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Patient self-efficacy and spouse perception of spousal support are associated with lower patient weight: Baseline results from a spousal support behavioral intervention

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Obesity and related chronic illnesses are leading causes of death and excessive health care costs, necessitating identification of factors that can help patients achieve and maintain healthy weight. Greater self-efficacy and perceived spousal support in patients have been associated with successful weight management. The current study also assesses self-efficacy and perceived support in spouses and whether these factors are related to patient weight. At baseline of a spousal support trial, patients and spouses ($N = 255$ couples) each completed measures of self-efficacy and spousal support for their own exercise and healthy eating behaviors. We fit a multivariable regression model to examine the relationship between these factors and patient weight. Patients were 95% males and 65% Whites, with average age of 61 years ($SD = 12$) and weight of 212 lbs ($SD = 42$). Spouses were 64% Whites, with average age of 59 years ($SD = 12$). Factors associated with lower patient weight were older patient age (estimate = −0.8 lbs, $p < .01$), normal blood pressure (estimate = −17.6 lbs, $p < .01$), higher patient self-efficacy for eating healthy (estimate = −3.8 lbs, $p = .02$), and spouse greater perceived support for eating healthy (estimate = −10.0 lbs, $p = .03$). Future research should explore the causal pathways between perceived support and health outcomes to establish whether patient support behaviors could be a point of intervention for weight management.

Keywords: diet behavior; exercise behavior; obesity; self-efficacy; spousal support; weight

Introduction

Obesity is the second leading cause of death in the United States and is associated with many deadly and costly diseases (Danaei et al., 2009; Flegal, Graubard, Williamson, & Gail, 2005; Thorpe, Florence, Howard, & Joski, 2004). Weight loss interventions typically achieve only small, short-term effects, indicating the need to find additional strategies to help patients achieve and maintain a healthy weight

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(Goldstein, Whitlock, DePue, & Planning Committee of the Addressing Multiple Behavioral Risk Factors in Primary Care Project, 2004; Michie, Abraham, Whittington, McAteer, & Gupta, 2009; Rao et al., 2011, WHO, 2009).

Self-efficacy, the belief in one's capability to perform a given behavior or course of action, has been consistently related to a wide range of health behaviors, including better response to weight control interventions (Ashford, Edmunds, & French, 2010; Linde, Rothman, Baldwin, & Jeffery, 2006; Schwarzer & Fuchs, 1996). Support from spouses is also related to healthier outcomes in patients. Several interventions have achieved more positive effects, including weight loss, in patients when patients and spouses were both treated compared to when patients were treated without spouses, although these effects are generally small and short-lived (Martire, Schulz, Helgeson, Small, & Saghafi, 2010; McLean, Griffin, Toney, & Hardeman, 2003).

Self-efficacy and perceived spousal support have been studied almost exclusively in patients alone. However, spouses share environments, psychological and relationship characteristics (Kenny, 1996), and risk factors for health outcomes (Di Castelnuovo, Quacquaruccio, Donati, de Gaetano, & Iacoviello, 2008), so several unexplored partner effects between spouses might also be important for healthy weight management. First, spouses with high self-efficacy for their own healthy behaviors might positively affect patients' weight by, for example, modeling healthy behaviors for patients. Second, spouses' perceptions of received spousal support might be positively related to maintaining a healthy weight. Previous studies indicate that spouses' perceptions of patients' behavior can be related to patient outcomes; for example, spouses' perceived criticism from patients has been related to depressed patients' symptoms (Peterson & Smith, 2010).

In the current study, we hypothesized that greater patient self-efficacy and perceived spousal support would be associated with lower patient weight. We also hypothesized that higher *spouse* self-efficacy and more *spouse* perceived spousal support would be associated with lower patient weight.

Methods and procedures

Participants were veterans and their spouses enrolled in the Couples Partnering for Lipid-Enhancing Strategies (CouPLES) trial at the Durham VA Medical Center. Detailed methods have been published previously (Voils et al., 2009). Briefly, 255 married veterans with elevated LDL-C and their spouses were randomized as a pair to receive a 10-month telephone intervention focused on lowering cholesterol or usual care. The present analysis used only baseline data.

The outcome variable, patient weight, was obtained from the record of patients' most recent clinical appointment in relation to the baseline assessment; these appointments were within a median number of 40 (1st quartile = 6; 3rd quartile 101) days of the baseline assessment.

Explanatory variables

Self-efficacy and spousal support

To measure self-efficacy for exercise (nine items) and healthy eating (15 items), patients and spouses each rated their confidence that they could (1) exercise three times per week for 20 min under certain circumstances (e.g. "*if the weather were bad*") and (2) adhere to a cholesterol-lowering diet under certain circumstances (e.g.

