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Gratitude Mediates Quality of Life Differences Between Fibromyalgia Patients and Healthy Controls

Abstract

Purpose: Despite a growing literature on the benefits of gratitude for adjustment to chronic illness, little is known about gratitude in medical populations compared to healthy populations, or the degree to which potential deficits in gratitude might impact quality of life. The purpose of the present study was to: 1) examine levels of gratitude and quality of life in fibromyalgia patients and healthy controls, and 2) consider the role of gratitude in explaining quality of life differences between fibromyalgia patients and healthy controls.

Methods: Participants were 173 fibromyalgia patients and 81 healthy controls. All participants completed measures of gratitude, quality of life, and socio-demographics.

Results: Although gratitude was positively associated with quality of life, levels of gratitude and quality of life were lower in the fibromyalgia sample relative to the healthy controls. This difference in gratitude partially mediated differences in quality of life between the two groups after controlling for sociodemographic variables.

Conclusions: Our findings suggest that gratitude is a valuable positive psychological trait for quality of life in people with fibromyalgia. Interventions to improve gratitude in this patient population may also bring enhancement in quality of life.

Keywords: Gratitude; fibromyalgia; quality of life; adjustment; chronic illness

Introduction

Characterized by muscle pain, fatigue, and tender points [1], fibromyalgia is a chronic pain syndrome that can significantly compromise daily functioning and quality of life [2,3]. Sleeping difficulties and cognitive problems, including memory issues (i.e., “fibro fog”), are common in up to 70% of patients [4]. These factors can exacerbate pain and problems with daily functioning [5], key components of health-related quality of life in fibromyalgia syndrome (FMS). Together, the cognitive and physical symptoms of FMS can detrimentally impact psychological and physical well-being [6]. The toll on mental health is evidenced by the high rates of anxiety and depression in people with FMS compared to the general population [7,8], which in turn can further compromise quality of life [9].

From the lens of positive clinical psychology [10], certain qualities and traits can provide resilience to the challenges of living with chronic conditions such as FMS, and thus ameliorate the impact of FMS on quality of life. For example, positive affect has been identified as an asset for managing fibromyalgia [11], and trait hope, which is characterized by high levels of positive affect, is linked to lower levels of fatigue among fibromyalgia patients [12]. A growing evidence base indicates that gratitude, an orientation towards noticing and appreciating the positive in life [13], may be particularly beneficial for improving quality of life in clinical populations, including those with chronic health conditions. As a trait construct, gratitude is associated with lower levels of depression in those with heart failure and breast cancer [14,15], and longitudinally predicts lower depression in individuals with inflammatory bowel disease and arthritis [16]. Gratitude is also associated with enhanced quality of life in arthritis, chronic obstructive pulmonary disease, and diabetes [17], and better self-rated health, in people with inflammatory bowel disease and arthritis [16]. Yet to date, gratitude has not been specifically examined with respect to quality of life in FMS.

There are several reasons to expect that gratitude may be linked to better health-related quality of life in FMS. In healthy populations, gratitude is associated with better sleep quality via better pre-sleep cognitions [18], and lower depression both cross-sectionally [19], and longitudinally [20,13]. Gratitude is also associated with well-being in non-clinical populations after controlling for other known predictors such as socio-demographic factors and higher-order personality traits [21], and is linked to adaptive coping [22].

Despite the value of gratitude for enhancing well-being, little is known about the relative levels of gratitude among those living with a chronic health condition compared to healthy populations, or the degree to which deficits in gratitude might impact well-being for those with FMS. Ostensibly, living with FMS can make focusing on and appreciating the positive more difficult, as FMS can have a widespread negative impact on personal relationships, career, and mental health [3], in addition to impeding daily functioning [2]. Among the eight diverse facets of gratitude identified by Wood and colleagues (2010), appreciation of one's social relationships and the support they provide, and positive social comparisons, are two key social dimensions of gratitude that may be difficult for people with FMS to experience. Both quality and quantity of social support are important for improving disease self-management and quality of life in people with FMS [23], yet social support is often lacking for individuals with FMS [3]. To the extent that social networks do not include peers with FMS or other chronic illnesses, opportunities for positive social comparisons may be scarcer for individuals with FMS than for those not living with this chronic condition, and may limit their capacity to make growth-oriented upward social comparisons or symptom minimising downward social comparisons [24]. Importantly, for gratitude to be considered a more enduring life-orientation or trait, each of the eight facets of gratitude would need to be experienced frequently, intensely, and easily [25,19]. Given this, and the impact of FMS on

daily and social functioning, it may be difficult for people with FMS to have a sustained grateful approach to life when managing the challenges of their condition.

