

# FAMILY ENVIRONMENT, INTRUSIVE IDEATION, AND ADJUSTMENT AMONG RENAL TRANSPLANT CANDIDATES<sup>1,2</sup>

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## ABSTRACT

*Waiting for an organ transplant is a stressful experience frequently associated with symptoms of depression and anxiety. Little empirical work has examined patients during the stressful period prior to transplantation, particularly among patients waiting for a renal transplant. A large body of research has demonstrated that social and family support variables are associated with psychological adjustment in a variety of medical populations. Little research has examined the mechanism by which social support exerts its effects on psychological well-being. We examined two possible models of the role of intrusive thoughts on the relationship between a supportive family environment and both depression and anxiety in a sample of 75 patients with end-stage renal disease (ESRD) waiting for a kidney transplant. Path analyses provided modest support for a mediational model, showing that intrusive thoughts partly accounted for the relationship between family expressiveness and psychological distress. A moderational model examining the interactive effects of family environment and intrusive thinking on adjustment was not supported.*

(*Ann Behav Med* 1999, 21(4):311–316)

## INTRODUCTION

Anecdotal and clinical evidence suggests that waiting for an organ transplant is frequently a stressful experience, often associated with anxiety and depression (1,2). The shortage of donor organs and consequent increased waiting times can make the experience even more difficult (2). Although initial inclusion on the transplant list elicits relief and hope, the long wait for a donor organ frequently results in a variety of negative emotions, such as pessimism about obtaining an organ, fear of being “forgotten” by the transplant staff, or mistrust and anger when other candidates receive an organ (1,3).

Little empirical work has examined patients during the stressful period prior to transplantation. Previous studies have revealed that, for cardiac transplant candidates, the pretransplantation period is commonly associated with symptoms of depression and anxiety (e.g. 4,5). Fewer studies have examined psychological adjustment among end-stage renal disease (ESRD) patients waiting for a renal transplant. However, the available data do suggest

that symptoms of anxiety and depression are also common among renal transplant candidates (3,6,7).

For renal transplant candidates, the pretransplant process involves a variety of highly stressful circumstances. Due to a perennial shortage of donor organs, prolonged waiting periods for a renal graft are common. Further, the prospect of undergoing a major surgical procedure, a lifetime of immunosuppressive medications, and the threat of an eventual graft rejection or failure all weigh heavily on the minds of renal transplant candidates (3).

## Social Support and Adjustment

Very little research has examined potential influences on emotional adjustment among renal transplant candidates. A large body of literature suggests that the availability and quality of social support is associated with better psychological adjustment among the general population as well as various medical populations (8,9). Among ESRD patients receiving renal dialysis, indices of social support have been associated with various measures of emotional and behavioral adjustment (see review, 10). A supportive family environment has been identified as a particularly important source of social support for chronically ill individuals (11,12). Several studies involving ESRD patients receiving renal dialysis have demonstrated that a family environment characterized by higher levels of perceived expressiveness, higher cohesiveness, and lower conflict among family members is associated with lower depression and anxiety, better medical regimen adherence, and increased survival (11,13–17). However, no previous studies have examined the adaptive significance of social or family support among ESRD patients waiting for a kidney transplant.

## Social Environment, Intrusive Thinking, and Emotional Distress

One often-noted limitation of the social support literature (e.g. 8,18) is the absence of data regarding how social support exerts its effects on well-being. Although various mechanisms have been theorized to mediate the support–adjustment relationship, very few empirical studies have identified potential mediating variables. There is some evidence that social support enhances self-esteem and self-efficacy, which in turn is associated with more positive emotional and behavioral adjustment (19,20).

One potential mediator of the support–adjustment relationship that has not been previously examined in any population involves the extent to which support decreases intrusive thoughts for individuals under stress. Individuals who experience stressful or traumatic events often have unwanted and intrusive thoughts or images of the event, such as dreams and unavoidable thoughts. Although these thoughts and feelings, collectively called intrusive thoughts, are not themselves considered pathological or irrational, they are thought to play a central role in the development and maintenance of psychological distress among some individuals (21). For example, among individuals exposed to the Three Mile Island nuclear accident, those who reported more intrusive ideation

<sup>1</sup> Preparation of this manuscript was supported in part by the National Institute of Diabetes and Digestive and Kidney Diseases grant DK49129 awarded to Alan Christensen.

