Stress and family relationship functioning as indicators of the severity of fibromyalgia symptoms: a regression analysis

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Abstract:

This article presents the results of a secondary analysis of data collected from a cross-sectional survey of 201 individuals with fibromyalgia syndrome (FMS). This study examines the influence of stress and family relationship functioning (differentiation of self) on symptoms severity among FMS patients. The primary analysis of the data (published elsewhere) revealed that perceived levels of stress were correlated with symptom severity, and that other variables related to family functioning moderated this relationship to a small degree. In the secondary analysis presented here, additional relationships among perceived stress, stressful life events, family relationship functioning, age of FMS onset, and symptom severity were examined. The results indicated that participants' levels of symptom severity could be predicted by their level of differentiation and appraisal of stressful life events occurring within a year prior to the age of onset. Consistent with the findings of the primary analyses, the level of perceived stress was the predictor variable that accounted for the greatest amount of variance associated with FMS symptoms. Limitations of the study and recommendations for future research are presented.

Keywords: fibromyalgia syndrome | Bowen family systems theory | differentiation | stress

Article:

Introduction

Fibromyalgia syndrome (FMS) is a painful rheumatologic condition. Although researchers have examined genetic predisposition (Arnold et al., 2004; Buskila, Neumann, Hazanov, & Carmi, 1996) and psychosocial factors such as prior victimization (Van Houdenhove et al., 2001;

Walker et al., 1997) as precursors to FMS, neither a cause nor a cure for the disorder has been discovered (American College of Rheumatology, 2004).

Theoretical framework and review of the literature

BFST reflects the multicausal view of disease and describes development of emotional and physical diseases. This section presents a brief overview of BFST and its conceptualization of the development of symptoms. For more complete descriptions of BFST, see Bowen (1985), Kerr and Bowen (1988), and Titelman (1998).

BFST views families as emotional systems. Systemic anxiety affects the development of physical and psychological symptoms (Kerr, 1980, 1981, 1992; Kerr & Bowen, 1988). One's response to systemic anxiety is influenced by his or her level of differentiation of self. Differentiation of self—the core concept in BFST—is a product of emotional processes within one's family of origin. Bowen defines one's level of differentiation as one's degree of adaptability to stress. Higher differentiation is manifested as an ability to think clearly even when experiencing intense emotions. In addition, individuals with high levels of differentiation tend to function well across areas of life.

Murdock and Gore (2004) investigated the influence of differentiation on coping skills and responses to stress using a sample of 119 university students. Their findings indicated that higher levels of differentiation were associated with lower levels of psychological symptoms and perceived stress. They also found that those with higher levels of differentiation exhibited reflective coping (e.g. identifying the cause of emotions to solve problems) while those with lower levels of differentiation exhibited suppressive (e.g. avoidance) and reactive (e.g. impulsive decisions) coping. Murdock and Gore wrote, '. . . poorly differentiated people experiencing high stress reported significantly greater levels of psychological dysfunction than did well-differentiated people who experience similar levels of stress' (2004, p. 332).

Bowen proposed that one's level of differentiation contributes to the level of vulnerability to symptoms (Kerr & Bowen, 1988). Anxiety-binding mechanisms (i.e. relational processes in which families displace anxiety to one member) determine who in the family develops symptoms. These anxiety-binding mechanisms include emotional cut-off, emotional conflict, triangling, and the existence of a compromised spouse (Kerr, 1981).

Emotional cut-off 'is a distant posture carried to the extreme—a nonfunctioning relationship' (Gilbert, 1992, p. 61). An example of emotional cut-off is two estranged brothers who fought years earlier about an event that has since been forgotten and continue to remain estranged. Triangling occurs when the parents' anxiety is focused on one or more of the children. An illustration of triangling is when a conflict between spouses diminishes when their child develops depression. In the compromised spouse mechanism, one spouse sacrifices repeatedly on important issues. BFST assumes that those who are least differentiated within a family are more vulnerable to symptoms.

Numerous research studies validate the link between stress and anxiety and symptom development (e.g. Bartle-Haring, Rosen, & Stith, 2002; Biondi & Zannino, 1997; Bryla, 1996;

Herrmann, Scholmerich, & Straub, 2000). Additional researchers have demonstrated the connections between stress (Aaron et al., 1997; Davis, Zuatra, & Reich, 2001; Starlanyl & Copeland, 1996) and impaired family relationships (Bolwijn, van Santen-Hoeufft, Baars, & van der Linden, 1994; Erickson, 1992; Van Houdenhove et al., 2001; Walker et al., 1997) among FMS patients. These findings support the application of BFST to FMS, specifically the influence of stress and family relationship functioning as indicators of symptoms severity.

This article presents the secondary analysis of data collected as part of a cross-sectional survey of 201 FMS patients. The primary analysis was presented elsewhere (Murray, Daniels, & Murray, 2006), and it examined the nature of the relationships between perceived stress, differentiation of self, and FMS symptom severity. The findings revealed that higher levels of FMS symptom severity were correlated to a statistically significant level with higher levels of perceived stress and with lower levels of differentiation of self. The findings also revealed that differentiation of self moderated the relationship between perceived stress and symptom severity, although differentiation of self only accounted for a small proportion of the observed variance in symptom severity. The secondary analysis described in this article goes beyond the primary analysis to also include an examination of the impact of age of symptom onset and stressful life events (occurring within 1 year prior to the onset of symptoms) on FMS symptom severity.

