LEISURE ACTIVITIES AND DEPRESSION IN PEOPLE WITH AND WITHOUT FIBROMYALGIA

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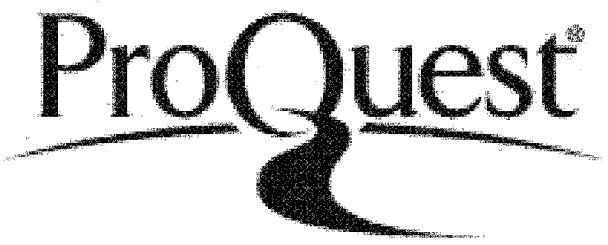

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ABSTRACT

The objective of the present study was to analyze the association between the symptoms of fibromyalgia (FM, chronic pain symptoms in particular) leisure activities (as measured by a Social/Leisure Activity questionnaire), and depressive symptoms (as measured by the Beck Depression Inventory II). The current study used both cross-sectional and longitudinal data from two waves of a parent study (Jones, Rutledge, & Aquino, 2010; Rutledge, Cherry, Rose, Rakovski, & Jones, 2010). Secondary analyses of data were performed using a sample of 70 participants with FM (93% female, mean age 60 years) and 76 participants without FM (67% female, mean age 68 years). To get a longitudinal perspective, we used data from participants with FM who participated in both the first and second waves of data collection (N = 78). Participants diagnosed with FM had higher levels of depression and participated less in leisure activities than those without FM. An association was found between leisure activities (specifically, overall and active leisure) and depressive symptoms. However, logistic regression analyses displayed no significant association between participation in leisure activities in Wave 1 (overall, active, or passive) and later depressive symptoms in Wave 2. The present findings encourage the integration of active leisure activities in the daily routines of individuals with FM.

TABLE OF CONTENTS

LIST OF TABLES

CHAPTER 1

INTRODUCTION

Fibromyalgia (FM) is a disorder that is characterized by the presence of chronic musculoskeletal pain, as well as a number of other symptoms (Arnold et al., 2006; Terre, 2010). As defined by the College of American Rheumatology, this widespread pain must be experienced for a duration of at least 3 months and in 11 or more of the 18 tender points in the body (Wolfe et al., 1990; see also Wolfe et al., 2010).

Fibromyalgia affects approximately 2% of the United States population. The diagnosis of FM is found more commonly in women compared to men, affecting 3.4% of women and 0.5% of men, and peaking in women in the 70-79 year age group with maximum prevalence of 7.4% (Wolfe, Ross, Anderson, Russell, & Hebert, 1995).

Along with the defining symptom of chronic pain, persons with FM often experience other symptoms and comorbidities that include fatigue, irritable bowel syndrome, sleep disturbances, headaches, balance problems, and stiffness (Bennett, Jones, Turk, Russell, & Matallana, 2007; Lawrence et al., 2008; Silverman, Harnett, Zlateva, & Mardekian, 2010; Wolfe et al., 2010). The symptoms that have been identified to be the most characteristic of FM and experienced at the highest levels of severity as compared to other symptoms are sleep problems, fatigue, and morning stiffness, which affect approximately three-fourths of persons with FM (Bennett et al., 2007; Wolfe et al.,

1990). Additionally, there are some cognitive symptoms such as loss of concentration and memory loss (Bennett et al., 2007).

Because FM presents with such a variety of symptoms, ranging from physical to cognitive, it affects the lives of those diagnosed with it across multiple areas of life, such as social, emotional, and occupational, affecting overall quality of life (Arnold et al., 2008; Bennett et al., 2007; Skjutar, Schult, Christensson, & Mullersdorf, 2010). In fact, studies that compared people diagnosed with FM to others without the diagnosis, as well as to those with other chronic pain conditions, found that persons with FM had significantly lower quality of life compared to other groups, including those diagnosed with rheumatoid arthritis (RA) (Bernard, Prince, & Edsall, 2000; Verbunt, Pernot, & Smeets, 2008). While limitations in daily activities lead to a decrease in quality of life for people experiencing FM symptoms, they might also lead to a state of depression. Consequently, depression could lead to even greater escape from everyday activities, which could cause an even greater state of depression (Bernard et al., 2000).

Leisure and Chronic Pain

The hallmark symptom of fibromyalgia, chronic widespread pain, has multiple negative effects influencing the lives of those diagnosed with the disorder. Chronic pain limits everyday activities (Jones, Rutledge, & Aquino, 2010), which makes it difficult for those diagnosed with FM to lead fulfilled lives. As noted in a case study of an individual diagnosed with FM (Turk, Vierck, Scarbrough, Crofford, & Rudin, 2008), chronic pain might lead to a person becoming inactive and passive in his or her everyday activities because participation in such activities leads to an increase in the level of pain (Turk et al., 2008). These everyday activities could include performing chores around the house,

taking care of children or other relatives, or even basic recreational activities. Participation in these recreational or leisure activities is the main focus in the current study.

General Benefits of Leisure Activities

Leisure activities are intrinsically meaningful activities that individuals freely choose when unoccupied by other obligations (Rogers, Hawkins, & Eklund, 1998; Soderback, 1999). These may or may not include activities focused on improving or maintaining proper physical or mental health, engaging in social relationships, and learning new skills or advancing in already existing ones (Pressman et al., 2009; Rogers et al., 1998; Soderback, 1999). Leisure time physical activity includes exercising, participating in sports, and any other recreational activities that entail a physical activity component not related to job duties (Ashe, Miller, Eng, & Noreau, 2009; Lin, Huang, Yeh, & Tai, 2009). Other leisure activities may lack a physical activity component, but have intrinsic value and create a pleasure element; these activities include traveling, hobbies, socializing, and watching television (Pressman et al., 2009). The current investigation will be directed toward leisure activities that include both types of activities, those with or without a physical component.

