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## Diabetes Distress and Depressive Symptoms: A Dyadic Investigation of Older Patients and Their Spouses

*In this dyadic study, we examined diabetes distress experienced by male and female patients and their spouses (N = 185 couples), and its association with depressive symptoms using the Actor-Partner Interdependence Model. Diabetes-related distress reported by both patients and spouses was associated with each partner's own depressive symptoms (actor effects) but generally was not associated with the other's depressive symptoms (partner effects). Moreover, diabetes distress was associated with*

*depressive symptoms more strongly for male than for female patients, but this association did not differ between female and male spouses. Findings underscore the dyadic nature of managing chronic illness in that disease-related distress was experienced by patients and by their spouses and consistently was associated with poorer affective well-being.*

A growing literature affirms that marital partners often face chronic illness together, and yet studies often emphasize the health and well-being of patients and give less attention to the experiences of their spouses (Berg & Upchurch, 2007). Spouses often are actively involved in the day-to-day management of their partners' illness. Moreover, involvement of spouses is associated not only with their partners' disease-related outcomes (Franks et al., 2006), but also with their own emotional well-being (Coyne & Smith, 1991). Our dyadic study of married partners' responses to chronic illness was guided by the developmental-contextual model of couples coping with chronic illness put forth by Berg and colleagues (Berg & Upchurch). Drawing from this model, we investigated

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patients' and spouses' concerns associated with managing diabetes, referred to as diabetes distress (Polonsky et al., 1995), and the association of their diabetes distress with their own and their partners' depressive symptoms. We further explored potential gender differences in the association between diabetes distress and depressive symptoms of married patients and their spouses in light of potential differences in the way that women and men respond to the health needs and emotional distress of their ill partners (Berg & Upchurch; Kiecolt-Glaser, & Newton, 2001).

#### DAILY MANAGEMENT OF DIABETES

Diabetes affects approximately one in five Americans over the age of 60 and is among the leading causes of death in the United States (Centers for Disease Control and Prevention, 2008). Type 2 diabetes is a chronic disorder of the endocrine system involving insufficient secretion of insulin and resistance to insulin that lessens the ability of cells to absorb glucose from the bloodstream. This type of diabetes accounts for the vast majority of cases of diabetes (only 5–10% of individuals with diabetes have Type 1 diabetes, which involves insulin deficiency resulting from autoimmune destruction of  $\beta$ -cells of the pancreas; American Diabetes Association, 2010).

The management of diabetes requires vigilant and sustained adherence to a complex and coordinated treatment regimen comprising multiple health behaviors, including diet, exercise, and use of prescribed medications (Halter, 1999). Proper daily management of diabetes reduces patients' risk of serious complications such as heart disease and stroke, neuropathy and nephropathy (Gonder-Frederick, Cox, & Ritterband, 2002; Halter). Despite encouragement from healthcare providers and warnings about the harmful consequences of treatment nonadherence, many patients are unsuccessful in sustaining recommended lifestyle behaviors. For instance, although individualized nutrition education often is emphasized in diabetes education, some patients do not recall receiving nutrition recommendations from their healthcare provider, and many patients who receive nutrition recommendations do not closely adhere to them (Rubin, Peyrot, & Saudek, 1991). Notably, the importance of family support for sustaining patients' treatment adherence is recognized in that national standards for diabetes self-management education specifically address

education of patients' families and caregivers to promote effective self-management of diabetes (Funnell et al., 2008).

Distress directly related to sustaining a daily diabetes regimen is common among patients (Fisher, Glasgow, Mullan, Skaff, & Polonsky, 2008; Polonsky et al., 1995). Patients frequently report worries about diabetes complications and anxiety about poor disease management (Polonsky et al.). As patients' concerns regarding their diabetes management exact a greater toll, they tend to experience higher levels of general emotional distress as well, including greater depressive symptoms (Polonsky et al., 1995, 2005). Moreover, higher levels of both disease-related distress and depressive symptoms are associated with patients' age (being younger), gender (being female), and their health status (e.g., complications and comorbidities; Fisher, Skaff, et al., 2008).

