----------	----------	----------	----------

QUALITY OF SEXUALITY/SENSUALITY IN THE RELATIONSHIP

S1: Frequency	1	2	3	4	5
S2: Satisfaction	1	2	3	4	5
S3: Sensuality	1	2	3	4	5
S4: Sexual Difficulties	1	2	3	4	5

Global Rating – Sexuality/Sensuality:	1	2	3	4	5
--	----------	----------	----------	----------	----------

QUALITY OF SUPPORT TRANSACTIONS IN THE RELATIONSHIP

P1: Emotional Support	1	2	3	4	5
P2: Tangible Support	1	2	3	4	5
P3: Informational Support	1	2	3	4	5

P4: Esteem Support	1	2	3	4	5
P5: Network Support	1	2	3	4	5

Global Rating – Support Transactions:	1	2	3	4	5
--	----------	----------	----------	----------	----------

QUALITY OF RESPECT AND CONTROL IN THE RELATIONSHIP

R1: Respect	1	2	3	4	5
R2: Acceptance	1	2	3	4	5
R3: Respect when Disagree	1	2	3	4	5
R4: Who Makes Decisions	Male		Female		N/A
R5: Satisfaction w/DM	1	2	3	4	5
R6: Who Controls	Male		Female		N/A
R7: Scheduling	1	2	3	4	5
R8: Career	1	2	3	4	5
R9: Money	1	2	3	4	5
R10: Family	1	2	3	4	5
R11: Same Sex Friends	1	2	3	4	5
R12: Opposite Sex Friends	1	2	3	4	5

Global Rating – Respect and Acceptance:	1	2	3	4	5
---	---	---	---	---	---

Global Rating – Decision-Making/Control:	1	2	3	4	5
--	---	---	---	---	---

Global Rating – Respect and Control:	1	2	3	4	5
---	----------	----------	----------	----------	----------

QUALITY OF COMMUNICATION AND CONFLICT IN THE RELATIONSHIP

C1: Arguments	1	2	3	4	5
C2: Conflict Resolution/Recovery	1	2	3	4	5

Global Rating – Conflict:	1	2	3	4	5
----------------------------------	----------	----------	----------	----------	----------

RQI Interviewer Rating Scales

Individual Item Ratings (1-5 scales; scores of .5 are permissible)

Note: The same rating scales are used for all individual item ratings. Some individual item ratings target specific behaviors, whereas others target participant/partner satisfaction with those behaviors. Thus, guidance regarding both types of questions is included in the descriptions below.

- 1 Participant or partner absolutely never engages in this behavior (if it's a positive/desired behavior) or always engages in this behavior (if it's an aversive behavior). Participant is completely/extremely dissatisfied with partner/relationship in this area. (This is meant to be an extreme rating.)
- 2 Poor functioning in this area: Participant or partner engages in this behavior rarely/occasionally (if it's a desired/positive behavior) or frequently/often (if it's an aversive behavior). Participant is somewhat dissatisfied with partner/relationship in this area.
- 3 Participant or partner engages in this behavior about half of the time. Participant is satisfied with partner's behavior in this area about half of the time or is indifferent on this matter.
- 4 Good functioning in this area: Participant or partner engages in this behavior frequently/often (if it's a desired/positive behavior) or rarely/occasionally (if it's an aversive behavior). Participant is satisfied with partner/relationship in this area.
- 5 Participant or partner always engages in this behavior (if it's a positive/desired behavior) or absolutely never engages in this behavior (if it's an aversive behavior). Participant is completely/extremely satisfied with partner/relationship in this area. (This is meant to be an extreme rating.)

Global Ratings (1-5 scales; scores of .5 are permissible)

Quality of Emotional Intimacy in the Relationship

This rating measures feelings of trust and closeness (overall sense of closeness, warmth, affection and interdependence); mutual comfort confiding in & being emotionally vulnerable with each other; comfort being oneself with partner; and quality of self-disclosure transactions across variety of topics; quality of couple's friendship; demonstrations of love & affection.

- 1 Extreme emotional distance from partner. Partner cannot be trusted/confided in. All difficult topics are avoided. Attempts to self-disclose are punished. Partner does not disclose to participant. Partner expresses very little love or affection. Total lack of intimacy in all aspects of the relationship.

- 2 Lack of closeness and trust. Little emotional intimacy. Participant uncomfortable talking about most private feelings or thoughts. Partner rarely self-discloses. Several topics are avoided. Lack of love or affection.
- 3 Some closeness emotionally. Some trust in partner, depending on the situation. Certain topics are avoided. Partner discloses somewhat and shows some love/affection. Level of intimacy is moderate.
- 4 High degree of closeness and trust. Participant feels comfortable talking about most topics. Partner feels comfortable self-disclosing. Both partners are comfortable feeling and expressing vulnerability with the other across most/all topics. Level of intimacy is high.
- 5 Extreme closeness between partners. There is a high level of trust and intimacy in the relationship. Self-disclosure rewarded by partner. Both partners are able to confide in/disclose to the other about any topic. Extremely high levels of emotional intimacy in all aspects of the relationship.

