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Associations Between Economic Pressure and Diabetes Efficacy in Couples with Type 2 Diabetes

Objective: The purpose of this study was to explore dyadic associations between economic pressure and diabetes self-efficacy via emotional distress in patients with type 2 diabetes and their partners.

Background: Understanding how economic pressure is associated with successful diabetes management is an important area for research, as couples with type 2 diabetes can incur heavy economic pressures that could likely influence diabetes outcomes.

Method: Data from 117 married couples were used to test actor–partner associations using moderated mediation analyses in a structural equation modeling framework. Problem-solving communication was tested as a possible moderator of the economic pressure–emotional distress pathway.

Results: Results revealed that greater patient economic pressure was associated with lower patient and spouse confidence in the patient's diabetes management ability through higher levels of patient emotional distress. The deleterious

association between economic pressure and emotional distress was less pronounced when spouses reported more effective problem-solving communication.

Conclusion: These results provide evidence that the economic pressure couples with type 2 diabetes face may reduce the patient and spouse's confidence in the patient's diabetes management ability.

Implications: This study demonstrates the importance of couple's relationship processes in buffering the impact of economic pressure on diabetes management, providing a clear target for intervention and education efforts.

Type 2 diabetes is a major health concern that is increasingly prevalent in high- and low-income countries (Seuring, Archangelidi, & Suhrcke, 2015), affecting approximately 387 million people worldwide (International Diabetes Federation, 2014). This chronic health problem comes at a considerable cost, with recent estimates of the direct health-care costs totaling \$282,973 over one's lifetime in the United States (Seuring et al., 2015). These substantial health-care costs do not include the indirect costs of living with diabetes, such as lost productivity (Seuring et al., 2015) and increased mental health problems (Ho, Dobb, Knuiman, Finn, &

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Webb, 2008; Lynch, Kaplan, & Shema, 1997). As such, investigation into how one's financial standing might be linked with type 2 diabetes outcomes is a crucial direction for research. Although economic pressure is common in couples with a partner battling cancer (Sharp & Timmons, 2010), little is known about the consequences of economic pressure for couples with type 2 diabetes. Perceptions of economic pressure may be associated with increased emotional distress for both partners and, ultimately, how confident both partners are in the patient's ability to manage his or her diabetes.

Drawing on survey data from 117 married couples in which one partner has been diagnosed with type 2 diabetes (referred to as patients), the purpose of this study is to examine associations between patient and spouse perceived economic pressure (e.g., inability to pay bills), and patient (self-efficacy) and spouse confidence in the patient's ability to successfully manage the diabetes. In addition, we examine both partners' emotional distress (symptoms of depression, negative affect, and stress) as a potential mediator of the economic pressure–diabetes efficacy association, and problem-solving communication was tested as a moderator to understand how relationship dynamics might buffer associations between economic pressure and emotional distress.

LITERATURE REVIEW

Economic Pressure and Couples with Chronic Illnesses

Economic pressure represents the degree to which a couple's financial resources do not meet their financial obligations or material needs and is often accompanied by a constant need to reduce expenditures. This construct encompasses recurring events, such as inability to pay monthly bills or not having money left over after paying bills, and larger circumstances, including income loss, debt, unemployment, unstable work conditions, and medical emergencies (Conger & Elder, 1994; Conger, Rueter, & Elder, 1999). The present study focuses on economic pressure as it relates to the daily irritations and difficulties to pay one's bills or fund economic necessities. Economic pressure differs from financial stress or distress, as the latter refers to the subjective worry about one's financial situation—regardless of income level—and

is a by-product of economic pressure (Wheaton, 1994). Economic pressure is a particularly important variable to study, as scholars have found that other indicators of socioeconomic status, such as income level, tend to exert their influence on emotional health by decreasing one's ability to meet financial needs (greater economic pressure leads to greater emotional distress according to the family stress model; Conger et al., 1999).

Understanding economic pressure in couples with type 2 diabetes is important for several reasons. First, research has shown that couples dealing with a chronic illness experience more economic pressure than couples without (Sharp & Timmons, 2010; Smith, 2004). This is increasingly true in the context of type 2 diabetes, as couples incur frequent expenses for hospital and physician visits, prescription drugs, and diagnostic and laboratory tests, as well as costs associated with adhering to diet and exercise guidelines (Seuring et al., 2015). Very little research has investigated the impact of economic pressure on couples challenged by chronic illnesses (see Skinner, Zautra, & Reich, 2004), and no studies, to our knowledge, have investigated the impact of economic pressure on couples with type 2 diabetes.

Second, previous research has established that economic pressure—or difficulty meeting financial demands—is associated with poorer physical health and well-being (Ho et al., 2008; Lynch et al., 1997; Wilkinson, 1996). Beyond economic pressure, subjective reports of financial stress—not inability to meet financial demands, but worry about finances—have been linked to physical health outcomes (Catalano & Dooley, 1983; Fox & Chancey, 1998; Takeuchi, Chun, Gong, & Shen, 2002); the impact of economic pressure may be even more pronounced as it represents actual difficulty, not perceived worry. Specific to type 2 diabetes, the results of two studies indicated that stress decreases health management behaviors, such as dietary adherence and exercise (Delamater & Cox, 1994; Viner, McGrath, & Trudinger, 1996). Given that economic pressure is one particularly potent stressor, there is a high likelihood that it may affect one's ability to manage disease, or even one's confidence to do so. One study (Jeon, Essue, Jan, Wells, & Whitworth, 2009) did find that economic stressors associated with managing the illness were associated with less optimal

health outcomes and even compromised healthy lifestyle choices.

