

Differentiation of Self, Perceived Stress, and Symptom Severity Among Patients with Fibromyalgia Syndrome

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Murray, T. L., Daniels, M. H., & Murray, C. E. (2006). Differentiation of self, perceived stress, and symptom severity among patients with Fibromyalgia Syndrome. *Families, Systems, & Health: The Journal of Collaborative Family HealthCare* (An APA journal), 24(2), 147-159.

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Abstract:

This article presents an empirical examination of the usefulness of Bowen family systems theory as a framework for understanding fibromyalgia syndrome. This cross-sectional Internet-based survey included 201 participants diagnosed with fibromyalgia syndrome. Results indicated that more severe symptoms of fibromyalgia syndrome are significantly correlated with higher levels of perceived stress, lower levels of differentiation of self, and higher levels of emotional cutoff. In addition, indicators of differentiation of self (i.e., emotional cutoff and emotional reactivity) were found to moderate the relationship between perceived stress and symptom severity, although these indicators did not account for large proportions of the observed variances in symptom severity. Implications for Bowen family systems theory and clinical practice and recommendations for future research are discussed.

Keywords: Bowen family systems theory, differentiation, fibromyalgia, symptom severity, chronic anxiety

Article:

Fibromyalgia syndrome (FMS) is a rheumatologic disorder characterized by widespread musculoskeletal pain and low pain thresholds at specific sites throughout the body. The musculoskeletal pain is not associated with an inflammatory process. Additional symptoms may include stiffness, fatigue, depression, impaired memory, sleep and balance disturbance, dry mouth, headaches, and/or sore throats (Cymet, 2003). FMS is further complicated by its apparent random onset and sensitivity to emotional and physical stress, anxiety, and depression.

In the United States, 3 to 6 million Americans are diagnosed with FMS (Turk, Okifuji, Sinclair, & Starz, 1996). Most patients range in age from 20–50 when diagnosed (Berne, 2002). Compared to men, women are more susceptible to acquiring FMS by a ratio of between 5:1 and 20:1 (Berne, 2002).

Fibromyalgia syndrome is incurable, so the aim of treatment is symptom management. Researchers have focused much attention on psychological (e.g., Aaron et al., 1997; Bolwijn, van Santen-Hoeufft, Baars, & van der Linden, 1994; Dailey, Bishop, Russell, & Fletcher, 1990), physiological (e.g., Henriksson, 1993; Staud et al., 2003), neurological (e.g., Bonica, 1990; Yunus, 1992), and biochemical/genetic (e.g., Arnold et al., 2004) factors associated with FMS. Despite previous efforts to determine the etiology of FMS, no firm etiological explanation has been discovered. Moreover, one important variable has not been investigated: the combined impact that family relationships and perceived stress have on the development and severity of FMS. The present study addresses this limitation by investigating the influence and interaction of family relationships and perceived stress on FMS. Specifically, the purpose of this study is to determine the usefulness of applying Bowen family systems theory as a framework for understanding the symptoms of FMS.

Bowen family systems theory (BFST), developed by psychiatrist Murray Bowen, contends that “. . .the human family is a multigenerational, natural, living system and that the emotional functioning of each member of the system affects the functioning of the other members in predictable ways” (Comella, Bader, Ball, Wiseman, & Sagar, 1995, p. 5). Based on his observations of his patients and their families, Bowen noticed that a family’s

anxiety shifted from one family member to another. Such observations led him to believe that the emotional unit was not the individual, as previously thought, but the family (Bowen, 1985; Kerr & Bowen, 1988). Bowen also focused on the pathways in which a disease process occurred. He proposed that all psychological, social, behavioral, and chronic physical problems are a product of the emotional forces operating in a family (Kerr & Bowen, 1988; Nichols & Schwartz, 1998).

REVIEW OF THE LITERATURE

This review of the literature describes the major tenets of BFST and research supporting the application of these theoretical assumptions to the study of FMS patients and their families.

Major Tenets of Bowen Family Systems Theory

Bowen family systems theory describes the emotional functioning of a family system. The role of anxiety is a significant factor to an adequate understanding of BFST and its assumptions about disease development. Kerr has written about the role of emotion, particularly the impact of chronic anxiety on physical diseases like cancer and psoriasis (Kerr, 1980, 1981, 1992; Kerr & Bowen, 1988).