Spouses of patients with diabetes report levels of depressive symptoms comparable in magnitude to those reported by their partners (Fisher, Chesla, Skaff, Mullan, & Kanter, 2002). This similarity in levels of depressive symptoms between married partners confronting diabetes is consistent with other studies revealing comparable affective well-being between older, married partners (Bookwala & Schulz, 1996; Townsend, Miller, & Guo, 2001). One potential basis for the robust correspondence in married partners' affective well-being described in these studies is circumstances they both encounter in their shared environment. Given that spouses are actively involved with their partners in maintaining their diabetes treatment regimens (Fisher et al., 2000; Gallant, 2003; see also Fisher & Weihs, 2000), in particular, assisting with dietary adherence (Trief et al., 2003; Williams & Bond, 2002), they likely are exposed to similar disease-related concerns and worries experienced by their partners. Moreover, spouses' experience of disease-related distress may be associated with their depressive symptoms, similar to the association of diabetes distress and depressive symptoms among patients.

The toll of diabetes management may not be confined to each partner's own emotional well-being. Rather, each partner's exposure to diabetes-related problems may "cross over" to be related to the well-being of the other. For instance, among women with breast cancer, their stress and their feelings of negative affect were associated with both their own depressive

symptoms and with their partners' depressive symptoms (Segrin et al., 2005). Moreover, feelings of positive affect reported by partners were associated with their own depressive symptoms and with patients' depressive symptoms. Although treatment and disease management demands differ considerably for patients and partners in the context of breast cancer and for those managing diabetes, the involvement of spouses in their partners' disease management and subsequent potential for illness demands to affect their well-being has been documented across various chronic diseases (Berg & Upchurch, 2007). Thus, similar associations between one partner's distress and the well-being of the other should be evident in other chronic disease conditions, including diabetes.

#### GENDER AND PSYCHOLOGICAL WELL-BEING IN THE CONTEXT OF DIABETES

Drawing on the developmental-contextual model of couples coping with chronic illness (Berg & Upchurch, 2007), spouses' responses to the demands of their partners' illness likely differ among wives of male patients and husbands of female patients. Women generally are more attentive to their marital relationships than are men, and this difference in the salience of their relationships may be reflected in their relative responsiveness to needs of their partners in the illness context. Importantly, among spouses of patients with diabetes, wives of patients experience more depressive symptoms and greater anxiety than their male counterparts (Fisher et al., 2002). One explanation for this pattern of findings is that wives may be more receptive than are husbands to worries and problems of their partners (Fisher et al., 2002; see also Benazon & Coyne, 2000; Hagedoorn, Sanderman, Bolks, Tuinstra, & Coyne, 2008). Thus, compared to husbands of patients, the well-being of wives of patients may be more strongly associated with their partners' experience of disease-related distress.

#### STUDY AIMS AND HYPOTHESES

The overarching aim of our investigation was to examine interdependence in disease-related experiences of patients and their spouses in response to the day-to-day challenges of living with diabetes. The association of patients' diabetes distress with their depressive symptoms

has been established; however, the plausible association of spouses' diabetes distress with their depressive symptoms has not. Our study was guided by the developmental-contextual model of couples coping with chronic illness (Berg & Upchurch, 2007), which emphasizes the dyadic nature of disease management in the context of marriage. Thus, disease-related experiences of both patients and spouses were investigated, and the dyad was the unit of analysis.

Our dyadic study of married patients and their spouses requires special statistical consideration because of the potential nonindependence of data from married partners. The Actor-Partner Interdependence Model (APIM; Kenny, Kashy, & Cook, 2006) provided an analytical framework to explore the association of each partner's diabetes distress with his or her own depressive symptoms and with the depressive symptoms of the other partner (shown in Figure 1, below). APIM combines the conceptual distinction of intrapersonal effects of each partner's diabetes distress on his or her own depressive symptoms (referred to as actor effects) and interpersonal effects of each partner's diabetes distress on depressive symptoms of the other (referred to as partner effects), with statistical techniques for simultaneously estimating these effects (Cook & Kenny, 2005). This framework for testing dyadic effects has been used in prior studies of health-related interactions of married partners (Franks, Wendorf, Gonzalez, & Ketterer, 2004; Hong et al., 2005), personality and relationship outcomes (Robins, Caspi, & Moffit, 2000), and stress and well-being among women with breast cancer and their partners (Segrin et al., 2005).

Our primary hypothesis was that each partner's diabetes distress would be related to his or her own depressive symptoms (actor effects). Given that spouses often are involved in disease management with patients, we also anticipated that each partner's diabetes distress would be associated with the other's depressive symptoms (partner effects). Additionally, we investigated gender differences in these actor and partner effects. In particular, in light of suggestions that wives may be more attentive to the needs of their partners than are husbands, we expected that the partner effect linking male patients' diabetes distress with their wives' depressive symptoms would be stronger than that linking female patients' diabetes distress with their husbands' depressive symptoms.