Finally, although the studies described here can shed light on how economic pressure may hinder the patient's diabetes management, they did not take into account the interdependent nature of couple relationships in the management of chronic illnesses (Berg & Upchurch, 2007). Intimate partners represent a powerful contextual influence that can help or hinder one's ability to manage type 2 diabetes, as demonstrated in prior publications using the same data as the present study (Johnson et al., 2013, 2014, 2015). As such, research utilizing the relationship dyad should consider the shared influence that one partner's experience (economic or emotional stress) can have on the others' (emotional contagion theory; see Johnson, Galambos, Horne, Finn, & Neyer, 2017). Our focus in the present study is to understand associations between patient and partner reports of economic pressure and patient diabetes self-efficacy or spouse confidence—an important disease specific cognition that is a precursor to actual health behaviors (e.g., Zulman, Rosland, Choi, Langa, & Heisler, 2012). Two important conceptual frameworks motivate our investigation of this pathway: Conger et al.'s (1999) family stress model that contends economic pressure is related to relationship well-being via the mechanism of emotional distress in couple relationships (see also Conger & Elder, 1994), and research connecting higher financial pressure with less confidence (or efficacy) to perform healthy behaviors (Shelton, Goldman, Emmons, Sorenson, & Allen, 2011; Tucker-Seeley, Mitchell, Shires, & Modlin, 2015; Xanthos, Treadwell, & Holden, 2010).

Economic Pressure and Diabetes Self-Efficacy

In the context of chronic illness, self-efficacy refers to the confidence in one's ability to control his or her health habits related to disease management (Bandura, 1997, 2004). Self-efficacy is one of the strongest predictors of actual health behaviors and health outcomes (Jackson, Tucker, & Herman, 2007). In fact, diabetes self-efficacy (confidence that the patient can successfully manage type 2 diabetes) and spouse's confidence in the patient's ability to manage the disease are associated with better patient diabetes self-management behaviors (Johnson et al., 2013; Zulman et al., 2012). The

link between economic pressure and health self-efficacy, including diabetes self-efficacy, has not been established, although previous research found greater financial stress leads to less confidence to perform healthy behaviors (Shelton et al., 2011; Tucker-Seeley et al., 2015; Xanthos et al., 2010). Actual difficulty in meeting financial demands may negatively affect one's confidence in managing a chronic illness, as financial concerns may take priority over healthy eating and exercising. This may also extend to the spouse, as the partner may worry whether the diabetic partner can adhere to management behaviors in the face of pressure to meet financial demands.

Although the extant literature suggests a direct association between economic pressure and diabetes self-efficacy (or spouse confidence), there are likely mechanisms that mediate this pathway, such as emotional responses to economic pressure. As such, we suggest economic pressure may be negatively associated with diabetes self-efficacy via heightened emotional distress.

Economic Pressure and Emotional Distress

Scholars have identified several ways that economic pressure affects emotional health, including increased reports of depressive symptoms (Takeuchi et al., 2002), anxiety (Creed, Muller, & Machin, 2001), stress (Fox & Chancey, 1998), and decreased self-esteem (Jackson, Iezzi, Lafreniere, & Narduzzi, 1998). Specific to chronic illness, a link between subjective reports of financial stress—a potential sequelae of economic pressure—greater health complaints, and negative affect was found among patients with arthritis (Skinner, Zautra, & Reich, 2004), which suggests that financial stress could be associated with emotional distress in patients managing a chronic illness. Economic pressure may have similar effects on emotional distress. Studies based on the family stress model (Conger et al., 1999) found heterosexual couples' economic pressure was associated with higher reports of both wife and husband emotional distress (Gudmunson, Beutler, Israelsen, McCoy, & Hill, 2007), highlighting the importance of considering both partners' perspectives. These findings also support emotional contagion theory (Lyons, Sullivan, & Ritvo, 1995), which is a key theoretical model in the literature linking affect

similarity among spouses (or shared emotional experience), and that this can be particularly true among relationships in which one partner has a debilitating physical illness (Goodman & Shippy, 2002).

A core tenet of Bandura's self-efficacy theory is that physiological and psychological states affect self-efficacy (Bandura, 1997; Strecher, DeVellis, Becker, & Rosenstock, 1986). Emotional distress has been linked to efficacy in the diabetes literature (e.g., Sacco et al., 2005), but this pathway is typically analyzed with higher efficacy predicting less emotional distress (see Anderson et al., 2016). Individuals experiencing emotional distress are more likely to believe that they are incapable of performing behaviors required to manage their disease (Tate et al., 2008). Therefore, consistent with this ordering (emotional distress affects diabetes efficacy), we hypothesize that higher economic pressure is associated with less diabetes efficacy for both the patient and spouse indirectly through higher levels of emotional distress.