Quality of Sexuality/Sensuality in the Relationship

This rating measures frequency of sexual activity; a/symmetry of and preferences for initiation of and engagement in sexual activities; sexual satisfaction during the arousal and orgasm phases of the sexual response cycle; negative emotions (e.g., fear, disgust) during or after sexual interactions; sexual difficulties or concerns; and frequency and quality of sensual behaviors (e.g., touching, hugging, cuddling, massage) with and without sexual activity.

- 1 Infrequent sexual relations. Both partners very unsatisfied. Sex always accompanied by negative emotions. Sensual behaviors are rare. Sexual difficulties are frequent.
- 2 Occasional sexual relations (less than 1 time per month). Both partners dissatisfied. Sex sometimes accompanied by negative emotions. Sensual behaviors typically lead to sex and are rarely engaged in after sex. Occasional sexual difficulties.
- 3 Occasional sexual relations (1-2 times per month). Moderate satisfaction from both partners or one partner more satisfied than the other. No sexual difficulties. (Exception: if woman never has orgasm but reports satisfaction, may give 4 or 5).
- 4 Frequent sexual relations (1 time per week). Sex is satisfying for both partners and is never accompanied by negative emotions. Frequent sensual behaviors that do not always lead to sex. Sensual behaviors engaged in after sex. No sexual difficulties.
- 5 Frequent sensual relations (2-3 times per week). Sex is extremely satisfying for

both partners. Frequent sensual behaviors that do not necessarily lead to sex. Sensual behaviors engaged in after sex. No sexual difficulties.

Quality of Support Transactions in the Relationship

This rating measures quality of support when one partner has had a bad day, is feeling down, or has a problem; types of support (emotional, tangible, informational, and esteem); match between desired and received levels of support; whether support is offered in a positive or negative manner; mutuality of support provided and received across both partners; adequacy of support across a variety of situations and contexts.

- 1 Partner provides no support or provides limited support but it is not what the participant wants. Partner almost always dismisses or ignores requests for support (or time alone) or responds with criticism.
- 2 In most situations, there is a mismatch between type of support received and support desired. Partner sometimes dismisses or ignores requests for support.
- 3 There is some mismatch between type of support provided and type of support desired (about half of the time). Participant is indifferent on this topic.
- 4 In most situations, there is a match between type of support provided and type of support desired. Partner never dismisses or ignores requests for support.
- 5 High quality of support from partner. Partner is excellent at providing support and always responds well to requests for support.

Quality of Respect and Control in the Relationship

This rating measures demonstrations of respect for each other as competent, independent adults; acceptance of and positive regard for each other, even during disagreements; a/symmetry in decision-making across a variety of areas; adequacy/tension surrounding division of responsibilities; couple's ability to negotiate control across a variety of areas (e.g., scheduling one's own day, controlling money, contact with friends and family).

- 1 Participant is not treated as a competent person or equal partner. There is extreme disrespect in the relationship. One partner has almost all of the power in the relationship, including over the other partner's daily life and contact with family and friends.
- 2 There is little respect demonstrated in the relationship, power over decision-making is imbalanced, and one partner has substantial power over the other partner's daily life.
- 3 One or both partners are occasionally disrespected and sometimes feel unaccepted (about half the time). There is some shared power over decision-making. There are some specific power issues in the relationship, or there is some lack of

personal freedom.

- 4 There is a great deal of respect in the relationship, balanced decision-making, and no power issues.
- 5 Partners treat each other as competent individuals and equal partners. There is tremendous respect, and each partner has power over his/her own daily life and contact with friends and family. Partners share decision-making power or are comfortable with the division in decision-making power.

Quality of Communication and Conflict in the Relationship

(Typical frequency & length of major and minor arguments; typical behaviors engaged in during conflicts; presence, level & severity of psychological & physical aggression or withdrawal during arguments; emotions & behaviors before, during & after arguments; quality/mutuality of conflict recovery strategies after an argument)

- 1 Major arguments occur often (e.g., several times a week). All/almost all disagreements escalate into major arguments. Conflict regularly includes verbal aggression and/or physical aggression along with a multitude of negative emotions. Couple has poor conflict management skills. The argument may end, but the issue is not resolved.
- 2 Major arguments are common (e.g., weekly). Disagreements often escalate into major arguments. Conflict often includes verbal aggression and may sometimes include “moderate” physical aggression. Couple has poor conflict management skills. Couple typically takes hours to days to recover from an argument, and disagreements are rarely resolved.
- 3 Major arguments occur occasionally (e.g. once a month). Minor arguments (bickering) occur regularly (e.g. weekly). Major arguments include some negative affect with occasional verbal aggression, but no severe physical aggression. Conflict resolution takes a long time, but issues are typically resolved in some way. One person tends to facilitate the process of getting back to normal more than the other.
- 4 Major arguments are rare. Minor arguments occur occasionally. There is absolutely no psychological or physical aggression (but the couple may express some degree of negative affect during arguments). Couple has good conflict management skills, and issues are almost always resolved.
- 5 Absolutely no major arguments. No psychological or physical aggression. Very rarely have minor arguments (bickering). Couple is good at resolving conflict and exhibits good conflict management skills. Disagreements are typically resolved with healthy communication/do not escalate into arguments.