Methodology

This study used a cross-sectional Internet-based survey of adults diagnosed with FMS using a non-randomized convenience sample. During a 4-weekperiod, Internet postings were used to recruit participants through websites, e-mail listserves, and electronic bulletin boards related to FMS. The survey allowed participants to download and complete the survey on-line. Participants verified their diagnosis of FMS as part of the survey. Additional details about the methodology used to collect the data can be found in Murray et al. (2006).

This study address two research questions: (1)Can symptom severity be predicted by level of differentiation, age of onset, and stressful events that occurred within a year prior to age of onset?; and(2) Which predictor variable accounts for the greatest amount of variance associated with FMS symptoms?

Question (1) was answered with a multiple linear regression. Age of onset was included in this analysis, based on previous findings (Burckhardt, Clark, & Bennett, 2001; Cronan, Serber, Walen, & Jaffe, 2002) that younger patients experience more severe FMS symptoms. Question (2) was answered with a stepwise multiple regression. A stepwise multiple regression allows all the independent variables to be entered in sequence and to assess their values and to assess how much variance in the dependent variable for which they account. Only values contributing to the model were retained in order to identify the smallest possible set of predictor variables.

Survey respondents completed the Differentiation of Self Inventory (DSI: Skowron & Friedlander, 1998; Skowron & Schmitt, 2003), the Perceived Stress Scale (PSS: Cohen, Kamarck, & Mermelstein, 1983), the Fibromyalgia Impact Questionnaire (FIQ: Burckhardt, Clark, & Bennett, 1991), the Life Experiences Scale (LES: Sarason, Johnson, & Siegal, 1978), and a demographic questionnaire.

Differentiation of self inventory-revised (DSI-R)

Skowron and Schmitt's (2003) survey assesses various components of Bowen theory. The following describes the psychometric properties and defines the individual constructs. The level of differentiation describes 'the lifelong process of striving to keep one's being in balance through the reciprocal external and internal processes of self-definition and self-regulation' (Friedman, 1991, p. 140). In addition, differentiation includes the following processes: (1) balancing emotional and intellectual functioning and (2) balancing the natural force of togetherness and separateness/autonomy (Skowron & Friedlander, 1998). The DSI provides for a full-scale Level of Differentiation score [Cronbach's alpha internal consistency reliability coefficient (α) = 0.92]. The DSI contains four subscales described as:

- Emotional reactivity (ER; α=0.89) is the instinctual response to the demands that life has on an organism to survive and adapt. Emotional reactivity also references the automatic response/reaction to a real or imagined threat.

- 'I' Position (IP; α=0.81) is the counterbalancing element to togetherness, or fusion. 'I-position defines principle and action in terms of, "This is what I think, or believe" and, "This is what I will do or not do", 8 without impinging one's own values or beliefs on others' (Titelman, 1998, p. 46).

- Emotional Cut-off (EC; α=0.84) is a process that describes one way a system 'manage[s] the undifferentiation (and emotional intensity [i.e. anxiety] associated with it) that exists between the generations' (Kerr & Bowen, 1988, p. 271). The occurrence of an emotional cutoff increases as the level of fusion increases within a system. Emotional cutoff, which is an example of emotional reactivity, can be characterized as physical distance and/or emotional withdraw. All families have some degree of unresolved emotional attachment, which can be managed through emotional cutoffs. An important element of family therapy is to reduce emotional cutoffs from the past (Kerr & Bowen, 1988).

- Fusion with Others (FO; α=0.86) is characterized by one's place on a continuum (intensely fused to highly differentiated) that denotes one's degree of unresolved emotional attachment from one's family-of-origin and level of emotional reactivity to anxiety, which is developed before an individual leaves one's family-of-origin. In addition, those who are highly fused remain fixed emotionally in their respective roles they played in their families-of-origin. They have few firmly held beliefs and will abandon those beliefs under pressure. Finally, highly fused individuals will seek the approval of others at the expense of other goals (Nichols & Schwartz, 1998; Skowron & Friedlander, 1998). Emotional fusion, or emotional attachment, is a normal and necessary component of human infant survival. However, as children grow, they benefit from increasing levels of emotional autonomy, or separateness.

Three subscales are reverse scored (ER, EC, and FO).

Perceived stress scale (PSS)

Cohen, Kamarck, and Mermelstein (1983) developed this scale to measures one's perception of stress related to his/her daily life. The PSS demonstrated good internal consistency (α=0.78–0.86).