Relationship Processes as a Potential

Moderator: Problem-Solving Communication

Conger et al.'s (1999) family stress model also proposes that relational processes (e.g., social support, problem solving) might mitigate the relationship between economic pressure and outcomes. Consistent with the already-mentioned model, we chose to include problem-solving communication as a moderator, as it goes beyond providing sensitivity and concern to the patient (i.e., social support) and is a demonstrable and teachable skill. Problem-solving communication—a core skill within couple relationships and key indicator of relational and physical health (Baucom, 1982; Notarius & Markman, 1993)—includes several important aspects of handling family matters through communication with a partner, including generating realistic and manageable solutions, negotiating, and reaching agreements about how to tackle stressors. Specific to the diabetes literature, researchers have found that families are better able to manage the effects of diabetes when they have healthy patterns of interaction (Fisher et al., 1998). Therefore, we hypothesize that better problem-solving communication will mitigate the association between economic pressure and diabetes self-efficacy by moderating the economic

pressure–emotional distress pathway. For example, high levels of economic pressure may be less likely to elicit feelings of depression, negativity, and stress when the couple solves problems effectively; discussing specific and concrete solutions about their financial standing could lead to behaviors that ultimately alleviate economic pressure.

The Present Study

Drawing on the proposed links between economic pressure, emotional distress, and diabetes self-efficacy, the present study examines whether economic pressure reported by both members of the couple is associated with patient diabetes efficacy and spouse confidence in the patient's ability to manage diabetes via his or her own and partner's emotional distress. To increase confidence in our hypothesized model, we tested two plausible alternative models: (a) Because it is possible that emotional distress predicts economic pressure, we tested the alternative ordering (emotional distress → economic pressure → diabetes self-efficacy or spouse confidence); and (b) to confirm whether the economic pressure–diabetes self-efficacy (or spouse confidence) association is fully mediated by emotional distress, we conducted a nested model comparison to determine whether including the direct paths from economic pressure to diabetes self-efficacy or spouse confidence improves model fit. Additionally, we tested problem-solving communication as a moderator of the relationship between economic pressure and emotional distress. We used moderated mediation analyses to investigate whether the indirect effect of economic pressure on diabetes efficacy through emotional distress is attenuated by problem-solving ability.

METHOD

Procedures

Participants were recruited from a large, Midwestern medical center patient registry (a collection of standardized information about a group of patients who share a similar condition or experience and who all agreed to be contacted to participate in research studies). Inclusion criteria limited the sample to only patients diagnosed with type 2 diabetes, who were between 18 and 74 years of age, and who had not experienced

severe complications from their diabetes, including renal failure, blindness or low vision, chronic kidney disease, or amputation. A research assistant called the qualifying patients ($n = 240$) and asked for patient and spouse consent to participate in the study. Of those who consented ($n = 155$), 117 couples (patients and spouses) completed the online survey (or paper copies with self-addressed stamped envelopes). There was a 49% response rate from the 240 eligible couples, and a 75% response rate among the 155 consenting couples. Data were collected and managed using REDCap electronic data capture tools hosted at the University of Kansas Medical Center (Harris et al., 2009). After the patient and spouse completed the survey, the couple was sent \$30 as a token of appreciation.

Participants

In this sample of 117 couples, 57.3% of diabetic patients were male and 42.7% were female. Patients ranged in age from 29 to 72 years ($M = 57.4$, $SD = 9.8$) and spouses ranged in age from 29 to 73 years ($M = 57.4$, $SD = 10.2$). The length of time since diagnosis with type 2 diabetes ranged from less than a year to 52 years ($M = 11.0$, $SD = 9.2$). The majority of respondents reported being European American (patients = 87% and spouses = 83.3%), 7% of patients and 5.3% of spouses were African American, 3.5% of patients and 4.4% of spouses were Latino/a, and the remaining 2.6% of patients and 7% of spouses were another race not listed. The relationships had lasted a mean of 29.4 years ($SD = 13.9$); 61.5% of the couples were in their first marriage, 27.4% in their second, and 11.1% had been married three or more times. In terms of education, 0.9% of patients and no spouses had less than a high school diploma, 12.1% of patients and 19.1% of spouses were high school graduates, 43.1% of patients and 31.3% of spouses had completed some college or had an associate's degree or technical training, 21.6% of patients and 28.7% of spouses held a bachelor's degree, and 22.4% of patients and 20.9% of spouses had a postgraduate degree. Concerning reported annual household income, 18.5% of couples made less than \$50,000 a year, 24.1% made between \$50,000 and \$69,999 annually, 31.5% earned between \$70,000 and \$99,999 per year, and 25.9% had a household income of \$100,000 or more per year.

Measures

Economic Pressure. Economic pressure was measured with three items about the daily irritations and difficulties created by the inability to pay one's bills or fund economic necessities (see Conger & Elder, 1994). Items included (a) "At the end of the month we have" *more than enough money left over* (coded as 1), *some money left over* (2), *just enough to make ends meet* (3), *not enough to make ends meet* (4); (b) "We are able to afford adequate housing, clothing, food, and medical care," with response options ranging from *strongly agree* (1) to *strongly disagree* (4); and (c) "How much difficulty have you and your spouse had in paying bills during the past 12 months?" where responses included *no difficulty at all* (0), *a little difficulty* (1), *some difficulty* (2), *quite a bit of difficulty* (3), and *a great deal of difficulty* (4). Mean scores were computed for the three items, with higher scores indicating more economic pressure. Cronbach's alpha reliability estimates were calculated for both patients ($\alpha = .85$) and spouses ($\alpha = .82$).