Many research studies have evaluated the effects of leisure activities. The majority focus on leisure time physical activities (Ashe et al., 2009, Lin et al., 2011, Natvig, Bruusgaard, & Eriksen, 1998). Findings in persons with FM support leisure time physical activities as having physical health benefits, and leading to diminished symptom intensity, including chronic pain, and potentially elevating mood (Hoffman & Hoffman, 2007; McCain, Bell, Mai, & Halliday, 1988). However, other studies focused on the

importance of engaging in leisure activities in general, which is the focus of the current study. Frequently engaging in leisure activities has both psychological and physical benefits, and is associated with increased life satisfaction and quality of life (Baldwin & Tinsley, 1988; Coleman & Iso-Ahola, 1993; Iso-Ahola & Park, 1996; Pressman et al., 2009; Tinsley & Eldredge, 1995). In fact, Hawkins (as cited in Schalock, 1997) found that one's subjective life satisfaction level is determined by a balanced relationship between personal responsibilities, work, and leisure activities. If one of these areas is decreased, the satisfaction with life also goes down. Therefore, any changes in leisure activities could lead to changes in one's quality of life (Hawkins, 1997, as cited in Schalock, 1997).

Some leisure activities promote and support coping with various stressors (Calbabiano, 1994, as cited in Chun & Lee, 2010; Coleman & Iso-Ahola, 1993). Participation in leisure activities can create certain social connections that lead to a perception of available social support, which can be called upon when life stressors arise. This proposition creates one possible explanation of why leisure activities may create a buffering effect from life stressors. In addition to the social support factor, participation in leisure activities is thought to generate enhanced self-determination, a personality disposition that is characterized by a belief of being able to initiate, persevere, and complete a task successfully (Coleman & Iso-Ahola, 1993). Personality dispositions that exemplify internal locus of control and hardiness are found to have a buffering effect against stress. If both leisure-generated social support and self-determination attitude do, in fact, work together to buffer against life stressors, mental and physical health are maintained (Coleman & Iso-Ahola, 1993). However, it may be that only non-passive and

more social activities promote coping and improve mental health (Joudrey & Wallace, 2009).

Engagement in leisure activities may create a buffering effect from possible negative impacts of stress, with subsequent lower levels of depression (Iso-Ahola & Park, 1996; Lu, 2011; Pressman et al., 2009). All of these findings related to the beneficial outcomes associated with leisure activities are especially salient when looking at populations of people dealing with life stressors associated with chronic pain. In fact, in a literature review evaluating different coping strategies used by people experiencing chronic pain, Peres and Lucchetti (2010) found that participation in "Distraction/Diverting attention" and "Keeping Busy" techniques promoted directing attention away from pain and encouraged people with chronic pain to focus on other activities, such as leisure, which could also in turn be associated with positive mood increases.

Impact of Chronic Pain on Leisure Activities

According to Soderback (1999), experiencing chronic pain can create an imbalance between self-care, work, rest and leisure activities, with leisure activities being the first ones to disappear. Skjutar and colleagues (2010) attempted to describe such a decrease in leisure activities by creating a construct named "disproportional activity pattern." They proposed that because of chronic pain, individuals start to struggle at work, and in order to keep up with the demands placed on them, they have to dedicate more energy to it. When they come home, they do not have energy for anything else, including leisure activities (Skjutar et al., 2010).

The direction of the relationship between chronic pain, depression, and leisure activities is unclear. Depression may play a mediating role between chronic pain and leisure activities. Palomino, Nicassio, Greenberg, and Medina (2007) found that in people diagnosed with FM, when limitations in physical performance caused by chronic pain lead to disruption in areas of personally valued characteristics of role functioning, chronic pain is linked to depression. It was also found by Kemler and Furnee (2002) that chronic pain could lead to the loss of energy and interest to participate in pleasurable activities. Additionally, experiencing chronic pain may cause isolation and lead to strained relationships with significant others. The combination of all these factors could lead to depression (Arnstein, 2004). However, the direction of the relationship between chronic pain, depression, and leisure activities is unclear. While some research shows that chronic pain leads to a decrease in leisure activities, which leads to depression, others show a reverse relationship where depression precedes decreased leisure activities (Roshanaei-Moghaddam, Katon, & Russo, 2009). This reverse relationship has been studied both cross-sectionally and longitudinally, although longitudinal studies evaluating whether chronic pain leads to a decrease in leisure followed by symptoms of depression are lacking.

As stated by occupational therapists working with individuals who experience chronic pain in regards to living with this symptom, "The joys in life have disappeared" (Skjutar et al., 2010, p. 98). Therapists also noted that when chronic pain symptoms become more severe, leisure activities are the first ones to be eliminated (Skjutar et al., 2010). There are a number of proposed treatment options to help increase the time people diagnosed with FM spend on leisure activities. One of the treatment options is

occupational therapy. When working with occupational therapists, individuals can work on resuming old activities that they used to engage in before the chronic pain took over their lives or find new ones (Skjutar et al., 2010).

Another way to help those diagnosed with FM increase the level of engagement in pleasurable activities is to increase their level of everyday activities. Sandstrom and Keefe (1998) note that by increasing general activity level and fitness, individuals with FM were able to increase the amount of time they spend in leisure activities.

When talking about the effects of leisure activities on individuals with chronic pain, it is important to include research on individuals diagnosed with rheumatoid arthritis (RA), where chronic pain is a central symptom. For example, in people diagnosed with RA, there was a link between the inability to engage in leisure activities and an onset of depressive symptoms (Katz & Yelin, 2001). In addition, there is some evidence that the inability of those diagnosed with RA to engage in highly valued activities, including leisure activities, may contribute to developing depressive symptoms. Depressed individuals diagnosed with RA reported being able to perform fewer activities than non-depressed individuals diagnosed with RA. It was unclear whether the deficit in activities was the result or the cause of the onset of the depressive symptoms (Katz & Yelin, 1994), again highlighting the need for longitudinal data.

People diagnosed with FM often experience a reduction in participation in enjoyable activities (Bernard et al., 2000). Participation in these activities is associated with increased positive mood and quality of life, as well as pain inhibition or a reduction in perception of pain (Baldwin & Tinsley, 1988; Pressman et al., 2009; Tinsley & Eldredge, 1995; Wuytack & Miller, 2011). By connecting these two findings, it could be

concluded that individuals with FM may experience an increase in their pain symptoms if they reduce their participation in leisure activities.