REFERENCES

- Antonucci, T. C. (2001). Social relations: An examination of social networks, social support, and sense of control. In J. E. Birren & K. W. Schaie (Eds.), *Handbook of the psychology of aging* (5th ed.) (pp. 427-453). San Diego, CA: Academic Press.
- Antonucci, T. C., Birditt, K. S., & Webster, N. (2010). Social relations and mortality: A more nuanced approach. *Journal of Health Psychology, 15*, 649-659.
- Antonucci, T. C., Fuhrer, R., & Dartigues, J. (1997). Social relations and depressing symptomatology in a sample of community-dwelling French older adults. *Psychology & Aging, 12*, 189-195.
- Barbour, K.A., Blumenthal, J.A., & Palmer, S.M. (2006). Psychosocial issues in the assessment and management of patients undergoing lung transplantation. *Chest, 129*, 1367-1374.
- Barnes, M. L., & Sternberg, R. J. (1997). A hierarchical model of love and its prediction of satisfaction in close relationships. In R. J. Sternberg & M. Hojjat (Eds.), *Satisfaction in close relationships* (pp. 79-101). New York: Guilford Press.
- Birditt, K., & Antonucci, T. C. (2008). Life sustaining irritations? Relationship quality and mortality in the context of chronic illness. *Social Science & Medicine, 67*, 1291-1299.
- Birmingham, W., Uchino, B. N., Smith, T. W., Light, K. C., & Sanbonmatsu, D. M. (2009). Social ties and cardiovascular function: An examination of relationship positivity and negativity during stress. *International Journal of Psychophysiology, 74*, 114-119.
- Bohachick, P., Taylor, M. V., Sereika, S., Reeder, S., & Anton, B. B. (2002). Social support, personal control, and psychosocial recovery following heart transplantation. *Clinical Nursing Research, 11*, 34-51.
- Bolger, N., DeLongis, A., Kessler, R. C., & Schilling, E. A. (1989). Effects of daily stress on negative mood. *Journal of Personality and Social Psychology, 57*, 808-818.
- Bolger, N., Foster, M. V., Vinokur, A. D., & Ng, R. (1996). Close relationships and adjustment to a life crisis: The case of breast cancer. *Journal of Personality and Social Psychology, 70*, 283-294.
- Bohlke, M., Marini, S., Rocha, M., Terhorst, L., Gomes, R. H., Barcellos, F. C., et al. (2009). Factors associated with health-related quality of life after successful kidney transplantation: A population based study. *Quality of Life Research, 18*, 1185-1193.
- Booth, B. M., Russell, D. W., Soucek, S., & Laughlin, P. R. (1992). Social support and outcome of alcoholism treatment: An exploratory analysis. *The American Journal of Drug and Alcohol Abuse, 18*, 87-101.
- Bright, M. J., Craven, J. L., & Kelly, P. J. (1990). Assessment and management of psychosocial stress in lung transplant candidates. *Health & Social Work, 15*, 125-132.

- Brissette, I., Cohen, S., & Seeman, T.E. (2000). Measuring social integration and social networks. In S. Cohen, L. Underwood, & B. Gottlieb (Eds.), *Measuring and intervening in social support* (pp. 53–85). New York: Oxford University Press.
- Bunzel, B., & Laederach-Hofmann, K. (2000). Solid organ transplantation: Are there predictors for posttransplant noncompliance? A literature overview. *Transplantation*, *70*, 711-716.
- Busby, D. M., Christensen, C., Crane, R. D., & Larson, J. H. (1995). A revision of the Dyadic Adjustment Scale for use with distressed and non-distressed couples: Construct hierarchy and multidimensional scales. *Journal of Marital and Family Therapy*, *21*, 289–298.
- Cameron, J. I., Whiteside, C., Katz, J. & Devins, G. M. (2000). Differences in quality of life across renal replacement therapies: A meta-analytic comparison. *American Journal of Kidney Disease*, *35*, 629-637.
- Cano, A., & Leonard, M. (2006). Integrative behavioral couple therapy for chronic pain: Promoting behavior change and emotional acceptance. *Journal of Clinical Psychology: In Session*, *62*, 1409-1418.
- Cano, A., & Williams, A. C. (2010). Social interaction in pain: Reinforcing pain behaviors or building intimacy? *Pain*, *149*, 9-11.
- Carrasco, F. R., Moreno, A., Ridaio, N., Calvo, N., Perez-Flores, I., Rodriguez, A., et al. (2009). Kidney transplantation complications related to psychiatric or neurological disorders. *Transplantation Proceedings*, *41*, 2430–2432.
- Caughlin, J. P., & Huston, T. L. (2002). A contextual analysis of the association between Demand/withdraw and marital satisfaction, *Personal Relationships*, *9*, 95-119.
- Cetingok, M., Hathaway, D., & Winsett, R. (2007). Contribution of post-transplant social support to the quality of life of transplant recipients. *Social Work in Health Care*, *45*, 39-56.
- Christensen, A. (1987). Detection of conflict patterns in couples. In K. Hahlweg & M. J. Goldstein (Eds.), *Understanding major mental disorder: The contribution of family interaction research* (pp. 250—265). New York: Family Process Press.
- Christensen, A., & Jacobsen, N. S. (2000). *Reconcilable differences*. New York: Guilford Press.
- Christensen, A.J., Raichle, K., Ehlers, S., & Bertolatus, A. (2002). Effect of family environment and donor source on patient quality of life following renal transplantation. *Health Psychology*, *21.5*, 468-476.
- Cohen, S. (2004). Social relationships and health. *American Psychologist*, *59*, 676-684.
- Cohen, S., Gottlieb, B., & Underwood, L. (2000). Social relationships and health. In S. Cohen, L. Underwood, & B. Gottlieb (Eds.), *Measuring and intervening in social support* (pp. 3-25). New York: Oxford University Press.