"*at a restaurant with friends*"). Response scales were 1 (*not at all confident*) to 10 (*extremely confident*). Patient perceived spousal support was measured with patient ratings of the amount of support they received from their spouses; spouse perceived spousal support was measured with spouse ratings of the support they receive from patients. Spousal support scales were adapted from previous scales (Sallis, Grossman, Pinski, Patterson, & Nader, 1987). Spousal support for exercise was measured with 15 items (e.g. "*My spouse helped plan activities around my exercise*"). Spousal support for healthy eating was measured with 10 items (e.g. "*My spouse refused to eat the same foods I eat*"). Response scales for both spousal support questionnaires were 1 = *never*, 2 = *rarely*, 3 = *a few times*, 4 = *often*, 5 = *very often*. Scores were the average of the non-missing items after reversing appropriate items; higher scores indicate greater self-efficacy or spousal support.

Other covariates

Patients provided age and race and indicated whether they had ever been diagnosed with heart disease, diabetes, or high blood pressure (yes or no); spouses provided age and race. Patients and spouses both reported family history of coronary heart disease (CHD); those who reported that parents or siblings had been diagnosed with CHD before the age of 55 for male relatives or age 65 for female relatives were coded as having family history of CHD (vs. no history). Patient and spouse knowledge of cholesterol facts was assessed with a validated scale (Frank, Winkleby, Fortmann, Rockhill, & Farquhar, 1992), with higher scores indicating more knowledge.

Analysis

We first fit a series of simple (bivariate) linear regression models with patient weight as the outcome and each of the explanatory variables described above. We then fit a multivariable linear regression model with patient weight as the outcome and all of the explanatory variables described above. We examined the correlation matrix of explanatory variables and checked for multicollinearity among explanatory variables. There was no evidence of multicollinearity or poor model fit. All analyses were performed using SAS software (SAS Institute, Cary, NC).

Results

Average patient clinical and demographic factors appear in Table 1. On average, patients were 61 years old and weighed 212 pounds.

Average levels of self-efficacy and spousal support were similar in patients and spouses, and patient and spouse ratings (see Table 2) were generally moderately correlated (see Table 2). Within patients, correlations between diet and exercise self-efficacy, and diet and exercise perceived support were .56 and .45, respectively. Within spouses, correlations between diet and exercise self-efficacy, and diet and exercise perceived support were .21 and .53, respectively.

In the simple linear regression models, the following variables were associated with patient baseline weight: patient self-efficacy for eating healthy and for exercise, spouse perceived support for eating healthy and exercise, and patient age, blood pressure status, and race (see Table 3). In the multivariable model, patient self-efficacy for eating healthy and spouse perceived support for eating healthy were

Table 1. Patient and spouse clinical and demographic characteristics.

	Patients	Spouses
Average age (*SD*)	61 (12)	59 (12)
Average patient weight (*SD*)	212.0 (42.0)	N/A
White/Non-white	65%/35%	64%/36%
Diagnosed with heart disease	20%	N/A
Diagnosed with diabetes	16%	N/A
Diagnosed with high BP	55%	N/A
Family history of CHD	42%	38%
Average cholesterol knowledge score (*SD*), (range 1 = low knowledge to 10 = high knowledge)	7.0 (1.8)	7.1 (1.8)

Notes: CHD, coronary heart disease. Four patients were missing race data; seven patients were missing diagnoses and cholesterol knowledge data; 12 patients were missing family history of CVD data; seven spouses were missing age and race data; 13 spouses were missing cholesterol knowledge scores and family history of CHD.

Table 2. Mean patient and spouse self-efficacy and perceived spousal support scores and correlations.

	Patients, mean (SD)	Spouses, mean (SD)	Correlation between patient and spouse score
Self-efficacy (scale = 1 (low) to 10 (high))			
Diet	6.6 (1.9)	6.6 (1.9)	0.32
Exercise	6.6 (2.3)	6.3 (2.2)	0.38
Received spousal support (scale = 1 (low) to 5 (high))			
Diet	3.4 (0.6)	3.0 (0.7)	0.15
Exercise	2.8 (0.8)	2.8 (0.8)	0.52

Notes: Seven patients were missing data on the self-efficacy scales; eight patients were missing data on the social support scales; 11 spouses were missing data on the self efficacy scale for diet scale; 10 spouses were missing data for the self efficacy for exercise scale; 10 spouses were missing data for the spousal support scales. All correlations are significant at $p < .05$.

associated with patient weight. Each one-point increase in patient self-efficacy for healthy eating corresponded to a mean decrease of 3.8 lbs in baseline weight (95% CI = −7.0, −0.7; $p = .02$), and each one-point increase in spouse perceived support for healthy eating corresponded to a mean decrease of 10.0 lbs in weight (95% CI = −18.8, −1.2; $p = .03$). Similar to the simple regression models, older age was associated with lower weight, and high blood pressure was associated with higher weight (see Table 3).