Within the context of chronic anxiety, BFST describes eight interlocking concepts: (1) differentiation of self: a concept that contains intrapsychic and interpersonal components that includes “the degree of fusion between emotional and intellectual functioning” (p. 362) as well as one’s ability to remain a self in the face of the pressure to conform to a group (Bowen, 1985); (2) triangles: the building block of any emotional system that is easily observed when “a two-person emotional system is unstable in that it forms itself into a three-person system or triangle under stress” (Bowen, 1985, p. 478); (3) nuclear family emotional process: the process through which symptoms develop in a family; (4) family projection process: anxiety passed within the nuclear family; (5) multigenerational transmission process: a relationship process through which anxiety is passed from one generation to another; (6) sibling position: the influence of birth order on individual functioning; (7) emotional cutoff: reactive physical distance or emotional withdrawal across generations as a means to manage stress (Kerr & Bowen, 1988); and (8) societal emotional process: the emotional processes that occur on a large-scale societal level. Additional important theoretical constructs include emotional reactivity (instinctual, automatic responses to a real or imagined threat) and I-position (an individual’s ability to determine one’s own behaviors, thoughts, and decisions without imposing on the rights of others; Titelman, 1998). Bowen (1985), Kerr and Bowen (1988), and Titelman (1998) provide more comprehensive descriptions of BFST.

Review of Empirical Research

Existing literature on FMS lends support for the use of BFST as an alternative conceptual medium to understand the development and course of FMS. In using BFST to describe the onset and development of FMS, the following two theoretical assumptions are made: (a) FMS is associated with stress, and (b) FMS is associated with family relationship experiences.

No attempt to date has tried to understand the development of FMS through BFST. The purpose of this section is to discuss the FMS literature that supports the above assumptions of BFST. This section includes brief reviews of research on the following topics: (a) patients with FMS and stress and (b) the family relationship patterns of patients with FMS.

FMS and Stress

Bowen family systems theory suggests that people with FMS have levels of differentiation that fall short of what is needed to handle the chronic stress and anxiety in their lives. In other words, those with FMS, or any chronic disease for that matter, have a greater vulnerability to effects of stress. Research by Davis, Zutra, and Reich (2001); Starlanyl and Copeland (1996); and Dailey, Bishop, Russell, and Fletcher (1990) supports these theoretical predictions.

Davis, Zutra, and Reich (2001) studied the vulnerability to negative effects of stress among women with FMS and osteoarthritis (OA) by assessing participants’ affect, pain, and physiological arousal before, during, and

after being presented with an interpersonal stressor. The results indicated that only FMS participants experienced an increase in stress-related pain after exposure to negative mood induction. In addition, the FMS participants also reported less positive affect when they experienced pain during stress, where the OA group had no change. These findings suggest that FMS patients may be particularly vulnerable to the negative effects of stress.

Stress also appears to affect the trigger points (TrPs) that are the hallmark of FMS. TrPs are sore points within the muscle tissue that can occur throughout the body. TrPs, when touched, can send pain to different parts of the body (Starlanyl & Copeland, 1996). Starlanyl and Copeland (1996) found that emotional stress can exacerbate TrPs.

Dailey et al. (1990) analyzed the relationships among stress, social support, and pain in FMS patients ($n = 28$), rheumatoid arthritis (RA) patients ($n = 20$), and pain-free controls ($n = 28$). The FMS group reported higher incidences of daily minor stress than either the RA or the healthy control group. However, the FMS group reported lower incidences of major life stressors. Bowen family systems theory suggests that chronic stress, often associated with daily hassles, has the most profound effect on health compared to acute stress, as in the sudden death of a loved one (Bowen, 1985).

FMS and Family Relationships

People who have strong, healthy families reap benefits that protect them from stress and disease (Hafen, Karren, Frandsen, & Smith, 1996). Conversely, a family marked by high levels of stress (including diffuse boundaries) without adequate coping mechanisms can produce many deleterious health effects (Craddock, 1983). This section examines the nature of family relationships of many people with FMS prior to onset, and including social networks, victimization, and childhood experiences.