- Cohen, S., Mermelstein, R., Kamarck, T., & Hoberman, H.M. (1985). Measuring the functional components of social support. In I.G. Sarason & B.R. Sarason (Eds.), *Social support: Theory, research and applications* (pp. 73–94). Boston: Martinus Nijhoff Publishers.
- Cohen, S., & Hoberman, H. (1983). Positive events and social supports as buffers of life change stress. *Journal of Applied Social Psychology, 13*, 99-125.
- Cohen, S., & Wills, T. A. (1985). Stress, social support, and the buffering hypothesis. *Psychological Bulletin, 98*, 310-357.
- Cordova, J. V., Gee, C. B., & Warren, L. Z. (2005). Emotional skillfulness in marriage: Intimacy as a mediator of the relationship between emotional skillfulness and marital satisfaction. *Journal of Social and Clinical Psychology, 24*, 218–235.
- Cordova, J.V., Scott, R.L., Dorian, M., Mirgain, S., Yaeger, D., & Groot, A. (2005). The marriage checkup: An indicated preventive intervention for treatment-avoidance couples at risk for marital deterioration. *Behavior Therapy, 36*, 301-309.
- Cordova, J. V., Warren, L. Z., & Gee, C. B. (2001). Motivational interviewing with couples: An intervention for at-risk couples. *Journal of Marital and Family Therapy, 27*, 315–326.
- Cornwell, B. (2012). Spousal network overlap as a basis for spousal support. *Journal of Marriage and Family, 74*, 229-238.
- Cranford, J. A. (2004). Stress-buffering or stress-exacerbation? Social support and social undermining as moderators of the relationship between perceived stress and depressive symptoms among married people. *Personal Relationships, 11*, 23-40.
- Cunningham, A. J., Edmonds, C. V. I., Jenkins, G. P., Pollack, H., Lockwood, G. A., & Warr, D. (1998). A randomized controlled trial of the effects of group psychological therapy on survival in women with metastatic breast cancer. *Psycho-oncology, 7*, 508-517.
- Cutrona, C. E. (1996). *Social support in couples: Marriage as a resource in times of stress*. Thousand Oaks, CA: Sage Publications.
- Dalgard, O. S., & Haheim, L. L. (1998). Psychosocial risk factors and mortality: A prospective study with special focus on social support, social participation, and locus of control in Norway. *Journal of Epidemiology & Community Health, 52*, 476-481.
- Dew, M. A., Simmons, R. G., Roth, L. H., Schulberg, H. C., Thompson, M. E., Armitage, J. M., & Griffith, B. P. (1994). Psychosocial predictors of vulnerability to distress in the year following heart transplantation. *Psychological Medicine: A Journal of Research in Psychiatry and the Allied Sciences, 24*, 929-945.
- Dew, M. A., Switzer, G. E., Goycoolea, J. M., Allen, A. S., DiMartini, A., Kormos, R. L., & Griffith, B. P. (1997). Does transplantation produce quality of life benefits? A quantitative review of the literature. *Transplantation, 64*, 1261-1273.

- DiMartini, A., Dew, M. A., Javed, L., Fitzgerald, M. G., Jain, A., & Day, N. (2004). Pretransplant psychiatric and medical comorbidity of alcoholic liver disease patients who received liver transplant. *Psychosomatics*, *45*, 517-523.
- Doss, B. D., & Christensen, A. (2006). Acceptance in romantic relationships: The frequency and acceptability of partner behavior inventory. *Psychological Assessment*, *18*, 289-302.
- Dohrenwend, B. S., & Dohrenwend, B. P. (1978). Some issues in research on stressful life events. *Journal of Nervous and Mental Disease*, *166*, 7-15.
- Druley, J. A., Stephens, M. A. P., Coyne, J. C. (1997). Emotional and physical intimacy in coping with lupus: Women's dilemmas of disclosure and approach. *Health Psychology*, *16*, 506-514.
- ENRICHHD Investigators. (2003). Effects of treating depression and low perceived social support on clinical events after myocardial infarction: The enhancing recovery in coronary heart disease patients (ENRICHHD) randomized trial. *Journal of the American Medical Association*, *28*, 3106-3116.
- Einollahi, B., Tavallaii, S-A., Bahaeloo-Horeh, S., Omranifard, V., Salehi-Rad, S., & Khoddami-Vishteh, H. R. (2009). Marital relationship and its correlates in kidney recipients. *Psychology, Health & Medicine*, *14*, 162-169.
- Fincham, F. D. (2003). Marital conflict: Correlates, structure, and context. *Current Directions in Psychological Science*, *12*, 23-27.
- Fisher, B. J., Graham, K. E., & Duffecy, J. (2006). Chronic disease, disability, and sexuality. In McAnulty, R. D., & Burnette, M. M. (Eds). *Sex and sexuality, Vol 2: Sexual function and dysfunction*. (pp. 233-260). Westport, CT: Praeger Publishers/Greenwood Publishing Group.
- Frasure-Smith, N., L'Esperance, F., Prince, R. H., Verrier, P., Garber, R. Juneau, M., et al. (1997). Randomized trial of home-based psychosocial nursing: Intervention for patients recovering from myocardial infarction. *The Lancet*, *350*, 473-479.
- Frazier, P. A., Davis-Ali, S. H., & Dahl, K. E. (1995). Stressors, social support, and adjustment in kidney transplant. *Social Work in Health Care*, *21*, 93-108.
- Frazier, P. A., Tix, A. P., Barnett, C. L. (2003). The relational context of social support: Relationship satisfaction moderates the relations between enacted support and distress. *Personality and Social Psychology Bulletin*, *29*, 1133-1146.
- Frazier, P. A., Tix, A. P., Klein, C. D., & Arikian, N. J. (2000). Testing theoretical models of the relations between social support, coping and adjustment to stressful life events. *Journal of Social and Clinical Psychology*, *19*, 314-335.
- Garos, S., Kluck, A., & Aronoff, D. (2007). Prostate cancer patients and their partners: Differences in satisfaction indices and psychological variables. *Journal of Sex Medicine*, *4*, 1394-1403.