## METHOD

Participating couples were recruited through newspaper advertisements, online classified advertisements, and presentations at senior centers announcing a study of "married couples' experiences with Type 2 Diabetes." Couples were eligible for the study if they were living together in the community (whether married or in a marriage-like relationship), if one partner had a medical diagnosis of type 2 diabetes and was 50 years of age or older, and if the other partner was not diagnosed with diabetes. Our study was reviewed and approved by the Institutional Review Board at Kent State University.

In total, 240 couples were screened for eligibility to participate. Of these, 29 couples did not meet our criteria for participation (often because both members of the couple were diagnosed with type 2 diabetes,  $n = 18$ ), and 2 couples declined participation, as one or both were too ill to take part. Of the remaining 209 couples, 18 did not return the questionnaires and an additional 6 couples were missing data on key study variables. Thus, a sample of 185 participating couples was retained, and characteristics of these patients and spouses are displayed in Table 1.

## Procedure

Potential participants were screened for eligibility by phone. Eligible couples received study questionnaires by mail and were asked to

complete the questionnaire independently. After completing the self-administered questionnaire, patients and spouses returned the questionnaire and signed consent forms using an enclosed, stamped envelope provided to each participant. Each member of the couple received \$10.00 for participation.

## Measures

The means and standard deviations of our main study variables are presented in Table 1. When a participant was missing more than 25% of items for either main study construct (diabetes distress or depressive symptoms), both partners in the dyad were excluded from all analyses. If at least 75% of items for all measures were completed by participants, missing items were replaced using mean substitution and a score was computed (fewer than 5% of participants were missing items for our main study constructs).

*Diabetes distress.* Patients and spouses reported the difficulties of living with diabetes using the 20-item Problem Areas in Diabetes (PAID) Survey (Polonsky et al., 1995). The PAID was developed to assess patients' psychosocial adjustment specific to the context of diabetes. Participants indicated how much each item (e.g., feeling overwhelmed by your/your partner's diabetes regimen) was a problem for them using a 6-point scale ranging from 0 (*no problem*) to

Table 1. *Sample Characteristics*

	Female-Patient Couples ( $n = 67$ )		Male-Patient Couples ( $n = 118$ )	
	Patient $M$ ( $SD$ )	Husband $M$ ( $SD$ )	Patient $M$ ( $SD$ )	Wife $M$ ( $SD$ )
Age (years)	67.3 (8.5)	69.3 (9.2)	66.3 (7.6)	64.3 (7.6)
Education (years)	13.3 (2.2)	13.6 (2.5)	14.0 (2.2)	13.9 (2.1)
Race (% Caucasian)	94.0%	97.0%	94.0%	94.9%
Years with diagnosis	10.4 (7.8)	—	9.9 (8.0)	—
Diabetes symptoms	72.8 (8.8)	—	74.8 (10.3)	—
Self-rated health	2.9 (0.9)	3.5 (1.0)	3.1 (0.8)	3.8 (0.9)
Diabetes distress	35.6 (23.8)	20.6 (14.8)	28.6 (22.0)	25.3 (20.8)
Depressive symptoms	12.5 (10.7)	9.7 (7.0)	11.1 (10.3)	9.8 (8.7)
Marital satisfaction	26.7 (5.1)	27.5 (4.0)	26.3 (5.1)	25.6 (6.2)
Years married	41.9 (13.4)		37.9 (13.2)	
Household income (median)	\$30,000–\$39,999		\$40,000–\$59,999	

*Note:* Sample size varies because of missing data. Patients' diabetes symptoms were assessed with the Diabetes Impact Measurement Scale (DIMS; Hammond & Aoki, 1992). Self-rated physical health was assessed with a single item using a 5-point scale from 1 = *poor* to 5 = *excellent*. Marital satisfaction was assessed with five items from the Quality of Marriage Index (Norton, 1983).

5 (*serious problem*). These items were summed, with higher scores representing greater diabetes distress. Cronbach's  $\alpha$  for this measure ranged from .91 (for husbands of female patients) to .96 (for both female and male patients).