Bolwijn, van Santen-Hoeufft, Baars, and Linden (1994) analyzed the personal social networks of FMS ($n = 10$) and RA ($n = 10$) participants. Although each group had similar numbers of people within their social network, the FMS group reported fewer intimate contacts. In fact, the FMS group reported that most of the intimate contact and support came from one or two people, primarily husband and/or the physician. Although this research must be interpreted with caution because of the low number of participants, it supports BFST's assumption that emotional and physical distance/cutoffs are related to symptom development and severity.

Regarding victimization, Van Houdenhove et al. (2001) analyzed the prevalence and characteristics of different forms of victimization among patients with chronic fatigue syndrome (CFS, $n = 54$) and FMS ($n = 41$) compared with control groups of patients with RA ($n = 26$) and multiple sclerosis (MS, $n = 26$). Victimization rates were highest among the FMS/CFS group (64.1%) compared to the RA/MS group (42.3%) and a healthy control group (49.4%) with the latter two not being significantly different. Walker et al. (1997) reported similar findings related to increased experiences of victimization by FMS patients.

Regarding childhood experiences, Erickson (1992) performed an ethnographic study of 20 patients with FMS who attended support groups for FMS and/or CFS in New Mexico and Texas. All participants described their families-of-origin as dysfunctional. Most patients described their parents as either chronically ill, depressed, having chronic muscle pain, or having allergies.

Research Questions

The following two research questions were examined in the current investigation.

1. Are there relationships between perceived stress, level of differentiation, level of emotional cutoff, and symptom severity? If so, what are the strength and direction of these relationships?

Question 1 was answered with a Pearson R correlation analysis.

2. Is the relationship between perceived stress and FMS symptom severity moderated by any of the following variables: differentiation of self, level of emotional cut-off, emotional reactivity, and level of I-position?

Question 2 was answered with a series of four hierarchical multiple regression analyses. Hierarchical linear regression permits the researcher “to force the order of entry of variables into the equation” (Munro, 1993, p. 212) based on a theoretical model. In addition, hierarchical linear regression permits the researcher to find the smallest group of variables that account the greatest amount of variance in the dependent variable (Munro, 1993).

METHODOLOGY

This section describes the participants, instrumentation, and research questions of this study.

Participants

A nonrandomized convenience sample was obtained during a 6-week recruitment period. Only adults (18 years and older) were permitted to complete the survey. Participants were recruited through Internet postings on websites, e-mail list-serves, and electronic bulletin boards that serve individuals with FMS. First, the webmaster or list-serve moderator was contacted. If the webmaster or coordinator agreed to this request, then an invitation was sent to their subscribers. Participants were directed to a survey battery hosted by a web-based survey company. An informed consent letter introduced the scope of the study and gave each participant several options for downloading, completing, and returning the survey. Participants were required to report that they had been diagnosed with FMS by a medical doctor or osteopath in order to access the survey. Respondents were able to complete the survey directly from the Internet or ask for an electronic or regular mail version to be sent to them.

Two hundred and one individuals participated in this survey. The mean age of participants was 47 years ($SD = 10.4$). Of the participants, 84% ($n = 169$) identified themselves as female, 15% ($n = 31$) identified themselves as male, and 0.5% ($n = 1$) was identified as transgender. Ninety-eight percent ($n = 196$) identified themselves as Caucasian, one percent ($n = 2$) as American Indian, one percent ($n = 2$) as Biracial or Multiracial. This sample indicated experiencing symptoms for an average of 15.81 years ($SD = 14.17$).

Instrumentation

Respondents were surveyed using the following instruments: the Differentiation of Self Inventory (DSI-R; Skowron & Friedlander, 1998; Skowron & Schmitt, 2003), the Perceived Stress Scale (PSS; Cohen, Kamarck, & Mermelstein, 1983), and the Fibromyalgia Impact Questionnaire (FIQ; Burckhardt, Clark, & Bennett, 1991). Each of these instruments was selected because of their strong reliability and validity.