The Present Study

In the current study we addressed an important and understudied question regarding the role of gratitude in adjustment to chronic illness, namely the extent to which gratitude might be a limited, but nonetheless valuable, positive psychological trait for health-related quality of life in people with FMS. To test this we examined the levels of trait gratitude in people with FMS relative to a healthy control group, and further tested the associations of gratitude to a composite measure of health-related quality of life in both samples. Because current evidence indicates that gratitude is a core resiliency factor for both healthy and chronically ill populations, we expected that gratitude would be linked to improved mental health and quality of life in both the FMS and the control samples. However, given the challenges of living with FMS, we also hypothesized that individuals with FMS would report lower overall quality of life and lower levels of trait gratitude compared to a healthy control group. We further hypothesized that the deficits in quality of life in those with FMS would be explained by their relatively lower levels of gratitude.

Methods

Participants & Procedures

FMS patients (n = 171) and healthy controls (n = 81) participated in the study. Table 1 provides descriptive statistics for each group and tests of group differences for socio-demographic variables. Patients and controls did not differ in terms of sex or marital status. Patients were about 12 years older than controls and more likely to have 9-11 years of education as compared to controls who were more likely to have 12 or more years of education.

In total 320 questionnaire sets were sent out to several fibromyalgia self-help groups which were recruited with the support of the German Fibromyalgia Patient Association. The group leaders were contacted by an author (MO) and were then sent the patient materials including the questionnaires, an information letter regarding the study objectives, and a consent form. Group leaders were asked to distribute the materials and to collect and return them when completed. Healthy controls were a German convenience sample of volunteers without fibromyalgia that completed the questionnaire set. The questionnaires were delivered to student assistants by one of the authors (NK) and students then delivered them to people they knew (e.g., parents, parents' friends, and other individuals 40 to 70 years of age).

Measures

The Gratitude Questionnaire-6. The Gratitude Questionnaire-6 is a brief (6-item) assessment of the disposition of gratefulness [25]. It was developed for use with a wide variety of respondents and has been used with college students, the general population, and medical patients [16,25]. The gratitude questionnaire has shown evidence of acceptable reliability and validity [25]. Responses are provided on a Likert scale ranging from 1 (*strongly disagree*) to 7 (*strongly agree*). The total score can range from 6 to 42 and higher scores indicate higher gratitude. In the present study, coefficient alpha for patients and controls was .79 and .69, respectively.

Hospital Anxiety and Depression Scale. The Hospital Anxiety and Depression Scale is a brief (14 item) self-report questionnaire measuring symptoms of anxiety and depression [26]. It was developed for use in general medical out-patient clinics but is now widely used in clinical practice and research. The Hospital Anxiety and Depression Scale has good reliability and construct validity [27]. Responses are based on the relative frequency of symptoms over the past week, using a four point Likert scale ranging from 0 (not at all) to 3 (very often). The total score for each of the depression and anxiety scales can range from 0 to

21 and higher scores indicate higher depression and anxiety. In the present study, coefficient alpha for anxiety for patients and controls was .86 and .76, respectively. Coefficient alpha for depression for patients and controls in the present study was .82 and .81, respectively.

Quality of Life Scale. The Quality of Life Scale is a 16-item questionnaire designed specifically for use in chronic disease patients including patients with fibromyalgia [28]. Items assess various aspects of quality of life such as physical and material well-being, relationships with other people, social, community, and civic activities, personal development and fulfillment, recreation, and independence. Satisfactory construct validity has been shown for the German version in a sample of fibromyalgia patients [29]. The items are scaled from 1 to 7 and aggregated into a sum score where a higher score indicates higher quality of life (possible sum score range 16-112). In the present study, coefficient alpha for patients and controls was .91 and .91, respectively.