A theoretical explanation exists for the psychological benefits of leisure activities in individuals diagnosed with FM. Engagement in recreational activities could help those experiencing the effects of FM stay in control instead of letting the disorder and pain control different aspects of their lives (Mannerkorpi, Kroksmark, & Ekdahl, 1999). This proposition is supported by a study where there was a strong association found between a role loss or a loss of control and depressive symptoms in persons with FM. In fact, researchers concluded that inability to engage in pleasurable activities may result in perceived helplessness leading to depression (Palomino et al., 2007).

Chronic Pain, Leisure Activities, and Depression

The prevalence rates of co-occurring major depression in individuals experiencing chronic pain range from 13% to 85% (Bair, Robinson, Katon, & Kroenke, 2003). Therefore, it is necessary to investigate further the relationship between these two symptoms and possible mediating factors. In a meta-analysis of several studies, Tunks, Crook, and Weir (2008) found that the association between disorders characterized by chronic pain and depression becomes stronger over time. The authors explain this phenomenon in terms of a possibility of increased stress associated with pain leading to increased emotional distress. Moreover, it was concluded that mood disorders, including major depression, are 2 to 7 times more common in individuals experiencing chronic pain. Furthermore, the severity of depressive symptoms appears to be amplified with increased severity of chronic pain (Tunks et al., 2008).

While it is evident that there is a strong association between chronic pain and depressive symptoms, the latter condition is not always accurately diagnosed in clinical settings. This could be explained by the fact that people tend to focus on physical symptoms and leave out the psychological ones when conferring with physicians. Such inaccurate diagnosis and failure to treat the psychological symptoms could lead to an undesirable change in the course of the disorder. Therefore, it is necessary to carefully examine both physiological and psychological factors associated with symptoms of chronic pain (Livingston et al., 2000; Ohayon, 2004).

From a psychiatric standpoint, one recent research study found that, among patients admitted to an outpatient clinic with FM, 47.6% were diagnosed with an Axis I disorder, with Major Depressive Disorder (MDD) being the most common (14.6% of diagnoses) (Uguz et al., 2010). This prevalence rate was not only higher than the rate observed in persons without FM, but it was also found to be higher than the occurrence in the general population (Uguz et al., 2010). People who already have an FM diagnosis are more likely to be diagnosed with MDD than individuals diagnosed with RA or individuals without FM, and those FM participants diagnosed with MDD reported having difficulties engaging in daily activities that could include leisure activities (McBeth & Silman, 2001).

In fact, leisure activities may be a mediating factor between chronic pain and depression. Since leisure time activities have been found to create a buffering effect from life stressors, they also may be associated with lower levels of depression (Iso-Ahola & Park, 1996; Lu, 2011; Pressman et al., 2009). In individuals diagnosed with RA (chronic pain population), it was found that loss of ability to engage in valuable leisure time

activities was associated with the onset of symptoms of depression (Katz & Yelin, 1994). In people diagnosed with FM, helplessness due to inability to perform regular daily activities, loss of control, and role loss may be the connection between depression and leisure activities (Palomino et al., 2007). While restrictions and a decrease in leisure activities may lead to the onset of depressive symptoms in individuals diagnosed with FM, the depression might then lead to an even further decrease in enjoyable activities, which creates a spiraling effect (Bernard et al., 2000).

The direction of the relationship between chronic pain, leisure activities, and depression, however, is not entirely clear from previous research on individuals with FM. While some sources argue that a decrease in leisure activities leads to the onset of symptoms of depression (Bernard et al., 2000; Katz & Yelin, 2001), others suggest different directionality (Allan, Johnston, Johnston, & Mant, 2007; Elliott & Shewchuk, 1995; Roshanaei-Moghaddam et al., 2009). For example, higher levels of depression were predictive of less involvement in leisure activities (Elliott & Shewchuk, 1995). Therefore, it is important to explore the relationship to learn more about the direction of influence between leisure activities and depression.

Current Study

A review of the literature on individuals diagnosed with FM, their participation in leisure activities, and comorbidity with depressive symptoms has revealed how unclear the relationship between these factors is and the need for more comprehensive research on direction of the association between them. The objective of the present study was to analyze the association between chronic pain (as measured by an FM status), leisure activities (as measured by a Social/Leisure Activity questionnaire), and depressive

symptoms (as measured by the Beck Depression Inventory II). Using existing data from the first two waves of a study with adults over age 50 (with and without FM), the current study first investigates correlations among the three variables of interest using the first wave of data (N = 146). The first hypothesis of the current study was that being diagnosed with FM (i.e., having chronic pain) would be associated with more depression and less engagement in leisure activities than in individuals without FM. The second hypothesis was that less engagement in leisure activities would be correlated with more depressive symptoms regardless of FM status. Then, using data from participants with FM who participated in both the first and second waves of data collection (N = 78), the third and final hypothesis was that the inability to participate in leisure activities at Wave 1 would predict higher depressive symptoms at Wave 2 (2 years later).

CHAPTER 2

METHOD

The current study used both cross-sectional and longitudinal data from two waves of a parent study (Jones et al., 2010; Rutledge, Cherry, Rose, Rakovski, & Jones, 2010). The association between the three variables stated above (chronic pain, leisure activities, and depression) is investigated in participants diagnosed with FM. The impact of having FM on severity of chronic pain symptom and depression, as well as engagement in leisure activities, is examined. In addition, both Wave 1 (2008) and Wave 2 (2010) data are analyzed from a longitudinal perspective. The original study investigated differences in cognitive performance, physical performance, and functional abilities in people aged 50 years old or over with or without FM (Jones et al., 2010; Rutledge et al., 2010).