Differentiation of Self Inventory-Revised (DSI-R)

This recently revised measure was taken from the assessment Skowron and Schmitt (2003) developed for use in measuring one's level of differentiation. The scale was normed using a sample of 225 adults (79% women and 21% men) with a mean age of 36.21 years. The DSI-R assesses emotional functioning, intimacy, and autonomy in interpersonal relationships. Skowron and Schmitt's (2003) survey provides a full-scale Level of Differentiation (Cronbach's alpha internal consistency reliability coefficient [α] = .92) as well as four subscales consistent with BFST: (1) Emotional Reactivity ($\alpha = .89$), (2) "I" Position ($\alpha = .81$), (3) Emotional Cutoff ($\alpha = .84$), and (4) Fusion with Others ($\alpha = .86$). Three out of four of the DSI-R subscales (Emotional Reactivity, Emotional Cutoff, and Fusion with Others) require reverse scoring in order to indicate greater levels of differentiation. For these three scales, higher scores indicate lower differentiation, while for the I-Position subscale higher scores indicate higher differentiation. Possible scores for each sub-scale ranged from 1 to 6. In the examination of the construct validity of the DSI-R, Skowron found a strong correlation between the DSI total scale score and chronic anxiety using the State-Trait Anxiety Inventory's Trait version (Spielberger, Gorsuch, & Lushene, 1970).

Perceived Stress Scale (PSS)

This survey, developed by Cohen, Kamarck, and Mermelstein (1983), measures one's perception of stress related to his/her daily life. The PSS is based on the rationale that one's perception of stressful life events has a more profound effect on one's health than the actual event itself. The developers normed the instrument using three samples: two co-ed groups of college students ($n = 332$; $n = 114$) and one group of male and female participants ($n = 64$) in a smoking cessation program. The PSS has good internal consistency, with an alpha of .78 to .86. Construct validity has been established for the PSS using other measures of stress (Corcoran & Fischer, 2000). Scores can range from 0 to 40, and higher scores suggest higher levels of perceived stress.

Fibromyalgia Impact Questionnaire (FIQ)

This survey, developed by Burckhardt, Clark, and Bennett (1991) contains 20 items that measure the current health status of patients with FMS in the following domains: physical, psychological, social and global well-being. Seven of the items ask the respondents to rate various symptoms using a 100-mm visual analog scale. Respondents answer questions based on their experiences during the previous seven days, and higher scores indicate greater symptom severity.

The FIQ and the Arthritis Impact Measurement Scales (AIMS; Meenan, Gertman, Mason, & Dunaif, 1982) were correlated for purposes of construct validity to two groups of women with confirmed diagnoses of FMS. In addition, for each item on the FIQ, test-retest reliability correlations ranged from 0.56 to 0.95 over six 1-week intervals (Burckhardt, Clark, & Bennett, 1991).

For the purpose of this study, a subscale consisting of seven items from the FIQ was generated to obtain a symptom severity subscale score. The items pertaining to symptom severity (i.e., job ability, pain, fatigue, morning tiredness, stiffness, anxious, and depression) yielded an overall Chronbach's alpha coefficient of .792, suggesting considerable internal consistency, thus justifying the use of this subscale score as an indication of symptom severity.

RESULTS

The first research question, which examined the relationships between perceived stress, level of differentiation, level of emotional cutoff, and symptom severity, was answered using a bivariate correlation analysis (Pearson r). Table 1 presents the results of this analysis and includes correlations between symptom severity, perceived stress, DSI-R total score, and the DSI-R subscale scores.

As presented in Table 1, significant correlations were found between all of the variables. This included significant correlations between perceived stress and symptom severity ($r = .52$, $p < 0.001$, two-tailed), level of differentiation and symptom severity ($r = -.38$, $p < 0.001$, two-tailed), and level of emotional cutoff and symptom severity ($r = -.37$, $p < 0.001$, two-tailed). Therefore, as perceived stress increased, so did one's level of symptom severity. In addition, as levels of differentiation of self increased and level of emotional cutoff (which is reverse-scored) decreased, symptom severity decreased.