Short Form 12. The Short Form 12 is a multidimensional general measurement instrument assessing health-related quality of life. It has become widely used in clinical trials and as a standard outcome assessment instrument because of its brevity and psychometric performance [30]. Like the full version of the Short Form (i.e., SF-36), the Short Form 12 contains items that assess function in eight health domains including: physical functioning, role-physical, bodily pain, general health, vitality, social functioning, role-emotional, and mental health. However, because only one or two items could be devoted to each of the domains in the Short Form 12, domain subscales are typically not computed. Instead, the Short Form 12 consists of mental and physical health composite scores. Scores can range from 0 to 100 with higher scores indicating better health-related quality of life. Acceptable estimates of internal consistency have been shown for both mental (coefficient alpha = .82) and physical (coefficient alpha = .88) health composite scores [31]. Mental and physical health composite scores have shown acceptable two-week test-retest reliability coefficients of

.76 - .89 [32,33]. Internal consistency of the mental (coefficient alpha = .84) and physical (coefficient alpha = .91) health composite scores in the present study was acceptable. Because of the present focus on mental health-related quality of life, only the mental health composite score was used in this study.

Socio-demographics. Age and sex were assessed, as were educational level (i.e., 9 or less years, 10-11 years, 12 or more years, advanced) and marital status (i.e., married versus other).

Analyses

Descriptive statistics (means and standard deviations) were computed along with bivariate correlations. Next, a multiple group confirmatory factor analysis model was fit to the data to evaluate the latent quality of life variable and ensure measurement invariance across FMS patients and healthy controls. Several different levels of measurement invariance can be considered [34]. Testing for configural invariance evaluates if the same factor model (i.e., number of factors and indicators) fits equally well in both groups. Testing for metric invariance adds the requirement that the factor loadings must be equal for both groups. Testing for scalar invariance involves evaluating factor variance/covariance invariance tests determining if the variances and covariances of the latent factors are equal for both groups. Last, testing for strict factorial invariance adds the final equality constraint consisting of the requirement that all item residuals are invariant across both groups. Multiple group confirmatory factor analysis models are complex and include numerous parameters, consequently RMSEA is the preferred fit index as it possesses known distributional properties and remains unaffected by model complexity or sample size [35,36]. RMSEA $\leq$ .08 is considered acceptable fit [35]. However, strict RMSEA cutoffs do not exist and values of up to .10 can be considered acceptable [37]. Multiple group confirmatory factor analysis loadings are usually provided in unstandardized units. This prevents confusion in interpreting

standardized loadings that may differ across groups due to different variances in each group [38]. Nevertheless, both unstandardized and standardized loadings are provided for interpretation.

Tests of study hypotheses involved a structural equation model that examined the hypothesis that FMS patients and controls would differ on quality of life and that some portion of this difference could be explained by gratitude levels. The structural model included a direct effect representing the difference between FMS patients and healthy controls on quality of life, as well as, on gratitude. The model also included the direct effect of gratitude on quality of life. An indirect effect was included in the model that represented the extent to which FMS patient and healthy control differences in quality of life were explained by group differences in gratitude. Testing the significance of the indirect effect in a structural equation model is the recommended and most direct method for understanding if a mediating variable conveys the effects of a predictor to an outcome [39,40]. There are a number of advantages to testing for mediation by examination of the indirect effect in structural equation modeling [41]. Some of the advantages include the ability to include latent variables, simultaneous, as opposed to sequential, estimation of model effects, and modeling error terms in the equation. Structural equation models also allow for testing nested models that can help evaluate if direct or indirect effects could be eliminated, making the model more parsimonious [42]. The influence of socio-demographic variables on all other variables in the model was controlled. We assessed fit of the structural models using the ratio of chi-square value to degrees of freedom (CMIN/df), Comparative Fit Index (CFI), Tucker-Lewis-Index (TLI), and root mean square error of approximation (RMSEA) [38]. In order to assess model fit, conventional cut-off criteria (good fit: CMINI/df < 2; CFI>.97; TLI:>.97, RMSEA<.05; acceptable fit: CMINI/df < 3; CFI>.95; TLI:>.95, RMSEA<.10) were employed [43]. Statistical significance tests were considered at the $p < .05$ level.

Results

Descriptive statistics and tests of group differences are shown in Table 2. Being an FMS patient was associated with lower gratitude, quality of life and mental health-related quality of life, and higher anxiety and depression in comparison to a healthy control group. Compared to other FMS patient cohorts' levels of quality of life (M = 72), mental health-related quality of life (M = 42), anxiety (M = 11), and depression (M = 8) [29,44-47], FMS patients in the present study showed slightly lower quality of life (M = 66) and mental health-related quality of life (M = 35), equal levels of anxiety (M = 11), and slightly higher depression (M = 10). Descriptive statistics and bivariate correlations for the total sample are shown in Table 3. Gratitude was correlated with less anxiety and depression and more quality of life and mental health-related quality of life. Education was related to more gratitude, quality of life, and mental health-related quality of life and less anxiety and depression. Age was related to more anxiety and depression and less mental health-related quality of life. Participant sex and marital status were not statistically related to any variable.