Emotional Distress. Emotional distress was analyzed as a latent variable with three indicators: depression symptoms, acute stress, and negative affect. Depression symptoms were measured with the nine-item Patient Health Questionnaire (PHQ-9; Kroencke, Spitzer, & Williams, 2001). Both patients and their spouses were asked how often they have been bothered by a list of depression symptoms over the last 2 weeks. Examples of items include: "little interest or pleasure in doing things"; "feeling down, depressed, or hopeless"; and "thoughts that you would be better off dead or hurting yourself in some way." Response options ranged from *not at all* (0) to *nearly every day* (3), and mean scores were computed for the nine items, with higher scores indicating more emotional distress. Cronbach's alpha reliability estimates were calculated for both patients ($\alpha = .89$) and spouses ($\alpha = .85$).

Acute stress was measured with eight items from the Multidimensional Stress Questionnaire for Couples (Bodenmann, Schär, & Gmelch, 2008). The stem, "How stressful/straining are the following situations in the past 7 days?" prefaced the eight items: job or education, social contacts, free time, children, family of origin, living situation, finances, and daily hassles. Response options ranged from *not at all* (1) to *strong* (4), and mean scores were computed for

the nine items, with higher scores indicating more acute stress. Cronbach's alpha reliability estimates were calculated for both patients ($\alpha = .79$) and spouses ($\alpha = .70$).

Negative affect was measured with the 10-item negative affect subscale of the Positive and Negative Affect Schedule (PANAS; Watson, Clark, & Tellegen, 1988). A list of emotions was presented and respondents indicated how often they felt that way (e.g., irritable, distressed, nervous). Response options ranged from *very slightly or not at all* (1) to *extremely* (5), and mean scores were computed for the 10 items, with higher scores indicating more negative affect. Cronbach's alpha indicated good reliability for both patients ($\alpha = .90$) and spouses ($\alpha = .91$).

The final model includes latent variables for patient emotional distress and spouse emotional distress. Factorial invariance is assumed in structural regression modeling and was confirmed in these data, which means that factor loadings were constrained to equality between patients and spouses [model fit indexes: $\chi^2(10) = 9.07$, $p = .523$, comparative fit index (CFI) = 1.00, Tucker-Lewis index (TLI) = 1.01, root mean square error of approximation (RMSEA) < .01 (90% confidence interval (CI) [.00, .09]), standardized root mean residual, SRMR = .05].

Patient Efficacy and Spouse Confidence. Both patient diabetes efficacy and the spouse's confidence in the patient's ability to manage the disease was measured using the seven-item self-efficacy subscale of the Multidimensional Diabetes Questionnaire (MDQ; Talbot, Nouwen, Gingras, Gosselin, & Audet, 1997). Patients reported their own self-efficacy and spouses reported their level of confidence in the patient's ability to adhere to the prescribed treatment regimen, including following the recommended diet, testing blood sugar levels, and exercising regularly. Sample items include "How confident are you in your ability (or your partner's ability) to keep your (his or her) blood sugar level under control?" and "How confident are you in your ability (or your partner's ability) to exercise regularly?" Response options ranged from *not at all confident* (0) to *completely confident* (5), and mean scores were computed for the seven items, with higher scores indicating more self-efficacy or confidence. Cronbach's alpha reliability in the present study was .87 for patients and .91 for spouses.

Problem-solving Communication. Problem-solving communication was measured using eight items from the Iowa Youth and Family Scale (IYFS; Conger, 1989) and assessed both the patient's and spouse's perception of their problem solving. The following stem preceded each question: "When the two of you have a problem to solve, how often do you . . . ?" and examples of questions include "listen to your spouse's ideas about how to solve the problem" and "show a real interest in helping to solve the problem." Response options ranged from *never* (0) to *always* (6), and mean scores were computed for the eight items, with higher scores indicating more problem-solving communication. Cronbach's alpha reliability estimates were calculated for patients ($\alpha = .81$) and spouses ($\alpha = .85$).

Control Variables. Patient and spouse gender, age, relationship satisfaction, and years of education; couple income; number of children; and time since the patient was diagnosed with type 2 diabetes were considered potential control variables in the analyses. Research has demonstrated differences between men and women in experiences of financial stress and worry (Malone, Stewart, Wilson, & Korsching, 2010). Likewise, researchers have highlighted the importance of considering age in the context of chronic illness, as older adults may be more prone to developing multiple illnesses (e.g., Roper & Yorgason, 2009). A previous study using the same data found a longer time since diagnosis of type 2 diabetes was associated with lower patient diabetes self-efficacy (Johnson et al., 2013). Finally, it is important to account for the partners' subjective perception of their marriage because sentiment override (Weiss, 1980) may influence responses to other questions in the survey. As such, we included the four-item Couple Satisfaction Index (CSI; Funk & Rogge, 2007) as a covariate about overall feelings toward the relationship: patients ($\alpha = .94$) and spouses ($\alpha = .94$).