*Depressive symptoms.* Patients and spouses reported their experience of 20 depressive symptoms in the last week using the Centers for Epidemiologic Studies-Depression Scale (CES-D; Radloff, 1977). Participants indicated the extent to which they had experienced each symptom (e.g., I was bothered by things that don't usually bother me) in the last week on a 4-point scale ranging from 0 (*rarely or none of the time*) to 3 (*most of the time*). Items were summed, with higher scores representing greater depressive symptoms. Cronbach's  $\alpha$  for this measure ranged from .74 (for husbands of female patients) to .92 (for male patients).

#### *Data Analysis Plan*

We used covariance structure analysis to examine anticipated actor and partner effects of patient and spouse reports of diabetes distress and depressive symptoms. All analyses were carried out at the manifest (observed) level of measurement using LISREL 8.30 (Joreskog & Sorbom, 1999) and maximum likelihood estimation. We assessed the viability of all models using several well-established fit indices in addition to  $\chi^2$  values. These included the non-normed fit index (NNFI; Bentler & Bonett, 1980), the comparative fit index (CFI; Bentler, 1990; Satorra & Bentler, 1994), and the root-mean-square error of approximation (RMSEA; Browne & Cudeck, 1993). Although use of strict benchmark values is a somewhat contentious issue (Barrett, 2007), values of .90 or higher are thought to indicate good overall fit for the NNFI and the CFI, whereas values below .05 are generally considered acceptable for the RMSEA.

In accordance with expectations of gender differences in links between diabetes distress and depressive symptoms, we assessed multiple-group models comparing actor and partner effects of diabetes distress and depressive symptoms for male patients and their wives ( $n = 118$  dyads) with those for female patients and their husbands ( $n = 67$  dyads). Each model represents a pair of correlated regressions comprising the APIM framework. On the basis of prior work with similar models (Griffin &

Gonzalez, 1995), our sample was sufficient to test hypothesized actor and partner effects of diabetes distress on depressive symptoms in these two groups.

Our dyadic analyses were conducted in two steps. First, actor and partner effects were examined *within* each group to identify the best-fitting, and most parsimonious, model for each group. We initially constrained the two paths representing actor effects and those representing partner effects to equality (also called invariance) to assess their similarity within each group (Kenny, 1996). We then systematically freed alternate pairs of paths to be estimated and compared model fit with the constraints applied and with them removed. We used  $\chi^2$  difference tests for model comparisons, in which significant decreases in  $\chi^2$  (relative to our baseline model) indicated superior model fit when equality constraints were removed (Byrne, 2001). In addition, because  $\chi^2$  tests may be affected by sample size and degrees of freedom, we interpreted changes in CFI values greater than .01 as corroborative evidence of a meaningful change in model fit (Cheung & Rensvold, 1999).

In our second step, we examined equality of actor and partner pathways *across* the two groups (e.g., the actor effect for male patients was compared to that for female patients). We began with the best-fitting model for each group as identified in our first step, and we alternately constrained actor paths and partner paths to equality across the two groups. We used  $\chi^2$  difference tests for model comparisons in order to determine whether model fit deteriorated when equality constraints were imposed on specific pathways. Actor and partner paths that were not equivalent across the groups reflected gender differences in the associations of diabetes distress and depressive symptoms of patients and spouses.

#### RESULTS

Before addressing our main study constructs of diabetes distress and depressive symptoms, we present comparisons of patients' and spouses' demographic, health, and marital characteristics. We first used paired  $t$  tests to examine mean differences in these characteristics between female patients and their husbands and between male patients and their wives (within dyad comparisons; means and standard deviations are shown in Table 1). Female patients were younger than their husbands ( $t[65] = -3.36, p < .001$ ) and

male patients were older than their wives ( $t[115] = 6.13, p < .001$ ), on average. Both husbands and wives of patients reported better health, on average, than did female and male patients, respectively ( $t[66] = -3.85, p < .001$  for female-patient couples;  $t[116] = -7.32, p < .001$  for male-patient couples).

Next, we examined mean differences in demographic, marital, and health characteristics between male and female patients and between wives and husbands of partners with diabetes (between dyad comparisons; means and standard deviations are shown in Table 1). Male patients had more years of education than did female patients, on average ( $t[183] = 1.96, p = .05$ ), and wives of male patients were younger than husbands of female patients, on average ( $t[182] = -3.96, p < .001$ ). Husbands of female patients reported being more satisfied with their marriage than did wives of male patients ( $t[183] = -2.23, p < .05$ ). Additionally, female patients and their husbands had been married longer ( $t[182] = -1.94, p = .05$ ) and had a lower household income, on average ( $t[161] = 3.04, p < .01$ ) than male patients and their wives.

