

## The Relationship between Dimensions of Family Functions with the Fear of Pain Associated with Chronic Musculoskeletal Pain.

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### ABSTRACT

Chronic pain is an invisible imaginary structure and an example of external factors that can disturb the balance of family function. When the external or internal factors sabotage the balance of family function, family tries to win its equilibrium back. Thus the role of family as an important social factor affecting the chronic pain field has attracted researchers' attention. This study examined the relationship between family function and chronic musculoskeletal pain-related fear levels. So, 100 patients with musculoskeletal pain were randomly selected and (FAD) and (FPQ3) questionnaires were used to assess the correlation. The results showed the relationship between total family function and the fear of pain variable is significant (219/0) ( $\alpha = 0.05$ ). Among dimensions of family function, problem solving, emotional blend, emotional responsiveness and communication, with a correlation coefficient of 0.296, 0.206, 0.214 and 0.256 had the highest rates of relationship with this variable and dimensions of family function explain the levels of fear associated with chronic musculoskeletal pain. Also problem solving in a family has highly predicts the variable of the fear associated with motion.

**KEYWORDS:** family function, fear of pain, chronic musculoskeletal pain.

### INTRODUCTION

Pain<sup>1</sup> is an unpleasant sensory and emotional experience that causes tissue damage (sensory dimension) and inconvenience (emotional dimension) which are always associated with it. Pain is always a mental experience, that's why sometimes people with no tissue damage experience pain. These unpleasant painful emotional experiences have psychological reasons. Since there is no common way to detect tissue damage in individual reports of pain, even this kind of mental experience based on individual report is considered pain (International Association for the Study of Pain (IASP)).

Linton (1994) proposed a model that included components that influence the development of pain and pain modifiers (such as family, cultural, mental, and learning factors) and pain components (cognitive, behavioral, and physiological). In fact, pain is an all-inclusive medical problem, because it not only affects the lives of more than 50 million Americans but through decreasing staff productivity and increasing the costs of health care (such as the loss of income, increasing expenditures for health care, and disability payments) causes 70 billion dollars loss annually. In addition, more than two-thirds of America's senior citizens suffer from chronic conditions, including chronic pain treatment of which allocates more than 66% of the health budget to itself (Martin et al, 2005). Gleicherr et al (2011) Argue that the risk of affective disorders such as depression are the main results of permanent and chronic pain in adults. The rate of major depression in adults with persistent pain has been estimated between 19 to 28 percent, this number is about 2 to 4 percent of the general population (Lum et al, 2013). Thus chronic pain is a stronger predictor of depression compared with other risk factors such as social isolation. In addition, recent studies show that chronic pain is associated with suicidal ideations in the adults (Almeida et al, 2012).

Chenhall (1998) classifies different types of pain into three general categories: 1. Transient pain 2. Acute pain 3. Chronic pain. Chronic pain is a stable condition of experiencing pain which is not treated or hard to cure and may be related to the long-term incurable situation (IASP, 2008). This situation is a hypothetical unobservable structure which can be understood through studying its effects on three psychological - physiological, cognitive - perceptual

<sup>1</sup> Greek root: *ποινή* - *poine*

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and motor - Environmental levels (Vlaeyen & Snijders, 1995). Family is one of the environments affecting the physical and mental health of the individual that provides the necessary conditions for physical, psychological and social growth and balance (Woods, 1995). Family provides these conditions through a series of joint actions called family functions.

According to research conducted in the areas of family, the purpose of family function is to achieve balance, but pain with its real threats to human life and its pressures on physical and psychological states, creates serious problems for families and individuals. Those who primarily suffer from the pain are the person, his/ or her spouse and their children or the whole family. The role of the family as an important social factor affecting the chronic pain field has attracted researchers' attention (Romano, Turner, Clancy, 1989; Leonars and Cano, 2006).