- Goetzmann, L., Klaghofer, R., Wagner-Huber, R., Halter, J., Boehler, A., Muellhaupt, B., et al. (2007). Psychosocial vulnerability predicts psychosocial outcome after an organ transplant: Results of a prospective study with lung, liver, and bone-marrow patients. *Journal of Psychosomatic Research*, *62*, 93-100.
- Goetzmann, L., Ruegg, L., Stamm, M., Ambühl, P., Boehler, A., Halter, J., et al. (2008). Psychosocial profiles after transplantation: A 24-month follow-up of heart, lung, liver, kidney, and allogeneic bone marrow patients. *Transplantation*, *86*, 662-668.
- Goodwin, P. J., Leszcz, M., Ennis, M., Koopmans, J., Vincent, L., Guther, H., et al. (2001). The effect of group psychosocial support on survival in metastatic breast cancer. *New England Journal of Medicine*, *345*, 1719-1726.
- Harland, R., & Huws, R. (1997). Sexual problems in diabetes and the role of psychological intervention. *Sexual and Relationship Therapy*, *12*, 147-157.
- Harper, R. G., Chacko, R. C., Kotik-Harper, D., Young, J., & Gotto, J. (1998). Self-report evaluation of health behavior, stress vulnerability, and medical outcome of heart transplant recipients. *Psychosomatic Medicine*, *60*, 563-569.
- Heavey, C. L., Christensen, A., & Malamuth, N. M. (1995). The longitudinal impact of demand and withdrawal during marital conflict. *Journal of Consulting and Clinical Psychology*, *63*, 797-801.
- Heffner, K. L., Kiecolt-Glaser, J. K., Loving, T. J., Glaser, R., & Malarkey, W. B. (2004). Spousal support satisfaction as a modifier of physiological responses to marital conflict in younger and older couples. *Journal of Behavioral Medicine*, *27*, 233-254.
- Heffner, K. L., Loving, T. J., Kiecolt-Glaser, J. K., Himawan, L. K., Glaser, R., & Malarkey, W. B. (2006). Older spouses' cortisol responses to marital conflict: Associations with demand/withdraw communication patterns. *Journal of Behavioral Medicine*, *29*, 317-325.
- Hegleson, V. S. (1991). The effects of masculinity and social support on recovery from myocardial infarction. *Psychosomatic Medicine*, *53*, 621-633.
- Herbette, G., & Rime, B. (2004). Verbalization of emotion in chronic pain patients and their psychological adjustment. *Journal of Health Psychology*, *9*, 661-676.
- Ho, J. K., Ko, H. H., Schaeffer, D. F., Erb, S. R., Wong, C., Buczkowski, A. K., et al., (2006). Sexual health after orthotopic liver transplantation. *Liver transplantation*, *12*, 1478-1484.
- Hogan, B. E., Linden, W., & Najarian, B. (2002). Social support interventions: Do they work? *Clinical Psychology Review*, *22*, 381-440.
- Howard, L. M., Williams, R., & Fahy, T. A. (1994). The psychiatric assessment of liver transplant patients with alcoholic disease: A review. *Journal of Psychosomatic Research*, *38*, 643-653.
- Hu, L., & Bentler, P. M. (1999). Cutoff criteria for fit indices in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling*, *6*, 1-55.