Participants

In Wave 1 (2008), participants in the FM group were recruited through emails or phone calls to people listed in databases from the Fibromyalgia and Chronic Pain Center (formerly, Fibromyalgia Research and Education Center), which is a university-based research center, as well as through an advertisement sent to local FM support groups, senior housing facilities, and senior centers. Participants in the non-FM group were recruited through an advertisement sent to local senior housing facilities and a senior center or through emails and phone calls to the university's Center for Successful Aging members. In the fall of 2008, 70 participants with FM (93% female, mean age 60 years)

and 76 participants without FM (67% female, mean age 68 years) completed the assessment and questionnaires required for participation in the study. Table 1 presents demographic information for the participants in the sample. The inclusion criteria for the original study required that participants were a minimum age of 50 years old, independently functioning, and community residing. Participants in the FM group were required to present documentation signed by a licensed physician indicating that they have met the criteria for classification of FM from the American College of Rheumatology (Wolfe et al., 1990; Wolfe et al., 2010). In the original study, people in both the FM and non-FM groups were excluded if they failed to meet the minimum requirements for testing. Requirements included scoring 25 or higher on the Mini-Mental Status Examination (Folstein, Folstein, & McHugh, 1975, as cited in Rutledge et al., 2010), not having any medical conditions that would contraindicate submaximal testing based on the guidelines from the American College of Sports Medicine (Dwyer & Davis, 2008, as cited in Rutledge et al., 2010), and an ability to walk for at least 6 minutes without assistance. A participant would not be allowed to participate in the physical performance testing with blood pressure higher than 160/100 mmHg. Medical authorization to participate in the study was necessary if one of the following applied: (1) participant's physician has recommended refraining from exercising due to a medical condition; (2) participant has had a history of congestive heart failure; and (3) participant was currently experiencing chest pain, dizziness, severe joint pain, or had exertional angina. All participants were asked to read and sign an informed consent form that was approved by the university's Institutional Review Board.

In Wave 2 (2010), the participants from Wave 1 were contacted through phone or mail to determine their interest in participating in the second stage of the original study. A total number of 78 participants returned for Wave 2. In addition to the original sample, a new sample of participants diagnosed with FM was accrued. Participants in the new sample were recruited through an outreach in the FM community (National Fibromyalgia Association, flyers to FM support groups, and contacts with people associated with the FM Research and Education Center) as in 2008. Persons interested in participating, were asked to call or send an email to assigned study personnel for additional questions about the study and to be screened for exclusion and inclusion criteria. The inclusion criteria for Wave 2 were the same as those for Wave 1 and, just as before, participants read and signed an informed consent form approved by the university's Institutional Review Board.

Measures (Wave 1 and 2)

Demographics

Demographic information was obtained from a questionnaire containing a list of descriptive and demographic questions, as well as health history. These questions included information on age, gender, ethnicity (Caucasian, African American, Asian or Pacific Islander, American Indian or Alaska Native, other race or nationality, and multi-racial), employment [retired, working full-time (35+ hours/week), working part-time (less than 35 hours/week), on temporary leave (including sick leave), looking for work, permanently disabled, keeping house, and other], education level (grade school, some high school, high school diploma or GED, trade/technical school/ community college/ some college, college degree (baccalaureate), and graduate/ professional school), and

medical history. To evaluate symptoms of FM in terms of intensity, the National Fibromyalgia Association Questionnaire (NFAQ; Bennett et al., 2007) was used with numeric rating scales. The intensity of pain (a key variable in the study) was measured with the question, "Please circle the number that best describes your experience with the following on average during the past week". The responses ranged from "0" being the least and "10" being the most severe. Additional symptoms assessed included fatigue, feeling rested after sleeping, stiffness in the morning, swelling in legs, feet and ankles, rashes, anxiety, depression concentration problems, forgetfulness, falling asleep, staying asleep, restless legs, headaches, abdominal pain, bladder problems, anger, postural instability (balance problems), and dizziness.

Leisure Activities

Participants were asked to answer 18 questions to assess their participation in leisure activities. Fifteen of these items were adopted from a social activities scale by House, Robbins, and Metzner (1982), which evaluate the frequency of social leisure pursuits, solitary leisure pursuits, intimate social relationships, and formal involvement in organizations. Three of the 18 items were added to the original scale with two items expanding on intimate relationships (talking on the phone with relatives, talking on the phone with friends) and one expanding on solitary leisure pursuits (engaging in projects or hobbies around the house). Two of the items ("go to church" and "go to classes/lectures", items 8 and 10 from the first section) were removed at the analysis stage as they had the highest SDs out of all the 18 items (1.50 and 1.40 respectively) and they were bimodally distributed. Three subgroups of the scale were created as follows: overall leisure (total of 16 items, alpha = .76), active leisure (total of 9 items, first 10

items without item 8 and 10, adding item 8 from the second section, alpha = .71), and passive leisure (total of 7 items, 8 items from the second section without item 8, alpha = .65). Test-retest reliability values for these subscales were $r = .70$, $r = .70$, and $r = .62$, respectively. Response options for the first 10 questions were as follows: never, less than once a month, 1-3 times a month, about once a week, and more than once a week. Each response option was given a numerical value from "1" being the least frequent to "5" being the most frequent. The last eight items had the following response choices: less than 15 minutes a day, 15 minutes to 1 hour a day, 1-3 hours a day, 3-5 hours a day, and more than 5 hours a day. As with the first ten questions, these response options were coded with "1" representing the shortest duration of time engaged in an activity and "5" – the longest (see Appendix).

Depressive Symptoms

The Beck Depression Inventory II (BDI-II) (Beck, Steer, & Brown, 1996) was used to assess depression. The tool has strong validity and reliability across a variety of populations, and has been used previously with chronic pain samples (Poole, White, Blake, Murphy, & Bramwell, 2009). It is a 21-item self-report instrument that is used to assess the occurrence and level of severity of symptoms of depression as listed in the American Psychiatric Association's *Diagnostic and Statistical Manual of Mental Disorders – Fourth Edition* (DSM-IV, 1994). BDI-II uses a four-point scale response range of 0-3 for every question with the exception of items 16 and 18, where a response range of 0-6 is used. Responses to all questions are added together for an overall score. An overall score of 0-13 represents a minimal range, 14-19 mild, 20-28 moderate, and

29-63 the severe range of depression (Beck et al., 1996; Zettel-Watson, Rakovski, Levine, Rutledge, & Jones, 2010).