Fibromyalgia Impact Questionnaire (FIQ)

This survey (Burckhardt et al., 1991) contains 20 items measuring the current (within the previous 7 days) health status of FMS patients. Seven items involve rating various symptoms using a 100 mm visual analog scale. For this study, a subscale of these seven items was generated to obtain a symptom severity score. These items measuring symptom severity (i.e. job ability, pain, fatigue, morning tiredness, stiffness, anxious, and depression) yielded an overall Chronbach's alpha coefficient of 0.792

Life Experiences Scale (LES)

The LES (Sarason et al. 1978) contains 57 items allowing respondents to select positive and negative life events and report the impact of these events. The LES demonstrates reliability coefficients ranging from 0.56 to 0.88 (Sarason et al. 1978). Dailey, Bishop, Russell, and Fletcher (1990) established support for using the LES among FMS patients.

Results

Description of sample

The sample included 201 participants. Participants' mean age was 47 years (standard deviation, SD = 10.4). The sample consisted of 169 (84 per cent) females, 31 males (15 per cent), and one (0.5 per cent) transgendered individual. Participants' ethnic backgrounds included Caucasian (n = 196, 98 per cent), American Indian (n = 2, 1 per cent), and bi-racial or multi-racial (n = 2, 1 per cent). Age of onset of FMS symptoms ranged from birth to 62 years (mean = 31, SD = 13.55).

Research question (1)

This question examined whether symptom severity could be predicted by level of differentiation, age-of-onset, and stressful events that occurred within a year prior to age-of-onset. The simultaneous multiple regression method tested the following formula: $SS \neq B + DSI + age$ at onset + negative LES + e. The variables entering the model as predictors were level of differentiation and stressful life events (R = 0.44, adjusted $R^2 = 0.192$). The analysis of variance (ANOVA) results ($F_{3,197} = 16.80$, $p < 0.0001$) indicate a good fit for the model. The results of the analysis are found in Table I. The model significantly predicts the dependent variable of symptom severity of FMS and accounts for 19 per cent of the variance. Age-of-onset was not a statistically significant predictor of FMS symptom severity.

Table I. Multiple linear regression of FMS on differentiation (DSI), age at onset, and negative stressful life events (LES).

	R^2	ΔR^2	ΔF	β
Step 1	0.192	0.204	16.802**	
DSI				−0.278**
NEG_LES				0.270**
Age at onset				−0.045

Note: DSI, Differentiation of Self Inventory; NEG_LES, negative life events.
** $p < 0.01$.

Table II. Stepwise regression model summary for FMS symptom severity.

	R^2	ΔR^2	ΔF	β
Model (1)	0.27		74.886**	
PSS				0.52**
Model (2)	0.298	0.032	9.083**	
PSS				0.447**
NEG_LES				0.194**

Note: PSS, Perceived Stress Scale; NEG_LES, negative life events.
** $p < 0.01$.

Research question (2)

The second question examined which predictor variables account for the greatest amount of variance in FMS symptoms. Stepwise multiple regression was used to analyze this question using the following formula: $SS \neq PSS + neg\_LES + EC + ER + IP + \text{age at onset} + e$. The regression indicated two significant predictor models. The first variable entering the first model was PSS ($R = 0.52$, $R2 = 0.27$). The ANOVA results ($F_{1,199} = 74.886$, $p < 0.0001$) indicate a good fit for the model. The model is significant in predicting FMS symptom severity and accounts for 27 per cent of the variance.

In the second model, negative life events was included along with PSS ($R = 0.55$, $R^2 = 0.30$). The ANOVA results ($F_{2,198} = 43.505$, $p < 0.0001$) indicate a good fit for this model. The model is significant in predicting FMS symptom severity and accounts for 30 per cent of the variance; an increase of 3 per cent over the first model. The results of the regression predicting FMS symptom severity are found in Table II.

Discussion

There were two major findings of this study. First, participants' levels of symptom severity could be predicted by their level of differentiation and appraisal of stressful life events occurring within a year prior to the age of onset. Second, consistent with the findings of the primary analysis, the level of perceived stress was the predictor variable that accounted for the greatest amount of variance associated with FMS symptoms.

A discussion of the theory will explicate these findings. Level of differentiation describes one's ability to adapt to stress (Kerr & Bowen, 1988). Individuals with greater levels of differentiation have greater capacity to use intellectual functioning during stress. Bowen theory assumes that those with lower levels of differentiation will appraise life events more subjectively and negatively impacted negatively by this appraisal. Consistent with Bowen's theory, the level of differentiation influences symptom severity, or the converse, that symptom severity impacts appraisal of events and/or estimate of differentiation.

Limitations and recommendations for future research

The first limitation of this study is found in the sample used. This sample was non-randomized and was composed of volunteers recruited via the Internet. Furthermore, the sample consisted of primarily Caucasian individuals. The findings should be considered preliminary, and future research should examine the links among stress, family relationships, and FMS symptoms with other populations.

A second limitation is its reliance on self-report instruments. Future research should include other forms of assessment, including observation, physiological measures, and qualitative methods.

Third, this study was cross-sectional, so causal attributions cannot be made. Additional research should examine these variables through longitudinal measures.

Finally, this study was limited in terms of the number of variables to be studied. Using a theoretical framework of BFST, this study examined the role of stress and family relationship functioning as indicators of symptom severity among FMS patients. Many other variables influence the development of FMS symptoms, and these influences should be considered in future research.

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