Leonard & cano (2006) in their studies on the chronic pain and couples, reviewed the evidence of the function of spouses regarding chronic pain, including pain intensity, physical disability, pain behavior and stress and concluded that there is a relationship between variables of spouses' function variables including marital satisfaction, spousal support, spousal responses to pain and couples' interactions.

To better understand these effects, bio-psycho-social model can be used because it provides a comprehensive and systematic approach to understand behavior and inside and outside systems affecting health and illness of the individual (Sperry, 2006). This model includes the area of chronic pain affected by evaluation and biological processes involved in the perception of pain onset, timing and persistence of chronic pain (eg, impaired regulation of hypothalamic axis - adrenal sympathetic flow, and immune activity) of experiencing stress (Sperry, 2006).

A version of the bio-psycho-social model applied by Fordyce (1976) and Loeser (1982) and expanded used by others (including Flor and Herman, 2004) was a combination of these concepts: Changes arise in physiological levels from trauma and pathology; psychological variables considered in evaluation of internal emotions; These evaluations and behavioral responses are influenced by social and environmental variables. This model also asserts that social and psychological factors can affect the physiological responses (Turk & Flor, 1999). For example, behavioral responses, such as avoidance of activity due to variables such as pain, fear of pain or expecting to have more damage could lead to general inability (Veladin & Linton, 2000). But in the field of pain and its association with family function, most of the previous scientific contents directly addressed that whether the presence of pain in an adult family member has disrupted family function or not. And researchers have taken marital unit as an example of this family system (Roy 1985).

Despite the problems to clarify the role of the family in the pain onset, considerable research has been done on the role of the family in continuous pain. The observations suggest that pain affects some marriages and caused some diversion of attention from other problems into pain and created a sustainable balance in marital relationships. Besides, pain can cover other difficult or threatening issues. Chenhall (1998) found out that people refused sex through pain in marriages. Controlled and punished each other and refused close relationships. Roy (1985) reported that in 80% of interviews with couples, pain served as a means of controlling the spouse.

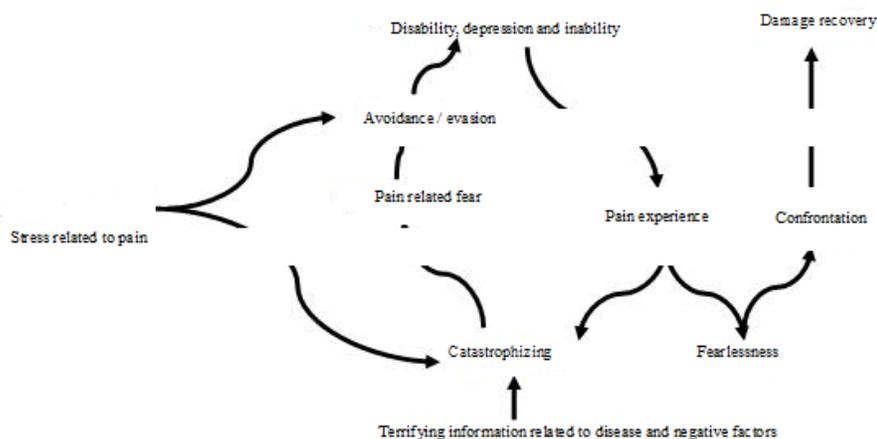
In sum, since pain is a complex and multidimensional phenomenon and the analysis of its effects and responses from a single point of view could be erroneous. Because based on the biological - psycho - social approach, chronic pain, like other forms of the disease is a result of very complex individual and interpersonal interaction variables on of which is the fear of the person influencing the family function. Based on the knowledge obtained from the general research related to fear and anxiety, the influence of pain and anxiety in the realm of chronic pain is increasingly recognized and acknowledged. The best definition of fear and anxiety related to pain includes: the Fear created by the pain stimuli perceived as the main source of threat. Fear and anxiety responses, include physiological, psychological factors (e.g., increased muscle reactivity) psychological factors (such as escape and avoidance behaviors) and cognitive factors (e.g., thoughts, tragedy, building). The individual pays attention to the stimuli based on his current anxieties and sometimes interpret them incorrectly. Fear of pain, fear of activities, fear of movement and fear of injury (back injury) often exist in patients with chronic pain (Vlaeyen & Linton, 2000).