Analytic Plan

Descriptive statistics and bivariate correlations were first explored to ensure that the data met the assumptions of structural equation modeling (e.g., distributional normality, heteroskedasticity). Missing data were low in this study, ranging from 3.7% on diabetes efficacy to 7.7% for acute stress, and were handled with

Table 1. Correlations and Descriptive Statistics for Study Variables (N = 117 couples)

Variables	1	2	3	4	5	6	7	8	9	10	11	12
1. P Economic Pressure	–											
2. S Economic Pressure	.76**	–										
3. P Depression Symptoms	.49**	.39**	–									
4. S Depression Symptoms	.13	.26**	.20*	–								
5. P Negative Affect	.54**	.37**	.68**	.16	–							
6. S Negative Affect	.16	.36**	.14	.69**	.13	–						
7. P Acute Stress	.45**	.35**	.49**	.22*	.59**	.25*	–					
8. S Acute Stress	.09	.20*	.11	.51**	.11	.50**	.25*	–				
9. P Diabetes Efficacy	-.31**	-.26**	-.48**	-.15	-.44**	-.25*	-.28*	-.02	–			
10. S Confidence in Patient	-.33**	-.34**	-.46**	-.32**	-.36**	-.32**	-.26*	-.11	.63**	–		
11. P Problem Solving	-.16	-.18	-.24*	-.17	-.33**	-.18	-.24*	-.20*	.20	.22*	–	
12. S Problem Solving	-.21*	-.18	-.19*	-.27**	-.19*	-.31**	-.21*	-.24*	.07	.18	.40**	–
<i>M</i>	2.02	2.01	0.73	0.46	1.76	1.69	2.00	2.00	2.52	2.71	4.43	4.43
<i>SD</i>	0.76	0.76	0.67	0.46	0.66	0.64	0.63	0.56	1.10	1.20	0.76	0.79

Note. P = patient, S = spouse.

* $p < .05$, ** $p < .01$, *** $p < .001$ (two-tailed).

full-information maximum likelihood estimation. The research questions were answered using structural equation modeling in Mplus 7.0 (Muthén & Muthén, 2012). An actor-partner interdependence modeling (APIM) strategy was used to account for the interdependence of the couple data (results from the omnibus test of model distinguishability led us to treat the couples as distinguishable dyads). Model fit was evaluated with the model chi-square (χ^2), CFI, TLI, RMSEA, and SRMR; a non-significant chi-square, and values greater than .95 for CFI and TLI and smaller than .06 and .08 for RMSEA and SRMR all suggest good fit (Hu & Bentler, 1999). The indirect paths were tested with bootstrapping procedures (Preacher & Hayes, 2008), and a nested model comparison using the chi-square difference test examined whether the omission of the direct paths between economic pressure and diabetes efficacy statistically worsened model fit. Finally, moderated mediation was used to test for conditional indirect effects with 2,000 bootstraps and a 95% CI.

RESULTS

Correlation Analyses

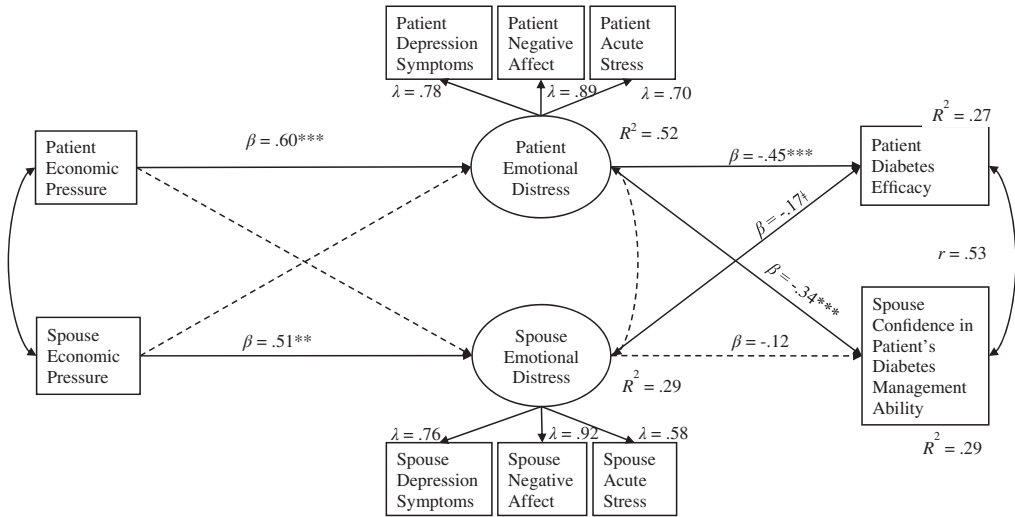
The correlation analyses revealed important information about the bivariate relationships among the variables (see Table 1). Patient economic pressure was statistically correlated with the patient's own emotional distress variables

(from $r = .45$ to $.54$), whereas spouse economic pressure was associated with higher patient and spouse's emotional distress (from $r = .20$ to $.39$). The spouse's confidence in the patient's diabetes management ability was associated with higher patient diabetes self-efficacy ($r = .63$) and less economic pressure and emotional distress indicators ($r = -.02$ to $-.48$). Finally, patient and spouse reports of problem-solving communication were associated with less economic pressure and emotional distress ($r = -.16$ to $-.24$), and higher diabetes self-efficacy ($r = .07$ to $.22$).