Procedure

Wave 1 Procedure

For Wave 1, potential participants were screened through telephone interviews for inclusion and exclusion criteria. Individuals eligible for the study were scheduled for two separate appointments, due to the large number of assessments, which could lead to potential burden on the participants. Participants were mailed the questionnaires (including the leisure participation information) and study consent form, which were asked to be filled out and brought on the first day of assessment. They were given a reminder phone call one day prior to their first appointment.

During the first assessment day, previously mailed questionnaires and consent forms were collected and reviewed for completeness. Investigators were available to answer any questions, including those about the consent forms, schedule appointments for the second assessment day using reminder cards to take home, and thank participants. Participants also filled out some additional forms related to the study. During the second assessment day, which took place within one week from the first appointment, participants filled out the BDI-II. Participants also completed a battery of physical performance and cognitive tests, the results of which are reported elsewhere (Cherry et al., 2012; Jones et al., 2010).

Wave 2 Procedure

Prior to Wave 2, prospective participants were contacted via telephone to determine their eligibility for the study based on the inclusion and exclusion criteria mentioned above. If eligible, individuals were scheduled for a single 2-½ hour

appointment and mailed the informed consent form and study questionnaires. Participants were instructed to sign the informed consent form prior to filling out other study related materials and bring the complete paperwork on the day of the assessment. A reminder phone call was given to them one day prior to the assessment appointment.

On the day of the assessment, the completed consent form and questionnaires were collected, the consent form was signed by one of the faculty investigators, and questions about the study were answered. Participants had their blood pressure, height/weight, and waist circumference measured. They also completed additional study related questionnaires and a battery of cognitive assessments and physical performance tests, the results of which are not relevant to the current study.

CHAPTER 3

RESULTS

Sample Characteristics

The majority of participants in the sample were female (80%), White/Caucasian (87%), and well educated (65% of the participants had college or graduate degrees). Their ages ranged from 50 to 87 with a mean of 64 years. Over half of the participants indicated spending zero weeks at work in the last 12 months (58%) with 45% being retired and 16% - permanently disabled. A vast majority of the participants reported not having responsibility for children/grandchildren (78%) or other adults (73%). There were a number of significant differences between the FM and non-FM groups, however. The participants in the FM group were younger (M = 59.40 years) than those in the non-FM group (M = 68.00 years). There were significantly more women in the FM group than in the non-FM group. People diagnosed with FM also scored higher on the Beck Depression Inventory scale (M = 17.10) than did people without FM (M = 4.30). As anticipated, participants in the FM group reported experiencing significantly more pain and fatigue in the past week, as well as more bodily pain in the past 4 weeks, as compared to the non-FM participants. The non-FM group was more involved in overall leisure and active leisure activities; however, there was no significant difference in the passive leisure activities. Demographic characteristics of the 2008 sample are listed in Table 1.

Table 1. Individual Characteristics of the 2008 Sample

Variable	Non-FM $n = 76$	FM $n = 70$	p-value
Age, *M (SD)*	68.0 (8.7)	59.4 (7.5)	< .001
range	50-85	50-87	
Gender, % female	67	93	< .001
Education, %			.047
≤ high school	0	6	
some college or professional training	22	38	
college	40	22	
graduate work or degree	36	33	
Hispanic (% yes)	4	7	.397
Ethnicity, %			.005
White/Caucasian	88.2	87.0	
African American/Black	0	2.9	
Asian/Pacific Islander	10.5	0	
multiracial	1.3	8.7	
other	0	1.4	
Marital status, %			.177
never married	3.9	11.4	
divorced/separated	28.9	24.3	
widowed	14.5	7.1	
married	52.6	57.1	
Current employment status, %			<.001
retired	65.8	22.9	
working full-time	11.8	15.7	
working part-time	9.2	18.6	
looking for work	5.3	2.9	
permanently disabled	1.3	31.4	
keeping house	2.6	8.6	
other	3.9	0	
Number of weeks employed in last 12 months, *M (SD)*	14.4 (22.5)	16.9 (22.3)	.575
Current responsibility for children/ grandchildren (% yes)			.559
not at all	80.8	74.6	
somewhat	13.7	20.6	
fully	5.5	4.8	

Current responsibility for other adults (% yes)			.240
not at all	75.7	71.0	
somewhat	18.9	27.5	
fully	5.4	1.4	
Experience with fatigue in past week, *M (SD)*	1.8 (1.6)	6.6 (2.4)	<.001
Experience with pain in past week, *M (SD)*	1.7 (1.9)	6.4 (2.3)	<.001
Bodily pain in past 4 weeks, %			<.001
none	40.0	0	
slightly	45.3	8.6	
moderately	13.3	25.7	
quite a bit	1.3	57.1	
severe	0	8.6	
Beck Depression Inventory, *M (SD)*	4.3 (3.9)	17.1 (9.1)	<.001
Overall leisure activity score, *M (SD)*	2.6 (.4)	2.3 (.5)	<.001
Active leisure activity score, *M (SD)*	2.9 (.4)	2.4 (.6)	<.001
Passive leisure activity score, *M (SD)*	2.3 (.5)	2.3 (.6)	.624

Note. *p*-values are based on *t*-tests for continuous variables and chi-square tests for nominal variables.

Correlations

Bivariate correlations among the variables of interest (pain, depression, and leisure) in the FM group are listed in Table 2. There was a significant correlation between "pain in the past week" and BDI-II score ($r = .26, p = .031$), as well as "pain in past 4 weeks" and BDI-II score ($r = .42, p < .001$). Specifically, a higher level of pain was associated with more severe levels of depression. However, the effect sizes in these correlations were weak, where only 7% and 18% (respectively) of the variance was explained. There were no significant correlations detected between leisure activity variables and either pain or depression variables. In the non-FM group, there was a similar association between the pain variable and depressive symptoms. Specifically, there was a significant correlation between "pain in the past week" and BDI-II score ($r = .45, p < .001$).