The second research question examined whether the relationship between perceived stress and FMS symptom severity is moderated by any of the following variables: differentiation of self, level of emotional cutoff, emotional reactivity, and level of I-position. The first research question established a significant positive correlation ($r = .52$, $p < .001$) between perceived stress and FMS symptom severity. A series of four hierarchical multiple regression analyses was used to examine whether the DSI-R total scale score or any of the subscale scores moderated this relationship. We began by analyzing the amount of variance in FMS symptom severity which was accounted for by DSI total score (14%) and PSS scores (27%).

The first hierarchical multiple regression examined whether level of differentiation of self (DSI) affects the direction and/or strength of the relationship between perceived stress (PSS) and FMS symptoms. The results of the hierarchical multiple regression predicting FMS scores are found Table 2. In the first step of the regression, PSS was entered and accounted for 27% of the variance. In the second step, DSI was added and did not

contribute significantly to the explained variance. The optimal solution was observed in the final step where the PSS X DSI interaction was added to the previous two steps. This final procedure contributed an additional 1% of the variance associated with FMS.

Table 1
Summary of Results of the Pearson Correlation of the IVs and DV

Variable	Symptom severity	Perceived stress	DSI-R total score	Emotional reactivity	I-position
Perceived stress	.52**				
DSI-R total score	-.38**	-.67**			
Emotional reactivity	-.34**	-.67**	.91**		
I-position	-.23**	-.51**	.77**	.61**	
Emotional cutoff	-.37**	-.51**	.81**	.67**	.44**

Note. IV = Independent Variables; DV = Dependent Variable; DSI-R = Differentiation of Self-Inventory.

** Correlation is significant at the .01 level (two-tailed).

Table 2
Three-Step Hierarchical Regression of Fibromyalgia Syndrome (FMS) on Perceived Stress (PSS), Differentiation of Self (DSI), and the Interaction of DSI and PSS Score

Steps	R ²	R ² Δ	FΔ	β
Step 1 PSS	.27		74.886**	.52**
Step 2 PSS DSI	.27	.001	.314	.49** -.05
Step 3 DSI PSS DSI × PSS	.28	.019	5.237*	.393 1.059** -.446*

* $p < .05$. ** $p < .01$.

Table 3
Three-Step Hierarchical Regression of Fibromyalgia on Emotional Cutoff (EC), Perceived Stress (PSS), and the Interaction of EC and PSS Scores

Steps	R ²	R ² Δ	F Δ	β
Step 1 PSS	.27		74.886**	.523**
Step 2 PSS EC	.28	.015	4.035**	.452** -.140**
Step 3 EC PSS EC × PSS	.29	.015	4.236**	.304 .928** -.474**

* $p < .05$. ** $p < .01$.

The final equation in this hierarchical multiple regression to predict FMS symptoms included PSS, differentiation of self score, and their interaction ($R = .54$, $R^2 = .283$). The analysis of variance (ANOVA) results, $F(3, 197) = 27.26$, $p < .0001$, indicate there is a good fit for the model. The model is significant in predicting FMS symptom severity and accounts for 28% of the variance. Although the model was significant, examination of the beta values indicate that the strength of PSS may be so great that DSI did not prove to be a statistically significant predictor of FMS severity. Thus, PSS and the interaction scores were the significant predictors in the final equation. Although the PSS and DSI interaction scores did have significant effects on the relationship between PSS and FMS, the magnitude of the effects appears to be small.

The second hierarchical multiple regression examined whether level of emotional cutoff (EC) affects the direction and/or strength of the relationship between perceived stress and FMS symptoms. The results of the hierarchical multiple regression predicting FMS scores are found in Table 3. In the first step of the regression, PSS was entered and accounted for 27% of the variance. In the second step, EC was added and did not contribute significantly to the explained variance. The optimal solution was observed in the final step where the PSS × ER interaction was added to the previous two steps. This final procedure contributed an additional 2% of the variance associated with FMS.

The final equation in this hierarchical multiple regression to predict FMS symptoms included PSS, ER, and their interaction ($R = .55$, $R^2 = .292$). The ANOVA results, $F(3, 197) = 28.54$, $p < .0001$, indicate there is a good fit for the model. The model is significant in predicting FMS symptom severity and accounts for 29% of the variance. Although the model was significant, examination of the beta values indicate that the strength of PSS may be so great that EC did not prove to be a significant predictor of FMS severity. Thus, PSS and the interaction scores were the significant predictors in the final equation. Although the PSS and EC interaction

scores had significant effects on the relationship between PSS and FMS, the magnitude of the effects appears to be small.