The cognitive-behavioral method is one of the models explaining this effect and it is usually introduced as the detailed descriptions of the fear avoidance model and through the individual symptoms, beliefs and behaviors describes how this emerged vicious circle causes the persistence of pain in patients (Vlaeyen et al, 2000).

This model implies that if the pain is caused by an injury, it is interpreted as a threatening factor (catastrophic pain) and pain-related fear evolves. This leads to avoidance-oriented behaviors and hyperawareness to physical feelings the result of which includes: inability, failure and depression. Depression perpetuates the experience of pain, thereby filing the vicious cycle of fear and avoidance. In non-catastrophizing patients in the absence of pain associated fear, rapid confrontation with daily affairs occurs which leads to a quick recovery. Principally pain catastrophizing is also influenced by negative emotions and threatening data related to the disease.

A schematic of this effect is shown in Figure 1

Anxiety associated with pain



The results of studies related to the thinking that the fear of pain and re-injury can be more debilitating than the pain itself, rejects the notion that a reduction in the ability to perform tasks of daily living in patients with chronic pain is just a consequence of pain (Crombez et al, 1996; Waddell et al, 1993). Jensen et al (2011) believes that Limitation of physical activity due to pain is a common approach, because the pain is to rest the need to improve, but in chronic pain restricting movements may lead to a cycle of constraints, deeper losses and inability to participate in activities. In addition to the loss of social and meaningful activities (Parkinson et al 2010) decreasing outdoor activities because of physical pain can lead to overweight and obesity in adults (Strine et al, 2005) which indicates the increase in musculoskeletal pains (MC Carthy et al, 2009).

A large number of studies show that fear of pain is actually one of the predictors of physical performance and disability levels expressed by individual. Asmundson & Norton (1995) found that patients with chronic back pain have a higher sensitivity to distress compared with those who are less anxious and sensitive, and they are more likely to escape the activities. Asmundson & Taylor (1996) in the latter study, which was conducted by structural modeling, confirmed that sensitivity to anxiety intensifies fear of pain directly. Even after inhibiting the effects of pain intensity on fear of pain.

People who had the same duration and intensity of pain were compared in a study. In this study, it was revealed that beliefs about avoiding fear are an important discriminator between those who had or didn't have the sick leave (Linton & Buer, 1995). Beliefs such as "being inactive" help more than participating in activities, or behaviors such as avoidance of activity due to fear of pain, poor family relationships, financial pressures increase the possibility of transformation of acute pain into chronic pain decrease the progress of treatment (Guidelines for the pharmacological management of chronic pain,2012).

Waddell et al (1993) reported that avoiding physical activities and work due to the fear is strongly connected with disability and loss of job in the last year of patient's which is much more than biomedical variables. Therefore, they concluded that fear of pain and what we do about it is very debilitating than the pain itself.

By prospective studies of Klenerman et al (1995) confirm that the fear of further pain is an introductory to further inabilities rather than being a reason of it.

So based on the studies done on the couples, family is an important factor in this area. Therefore, through identifying the effective dimensions of a family in this area it is possible to pay attention to the affected dimensions and the consequences of pain. So this study investigates the relationship between different dimensions of family function with the fear of pain in patients with chronic musculoskeletal pain.

### Research hypotheses

1. Different aspects of family function are associated with the fear caused by chronic pain in patients with chronic musculoskeletal pain.
2. Various aspects of family function predict the fear caused by chronic pain in patients with chronic musculoskeletal pain.

### Research method

This research is a correlational-quantitative study. The population was the patients with chronic musculoskeletal pain referred to Imam Hossein hospital specialized medical center in Tehran in 89 for treatment (physiotherapy). The sample in this study was selected using a random sampling method from the entire population available on a voluntary basis.