Table 2. Correlations between test variables for FM group (above diagonal; $N = 70$) and non-FM group (below diagonal; $N = 76$)

	Pain in past week	Pain in past 4 weeks	BDI-II	Overall leisure	Active leisure	Passive leisure
Pain in past week	1	.659***	.259*	-.016	-.075	.056
Pain in past 4 weeks	.765***	1	.424***	.016	-.053	.091
BDI-II	.451***	.317**	1	-.125	-.206	.013
Overall leisure	.023	.088	-.208	1	.881***	.793***
Active leisure	.101	.126	-.273*	.864***	1	.412***
Passive leisure	-.095	.038	-.007	.789***	.371**	1

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

In addition, "pain in the past 4 weeks" was significantly correlated with BDI-II ($r = .32$, $p = .006$). As before, the effect sizes were weak with 20% and 10% (respectively) of the variance explained. In contrast to the FM group, for the non-FM group, the active leisure variable was negatively correlated with BDI-II ($r = -.27$, $p = .02$) with 7% of the variance explained. This correlation suggests that higher level of participation in active leisure activities is associated with lower levels of depression. As before, there was no significant correlation detected between leisure activity variables and pain variables.

Additional bivariate correlations were run to determine whether other variables should be included in the planned regression analyses. Table 3 displays correlations

among the variables of interest (pain, depression, and leisure) and other potentially related variables across the entire sample.

Table 3. Correlations Between Variables of Interest and Other Potentially Contributing Variables

	Pain (FM status)	BDI-II	Overall leisure	Active leisure	Passive leisure
Number of weeks employed in last 12 months	.056	.007	-.025	.036	-.091
Responsibility for children/ grandchildren	.050	-.005	.062	.114	-.025
Responsibility for other adults	.007	.050	-.003	-.013	.018
Fatigue in past week	.762***	.695***	-.318***	-.436***	-.033

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

Number of weeks employed in the past 12 months or caregiving responsibilities were not significantly related to any of the key variables. Greater fatigue in the past week was associated with FM status ($r = .76$, $N = 145$, $p < .001$) and depression ($r = .70$, $N = 145$, $p < .001$). The effect size in these correlations was strong and 58% and 48% (respectively) of the variance was explained. In addition, negative significant correlations between fatigue and both overall leisure ($r = -.32$, $N = 147$, $p < .001$) and active leisure ($r = -.44$, $N = 138$, $p < .001$) were identified, but the effect sizes were weak (10% and 19%, respectively). Fatigue thus emerged as the most highly related potential variable, but

given its very strong correlation with FM status (r = .76), it was excluded from analyses to avoid problems with multicollinearity.

Testing Hypothesis 1

The first hypothesis of the current study was that being diagnosed with FM (i.e., having chronic pain) would be associated with more depression and less engagement in leisure activities. As shown in Table 1, participants in the FM group (i.e., those with chronic pain), reported higher levels of depression, as measured by the BDI-II (M = 17.14) than did those in the non-FM group (M = 4.25). The mean difference between the two groups was 12.89 (SD = 1.18) and the 95% confidence interval for the estimated population mean difference was between -15.24 and -10.54. Based on the criteria classification by Cohen (1969), the effect size (d = 1.98) is considered to be large. The results of an independent samples t-test illustrated that the difference between the FM and non-FM groups in terms of their BDI-II score was statistically significant (t (92) = -10.91, $p < .001$). Thus, depression levels were significantly higher among those with FM/chronic pain than among those without.

Participants in the FM group/chronic pain condition had lower scores on the leisure activity scale (M = 2.30) than those in the non-FM/no chronic pain condition (M = 2.60). The mean difference between the two groups was .29 and the 95% confidence interval for the estimated population mean difference was between .14 and .43. The effect size was medium (d = .67). The results of an independent samples t-test illustrated that the difference between the FM/chronic pain and non-FM/no chronic pain groups in terms of their leisure activity score was significant (t (136) = 3.90, $p < .001$). Thus, those with FM/chronic pain had significantly lower levels of overall leisure activity as compared to

those without FM/chronic pain. As shown in Table 1, similar results were found for the active subcategory of leisure activities, but not for passive leisure activities.

Testing Hypothesis 2 (Linear Regression)

The second hypothesis was that less engagement in leisure activities would be correlated with more depressive symptoms. In order to investigate the relationship among leisure activity and depression, a series of three linear regressions were conducted. In each, FM status was a covariate and depression was the dependent variable. A separate model was conducted for overall, active, and passive leisure activity. For the model looking at overall leisure activity, the overall model was significant [F (2,135) = 57.66, p < .001], explaining 45% of the variance in the dependent variable (adjusted R^2 = .45). Table 4 displays information for the predictor variables used in the model. FM status had an independent effect, which indicated that it was a significant predictor of depressive symptoms (β = .64, p < .001), while leisure activity was negatively associated but was not quite significant (β = -.11, p = .098). For the model looking at active leisure activity, the overall model was significant [F (2,136) = 62.19, p < .001], explaining 47% of the variance in the dependent variable (adjusted R^2 = .47). This model detected two independent effects: one for FM status (β = .60, p < .001) and another for active leisure activity (β = -.18, p = .011), which indicated that both FM status and active leisure activity were significant predictors of depressive symptoms. The third model was used to analyze the relationship between passive leisure activity and depression. The overall model was significant [F (2,141) = 61.04, p < .001], explaining 46% of the variance in the dependent variable (adjusted R^2 = .46).