Multiple group confirmatory factor analysis revealed evidence for invariance of the quality of life construct across FMS patients and healthy controls. Configural, metric, scalar, and strict invariance models all fit the data acceptably, RMSEAs = .00 - .07. Under the constraints of the strict invariance model, unstandardized factor loadings ranged from .99 - 3.67 and standardized factor loadings ranged from .66 - .86. All loadings were statistically significant at the $p < .001$ level. Residuals for anxiety and quality of life were allowed to covary in all models.

The structural model (see Figure 1) showed that FMS patients had lower levels of quality of life than healthy controls (Beta = -.58, $p < .001$) and lower levels of gratitude (Beta = -.36, $p < .001$). Gratitude had the expected positive association with quality of life (Beta = .29, $p < .001$). The difference between FMS patients and healthy controls in quality of life

was partially explained through gratitude (Indirect Beta = -.10, $p < .01$). The structural model showed good fit, $\chi^2 = 22.50$, $p = .26$, χ^2 / df = 1.18, CFI = 1.00, TLI = .99, RMSEA = .03. To examine if the mediating role of gratitude in quality of life differences between FMS patients and healthy controls was partial or complete, we examined a trimmed model with the direct effect between group and quality of life omitted. This model resulted in a statistically poorer fit, $\Delta\chi^2 = 65.27$, $p < .001$. Consequently, we retained the partial mediation model that included both the direct and indirect effects.

Discussion

The current study is, to our knowledge, the first to examine the role of trait gratitude as a core resiliency factor for people with FMS, and to do so in comparison to a healthy control group. FMS patients exhibited lower quality of life and mental health-related quality of life and higher anxiety and depression scores compared to healthy controls. The present group of FMS patients showed slightly lower quality of life and mental health-related quality of life, equal anxiety, and slightly higher depression in comparison to other FMS cohorts [29,44-47]. This points to a high burden of disease consequences on overall quality of life in our sample of FMS patients.

Consistent with our hypotheses, gratitude was associated with better quality of life. Although those with FMS reported lower average levels of quality of life and trait gratitude relative to controls, gratitude was positively linked to a composite index of quality of life. Importantly, differences in gratitude levels partially explained the differences in quality of life between the two groups, even after accounting for important sociodemographic variables. Together, these findings support our proposition that living with FMS presents a challenging context that can limit opportunities to express gratitude frequently, intensely, and easily, and thus as a trait [19,25], which in turn can have implications for quality of life.

Despite a growing recognition of the value of gratitude for improving well-being and

quality of life for those with chronic illness [15,14,17,16], it is important to acknowledge that the challenges of living with a chronic illness nonetheless creates a context in which finding people and circumstances to be grateful for on a regular basis may be very limited. Pain, fatigue, functional losses, and psychosocial challenges, are issues common to many chronic illnesses that can compromise quality of life [48-50], as well as potentially limit how often gratitude may be expressed. Erosion of social support is common among people with chronic illness [51], and could lead to less grateful responses to the support provided, especially if the amount of social support received is viewed as being relatively less than the support previously received [52]. Additionally, the extra effort required to maintain a grateful orientation in the context of living with a chronic illness may be beyond the resources available to the individual. For example, there is evidence that the well-known link between pain and poor executive functioning is exacerbated among individuals living with chronic pain who try to maintain a positive mood [53], suggesting that there may be limited cognitive resources to draw upon when trying to manage a painful chronic health condition. The cognitive deficits and “fibro fog” common to FMS are additional reasons why maintaining a grateful disposition may be particularly difficult for this patient group.

From a positive clinical psychology perspective [10], acknowledging when and under what circumstances positive traits such as gratitude may be compromised is important for reducing the symptoms and development of clinical disorders such as anxiety and depression. Rather than focusing only on the benefits of gratitude for adjustment in chronic illness populations, future research should also examine potential deficits in gratitude relative to healthy populations, as was done in the current study. Such an approach would permit a more accurate understanding of the factors that may limit having a grateful orientation.