#### *Diabetes Distress and Depressive Symptoms of Patients and Spouses*

As a context for our APIM analyses testing our main study hypotheses (described in subsequent text), descriptive and bivariate analyses of patients' and spouses' diabetes distress and their depressive symptoms are illustrated (Tables 1 and 2). Female patients' reports of diabetes distress were higher than those of their husbands, on average ( $t[66] = 5.32, p < .001$ ), whereas male patients' reports of diabetes distress did not differ from those of their wives, on average. Further, female patients reported greater diabetes distress than did male patients, on average ( $t[183] = -2.01, p < .05$ ). Diabetes distress reported by wives of male patients did not differ, however, from that reported by husbands of female patients. Ratings of items assessing diabetes distress revealed that most patients and their spouses indicated that they worried about the future and the possibility of serious complications, and that they experienced guilt or anxiety when they (or their spouse) got off track with diabetes management. Patients frequently reported that constant concern about food and eating was problematic, and their

spouses frequently endorsed feeling scared about their husband/wife living with diabetes.

Turning next to depressive symptoms, in contrast to comparisons of diabetes distress, patients' and spouses' reports of depressive symptoms generally did not differ. Female patients' reports of depressive symptoms did not differ from those of their husbands, on average, and male patients' reports of depressive symptoms did not differ from those of their wives, on average. Additionally, reports of depressive symptoms by female patients did not differ from those of male patients, on average. Likewise, no mean difference was detected between depressive symptoms reported by wives of patients and those reported by husbands of patients. Over one fourth of patients (28.6%) and about one fifth of spouses (17.3%) had depressive symptom scores at or above the threshold indicating risk for depression (i.e., a score of 16 or greater on the CES-D; Radloff, 1977).

We then examined bivariate associations among diabetes distress and depressive symptoms separately for male patients and their wives and for female patients and their husbands (Table 2). Each partner's report of diabetes distress was associated with his or her own depressive symptoms. Moreover, associations of one partner's diabetes distress with the other's depressive symptoms were detected for male-patient dyads but not for female-patient dyads.

Last, in order to explore potential covariates to be included in our actor-partner models, we examined partial correlations among patients' and spouses' reports of diabetes distress and depressive symptoms controlling for demographic and marital characteristics that differed between male- and female-patient dyads (i.e., spouse age, patient education, years married, spouse marital satisfaction, and household income reported earlier). No change in the pattern of associations between diabetes distress and depressive symptoms was detected for male-patient couples after controlling for these characteristics. For female-patient couples after controlling for these demographic and marital characteristics, the association between spouse diabetes distress and spouse depressive symptoms was no longer significant, and one additional significant association was detected (i.e., an inverse association between partners' reports of depressive symptoms emerged). Given the similarity in associations and a decrease in the size of each group because of missing data on

Table 2. Bivariate Associations Among Patient and Spouse Reports of Diabetes Distress and Depressive Symptoms

	Patient Diabetes Distress	Spouse Diabetes Distress	Patient Depressive Symptoms	Spouse Depressive Symptoms
Patient diabetes distress	—	0.36**	0.38***	0.06
Spouse diabetes distress	0.47***	—	0.16	0.33**
Patient depressive symptoms	0.65***	0.41***	—	-0.11
Spouse depressive symptoms	0.23**	0.39***	0.36***	—

Note: Correlations below the diagonal are for male patients and their wives (n = 118) and correlations above the diagonal are for female patients and their husbands (n = 67).

\*\*p < .01. \*\*\*p < .001.

demographic characteristics, we elected to use the bivariate associations shown in Table 2 for our structural equation models.

*APIMs of Diabetes Distress and Depressive Symptoms*

To address our hypotheses of actor and partner effects of diabetes distress on depressive symptoms, we began by identifying the best-fitting, and most parsimonious, model of partners' diabetes distress and depressive symptoms within each group (i.e., male patients and their wives, female patients and their husbands). Initially, we constrained the actor effects to be equal (i.e., the two paths linking each partner's diabetes distress to his or her own depressive symptoms) and the partner effects to be equal (i.e., the two paths linking each partner's diabetes distress to the other's depressive symptoms) within each group, and no paths were constrained to equality across the two groups (see model 1 in Table 3). Looking first at model comparisons for actor effects within each group, we determined that the actor effects of male patients and their wives were not equivalent, but those of

female patients and their husbands were equivalent. That is, freeing the actor effects improved the fit of this model over the baseline model among male-patient couples (Table 3, model 2a) but not among female-patient couples (Table 3, model 2b).