The third hierarchical multiple regression examined whether emotional reactivity (ER) affects the direction and/or strength of the relationship between perceived stress and FMS symptoms. The results of the regression predicting FMS scores are found Table 4. In the first step of the regression, PSS was entered and accounted for 27% of the variance. In the second step, ER was added and did not contribute significantly to the explained variance. The optimal solution was observed in the final step where PSS × ER interaction was added to the previous two steps. This final procedure contributed an additional 2% of the variance associated with FMS.

Table 4
Three-Step Hierarchical Regression of Fibromyalgia on Emotional Reactivity (ER), Perceived Stress (PSS), and the Interaction of ER and PSS Scores

	R^2	$R^2 \Delta$	$F \Delta$	β
Step 1	.27		74.886	
PSS				.523**
Step 2	.266	.000	.034	
PSS				.533**
ER				.015
Step 3	.287	.024	6.708**	
ER				.500**
PSS				.972**
ER × PSS				-.407**

** $p < .01$.

Table 5
Three-Step Hierarchical Regression of Fibromyalgia on I-position (IP), Perceived Stress (PSS), and the Interaction of IP and PSS Scores

Predictor	R^2	$R^2 \Delta$	$F \Delta$	β
Step 1	.270		74.886**	
PSS				.523**
Step 2	.268	.002	.551	
PSS				.550**
IP				.052
Step 3	.269	.004	1.208	
IP				.248
PSS				.804**
IP × PSS				-.237

** $p < .01$.

The final equation in this hierarchical multiple regression to predict FMS symptom severity included PSS, ER, and their interaction ($R = .545$, $R^2 = .287$). The ANOVA, $F(3, 197) = 27.81$, $p < .0005$, indicate there is a good fit for the model. The model is significant in predicting FMS symptoms severity and accounts for 29% of the variance. Unlike DSI and EC, an examination of the beta values indicates that ER remained significant in the final model. In other words, ER, PSS, and their interaction significantly predict FMS symptom severity. Although the model and the related beta values were statistically significant, ER does not appear to account for a large proportion of the observed variance.

The fourth hierarchical multiple regression examined whether level of I-position (IP) affects the direction and/or strength of the relationship between perceived stress and FMS symptoms. The results of the hierarchical regression predicting FMS scores are found Table 5. In the first step of the regression, PSS was entered and accounted for 27% of the variance. In the second step, IP was added and did not contribute significantly to the explained variance. The optimal solution was observed in the final step where the PSS × IP interaction was added to the previous two steps. This final procedure did not contribute any significant proportion of the variance.

The final equation in this hierarchical multiple regression to predict symptom severity included PSS, IP, and their interaction ($R = .529$, $R^2 = .27$). The ANOVA, $F(3, 197) = 25.52$, $p < .0001$, indicate there is a good fit for the model. The model is significant in predicting FMS symptom severity and accounts for 27% of the variance. Although the model was significant, examination of the beta values indicates that the strength of the PSS may be so great that IP and the interaction do not prove to be significant predictors of FMS severity. Although the PSS and IP interaction scores did have significant effects on the relationship between PSS and FMS, the magnitude of the effects appear to clinically insignificant for this Bowen theory construct.

DISCUSSION

This section reviews the major findings, limitations, and implications of this study. Recommendations for future research are also presented.

Major Findings

Several authors have examined the role of stress/anxiety and differentiation on symptomatology (Bartle-Haring & Gregory, 2003; Klever, 2005; Murdock & Gore, 2004; Ora, 2002), but this study is the first to examine the usefulness of Bowen theory's application to fibromyalgia. The results of this study indicated a significant positive relationship between participants' perceived stress levels and FMS symptoms severity, a significant negative relationship between level of differentiation and FMS symptom severity, and a significant positive relationship between emotional cutoff scores and FMS symptom severity. Thus, the following conclusions can be made: (a) participants who demonstrated higher levels of perceived stress also demonstrated higher levels of symptom severity; (b) those participants who reported higher levels of differentiation of self experienced less in-tense symptoms associated with FMS; and (c) participants who reported greater amounts of emotional cutoff experienced more severe FMS symptoms.