Importantly, evidence indicates that gratitude is a quality that can be cultivated with relatively simple interventions such as gratitude diaries and lists, which over time can

contribute to a more grateful disposition [19]. Indeed, there is evidence that the positive effects of gratitude interventions can persist for up to six months [19]. Although a growing body of evidence has demonstrated the efficacy of gratitude interventions for increasing the expression of gratitude and improving well-being in non-medical populations [19,54], research on such interventions in medical populations is scant. At least one study has found that gratitude interventions may be equally valuable for chronic illness populations, noting that breast cancer patients who received a 6-week online gratitude intervention had significant reductions in death-related fear of recurrence compared to a control group [55]. To the extent that gratitude can be bolstered to be expressed on a more regular basis via interventions, our findings suggest that such interventions have the potential to maximise quality of life related outcomes in chronic illness populations. Nonetheless, understanding the conditions that may restrict the full expression and experience of gratitude may be necessary to optimise the value of these interventions for medical populations.

Limitations

Studies of this type come with some limitations worth considering. First, this was a cross-sectional study and causal direction cannot be inferred. Nevertheless, it remains useful to know that patient-control differences in quality of life are, in some part, accounted for by differences in gratitude as impaired quality of life is a common outcome of concern in chronic illness and convenient targets of intervention to boost it are not always easily identifiable. Gratitude appears to be one such point of intervention. Second, this was a convenience sample of patients recruited from a patient self-help group in only one region of the world. Broader, more representative samples of patients could have advantages. Third, all measures were self-reports and response bias (i.e., faking good or bad) may have affected the data. Finally, although we controlled for socio-demographic confounds, other confounding variables could be at play. Gratitude may be serving as a proxy for several other positive

psychological traits such as optimism, hope, or general positive affect.

Conclusion

Our findings show that gratitude and quality of life are lower in FMS patients as compared to healthy controls and that lower gratitude levels explain part of the differences between patients and controls in quality of life. FMS patients have long been known to suffer decrements in key areas of functioning that contribute to losses in quality of life [e.g., 4], and yet few treatment approaches offer sufficient means to regain functional losses and improve quality of life. Developing personal resiliency and adopting positive coping styles offer ways of adjusting to chronic illnesses such as FMS. Gratitude may serve both purposes, functioning to contribute to the development of resilient personal character while also offering an approach to coping that is likely to bring quality of life benefits.

Although the cross-sectional design of this study does not allow for conclusions about the causal sequencing of these variables, future studies could illuminate if attempts to enhance a grateful disposition can lead to quality of life enhancements and if re-orienting coping from a focus on managing the negative to appreciating the positive in life can do likewise. The present study and future studies can contribute to a growing body of literature demonstrating the importance of gratitude for quality of life and well-being in individuals living with a chronic illness [16,14,15]. Overall, research of this kind highlights the importance of considering person-situation interactions when assessing how enduring positive personal traits such as gratitude may or may not be associated with important outcomes such as quality of life in the context of chronic illness.

Compliance with Ethical Standards

Disclosure of potential conflicts of interest

This research was supported in part by a grant from the The Friedrich Baur Foundation. All authors declare no conflicts of interest.

Ethical approval

All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

Informed consent

Informed consent was obtained from all individual participants included in the study.

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Table 1.

Socio-Demographic Descriptive Statistics for Fibromyalgia Patients and Controls

	Patients	Controls	F	η^2	χ^2	*r*
Age in years[1]	58 (8.8)	47 (14.2)	57.76***	.19		
Sex (female/male)[2]					.08	-.02
Female	161 (95)	76 (94)				
Male	9 (5)	5 (6)				
Marital status[2]					.02	-.01
Married/with partner	130 (76)	59 (76)				
Single/widowed/divorced	40 (24)	19 (24)				
Education (years)[2]					68.76***	.41
9 or less	74 (44)	7 (9)				
10 or 11	65 (39)	23 (29)				
12 or more	16 (10)	44 (56)				
Advanced	12 (7)	5 (6)				

[1]*M* (*SD*), F test; [2]*n* (% within column), χ^2 test

*** p < .001

Table 2.