Table 4. Linear Regressions for FM Status and Leisure Activity Predicting Depression

Models	B	SE B	β	p-value
(Constant)	10.39	3.75		.006
FM status	11.98	1.26	.64	<.001
Overall leisure activity	-2.32	1.39	-.11	.098
(Constant)	12.83	3.40		<.001
FM status	11.23	1.29	.60	<.001
Active leisure activity	-2.99	1.16	-.18	.011
(Constant)	4.05	2.73		.140
FM status	12.88	1.17	.68	< .001
Passive leisure activity	.10	1.12	.01	.931

As in the first model, there was an independent effect of FM status ($\beta = .68$, $p < .001$), however, the association between passive leisure activity and depressive symptoms was not significant ($\beta = .01$, $p = .931$).

Testing Hypothesis 3 (Logistic Regression)

The third and final hypothesis was that the inability to participate in leisure activities at Wave 1 would predict higher depressive symptoms at Wave 2 (2 years later). Logistic regression analyses displayed no significant association between participation in leisure activities in Wave 1 (overall, active, or passive) and later depressive symptoms in Wave 2 (increase or decrease/stay the same). Findings from these analyses are presented in Table 5.

Table 5. Logistic Regressions for Overall, Active, and Passive Leisure Predicting Depression[a] ($N = 78$)

	B	Wald	Exp (B)	Sig.
Overall Leisure				
Constant	-4.064	3.970	0.017	0.046
FM status	0.145	0.078	1.156	0.780
Overall leisure in Wave 1	1.484	3.103	4.413	0.078
Overall leisure change score[b]	0.335	0.125	1.398	0.724
Active Leisure				
Constant	-2.787	2.962	0.062	0.085
FM status	0.063	0.014	1.065	0.907
Active leisure in Wave 1	0.892	2.000	2.441	0.157
Active leisure change score	-0.003	0.000	0.997	0.997
Passive Leisure				
Constant	-2.953	3.195	0.052	0.074
FM status	0.362	0.531	1.437	0.466
Passive leisure in Wave 1	1.152	2.521	3.165	0.112
Passive leisure change score	0.831	1.037	2.295	0.309

Note. [a] For the logistic regressions, a dichotomous depression variable was created based on the Wave 2 – Wave 1 change score (either increased or decreased/stayed the same). [b] Leisure change scores were computed as follows: leisure score in Wave 2 – leisure score in Wave 1

In Model 1 (overall leisure), a total of 78 cases were analyzed with 74 cases included in the analysis (four cases had missing data on one or more variables). The full model showed no significance (omnibus chi-square = 3.97, $df = 3$, $p = .265$). There was no significant association between overall leisure activity in Wave 1 and depressive symptoms in Wave 2 (odds ratio, OR = 4.41, 95% CI = .85, 23.02). In Model 2 (active leisure), a total of 78 cases were analyzed with 74 cases included in the analysis. The full model, again, was not significant (omnibus chi-square = 2.84, $df = 3$, $p = .417$). There

was no significant correlation between active leisure activity in Wave 1 and depressive symptoms in Wave 2 (OR = 2.44, 95% CI = .71, 8.41). In Model 3 (passive leisure), a total of 78 cases were analyzed with 75 cases included in the analysis. Same as Model 1 and 2, the full model was not significant (omnibus chi-square = 3.10, $df = 3$, $p = .377$). There was no significant correlation between passive leisure activity in Wave 1 and depressive symptoms in Wave 2 (OR = 3.17, 95% CI = .76, 13.12).

CHAPTER 4

DISCUSSION

The results of the current study offer insight on the associations among chronic pain (i.e., fibromyalgia), reported depressive symptoms, and engagement in leisure activities. As anticipated, when compared to persons in a non-FM group, people with FM reported experiencing significantly more pain, more depressive symptoms, and less engagement in leisure activities (specifically, overall leisure activity and active leisure). The differences were still evident after controlling for age and gender. These results are in agreement with a previous line of research that concluded that people diagnosed with FM are affected in different areas of life, including social, emotional, and occupational areas, decreasing overall quality of life (Arnold et al., 2008; Bennett et al., 2007; Skjutar et al., 2010).

The first hypothesis of the study, which was that being diagnosed with FM would be associated with more severe chronic pain symptoms and depression and less engagement in leisure activities, was supported. Depressive symptoms were more severe in people diagnosed with FM than in those without the diagnosis. This finding is consistent with previous research that concluded that comorbidity of FM and Axis I disorders (Major Depressive Disorder in particular) was 47.6 %, which was higher than in the control group or in the general population (Uguz et al., 2010). In addition, people in our FM group engaged less in leisure activities. More specifically, there was a

significant association between overall and active leisure activities and FM status, but not between passive leisure activities and FM status. These findings are consistent with previous research conducted by Bernard and colleagues (2000), who found that people experience reduction in enjoyable activities following a diagnosis of FM. However, the current study is the first known investigation into the subgroups of leisure activities in FM population.

The second hypothesis was that less engagement in leisure activities would be correlated with more depressive symptoms. The current study examined associations between three types of leisure activities (overall, active, and passive) and depressive symptoms. All three regression models performed in the current study explained a high amount of variance in the depressive symptoms. Specifically, the regression models including FM status and overall, active, and passive leisure explained 45.3%, 47%, and 45.6% of the variance in depression, respectively. In addition, independent effects were found for FM status and active leisure activity. This is consistent with previous research conducted by Palomino and colleagues (2007), who found a correlation between leisure activities and depressive symptoms in persons with FM.

The results of these analyses support an association between leisure activities and depressive symptoms in participants with FM. These findings also display differentiation between active and passive type of leisure activity. Specifically, the relationship between leisure activity and depression seems to be driven by active leisure activity, as opposed to passive leisure. This is in line with research done by Joudrey and Wallace (2009), who found that only non-passive leisure activity plays a role in improving well-being and decreasing depressive symptoms among a sample of law firm lawyers.