A series of four hierarchical multiple regression analyses was completed to analyze whether any of the indicators of differentiation of self moderate the relationship between perceived stress and FMS symptom severity. The results of these analyses revealed that each of these variables weakly moderated the relationship between perceived stress and the severity of FMS symptoms, but that none of these variables contributed a large proportion of variance in symptom severity.

An important consideration that may account for the small addition to the accounted variance for the regression analyses is that the perceived stress construct may measure an important aspect of Bowen theory. Specifically, Bowen theory suggests that the interaction of chronic anxiety and differentiation level would account for the greatest amount of variance associated with symptoms (Kerr & Bowen, 1988). Sapolsky (1998) provided evidence that humans misperceive much of their stress and react physiologically to nonlife threatening stimuli as if they were life threatening, which ultimately can affect health. This misperception results in increased levels of chronic anxiety. The Perceived Stress Scale measures the degree to which situations in one's life are appraised as being stressful. From this perspective, the PSS is a cognitive appraisal grounded in emotional, reactive functioning, rather than solely in intellectual functioning. The BFST concept of chronic anxiety parallels precisely the pattern that Sapolsky identified and is measured by the PSS. We suspect that participants' responses to levels of perceived stress were tapping into the BFST concept of chronic anxiety, thus providing an explanation for the ability of participants' perceived stress levels to significantly predict FMS severity.

Those with higher levels of differentiation will not misperceive daily hassles or major life events as stressful (Kerr & Bowen, 1988). Therefore, the finding that perceived stress would account for the greatest amount of variance is consistent with theory. This finding is supported by the work of Murdock and Gore (2004) who also found that perceived stress levels also accounted for the greatest amount of variance on symptom severity of emotional distress.

Limitations

This study represents exploratory research examining how differentiation of self impacts FMS symptom severity. Therefore, the purpose of this research was to provide a beginning point for future research in theory building and intervention. There are three limitations to consider when interpreting the results, including (a) generalizability, (b) limitations of the Internet-based research design, and (c) instrumentation.

The most fundamental limitation of this study is its generalizability. Given the cross-sectional nature of the study, inferences about causality among the variables cannot be made. Participants were limited to those who actively engaged in or other-wise visited FMS-related websites and/or list-serves; thus, this research uses a convenience sample. The sample included primarily Caucasian individuals, so caution should be used in generalizing the findings to individuals of other ethnic backgrounds.

The method of Internet-based survey research involved four other potential disadvantages. First, surveys were not delivered directly to participants, and survey responses could have been contaminated by participants who may have commented about the research positively or negatively on the involved list-serves. Second, we were

unable to count either the number of list-serve moderators who participated in the survey or the number of people the survey invitation reached. Because participants could view a link on a number of FMS-related websites, there was no method to ascertain the maximum number of possible participants who viewed the websites and decided not to participate. In addition, there was no method to collect the total number of people who subscribed to the list-serves where moderators accepted our invitation to participate. This limitation makes it impossible to determine a response rate. The third disadvantage of using Internet-based research was the inability to verify that the participants had been diagnosed with FMS by a physician. Fourth, it was impossible to verify that the data were provided by the person who has the diagnosis of FMS.

The instrumentation used also presents a potential limitation of this study. This study relied heavily on retrospective self-report data. Also, Bowen never intended for his differentiation of self scale to be a paper-pencil inventory (Kerr & Bowen, 1988). In fact, he clearly stated that his scale was hypothetical (Bowen, 1985). It is the contention of Kerr (1981) and others that in order to obtain one's true level of differentiation one must accumulate a large amount of historical information, which would necessitate lengthy personal interviews. Such interviews with FMS patients and their nuclear and family-of-origin would provide more accurate details about the family systemic emotional processes.

Implications for Theory and Practice

This section discusses several implications of this study for Bowen theory and for the clinical practice of medical family therapists who work with FMS patients and their families.