<sup>2</sup> We gratefully acknowledge the assistance of Rachel Burke and Barbara Schanbacher in conducting this research.

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continued to exhibit more symptoms of stress (as measured by self-report of stress symptoms and norepinephrine levels) years later, whereas those who did not report many intrusive thoughts showed less distress (22).

A similar role for intrusive thoughts has been observed among patients with chronic medical problems. For example, among breast cancer patients, a strong relationship was found between intrusive thoughts and psychological distress (23). Although the association of intrusive thoughts to distress has not previously been examined in any transplant population, clinical observation suggests that patients waiting for a transplant do experience intrusive thoughts (3). For example, one common pattern of intrusive thinking that has been described in transplant candidates is ruminating about circumstances that might increase the chance of someone having an accident, thus causing an organ to become available (1). Other possible examples of intrusive ideation among transplant candidates might include hostile feelings towards other patients who receive an organ first and thoughts about the possibility of death during the major surgery.

A major goal of the present study was to examine the possibility that the effect of a supportive family environment on emotional distress is mediated by intrusive thoughts. From a statistical perspective, mediation occurs when a third variable accounts for or explains the association of a predictor variable with a criterion variable (24). In the case of the present study, a mediational relationship would occur if patients with a more supportive family experienced fewer intrusive thoughts about their possible upcoming transplant, and it was these intrusive thoughts that accounted for a significant effect of family environment on psychological distress.

Intrusive thoughts may be more relevant to some aspects of the social environment than others. For example, family expressiveness, or the degree to which the family environment allows for the expression of stressful thoughts and feelings, may be particularly relevant to the associations of support, intrusive thoughts, and adjustment (cf. 25). In their work involving a highly similar set of constructs, Lepore and colleagues (25,26) have argued for an interactive or moderational association of social environment and intrusive thinking on adjustment. Moderation occurs when a third variable affects the direction or strength of the relation between a predictor and criterion variable (24). Lepore and colleagues (25,26) have argued that intrusive thoughts have an adverse effect on adjustment only among individuals who hold the perception that their environment is not conducive to the expression of stressful thoughts and feelings (i.e. high in "social constraint"). Among individuals perceiving a less constraining or more expressive social environment, Lepore has suggested that intrusive thinking will not be associated with poorer adjustment.

### The Present Study

The present study examined two models of the effects of family expressiveness and intrusive thinking on both depressive and anxious symptomatology in a sample of ESRD patients waiting for a transplant. First, we tested a mediational model in which we anticipated that intrusive thoughts would account for a significant relationship between family expressiveness and two different measures of psychological distress. Specifically, we examined the hypothesis that lower levels of depression and anxiety among patients with a family environment high in expressiveness would be due to lower intrusive thinking among these individuals. Among patients with a family environment low

in expressiveness, we anticipated greater intrusive thinking and thus greater psychological distress.

The second model examined the notion that the family environment–adjustment relationship is moderated by intrusive thoughts. Consistent with Lepore and colleagues (25), we examined the possibility that greater intrusive ideation would be associated with more emotional distress only among patients perceiving a less expressive family environment. Among patients reporting an environment more conducive to the expression of stressful thoughts and emotions (high expressiveness), intrusive ideation was not expected to be associated with greater emotional distress.

## METHOD

### Patient Population

Participants were recruited from the Department of Surgery's Renal Transplantation Clinic at the University of Iowa Hospitals and Clinics (UIHC). Participants in the current study are involved in a longitudinal study of adjustment to renal transplant from a cadaveric donor. At the time of the current study, all patients were on the waiting list to receive a kidney transplant. Participants were contacted by mail and asked to complete a packet of questionnaires. Of 142 patients contacted, 79 patients (56%) returned the survey materials. Two patients were not eligible for the current study because they had already received a transplant. Two additional patients were eliminated due to incomplete questionnaire data, leaving a sample of 75 patients. Participants who returned the packet of questionnaires were compensated \$15.00 for their time.