The third hypothesis of the study was that the inability to participate in leisure activities at Wave 1 would predict higher depressive symptoms at Wave 2 (2 years later) among persons with and without FM. This hypothesis was not supported. There were no associations between engagement in leisure activities in Wave 1 and depressive symptoms in Wave 2. There are some possible theoretical explanations as to why no association was found between these two variables. First, there were perhaps other mediating variables that were not taken into account that affected the results. For instance, in a research study conducted by Elliott and Shewchuk (1995), there was an association found between leisure activities, depressive symptoms and the Reassurance of Worth subscale (RAW) score. Higher RAW scores were associated with more leisure activities with depression, mediating the relationship between the two variables. In the current study, efforts were made to screen for theoretically possible mediating variables to make the most accurate conclusions. Fatigue did emerge as a potential variable, but it was excluded from analyses to avoid problems with multicollinearity, due to its strong correlation with FM status. Future research with a larger FM sample (i.e., greater inter-FM variability) might be able to shed light on the possible mediating influence of fatigue and other relevant variables.

Another potential explanation of failing to find an association between engagement in leisure activities in Wave 1 and depressive symptoms 2years later in Wave 2 is the time limitation. A study conducted by Katz and Yelin (2001), which looked at the association between activity loss and depressive symptoms in persons diagnosed with RA, found that in participants who did experience an increase in depressive symptoms, the significant difference was not evident until the third year

following the initial assessment. More specifically, there was a significant increase in depressive symptoms detected only between the third and fourth years. Applying that to the FM population, future follow-up investigations may reveal a greater association between leisure activities and depressive symptoms.

It is important to note that, while no statistical significance was detected, the findings do suggest clinical importance. More specifically, an odds ratio of 4.41 for overall leisure activity in Wave 1 and depressive symptoms at Wave 2 illustrates that participants who experience a decrease in overall leisure activities at Wave 1 are 4.41 times more likely to have an increase in severity of depressive symptoms in Wave 2, as compared to those who do not see a decrease in overall leisure. Similarly, the odds ratios for active and passive leisure were 2.44 and 3.17, respectively, suggesting that participants who experience a decrease in active and passive leisure activities at Wave 1 are 2.44 and 3.17 times more likely to experience an increase in severity of depressive symptoms at Wave 2. However, due to the low sample size of individuals participating in both waves (2008 and 2010) leading to low power, this clinically meaningful association did not reach statistical significance.

Limitations and Future Directions

The current study has several limitations. The sample was limited to participants from a small geographic area in southern California. Most participants were female, well educated, and from middle and upper middle class backgrounds. Even though efforts were made to create a diverse sample of participants, the factors listed above create a barrier in generalizing results to other populations. In addition, a small sample size of persons participating in both Wave 1 and Wave 2 possibly contributed to the lack of

significant correlations found in the logistic regression analyses looking at the longitudinal data. Therefore, future research should explore the possibility of collecting a larger and more diverse sample to further explore relationships between chronic pain, leisure activity, and depressive symptoms in persons with FM.

In addition, there are other variables that could contribute to the associations analyzed in the current study that were possibly overlooked here. We did look into employment, responsibility for other adults and children, and fatigue and found strong association between fatigue and all three variables of interest (FM status, as a pain variable, depressive symptoms, and leisure activities). However, fatigue was not included in further analyses because of its very strong association with FM status to avoid issues with multicollinearity. In past research, there were other variables discovered (e.g., RAW score) that were associated with both leisure and depressive symptoms, which played a role in interpretation and application of the results (e. g., Elliott & Shewchuk, 1995). Therefore, looking at other alternative mediating variables could shed some light on different aspects of associations among the three variables of interest (chronic pain, leisure activities, and depressive symptoms).

Lastly, the lack of longitudinal studies in this field makes it important to address an additional aspect of the current study. Using data from two waves, collected 2 years apart, we were able to analyze the changes during that time period. However, it would be very important to further analyze the changes in the variables of interest past the 2 year mark. In fact, previous research did find significant changes in depressive symptoms between third and fourth years from an initial assessment in people with an RA diagnosis

(Katz & Yelin, 2001). A similar trend could be found in the FM population, so additional waves of data collection would be advantageous.

Conclusion

The effects of depression have not only been discussed in terms of one's psychological health, they can also lead to a decrease in one's physical health (Penninx et al., 1998).The findings of the current study suggest that people diagnosed with FM have more severe depressive symptoms and engage less in leisure activities than their counterparts without FM. Among these individuals, more engagement in active leisure activities was associated with lower levels of depression. The current study underscores the importance of leisure activities in persons diagnosed with FM. The present findings encourage the integration of active leisure activities in the daily routines of individuals with FM. The study may assist mental health workers and healthcare providers in creating the best care plan for those with an FM diagnosis. It could also provide those diagnosed with FM with some useful tools to decrease the possibility of developing depressive symptoms. Additional research that addresses the limitations of this study may help further improve our understanding of the struggles of people diagnosed with FM and ways to improve their well being.

APPENDIX

SOCIAL/LEISURE ACTIVITY SCALE

On average, how often do you do each of the following?

		Never	Less than once a month	1-3 times a month	About once a week	More than once a week
1	Visit with friends, neighbors?	1	2	3	4	5
2	Visit with relatives?	1	2	3	4	5
3	Go to the movies?	1	2	3	4	5
4	Go to watch sports events?	1	2	3	4	5
5	Go to concerts, plays, etc.?	1	2	3	4	5
6	Go to fairs, museums, exhibits, etc.?	1	2	3	4	5
7	Attend meetings of clubs or organizations?	1	2	3	4	5
8	Go to church?	1	2	3	4	5
9	Go on pleasure drives, picnics, etc.?	1	2	3	4	5
10	Go to classes or lectures?	1	2	3	4	5

About how many hours in an average day do you spend:

		Less than 15 minutes a day	15 minutes to 1 hour a day	1-3 hours a day	3-5 hours a day	More than 5 hours a day
1	talking on the phone with friends, neighbors?	1	2	3	4	5
2	talking on the phone with relatives?	1	2	3	4	5
3	watching television (total time)?	1	2	3	4	5

4	listening to the radio (total time)?	1	2	3	4	5
5	listening to the news on the radio or watching news on television?	1	2	3	4	5
6	reading newspapers?	1	2	3	4	5
7	reading magazines or books?	1	2	3	4	5
8	working on hobbies or projects around the house?	1	2	3	4	5

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