Implications for Bowen Family Systems Theory

Bowen theory assumes that symptom category (e.g., cancer, psychopathology, dermatitis, juvenile delinquency) is unimportant (Kerr & Bowen, 1988). The theory implies that all of the assumptions apply to all symptom formation regardless of its manifestation. However, very little research has been done to test these assumptions. Murray Bowen was noted to have said that one cannot chi square a feeling; thus, research testing his hypotheses was less important than developing further his theory (Wylie, 1991). However, testable assumptions are embedded within BFST.

The findings of this study support several assumptions of BFST. First, perceived stress was correlated with symptom severity. Second, those participants who reported greater level of symptom severity also reported lower levels of differentiation of self and higher levels of emotional cutoff. Third, this study provides marginal support for the assumption that the relationship between perceived stress and symptom severity is moderated by one's level of differentiation. Although significant interactions existed between the indicators of differentiation and perceived stress and corresponding symptom severity, the indicators of differentiation did not account for as much of the variance in symptom severity as did perceived stress. However, because of the methodological limitations of this study, more research is needed to further examine these findings.

Implications for Clinical Practice

The findings of this investigation may inform the clinical practice of medical family therapists and others who treat patients with medical problems and their families. By using instruments such as the Differentiation of Self Inventory-Revised, clinicians can identify potentially problematic aspects of family emotional functioning (e.g., fusion, emotional reactivity, and emotional cutoff) that may be linked to symptoms. For instance, in this investigation, emotional cutoff and perceived stress accounted for the greatest amount of variance associated with FMS. Clinicians can help clients manage stress and develop healthier relationships with their families-of-origin and nuclear family. However, it is recommended that instruments such as the DSI-R should only be used as one part of a complete assessment of family functioning vis-à-vis Bowen theory, which may include family histories, family map (genogram) construction, and timelines. In the end, the clinician must still rely on his or her professional training and intuition to provide the best care to the client.

We encourage clinicians to adopt a systems view of health and disease as described by Cassel (1976), Bowen (1985), and Brody and Sobel (1979). That is, clinicians consider that health and disease do not occur in isolation but are influenced by multiple factors that include the quality of family relationships.

Recommendations for Future Research

This study investigated the heuristic value of several assumptions of BFST for understanding FMS. The findings of this study contribute to a foundation for the development of a family-based treatment program for those with FMS. This study provides groundwork for additional research to develop pilot intervention protocols and eventual efficacy trials and community effectiveness research (Micklowitz & Hooley, 1998).

Several research questions arise based on the findings of this study, including the following: (a) Does family therapy or individual systems-based therapy improve differentiation? If so, does an increase in differentiation lead to a decrease in symptoms; (b) Does an increase in the patient's level of differentiation result in changes in individual and family system functioning?; and (c) Is there a significant decrease in medical utilization as a result of increases in levels of differentiation?

Future research may use a mixed-method research design combining quantitative and qualitative approaches such as interviews in order to develop more sophisticated self-report instrument to measure Bowen's constructs. For example, future research may use multiple Bowen-oriented instruments in a mixed-method study that also includes serial in-depth interviews to assess Bowen constructs. This approach may produce a better understanding of the nuances that occur within families. Moreover, given that a family can manifest cutoff, conflict, and triangling in many different ways, a qualitative approach may allow for more diversity through a range of open-ended questions, which would be impossible to capture using only empirical methods. Finally, Bowen theory suggests that people examine two to five preceding generations in order to appreciate fully the complexity of a family system and to understand the unique ways in which a family manages anxiety. Therefore, future re-search should interview multiple persons within the nuclear family and preceding generations.

CONCLUSION

Medical family therapists, physicians, and other health professionals who work closely with families with fibromyalgia, or any chronic disease, can be more effective when they consider the complex interactions between the patient and his or her environment. Murray Bowen believed that the emotional unit was the family system, not the individual. By viewing the family as a natural organism, trying to survive and adapt to the environment in the best way it can, the practitioner can better understand and respond to the complex systemic forces that contribute to or protect one from developing a chronic disease. Future mixed-method research may identify more effective methods of assessing and applying Bowen theory constructs to help improve the functioning and decrease the suffering of patients with fibromyalgia.

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