The sample consisted of 41 (55%) males and 34 (45%) females. Participants ranged in age from 15.9 to 74.3 years ( $M = 46.7$ ,  $SD = 13.5$ ). The mean level of education was 13.0 years ( $SD = 2.2$ , range = 8–19). Twenty-four (32%) patients were diabetic. Forty-one (54.7%) patients were married; 20 (26.7%) were divorced, separated, or widowed; and 13 (17.3%) were single (marital status information was missing for 1 participant). Twenty-seven (36%) patients had experienced a previous transplant failure. This sample appears to be fairly representative of ESRD patients in the United States in terms of demographic and clinical characteristics (27). For example, the gender composition of our sample was 45% female, while the national population consists of 46% females. Similarly, while 32.0% of the present sample was diabetic, 32.5% of the national ESRD population is diabetic.

The median time that participants in the present study had been on the transplant list was 8.0 months ( $M = 18.33$ ,  $SD = 31.57$ ). Waiting times for a renal transplant vary according to blood type compatibility and between-center differences. While the median waiting time nationally is 28 months (28), a review of UIHC transplant records indicated that the median waiting time in 1997 at our center was 12 months.

### Measures

*Family Environment Scale:* The 27-item Family Relationships Index derived from the Family Environment Scale (FES) (12) was used as a measure of family support. Although our primary hypotheses involved the expressiveness component of the FES, we obtained data using all three of the 9-item subscales comprising the relationships index. These subscales are Expressiveness (the extent to which family members are encouraged to act openly and express their feelings directly), Cohesion (the degree to which family members help and support each other), and Conflict (the extent to which openly expressed anger and conflictual interactions charac-

**TABLE 1**  
Intercorrelations, Means, and Standard Deviations of Key Variables (N = 75)

Variables	2	3	4	5	6	Mean (SD)
1. FES Expressiveness	.44***	-.26*	-.23*	-.28*	-.28*	6.2 (1.7)
2. FES Cohesion	—	-.55***	-.12	-.31**	-.22	7.7 (1.7)
3. FES Conflict	—	—	.06	.32**	.21	2.2 (2.0)
4. IES Intrusion	—	—	—	.34**	.38**	15.1 (5.1)
5. BDI	—	—	—	—	.46***	13.0 (7.0)
6. STAI	—	—	—	—	—	38.2 (12.9)

\*  $p < .05$ , \*\*  $p < .01$ , \*\*\*  $p < .001$ .

terize the family) (12). Representative items from the 9-item true–false Expressiveness subscale include, “We tell each other about our personal problems,” and “Someone usually gets upset if you complain in our family” (reverse scored). Scores on the subscales range from 0 to 9, with higher scores indicating a more expressive, cohesive, or conflictual family environment. An internal consistency of .89 (Cronbach’s alpha), a 1-year test–retest stability of .66, and evidence of construct validity has been reported for this measure (29).

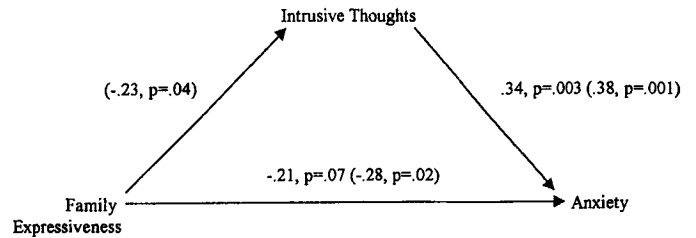
**Impact of Events Scale:** An assessment of intrusive thinking was obtained using an adaptation of the 8-item Intrusive Thoughts scale from the Impact of Events Scale (IES) (30). Instructions were modified to be kidney transplant-specific, asking participants to rate the frequency with which they experience intrusive thoughts and feelings about their possible upcoming transplant. Respondents rated the frequency of each of 8 intrusive thoughts from 1 (*not at all*) to 4 (*often*). Scores can range from 8 to 32, with higher scores indicating greater intrusive thinking. Sample items from the Intrusive Thoughts subscale of the IES include, “I thought about it when I didn’t have to,” “I had trouble doing other things because it kept coming into my mind,” and “I had waves of strong feelings about it.” Adequate internal consistency and test–retest reliability have been demonstrated for the IES (31). Construct validity of the measure has been previously described and includes evidence of associations of IES scores to psychological distress, the experience of stressful life events, and reactions to experimentally-induced stress in a variety of clinical and nonclinical populations (30).