- Jacobson, N.S., Christensen, A., Prince, S. E., Cordova, J., & Eldridge, K. (2000). Integrative Behavioral Couple Therapy: An acceptance-based, promising new treatment for couple discord. *Journal of Consulting and Clinical Psychology, 68*, 351-355.
- Jackson, D. L. (2001). Sample size and number of parameter estimates in maximum likelihood confirmatory factor analysis: A monte carlo investigation. *Structural Equation Modeling: A Multidisciplinary Journal, 8*, 205-223.
- Jalowiec, A., Grady, K. L., White-Williams, C. (2007). Predictors of perceived coping in patients awaiting heart transplant. *Nursing Research, 56*, 260-268.
- Johansen, A. B., & Cano, A. A. (2007). A preliminary investigation of affective interaction in chronic pain couples. *Pain, 132*, 586-595.
- Jowsey, S. G., Taylor, M. L., Schneekloth, T. D., & Clark, M. M. (2001). Psychosocial challenges in transplantation. *Journal of Psychiatric Practice, 7*, 404-414.
- Karney, B. R., & Bradbury, T. N. (1997). Neuroticism, marital interaction, and the trajectory of marital satisfaction. *Journal of Personality and Social Psychology, 72*, 1075-1092.
- Kasiske, B. L., Cangro, C. B., Hariharah, S., Hricik, D. E., Kerman, R. H., Roth, D., et al. (2001). The evaluation of renal transplant candidates: Clinical practice guidelines. *American Journal of Transplantation, 1*, 1-95.
- Kiecolt-Glaser, J. K., Glaser, R., Cacioppo, J. T., MacCallum, R. C., Snydersmith, M., Kim, C., et al. (1997). Marital conflict in older adults: Endocrinological and immunological correlates. *Psychosomatic Medicine, 59*, 339-349.
- Kiecolt-Glaser, J. K., Glaser, R., Cacioppo, J. T., & Malarkey, W. B. (1998). Marital stress: Immunologic, neuroendocrine, and autonomic correlates. *Annals of the New York Academy of Sciences, 840*, 649-655.
- Kiecolt-Glaser, J. K., & Newton, T. L. (2001). Marriage and health: His and hers. *Psychological Bulletin, 127*, 472-503.
- Kimmel, P. L., Peterson, R. A., Weihs, K. L., Shidler, N., Simmens, S. J., Alleyne, S., et al. (2000). Dyadic relationship conflict, gender, and mortality in urban hemodialysis patients. *Journal of the American Society of Nephrology, 11*, 1518-1525.
- Kreilkamp T. (1984). Psychological closeness. *American Behavioral Scientist, 27*, 771-784.
- Kober, B., Kuchler, T., Broelsch, C., Kremer, B., et al. (1990). A psychological support concept and quality of life research in a liver transplantation program: An interdisciplinary multicenter study. *Psychotherapy and Psychosomatics, 54*, 117-131.

- Kool, M. B., Woertman, L., Prins, M. A., Van Middendorp, H., & Geenen, R. (2006). Low relationship satisfaction and high partner involvement predict sexual problems of women with fibromyalgia. *Journal of Sex & Marital Therapy, 32*, 409-423.
- Kulik, J. A., & Mahler, H. I. M. (1989). Social support and recovery from surgery. *Health Psychology, 5*, 221-238.
- Laurenceau, J., Barrett, L. F., & Rovine, M. J. (2005). The interpersonal process model of intimacy in marriage: A daily-diary and multilevel modeling approach. *Journal of Family Psychology, 19*, 314-323.
- Lawrence, E., Barry, R. A., Brock, R.L., Bunde, M., Langer, A., Ro, E., et al. (2011). The Relationship Quality Interview: Evidence of reliability, convergent and divergent validity, and incremental utility. *Psychological Assessment, 23*, 44-63.
- Lawrence, E., Brock, R.L., Barry, R.A., Langer, A., & Bunde, M. (2009). *Assessing relationship quality: Development of an interview and implications for couple assessment and intervention*. In E. Cuyler (Ed.), *Psychology of relationships* (pp. 173-189). NY: Nova Science Publishers, Inc.
- Lawrence, E., Pederson, A., Bunde, M., Barry, R. A., Brock, R. L., Fazio, E., et al. (2008). Objective ratings of relationship skills across multiple domains as predictors of marital satisfaction trajectories. *Journal of Social and Personal Relationships, 25*, 445-467.
- MacCallum, R. C., Browne, M. W., & Sugawara, H. M. (1996). Power analysis and determination of sample size for covariance structure modeling. *Psychological Methods, 1*, 130-149.
- Marsh, H. W., Hau, K. T., & Wen, Z. (2004). In search of golden rules: Comment on hypothesis testing approaches to setting cutoff values for fit indexes and dangers in over-generalizing Hu & Bentler's (1999) findings. *Structural Equation Modeling, 11*, 320-341.
- McCausland Kurz, J., & Cavanaugh, J.C. (2001). A qualitative study of stress and coping strategies used by well spouses of lung transplant candidates. *Families, Systems & Health, 19*, 181-196.
- Moos, B. S., & Moos, B. S. (1986). *Family Environment Scale* (2nd Ed.). Palo Alto, CA: Consulting Psychologists Press.
- Moran, P. J., Christensen, A. J., Ehlers, S. L., & Bertolatus, J. A. (1999). Family environment, intrusive ideation, and adjustment among renal transplant candidates. *Annals of Behavioral Medicine, 21*, 311-316.
- Morley, S., Doyle, K., & Beese, A. (2000). Talking to others about pain: Suffering in silence. In M. Devor, M. Rowbotham, & Z. Wisenfeld-Hallin (Eds.), *Proceedings of the Ninth World Congress on Pain: Progress in pain research and management* (pp. 1123-1129). Seattle, WA: IASP Press.
- Mosher, C. E., Redd, W. H., Rini, C., Burkhalter, J. E., & DuHamel, K. N. (2009). Physical, psychological, and social sequelae following hematopoietic stem cell transplantation: A review of the literature. *Psycho-Oncology, 18*, 113-127.