A similar comparison was conducted for the two paths linking one partner's diabetes distress to the depressive symptoms of the other (partner effects). Through comparison of model fit with our baseline model, these paths were deemed to be nonequivalent for male patients and their wives (Table 3, model 3a), but equivalent for female patients and their husbands (Table 3, model 3b). Thus, the equality constraints on the actor and partner effects were retained for female patients and their husbands, but not for male patients and their wives.

Next, using the best-fitting models determined from our within-group analyses (see model 1 in Table 4), we systematically examined the equivalence of actor effects and partner effects across the two groups. No paths were constrained across the two groups in our baseline model. We began by comparing the actor effect for male patients' diabetes distress and their depressive symptoms

Table 3. Model Comparisons of Dyadic Effects of Diabetes Distress on Depressive Symptoms (N = 185)

Model	$\chi^2$	df	NNFI	CFI	RMSEA
Within-group analysis					
1. Actor and partner effects constrained within each group	10.45*	4	0.85	0.95	0.13
2. Actor effects					
2a. Actor effects free in male-patient group	0.80	3	1.00	1.00	0.00
2b. Actor effects free in female-patient group	10.39*	3	0.78	0.94	0.16
3. Partner effects					
3a. Partner effects free in male-patient group	5.23	3	0.93	0.98	0.09
3b. Partner effects free in female-patient group	10.11*	3	0.78	0.95	0.16

Note: NNFI = non-normed fit index; CFI = comparative fit index; RMSEA = root-mean-square error of approximation.

\*p < .05.

Table 4. Gender Differences in Dyadic Effects of Diabetes Distress on Depressive Symptoms (N = 185)

Model	$\chi^2$	df	NNFI	CFI	RMSEA
Between-group analysis					
1. Baseline <sup>a</sup>	0.36	2	1.00	1.00	0.00
2. Actor effects					
2a. Pooled female-patient/male spouse equal to male-patient actor effect	5.90	3	0.91	0.98	0.10
2b. Pooled female-patient/male spouse equal to female spouse actor effect	0.36	3	1.00	1.00	0.00
3. Partner effects					
3a. Pooled female-patient/male spouse equal to female spouse partner effect on male patient	2.35	3	1.00	1.00	0.00
3b. Pooled female-patient/male spouse equal to male-patient partner effect on female spouse	0.83	3	1.00	1.00	0.00
4. Final model <sup>b</sup>	0.93	4	1.00	1.00	0.00

Note: NNFI = non-normed fit index; CFI = comparative fit index; RMSEA = root-mean-square error of approximation.

<sup>a</sup>Baseline model is fully free for male-patient group and equivalent actor and partner effects for female-patient group.

<sup>b</sup>Final model is fully free for actor and partner effects of male patients and their wives. Actor effects and partner effects are set to equality for female patients and their husbands. Further, their pooled actor effects are set to equality with actor effects for wives of male patients, and their pooled partner effects are set to equality with the male-patient partner effect on their wives.

to the pooled effect (i.e., paths constrained to equality) for female patients and their husbands (Table 4, model 2a). Constraining these paths to be equal across the two groups reduced the model fit relative to our baseline model on the basis of change in CFI and RMSEA values. Imposing the same constraint on the actor effect for female spouses and the pooled actor effect for female patients and their husbands (Table 4, model 2b) did not reduce the fit of our model.

This same process of model comparison was repeated to examine differences in partner effects across the groups. Imposing the equality constraint between the pooled effect for female patients and their husbands on either partner effect for male patients and their wives did not reach the level of significant change in model fit from our baseline model (Table 4, models 3a and 3b). On the basis of parsimony (i.e., inequality in these two partner effects was indicated in our earlier model comparisons), we chose to constrain only the path linking male patients' distress with the depressive symptoms of their wives and the pooled partner paths for female patients and their husbands to be equal (Table 4, model 3b).