**Beck Depression Inventory:** The Beck Depression Inventory (BDI) (32) was used as a measure of depressive symptomatology. The BDI is a widely-used self-report measure consisting of 21 items, each representative of a category of depression symptoms. Adequate reliability and considerable evidence of validity have been demonstrated for the BDI (33).

**State–Trait Anxiety Inventory:** Patients completed the 20-item State Anxiety scale of the State–Trait Anxiety Inventory (STAI) (34) as a measure of anxiety. The STAI is designed to measure anxiety as a “state-like” or situationally-determined condition; the scale seems to measure the type of anxiety induced by the stress associated with a medical condition and its treatment. Spielberger and colleagues (34) reported satisfactory concurrent and construct validity, as well as high internal consistency (alpha coefficient = .86–.94).

**RESULTS**

Means, standard deviations, and intercorrelations for all of the key variables are reported in Table 1.



**FIGURE 1:** Diagram of partial mediational model testing the effects of family expressiveness and intrusive thoughts on anxious symptomatology. Standardized correlation coefficients are reported for all paths. Coefficients outside parentheses reflect the path with the other variable controlled for in the partial correlation analyses.

**Preliminary Analyses**

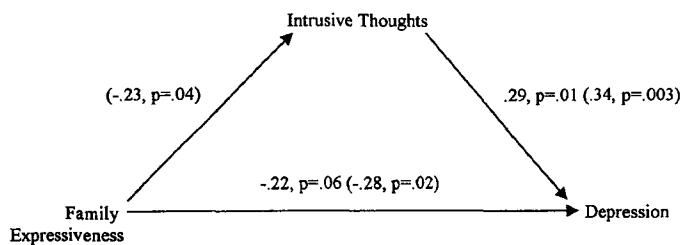
To examine the potential confounding effects of demographic and clinical factors on our measures of adjustment as well as our measures of family expressiveness and intrusive thoughts, a series of preliminary regression analyses were conducted. Patient age, education, sex, diabetic status, and history of previous transplant failure were included in a stepwise regression equation. Effect coding was used for the categorical gender, diabetic, and transplant failure variables. Predictor variables meeting a  $p < .05$  criterion were allowed to enter the regression model. In the regressions predicting BDI or STAI scores, as well as the regressions predicting FES and IES scores, none of the demographic or clinical variables entered the model as significant predictors. Thus, no demographic or clinical variables, including previous transplant failure and diabetic status were significantly related to any of the dependent or independent variables. As a result, no demographic or clinical factors were controlled for in the subsequent analyses. We also examined the possibility that intrusive ideation was related to the length of time that patients had been waiting for a transplant. The bivariate correlation between time on the waiting list and IES scores was nonsignificant ( $r = -.16, p > .20$ ).

**Mediational Analyses**

**Anxiety:** The mediational analyses involving the effects of expressiveness and intrusive ideation on anxiety are summarized in Figure 1. As depicted in Figure 1, the bivariate (nonunique) correlations were all consistent with prediction. First, the expected bivariate correlation was obtained between family expressiveness and anxiety ( $r = -.28, p = .02$ ). This association suggests that higher levels of family expressiveness are associated with lower anxiety. Also as expected, expressiveness was inversely related to intrusive ideation ( $r = -.23, p = .04$ ), indicating that patients with greater expression in their families experience significantly fewer intrusive thoughts. A significant positive association between intrusive thoughts and symptoms of anxiety was also obtained ( $r = .38, p = .001$ ).

Also as depicted in Figure 1, when controlling for the effect of intrusive thoughts, expressiveness was no longer significantly related to anxiety (partial  $r = -.21, p = .07$ ). Consistent with the parameters outlined by Baron and Kenny (24) for demonstrating a mediational effect, this pattern suggests that the effect of expressiveness on anxiety is partially mediated by individual differences in intrusive ideation.