The required criteria for entry into this study were: No history of accidents, at least 30 years old, being married and having children, having an educational degree, having chronic musculoskeletal pain requiring physiotherapy treatment. The number of samples were 100 but when scoring 1 data was not valid so one of the data were eliminated and statistical work was done on 99 patients. According to available data, 77.8 % were female and 22.2% of them were male.

### Measuring tools

- demographic questionnaire

The questionnaire, in addition to demographic characteristics such as age, gender, education, occupation, length of marriage and number of children included other items such as chronic pain and other diseases, including psychiatric and somatic therapies, diseases of other family members and residence area.

- Fear of pain questionnaire (FPQ3)

Fear of Pain Questionnaire was initially developed by Mcneil & Rainwater(1998) and aimed at assessing the fear of pain in the three subgroups of severe pain, acute pain, mild pain, and pain medicine. The minimum score of this questionnaire is 30 and the maximum is 150. The questionnaire consists of 30 items and each section is classified based on 5-point Likert scale ranging from 1 to 5. The reported Cronbach's alpha for this questionnaire is 0.93 (Mcneil & Rainwater, 1998).

- Family assessment device (FAD)

A questionnaire with 60 questions that assess family function which was developed by Epstein et al (1984) based on McMaster model (Miller et al, 2000). The 60 item questionnaire asked respondents to select any one of the following options: fully agree, agree, disagree, totally disagree explaining the circumstances of his family. For scoring, these items are encoded and higher scores on the scale indicate less effective family function. This questionnaire has seven scales including: 1 – Problem solving 2 - relationship 3 - Roles 4 - emotional responses 5 - emotional mixtures of 6 - behavior control and 7- the general function of family. The psychometric properties of the questionnaire made it clear that the validity of the scales is desirable. Internal consistency of this version was calculated through using Cronbach's alpha and retesting reliability with an interval of one week to ten days. The following calculations were estimated: Cronbach's ( 58% to 85%) retest reliability (42% to 78%) correlations of measures (40% to 71%) (Miller et al, 2000).

### Findings

This section describes the characteristics of the study population briefly.

Table 1 - Descriptive characteristics of variables such as age, duration of marriage, the spouse's age, duration of pain

Index Variable	No	Mean	Standard deviation
Age	99	48.4242	9.23181
Duration of marriage	99	24.4646	11.07425
Age of spouse	99	51.8687	11.98438
Duration of pain	99	3.6869	3.61797

The above table shows descriptive characteristics variables such as age, duration of marriage, age of spouse and duration of pain. This table is based on the standard deviation and the mean of the variables' scores.

Table 2 - Descriptive characteristics of fear of pain and family function variables

Index Variable	No	Mean	Standard deviation
Fear of pain	99	79.5714	13.90765
Problem solving	99	13.6700	3.66544
Behavior	99	21.7600	5.08934
Roles	99	23.2900	4.51103
Emotional Mixture	99	16.6900	4.60060
Emotional response	99	14.9700	4.43916
Relationships	99	21.3200	3.15230
General function	99	17.5000	3.34996

The above table shows descriptive characteristics fear of pain and dimensions of family function variables. This table is based on the standard deviation and the mean of the variables' scores.

To examine the study first the hypotheses are calculated using the Pearson correlation coefficient and then using the standard correlations in multivariable regression analysis the prediction of the main variable is measures based on the predictive variables.

Based on this the hypothesis “weather different aspects of family function are associated with the fear caused by chronic pain in patients with chronic musculoskeletal pain” is tested and the results are brought into attention in the following tables.

Table 3 - Results of the Pearson correlation matrix between family function and fear of pain in patients with chronic musculoskeletal pain.