Model Comparison

We compared our hypothesized model to two theoretically plausible models. First, an alternative model comparison was conducted in which emotional distress was modeled to predict diabetes self-efficacy or spouse confidence via economic pressure rather than the hypothesized model. The model was estimated and the Akaike and Bayesian information criteria values were smaller for the hypothesized model (AIC = 2,112.81, BIC = 2,212.25 vs. AIC = 2,137.75, BIC = 2,239.95), which indicates that our hypothesized model was a better fit to the data. Second, a nested model comparison was conducted to determine whether the inclusion of direct paths from economic pressure to diabetes self-efficacy statistically improved model fit or if our hypothesized model

FIGURE 1. FINAL STATISTICAL MODEL OF THE INDIRECT ASSOCIATION BETWEEN PATIENT AND SPOUSE ECONOMIC PRESSURE, PATIENT AND SPOUSE EMOTIONAL DISTRESS, AND PATIENT DIABETES SELF-EFFICACY AND SPOUSE CONFIDENCE IN THE PATIENT'S ABILITY TO MANAGE DIABETES.



Note. Standardized estimates shown. Model fit indexes: $\chi^2(71) = 74.789$, $p = .356$; RMSEA = .023 (CI = .000, .064); CFI = .989; TLI = .985; SRMR = .048. Dashed lines represent nonsignificant pathways. Spouse relationship satisfaction was included as a control variable. $^\dagger p < .10$, $^* p < .05$, $^{**} p < .01$, $^{***} p < .001$ (two-tailed).

(full mediation) was a better fit to the data. Each model was estimated and the chi-square difference supported our proposed model: omitting the direct paths did not worsen model fit [$\chi^2_{diff}(4) = 0.663$, $p = .114$]. Although the bivariate relationships were substantive, emotional distress proved to fully mediate the association between economic pressure and diabetes self-efficacy in this multivariate analysis.

Structural Equation Model Results

The final structural equation model results are shown in Figure 1. Initially, all variables in the model were regressed on the control variables. None of the control variables (except spouse relationship satisfaction) was associated with the study variables, and all were individually pruned to ensure that model fit was not statistically reduced. The model revealed good fit to the data: $\chi^2(71) = 74.789$, $p = .356$; RMSEA = .023 (95% CI [.000, .064]); CFI = .989; TLI = .985; SRMR = .048, and accounted for a substantive amount of the variance in all endogenous variables ($R^2 = .27$ to $.52$).

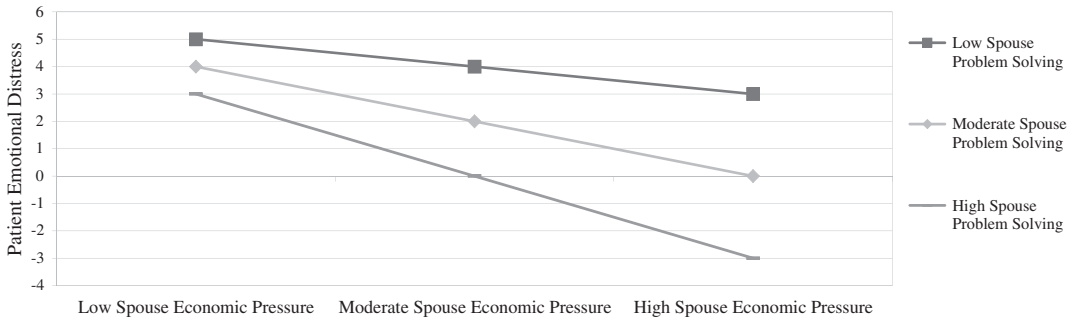
Higher patient economic pressure was associated with greater patient emotional distress ($\beta = .60$, $p < .001$), and higher spouse economic

pressure was associated with higher levels of spouse emotional distress ($\beta = .51$, $p = .001$). No partner effects were found from patient economic pressure to spouse emotional distress or spouse economic pressure to patient emotional distress. Greater patient emotional distress was negatively associated with patient diabetes self-efficacy ($\beta = -.45$, $p < .001$) and spouse confidence in the patient's diabetes management ability ($\beta = -.34$, $p < .001$). Spouse emotional distress was negatively—albeit not statistically—associated with patient diabetes self-efficacy in these data ($\beta = -.17$, $p = .087$). Finally, higher spouse relationship satisfaction was associated with higher spouse confidence in the patient's diabetes management ability ($\beta = .27$, $p = .001$).

Test of Indirect Effects

Indirect Actor Effects. There was a statistically significant indirect effect from patient economic pressure to patient diabetes efficacy: patient economic pressure \rightarrow patient emotional distress \rightarrow patient diabetes self-efficacy ($\beta = -.29$, $p = .001$, 95% CI $[-.45, -.13]$). This can be interpreted as follows: A 1-standard-deviation increase in

FIGURE 2. THE RELATIONSHIP BETWEEN SPOUSE'S ECONOMIC PRESSURE AND PATIENT EMOTIONAL DISTRESS, WITH SPOUSE PROBLEM SOLVING AS A MODERATOR.



patient economic pressure is associated with a 0.29-standard-deviation decrease in patient diabetes self-efficacy via the prior effect of patient economic pressure on patient emotional distress.