**Depression:** A highly similar pattern was obtained for depression and is summarized in Figure 2. Expressiveness was signifi-



**FIGURE 2:** Diagram of partial mediational model testing the effects of family expressiveness and intrusive thoughts on depressive symptomatology. Standardized correlation coefficients are reported for all paths. Coefficients outside parentheses reflect the path with the other variables controlled for in the partial correlation analyses.

cantly associated with both intrusive ideation ( $r = -.23, p = .04$ ) and depression ( $r = -.28, p = .02$ ). After controlling for the influence of intrusive ideation, the effect of expressiveness on depression was no longer significant (partial  $r = -.22, p = .06$ ). This pattern suggests that the effect of expressiveness on depression is also partially mediated by individual differences in intrusive ideation. Taken together, the present analyses suggest that the levels of intrusive thoughts that patients experience with regard to their upcoming possible transplants partially account for the relationship between family expressiveness and psychological distress.

#### Specificity of Mediational Pattern to Expressiveness

In secondary analyses, we examined the possibility that intrusive ideation also plays a role in mediating the association of other aspects of family support (i.e. the FES Cohesion and Conflict subscales) with emotional adjustment. As seen in Table 1, depression was significantly correlated with both familial conflict ( $r = .32, p < .01$ ) and cohesion ( $r = -.31, p < .01$ ). The effect for anxiety approached significance for both family cohesion ( $r = -.22, p = .05$ ) and conflict ( $r = .21, p < .07$ ). However, neither conflict nor cohesion were significantly related to intrusive thoughts ( $r = .06, p > .20$ , and  $r = -.12, p > .20$ , respectively). These results indicate that intrusive thoughts do not play a mediating role in the relationship between levels of family cohesion or conflict and psychological distress.

#### Moderational Analyses

To test the possibility that the effect of family expressiveness on psychological adjustment was moderated by intrusive thoughts, hierarchical multiple regression analyses were conducted using BDI and STAI scores as dependent variables. Intrusive thoughts and expressiveness were entered on the first step of the regression, followed by the interaction term of these two variables on the second step. In the regression predicting BDI as well as the regression predicting STAI, the main effect for intrusive thoughts was significant (respectively,  $t = 2.6, p < .05$ ;  $t = 3.0, p < .01$ ), while the main effect for family expressiveness was nonsignificant (respectively,  $t = 1.9, p > .05$ ;  $t = 1.9, p > .05$ ). The interaction term (intrusive thoughts  $\times$  expressiveness) was nonsignificant for the regressions predicting both BDI, change in  $R^2 = .02, F(1, 74) = 1.52, p > .20$ , and STAI, change in  $R^2 = .01, F(1, 74) < 1.0, p > .40$ . Thus, degree of expressiveness in the family environment does not appear to moderate the effect of intrusive ideation on psychological adjustment.

## DISCUSSION

The present findings extend previous research involving the effects of social and family support on the emotional well-being of individuals with chronic medical problems. Patients who perceived their family environment as being more conducive to the open expression of stressful thoughts and feelings reported fewer symptoms of both depression and anxiety. This finding is consistent with past reports that social and family support have a beneficial effect on the psychological adjustment of individuals with a variety of chronic and acute medical problems (e.g. 6).

The present data also extend previous findings regarding the influence of intrusive ideation on emotional distress in medically ill populations. The extent to which patients experienced intrusive thoughts about some aspect of the transplantation process was significantly associated with both depression and anxiety. These data are consistent with past research concerning the role of intrusive thinking in the development and maintenance of psychological distress among individuals experiencing a highly stressful or traumatic event (e.g. 21).

Levels of intrusive ideation partly accounted for the relationship between family expressiveness and psychological distress among renal transplant candidates. That is, part of the effect of an expressive family environment on adjustment appeared to be due to a reduction in intrusive ideation among patients who perceive their environment to be highly conducive to the free expression of stressful thoughts and emotions to family members. Any mediational effect of intrusive thoughts appeared to be specific to familial expressiveness. Although levels of family conflict and cohesion were also associated with psychological adjustment, neither of these aspects of the family environment was associated with intrusive thinking.

In previous uses of the FES, expressiveness, cohesion, and conflict have been typically aggregated to create a composite measure of family environment (12,15). However, the present data suggest that different types of family or social support are differentially related to intrusive thoughts and may exert their influence on well-being through distinct underlying mechanisms. This conclusion and our present methodology is consistent with an emerging view in the social support literature that more specific measures of social environment be used in place of more global measures (8,35,36).