Our final multiple-group model is shown in Figure 1. In summary, the actor effect of male patients' diabetes distress and depressive symptoms (.76) was stronger than that for their wives (.39) and that for the pooled actor effect of female patients and their husbands (.39). The

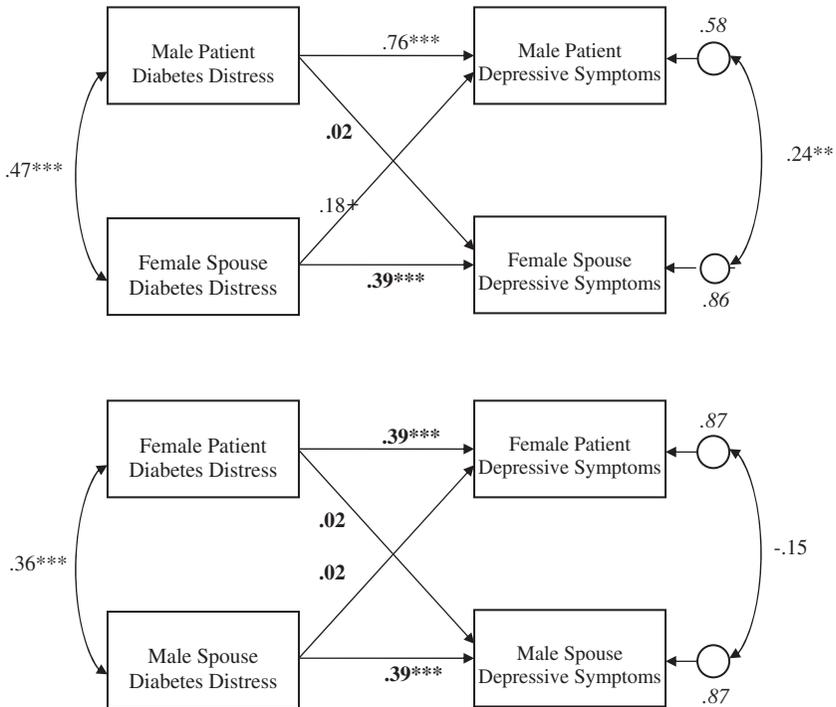
only (marginally) significant partner effect was the association between wives' diabetes distress on male patients' depressive symptoms (.18).

## DISCUSSION

Our study demonstrates that among older married couples, one partner's illness and its management is a source of disease-specific distress for both partners. Findings indicate that diabetes distress of both patients and spouses was related to their own depressive symptoms (i.e., actor effects) as we anticipated. Little evidence was found to indicate that diabetes-related worries of one partner were associated with the depressive symptoms of the other (i.e., partner effects), however. Further, notable gender differences were detected in the association of diabetes distress and depressive symptoms of patients and spouses, but these were not consistent with our expectations.

Consistent with our expectations, patients and their spouses each experienced distress associated with patients' diabetes management (and their individual reports of diabetes distress were moderately associated as shown in Table 2 and in Figure 1). Moreover, patients and their spouses indicated similar concerns regarding the potential for disease complications and their (or their partners') ability to manage the disease. Prior work has focused exclusively on diabetes

FIGURE 1. MULTIPLE-GROUP ANALYSIS OF PATIENT AND SPOUSE DIABETES DISTRESS ON DEPRESSIVE SYMPTOMS. ESTIMATES IN BOLD INDICATE PATHS WITH INVARIANCE CONSTRAINTS. ESTIMATES IN ITALICS INDICATE RESIDUAL VARIANCE. +  $p < .10$ . \*  $p < .05$ . \*\*  $p < .01$ . \*\*\*  $p < .001$ .



distress experienced by patients, yet spouses often are involved in the daily management of diabetes with their partners (Fisher et al., 2000). Our findings highlight the spouses' experience of psychosocial distress specific to the diabetes context. Further, our findings support the contention that chronic disease management represents a source of stress that often is shared by patients and their spouses (Berg & Upchurch, 2007; Revenson, 1994).

*Diabetes Distress and Depressive Symptoms: Moderating Effects of Gender*

Our consideration of spouses' own diabetes distress in addition to that of patients' afforded the unique opportunity to test dyadic effects of diabetes distress with depressive symptoms for patients and spouses and to explore gender differences in the responses of male and female spouses to diabetes distress. Consistent with our expectations, patients' diabetes distress was linked with their own depressive symptoms (i.e.,

actor effects). Likewise, spouses' diabetes distress also was linked with their own depressive symptoms.