Indirect Partner Effects. There was also a statistically significant indirect effect from patient economic pressure to the spouse's confidence in the patient's diabetes management ability: patient economic pressure → patient emotional distress → spouse confidence in the patient's ability to manage his or her diabetes ($\beta = -.21$, $p = .008$, 95% CI [-.38, -.07]).

Moderation Analyses

Patient and spouse problem-solving communication was next added as a moderator of the economic pressure–emotional distress association. Results revealed a statistically significant main effect of patient problem-solving communication on patient emotional distress ($\beta = -.27$, $p = .013$), indicating that better patient problem-solving communication was associated with lower patient emotional distress. The same effect was evident for spouses: Better spouse problem-solving ability was associated with lower spouse emotional distress ($\beta = -.25$, $p = .050$).

There was a statistically significant interaction between spouse economic pressure and spouse problem-solving communication on patient emotional distress ($\beta = -.41$, $p = .028$). Thus, spouse problem-solving communication moderated the association between spouse economic pressure and patient emotional distress. Simple slopes for the association between spouse economic pressure and patient

emotional distress were tested for low (-1 *SD* below the mean), moderate (mean), and high ($+1$ *SD* above the mean) levels of spouse problem-solving communication. Each of the simple slope tests revealed that at all levels of spouse problem-solving communication attenuated the association between spouse economic pressure and patient emotional distress (low: $b = -0.65$, $SE_b = 0.28$, $p = .021$, 95% CI [-1.24, -0.09]; moderate: $b = -0.79$, $SE_b = 0.34$, $p = .021$, CI [-1.51, -.14]; high: $b = -0.93$, $SE_b = 0.40$, $p = .021$, CI [-1.77, -0.17]). Figure 2 plots the simple slopes for the interaction and shows that at higher levels of spouse problem-solving communication, the effect of economic pressure on patient emotional distress decreases more steeply than at lower levels of spouse problem-solving communication.

Moderated Mediation Analyses

Finally, to test whether the moderator variables strengthened or weakened the indirect effects, conditional indirect effects were tested for two pathways at the 95% CI and 2,000 bootstrap samples (Hayes, 2015; Stride, Gardner, Catley, & Thomas, 2015): At all levels of spouse problem-solving communication, does patient emotional distress mediate the associations (a) between spouse economic pressure and patient diabetes self-efficacy, and (b) between spouse economic pressure and spouse confidence in the patient's diabetes management ability? For the first pathway, the indirect effect of spouse economic pressure on patient diabetes self-efficacy through patient emotional distress was weakened with

better spouse problem-solving communication (low: estimate = $-.309$, 95% CI [$-.565$, $-.122$]; middle: estimate = $-.242$, CI [$-.415$, $-.084$]; high: estimate = $-.217$, CI [$-.386$, $-.065$]). The same pattern was evident in the second pathway—the indirect effect of spouse economic pressure on spouse confidence in the patient's diabetes management ability through patient emotional distress was weakened with better spouse problem-solving communication (low: estimate = $-.224$, CI [$-.456$, $-.061$]; middle: estimate = $-.181$, CI [$-.366$, $-.054$]; high: estimate = $-.165$, CI [$-.341$, $-.048$]).

DISCUSSION

In this study, we examined the associations between economic pressure and diabetes self-efficacy via emotional distress for patients diagnosed with type 2 diabetes and their spouses. We also examined problem-solving communication as a potential moderator of the path between economic pressure and emotional distress. This investigation revealed three main findings. First, we found that patient's economic pressure was associated with the patient's diabetes self-efficacy via the patient's own emotional distress. In other words, experiencing financial difficulties, such as having trouble paying bills, was associated with heightened feelings of depression, stress, and negativity in the patient, which was ultimately linked with less patient confidence in the ability to manage his or her type 2 diabetes. Second, we found patient economic pressure to be associated with spouse confidence in the patient's diabetes management ability through patient emotional distress, which implies that the healthy spouse's confidence in the patient's ability to manage a chronic illness is intertwined with the patient's emotional health. These findings extend Conger et al.'s (1999) model about the dyadic influence of economic pressure on outcomes via emotional distress. Finally, spouse problem-solving communication attenuated the link between spouse economic pressure and patient emotional distress.

The indirect association between economic pressure and diabetes efficacy through emotional distress (corresponding to our first two important findings noted earlier) is important for three main reasons. First, our findings suggest patient perceptions of economic pressure can actually undermine both the patient's confidence and the spouses' confidence in the patient to

manage the illness and, though outside the scope of this study, may shed light on the difficulty of adhering to prescribed dietary and exercise regimens (August & Sorkin, 2010). Greater economic pressure could erode one's confidence to engage in health management behaviors, as tasks associated with making money to pay bills and afford basic necessities become the main priority. In such circumstances, health maintenance behaviors may take a back seat to alleviating economic pressure. Second, it is interesting that among our sample of relatively well-educated, high-earning couples, economic pressure had a surprisingly robust association with confidence to manage diabetes. This pattern could be even more pronounced among less educated or lower-income couples. Third, although the source of the couple's economic pressure is unknown, this finding may raise important considerations for future diabetes care. Type 2 diabetes management is quite costly (Jeon et al., 2009) and could plausibly serve as a driving force in a couple's financial difficulties, which may undermine the successful management of the illness. A more targeted investigation that is able to parcel out the sources of economic pressure most directly linked with illness outcomes would be valuable to inform diabetes education and medical practitioners, who might have the option to prescribe less costly treatment regimens to patients with financial struggles.