Discussion

The current finding extends past research connecting perceived spousal support to patients' health by indicating that the support spouses perceive from patients could play a role in patients' own health outcomes. Spouses' higher ratings of perceived support could reflect patients' favorable attitudes toward or motivations for healthy

Table 3. Estimates from simple (unadjusted) and multivariable (adjusted) linear regression models.

Variable	Unadjusted estimate from single-variable model (95% CI)	p	Adjusted estimate (95% CI)	p
Self-efficacy				
Patient self-efficacy for eating healthy	−5.3 (−7.9, −2.6)	<.01	−3.8 (−7.0, −0.7)	.02
Spouse self-efficacy for eating healthy	−1.7 (−4.5, 1.1)	.22	−0.1 (−3.6, 3.5)	.96
Patient self-efficacy for exercise	−4.3 (−6.6, −2.0)	<.01	−0.8 (−3.7, 2.1)	.59
Spouse self-efficacy for exercise	−1.8 (−4.1, 0.6)	.14	−0.2 (−3.1, 2.8)	.92
Spousal support				
Patient perceived spousal support for eating healthy	−0.9 (−9.0, 7.3)	.84	8.3 (−0.6, 17.2)	.07
Spouse perceived spousal support for eating healthy	−15.1 (−22.4, −7.8)	<.01	−10.0 (−18.8, −1.2)	.03
Patient perceived spousal support for exercise	−4.1 (−10.8, 2.6)	.23	−4.2 (−12.7, 4.3)	.33
Spouse perceived spousal support for exercise	−9.0 (−15.5, −2.5)	.01	−3.8 (−12.8, 5.1)	.40
Covariates				
Patient heart disease (Y/N)	−1.1 (−14.1, 11.9)	.87	−4.5 (−17.9, 9.0)	.51
Patient diabetes (Y/N)	13.2 (−0.7, 27.0)	.06	7.5 (−6.6, 21.6)	.30
Patient high blood pressure (Y/N)	19.5 (9.2, 29.7)	<.01	17.6 (6.4, 28.8)	<.01
Patient age	−0.7 (−1.1, −0.2)	<.01	−0.8 (−1.3, −0.3)	<.01
Patient race (White/Non-White)	−12.7 (−23.6, −1.7)	.02	−3.1 (−14.8, 8.7)	.61
Patient knowledge of cholesterol facts	−0.2 (−3.1, 2.7)	.88	0.7 (−2.3, 3.7)	.63
Spouse knowledge of cholesterol facts	−0.3 (−3.2, 2.6)	.84	−0.3 (−3.3, 2.7)	.83
Patient family history of heart disease (Y/N)	3.2 (−7.6, 14.0)	.56	2.7 (−7.9, 13.3)	.61
Spouse family history of heart disease	−1.4 (−12.4, 9.7)	.81	0.4 (−10.4, 11.2)	.94

Notes. For continuous variables, estimate is change in weight for a one unit increase in variable; for dichotomous variables, estimate is difference in weight between categories of variable (e.g. Whites vs. Non-Whites). Two hundred and twenty-six observations were included in the multivariable (adjusted) model because 29 subjects were missing a response to at least one of the variables included in the model.

eating. For example, patients who believe in the value of healthy eating might have lower weight and might be more likely to support healthy eating in their spouses.

Patients' perceived spousal support for exercise and eating healthy were not significantly associated with weight. Most of the patients in our study were males, and sex differences have been reported in the effects of spousal support and in provision of spousal support (Luszczynska, Boehmer, Knoll, Schulz, & Schwarzer, 2007; Schulz & Schwarzer, 2004; Wallace, Raglin, & Jastremski, 1995), suggesting that men might perceive or react to social support differently than women.

Some studies suggest that diet and exercise behaviors share underlying self-regulatory skills (Annesi, 2011; Mata et al., 2009). Our findings support this idea in two ways: First, patient ratings of self-efficacy for diet and for exercise were correlated, and second, only diet variables remained associated with lower weight in the multivariable model, suggesting that diet and exercise measures were tapping into one underlying factor.

One limitation of this study was its observational design, which prevents conclusions about causal relationships and raises the possibility of unmeasured confounders. Another limitation is that patients' weight was obtained from their medical records, and not at the time of other baseline measures; ideally, these measurements would be obtained on the same day.

In conclusion, our results support the idea that dynamics of patients' relationship with their spouse play a role in their weight management (Di Castelnuovo et al., 2008; Martire et al., 2010). Future research should explore the causal pathways for both partner and actor effects between spouses. Interventions might benefit from targeting spouses' support of patients, as in past interventions, and from targeting patients' support of their spouses' healthy eating.

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