An unexpected gender difference in the actor effect of diabetes distress and depressive symptoms was found between male and female patients. The association of diabetes distress and depressive symptoms for male patients was stronger than the corresponding association for female patients. In other words, when male patients experienced greater concerns associated with their diabetes, their depressive symptoms also were elevated, more so than those for female patients with a similar level of concerns associated with their diabetes management. This gender difference is consistent with prior work showing that male patients who are not managing their diabetes well tend to experience greater depression than do female patients under similar circumstances (Lloyd, Dyer, & Barnett, 2000).

The actor effect of diabetes distress and depressive symptoms for male patients also was stronger than the parallel actor effect for their

wives. Notably, however, the corresponding actor effects of diabetes distress and depressive symptoms did not differ between female patients and their husbands. This finding may suggest that a stronger association between diabetes-related distress and depressive symptoms is not necessarily characteristic of men more generally, but, rather, is limited to men who themselves are managing diabetes.

Our dyadic framework also afforded the opportunity to examine the association between one partner's diabetes distress and the depressive symptoms of the other (partner effects). After adjusting for the association between each partner's diabetes distress and his or her own depressive symptoms (actor effects), we found only one partner effect. Diabetes distress experienced by wives of male patients was linked with greater depressive symptoms of their husbands. This finding may coincide with the distinctive actor effect found for male patients and underscore the possibility that distress about their disease (even distress experienced by their wives) is closely associated with men's depressive symptoms (Lloyd et al., 2000).

Evidence for our hypothesis that the partner effect of male patients' diabetes distress with their wives' depressive symptoms would be stronger than that for female patients and their husbands was not found. The absence of this expected gender difference suggests that wives in our study were not more emotionally responsive to their ill partners' distress than were husbands. It should be noted, however, that longitudinal investigations of patients' and spouses' responses to disease-related distress may reveal stronger partner effects among women as hypothesized here. Daily studies of spouse support have demonstrated greater responsiveness among women than among men to increasing levels of need of their partners (Neff & Karney, 2005), consistent with our expectations.

### *Limitations*

Although the dyadic approach guiding our study is a notable strength of our investigation, our findings should be considered in light of study limitations. Foremost, the dyadic effects detected in this study are based on cross-sectional data, and, thus, direction of causation between diabetes distress and depressive symptoms cannot be determined. It is quite plausible that depressive symptoms of patients

and spouses also may shape their worries and concerns about diabetes and its management. Additionally, although partners were instructed to complete their questionnaires independently and privately, it is not known whether, or to what extent, patients' and spouses' responses were influenced by their partners' participation in our study.

Finally, our study emphasized patients' gender as a key moderator of the association of both partners' diabetes distress with depressive symptoms. It is likely, however, that other individual and marital characteristics (i.e., age, marital duration, and marital satisfaction) might further influence the detected links between married partners' experiences of disease-related distress and affective well-being. For example, it is possible that for our sample of older married couples, spouses may have been more highly attuned to patients' disease management because they have fewer family demands relative to younger couples with children at home. Additionally relative to younger couples, patients in our sample may have gained experience in communicating their disease-related concerns to their spouses across their additional years of marriage that were generally high in satisfaction. Clearly, further investigation of these characteristics as potential moderators of the association between diabetes distress and depressive symptoms in large and more diverse samples of married patients and their spouses is warranted.

### *Conclusions and Implications*

Results of this study encourage a broader focus of research and practice beyond experiences of patients alone. Our findings reveal that both patients and their spouses experience disease-related distress associated with diabetes management. Importantly, patients' and spouses' reports of their distress were moderately associated, suggesting that disease-related problems and concerns differed somewhat between patients and their spouses. Thus, in order to best address the demands of chronic illness for both married partners, interventions should identify and address distinct disease-related challenges for patients and those for their family members (Fisher & Weihs, 2000).

Our findings further indicate that problems related to diabetes and its management are associated with poorer emotional well-being not only for partners with the illness but also for their

spouses. Interventions tailored to address the stressors incurred by patients and those incurred by their spouses may better equip both married partners to meet the demands of managing a chronic disease such as diabetes and thereby curtail the adverse association of their disease-related distress with their general emotional well-being. In contrast, interventions designed solely for patients that welcome attendance by spouses but do not address their individual concerns may not be equally effective for spouses.

## NOTE

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