The third important finding from this study showed that the link between economic pressure and diabetes efficacy was attenuated by problem-solving communication. Specifically, effective spousal problem-solving communication weakened the association between economic pressure and emotional distress, ultimately translating into a less pronounced association with diabetes efficacy. This pattern of results was evident for spouse and patient emotional distress and diabetes efficacy. These findings underscore the buffering effect of intimate relationships for those with chronic illnesses and highlights how intimate unions may serve as a protective factor for diabetic individuals (Berg & Upchurch, 2007; Johnson et al., 2013). Our study also extends research on the dyadic experience of couples facing economic pressure (Conger et al., 1999; Masarik et al., 2016) by identifying a growing subpopulation of couples who may experience high levels of economic pressure due to the direct and indirect costs accrued from living with type 2 diabetes.

Yet this study shows that problem-solving communication, particularly by the nondiabetic spouse, helps increase the confidence both partners have about successfully managing the illness by decreasing the emotional distress associated with economic pressure. This study lays the foundation for more research into other types of communication and social support that may also serve to help couples weather the struggle of financial problems to promote better physical and relational health.

Clinical Implications

The findings from this study have important implications for both prevention and intervention in type 2 diabetes management. Because prior research has shown couples with chronic illnesses are at higher risk for economic pressure than those who are not living with chronic health problems (Sharp & Timmons, 2010), this study makes a case for assessing economic pressure among couples managing type 2 diabetes and explicitly considering whether these concerns have any bearing on the patient's or spouse's confidence in the patient's ability to manage the illness. Given that newly diagnosed patients routinely receive formal diabetes education (American Diabetes Association, 2014; Beeney, Bakry, & Dunn, 1996; Haas et al., 2013), such a setting may be ideal to include a financial screening component and to provide resources to those already experiencing or at risk of financial problems. Careful assessment that is also able to identify the sources contributing to economic pressure may be important for identifying how treatment recommendations might contribute to financial difficulties, which are linked with less confidence to engage in diabetes management behaviors. Such efforts may help practitioners consider referrals to financial planners or counselors as an important aspect of diabetes care.

Second, our study adds to the burgeoning body of literature on including and utilizing the healthy spouse in chronic illness intervention (Lewis et al., 2006; Trief et al., 2011). This work suggests that a focus on helping the couple effectively communicate and problem solve may yield dividends by reducing the impact of stressors, such as economic pressure, on emotional well-being. An educational component of diabetes intervention programming that addresses and equips healthy communication and problem-solving skills is a potentially

fruitful avenue, and again, referral to outside helping professionals—such as couples therapists—who possess the requisite skills to improve problem-solving communication may also be helpful. Although this level of intervention may not be warranted in every case, an escalated step approach may be particularly useful for couples in relationships that need more aggressive intervention.

Limitations and Future Directions

The results of this study must be considered in light of its limitations. First, the sample comprised primarily White, highly educated, married couples recruited from a single diabetes clinic in the Midwestern United States. It is unclear how generalizable the findings from this study may be to more diverse populations. As such, future research must replicate these results in samples better suited for examining these experiences among other racial and ethnic identities, relationship types (dating, cohabiting, and same-sex couples), socioeconomic status, and geographic regions. Second, our small sample size limited our ability to perform multiple group analyses of patient and spouse gender (male patient and female spouse; female patient and male spouse) among our variables of interest, and future studies would do well to identify whether the pattern of associations found in the present study hold true with different group compositions. Third, the cross-sectional nature of this study limits our ability to infer causal or sequential relationships among these variables and necessitates that future research examine these associations across time. Fourth, all constructs were measured by self-report and some of the observed associations may be attributed to shared method variance. The use of data gathered from both partners and the inclusion of relationship satisfaction as a control variable to account for sentiment override bolsters our confidence in these findings, but future research drawing on observational measures of problem-solving communication are certainly needed. Finally, future investigation is needed to understand how other types of communication (e.g., affective or emotional), as well as specific ways of coping or social support provision, may buffer or exacerbate the impact of economic pressure on emotional distress to provide a more comprehensive picture of how couple relations can be leveraged to promote successful diabetes outcomes.

CONCLUSION

In conclusion, this study demonstrates that economic pressure may hinder confidence in the patient's ability to manage type 2 diabetes—but healthy couple relations can weaken that association. The experience of financial problems is certainly distressing, maybe even more so when also battling chronic illness, but our findings underscore that couples are not powerless. The ability to solve problems effectively can help reduce feelings of despair, ultimately bolstering the couple's confidence that type 2 diabetes is manageable. Therefore, both intervention and assessment efforts should consider economic pressure an important factor in the context of diabetes management and consider enhancing couple relations to increase the likelihood of achieving successful diabetes outcomes.

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