Average Levels of Main Study Variables for Fibromyalgia Patients and Controls

	Patients		Controls		
Variable	*M*	*SD*	*M*	*SD*	*t*
Gratitude	30.45	6.13	35.87	4.10	-6.25***
Anxiety	10.93	4.46	5.45	3.15	8.63***
Depression	9.51	3.99	2.92	2.95	11.50***
Quality of Life	65.99	16.54	86.94	15.77	-8.30***
Mental Health-Related Quality of Life	35.36	9.28	49.96	9.22	-10.18***

*** $p < .001$

Table 3

Descriptive Statistics and Bivariate Correlations for all Study Variables

	M	*SD*	1	2	3	4	5	6	7	8	9
1. FMS Patients (Healthy Control = referent)	.70	.46									
2. Gratitude	32.09	6.10	-.41***								
3. Anxiety	9.23	4.83	.52***	-.39***							
4. Depression	7.47	4.80	.63***	-.50***	.77***						
5. Quality of Life	72.39	18.88	-.51***	.47***	-.58***	-.75***					
6. Mental Health-Related Quality of Life	39.82	11.40	-.59***	.40***	-.68***	-.74***	.63***				
7. Age	54.36	11.70	.42***	-.13	.14*	.20**	-.10	-.15*			
8. Sex	.94	.23	-.08	-.04	.00	.02	-.04	.08	-.08		
9. Married (other = referent)	.76	.43	-.04	.00	.08	.06	.04	-.03	.04	-.07	
10. Education	2.04	.93	-.43***	.34***	-.31***	-.36***	.24***	.26***	-.22***	-.06	-.03

* $p < .05$, ** $p < .01$, *** $p < .001$

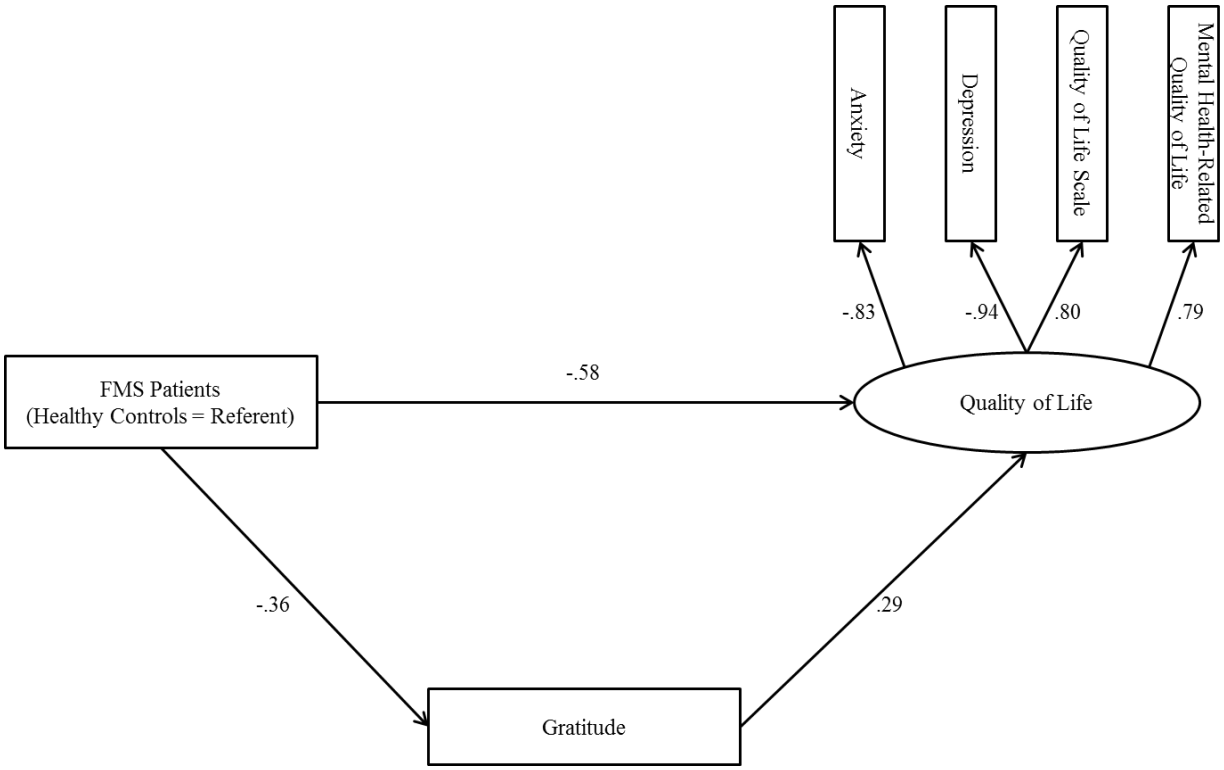

Figure 1. Structural model for the differences between FMS patients and healthy controls in quality of life with differences in gratitude as a mediating variable. All coefficients are significant at $p < .001$. Residual terms and age, sex, marital status, and education control variables not shown. With the exception of a positive association between education and gratitude (Beta = .20, $p < .01$), no other control variables had significant associations with any other variable.