- Muehrer, R. J. (2009). Sexuality, an important component of the quality of life of the kidney transplant recipient. *Transplantation Reviews*, 23, 214-223.
- Nemati, E., Pourfarziani, V., Jafari, A. M., Assari, S., Moghani-Lankarani, M., Khedmat, H., et al. (2007). Prediction of inpatient survival and graft loss in rehospitalized kidney recipients. *Transplantation Proceedings*, 39, 974-977.
- Newsom, J. T., Nishishiba, M., Morgan, D. L., & Rook, K. S. (2003). The relative importance of three domains of positive and negative social exchanges: A longitudinal model with comparable measures. *Psychology and Aging*, 18, 746-754.
- Olbrisch, M. E., Benedict, S. M., Ashe, K., & Levenson, J. L. (2002). Psychological assessment and care of organ transplant patients. *Journal of Consulting and Clinical Psychology*, 70, 771-783.
- Olsson, U. H., Foss, T., Troye, S. V., & Howell, R. D. (2000). The performance of ML, GLS, and WLS estimation in structural equation modeling under conditions of misspecification and nonnormality. *Structural Equation Modeling*, 7, 557-595.
- Organ Procurement and Transplantation Network (OPTN). (2010; 2012). Retrieved from <http://optn.transplant.hrsa.gov/>.
- Parolin, M. B., Rabinovitch, I., Urbanetz, A. A., Scheidemantel, C., Cat, M. L. & Coelho, J. C. U. (2004). Impact of successful liver transplantation on the reproductive function and sexuality in women with advanced liver disease. *Transplantation Proceedings*, 36, 943-944.
- Pérez-San-Gregorio, M. A., Martín-Rodríguez, A., Galán-Rodríguez, A., & Borda-Más, M. (2009). Living and deceased transplanted patients one year later: Psychosocial differences just after surgery. *International Journal of Clinical and Health Psychology*, 9, 429-438.
- Pesavento, T. E. (2009). Kidney transplantation in the context of renal replacement therapy. *Clinical Journal of the American Society of Nephrology*, 4, 2035-2039.
- Raggi, M.C., Siebert, S.B., Friess, H., Schremmer-Danninger, E., Thorban, S., & Dinkel, A. (2012). Sexual and relationship functioning before and after renal transplantation: A descriptive study with patients and partners. *Scandinavian Journal of Urology and Nephrology*, Early Online, 1-6.
- Reblin, M., & Uchino, B. N. (2008). Social and emotional support and its implications for health. *Current Opinions in Psychiatry*, 21, 201-205.
- Reifmann, A. (1995) Social relationships, recovery from illness, and survival: A literature review. *Annals of Behavioral Medicine*, 17, 124-131.
- Reis, H., & Shaver, P. (1988). Intimacy as an interpersonal process. In S. Duck (Ed.), *Handbook of interpersonal relationships* (pp. 367-389). New York: John Wiley & Sons.

- Rini, C., Redd, W.H., Austin, J., Mosher, C.E., Meschian, Y.M., Isola, L. et al. (2011). Effectiveness of partner social support predicts enduring psychological distress after hematopoietic stem cell transplantation. *Journal of Consulting and Clinical Psychology, 79*, 64-74.
- Rodrigue, J. R., Dimitri, N., Reed, A., Antonellis, T., Pavlakis, M., Johnson, S. R. (2010). Spouse caregivers of kidney transplant patients: Quality of life and psychosocial outcomes. *Progress in Transplantation, 20*, 335-342.
- Rose, R. C., Peake, M. R., Ennis, N., Pereira, D. B., & Antoni, M. H. (2005). Depressive symptoms, intrusive thoughts, sleep quality and sexual quality of life in women co-infected with human immunodeficiency virus and human papillomavirus. *Chronic Illness, 1*, 281- 287.
- Sarason, B. R., Pierce, G. R., & Sarason, I. G. (1990). Social support: The sense of acceptance and the role of relationships. In B. R. Sarason, I. G. Sarason, & G. R. Pierce (Eds.), *Social support: An interactional view* (pp. 971-128). New York: John Wiley & Sons.
- Sarason, B. R., & Sarason, I.G. (2006). Close relationships and social support: Implications for the measurement of social support. In A. L. Vangelisti, & D. Perlman (Eds.), *The Cambridge handbook of personal relationships* (pp.429-443). Cambridge, NY: Cambridge University Press.
- Sarason, B. R., Sarason, I. G., & Gurung, R. A. R. (2001). Close personal relationships and health outcomes: A key to the role of social support. In B. R. Sarason, & S. Duck (Eds.), *Personal Relationships: Implications for Clinical and Community Psychology* (pp. 15-41). New York: John Wiley & Sons.
- Schramm, D. G., Marshall, J. P. Harris, V. W., & Lee, T. R. (2005). After "I do": The newlywed transition. *Marriage and Family Review, 38*, 45-67.
- Schwarzer, R., & Leppin, A. (1989). Social support and health: A meta-analysis. *Psychology & Health: An International Journal, 3*, 1-15.
- Sher, T. G., & Baucom, D. H. (1993). Marital communication: Differences among maritally distressed, depressed, and nondistressed-nondepressed couples. *Journal of Family Psychology, 7*, 148-153.
- Sivo, S. A., Fan, X. T., Witta, E. L. & Willse, J. T. (2006). The search for 'optimal' cutoff properties: Fit index criteria in structural equation modeling. *The Journal of Experimental Education, 74*, 267-289.
- Spaderna, H., Mendell, N. R., Zahn, D., Wang, Y., Kahn, J., Smits, J. M. A. et al. (2009). Social isolation and depression predict 12-month outcomes in the "waiting for a new heart study." *The Journal of Heart and Lung Transplantation, 29*, 247-254.
- Sprecher, S., & Cate, R. M. (2004). Sexual satisfaction and sexual expression as predictors of relationship satisfaction and stability. In J. H. Harvey, A. Wenzel, & S. Sprecher (Eds.), *Handbook of sexuality in close relationships* (pp. 235–256). Mahwah, NJ: Lawrence Erlbaum Associates.