The present study did not support previous conclusions (e.g. 25,26) that aspects of the social environment and level of intrusive ideation have an interactive effect on adjustment. One possible reason for this differing pattern involves differences in the measures of family or social environment utilized. Previous research has typically used a highly situation-specific operationalization of perceived social constraints on disclosure. For example, in a study of bereaved mothers, respondents were asked how freely they felt they could express thoughts and emotions specific to their child's death (25). In contrast, the present study employed a generalized measure of the perceived expressiveness of the family environment. It is possible that generalized socioenvironmental perceptions influence adjustment differently than do situationally-bound appraisals. This interpretation is consistent with other evidence that the adaptive significance of health-related cognitive appraisals depends upon the degree of situational specificity with which they are assessed (37).

The present study is consistent with past theorizing and research suggesting that having the opportunity to talk about or disclose stressful thoughts and feeling facilitates adjustment to stressful events (38). It is also consistent with Clark's (39)

“conversation as coping” view, which suggests that talking with receptive others about stressful experiences provides specific coping benefits. Clark suggests that individuals facing a traumatic or highly stressful situation experience dysfunctional cognitive changes, primarily intrusive thoughts, which are counteracted or alleviated through talking about one’s concerns.

### Limitations and Qualifications

One limitation of the present study is its cross-sectional and correlational design which prevents the direction of causality from being firmly established. For example, it is possible that depression and anxiety symptoms influence one’s ability to secure or foster a social environment that allows for the expression of intrusive thoughts and feelings. Some evidence in the depression literature, for example, indicates that people decrease their interactions with depressed individuals and that depressed persons elicit rejection from others (e.g. 40,41). By examining levels of depression and anxiety over time, future research may better clarify the nature of the relationship between family expressiveness, intrusive thoughts, and psychological distress.

The participation rate of 56% in the present study potentially limits the generalizability of the findings. However, the demographic and clinical characteristics of this sample are quite similar to those of the national ESRD population. Nevertheless, a goal of future research should be to increase the rate of participation to ensure that participants are representative of the patient population at large.

In the present study, we assessed anxiety as a momentary or state-like phenomenon in response to being on the renal transplant waiting list. Given the prolonged or chronic duration of this stressor, it is possible that state anxiety varies somewhat over the course of the transplant process. To address this possibility, future research could assess anxiety at multiple time points to obtain a more complete reflection of the experience of anxiety throughout the transplant process.

Although the IES was developed to look at the effects of past trauma in posttraumatic stress disorder (PTSD) patients, the IES has been previously used to examine the role of intrusive thoughts regarding events that have not yet happened (e.g. the threat of AIDS in seronegative individuals from a high-risk population) (42). The present study provides further data in establishing the utility of the IES to assess intrusive thinking in the context of anticipated events. Before drawing firm conclusions regarding the role of intrusive thoughts in anticipated stressors, however, additional research examining the use of the IES in this context is needed.

In the present study, the significant effect of expressiveness on adjustment was no longer significant after controlling for intrusive ideation. While this pattern is consistent with Baron and Kenny’s (24) conventional standard for the demonstration of partial mediation, the absolute reduction in the magnitude of the coefficients was modest. Moreover, the partial correlation coefficients between support and adjustment still approached significance ( $p = .06$  and  $.07$ ) even after controlling for intrusive thinking. Clearly, intrusive thoughts did not account for the entire association between family expressiveness and psychological adjustment, and caution should be exercised in interpreting the mediational influence of intrusive thinking. This suggests that other mediational influences may be operating. Further work is needed to identify other processes underlying the commonly observed association between social support and well-being.

The above qualifications notwithstanding, the present findings are the first to address the associations of family environment, intrusive thinking, and psychological adjustment in patients facing the unique stress of an anticipated organ transplant. These findings are an early step in establishing the mechanisms by which social support exerts its effects on psychological outcomes. The results also suggest that renal transplant candidates whose environments are characterized by a lack of intrafamilial expressiveness may be at particular risk for intrusive ideation and psychological distress. These at-risk patients may warrant intervention at an early phase of the transplantation process. Such interventions might be aimed at providing patients with opportunities to express distressing thoughts and feelings. Similar disclosure-based interventions have been used successfully to improve patient outcomes in other populations (e.g. 43,44). Further research is necessary to delineate more clearly the influence of intrusive ideation and family environment on adjustment in this and other medically ill populations.

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