- Stilley, C. S., DiMartini, A. F., de Vera, M. E., Flynn, W. B., King, J., Sereika, S., et al. (2010). Individual and environmental correlates and predictors of early adherence and outcomes after liver transplantation. *Progress in Transplantation*, 20, 58-67.
- Szeifert, L., Molnar, M. Z., Ambrus, C., Borbala, A., Kovacs, A. Z., Vamos, E. P., et al. (2010). Symptoms of depression in kidney transplant recipients: A cross-sectional study. *American Journal of Kidney Diseases*, 55, 132-140.
- Tavallaii, S. A., Fathi-Ashtiani, A., Nasiri, M., Assari, S., Maleki, P., & Einollahi, B. (2007). Correlation between sexual function and post renal transplant quality of life: Does gender matter? *Journal of Sex Medicine*, 4, 1610-1618.
- Timmerman, G. M. (1991). A concept analysis of intimacy. *Issues in Mental Health Nursing*, 12, 19-30.
- Tomarken, A. J., & Waller, N. G. (2005). Structural equation modeling: Strengths, limitations, and misconceptions. *Annual Review of Clinical Psychology*, 1, 31-65.
- Tower, R. B., Kasl, S. V., & Darefsky, A. S. (2002). Types of marital closeness and mortality risk in older couples. *Psychosomatic Medicine*, 64, 644-659.
- Trief, P. M., Ploutz-Snyder, R., Britton, K. D., & Weinstock, R. S. (2004). The relationship between marital quality and adherence to the diabetes care regimen. *Annals of Behavioral Medicine*, 27, 148-154.
- Uchino, B. N. (2004). *Social support and physical health: Understanding the health consequences of relationships*. New Haven, CT: Yale University Press.
- Uchino, B. N., Cacioppo, J. T., & Kiecolt-Glaser, J. K. (1996). The relationship between social support and physiological processes: A review with emphasis on underlying mechanisms and implications for health. *Psychological Bulletin*, 119, 488-531.
- United Network for Organ Sharing (UNOS). (2012). Retrieved from <http://www.unos.org>.
- Vinokur, A. D., Price, R. H., & Caplan, R. D. (1996). Hard times and hurtful partners: How financial strain affects depression and relationship satisfaction of unemployed persons and their spouses. *Journal of Personality and Social Psychology*, 71, 166-179.
- Virzì, A., Signorelli, M. S., Veroux, M., Giammarresi, G., Mageri, S., Nicoletti, A., et al. (2007). Depression and quality of life in living related renal transplantation. *Transplantation Proceedings*, 39, 1791-1793.
- Walter-Ginzburg, A., Blumstein, T., Chetrit, A., & Modan, B. (2002). Social factors and mortality in the old-old in Israel: The CALAS study. *Journal of Gerontology: Social Sciences*, 57B, S308-S318.
- Ware J. E., Kosinski M., & Keller S. D. (1996). A 12-item short-form health survey: Construction of scales and preliminary tests of reliability and validity. *Medical Care*, 34, 220-233.

- Ware, J. E., Sherbourne, C. D. (1992). The MOS 36-item Short-Form health survey (SF-36): Conceptual framework and item selection. *Medical Care*, 30, 473-83.
- Watson, D., O'Hara, M. W., Chmielewski, M., McDade-Montez, E., Koffel, E., Naragon, K., et al. (2008). Further validation of the IDAS: Evidence of convergent, discriminant, criterion, and incremental validity. *Psychological Assessment*, 20, 248-259.
- Watson, D., O'Hara, M. W., Simms, L. J., Kotov, R., Chmielewski, M., McDade-Montez, E., et al. (2007). Development and validation of the Inventory of Depression and Anxiety Symptoms (IDAS). *Psychological Assessment*, 19, 253-268.
- Wilks, S. E., Spivey, C. A., & Chisholm-Burns, M. A. (2010). Psychometric re-evaluation of the immunosuppressant therapy adherence scale among solid-organ transplant recipients. *Journal of Evaluation in Clinical Practice*, 16, 64-68.
- Ziegelmann, J. P., Griva, K., Hankins, M., Harrison, M., Davenport, A., Thompson, A. , et al. (2002). The Transplant Effects Questionnaire (TxEQ): The development of a questionnaire for assessing the multidimensional outcome of organ transplantation – example of end stage renal disease (ESRD). *British Journal of Health Psychology*, 7, 393–408.