Fear of pain	Fear of pain	
Family function	R	0.269**
	Sig	0.003
	N	99
Problem solving	R	0.139
	Sig	0.169
	N	99
Behavior control	R	0.122
	Sig	0.228
	N	99
roles	R	0.206*
	Sig	0.039
	N	99
Emotional mixture	R	0.214*
	Sig	0.033
	N	99
Emotional response	R	0.256*
	Sig	0.010
	N	99
Relationships	R	0.219*
	Sig	0.029
	N	99
General function	R	0.219*
	Sig	0.029
	N	99

The results of Pearson correlation coefficient show that since the variable of “r” in the relationship between the problem solving of family function and fear of pain with the value of 0.296, The relationship between emotional mixture of family functioning and of fear of pain with the value of 0.206, The relationship between emotional responses of family functioning and fear of pain with the value 0.214, the relationship and fear of pain with the value of 0.256 and finally the relationship between the general family function with fear of pain 0.219 is at  $\alpha = 0.05$  is significant, this relationship is direct.

Due to the fact that a high score means that family function is not working correctly, direct relationship between family function scores and fear of pain means that lack of proper family function is associated with high

levels of fear of pain and vice versa. Therefore, the null hypothesis (no significant relationship between the variables) is rejected and the research hypothesis is confirmed with 95% confidence, In other words, changes in various aspects of family function predict fear of pain in patients with chronic musculoskeletal pain. It must be noted that the relationship between behavior and roles of family function and fear of pain in patients with chronic musculoskeletal pain is not significant.

After studying the relationship between the components of family functioning and fear of pain in patients with chronic musculoskeletal pain to examine the effect of clarifying role of family function on the fear of pain in patients with musculoskeletal chronic pain, the stepwise multiple regression and ANOVA regression model was used to confirm the value of the regression model the result of which as follows.

Table 4 - Results of multivariate regression analysis of fear of pain, in patients with skeletal - muscular chronic pain, based on the dimensions of family function

The variable	main	Source of change	Sum of the squares	Degree of freedom	Mean square	F	Level of significance
Fear of pain		Regression	366.845	1	366.845	9.423	0.003 <sup>a</sup>
		residual	3815.345	96	38.392		
		<b>Total</b>	4182.190	98			

The results of the regression analysis in the above table shows that the regression of fear of pain Variable in patients with chronic musculoskeletal pain, based on the dimensions of family functioning, is statistically significant. Because the value of  $F=9.423$  with the degrees of freedom 1 and 96 is significant at the level  $\alpha=0.05$  and aspects of family function in at least one sub-element, explain a part of the fear of pain variance. In other words, this result shows that the regression coefficients are significant and there is sufficient evidence to confirm the hypothesis.

Table 5 - Results of multiple regression of fear of pain in patients with chronic musculoskeletal pain, based on the dimensions of family function

Model	Predictor	R	R <sup>2</sup>	$\beta$ coefficients
1	Family problem solving	0.296 <sup>a</sup>	0.088	0.296

Based on the value of  $R^2$  in the above table, we can conclude that the problem solving variable of family function explains about 8.8% of the fear variable variance in patients with chronic musculoskeletal pain. In other words, the problem solving component is the best predictor of fear of pain variable. So a one-unit change in the variance of family problem solving variable, changes the variance of fear of pain about 296/0 unit.

#### Discussion and results

The present study examined the relationship between family functioning and chronic musculoskeletal pain-related levels of fear. The results showed that different dimensions of family function is related to the fear caused by chronic pain in patients with chronic musculoskeletal pain (first hypothesis) this finding is in line with the results obtained by Asmundson & Norton (1995), Linton & Buer (1995), Crombez et al (1996). Family environment affect the physical and mental health of the individuals and provides the necessary conditions for growth and to achieve a balance in physical, psychological, social life (Woods, 1995). Research conducted in this field indicates that Pain with its real threats to human life physical and psychological pressures causes serious problems to individuals and families (Leonrad & Cano, 2006). The results also showed that among all the sub-components of family function, problem solving, emotional mixture, emotional response and relationships are related with the fear of chronic pain. The bio-psycho-social model that presents a comprehensive and systematic approach to understand behavior and inside and outside systems relationships affecting health and illness of person (Sperry, 2006) in the field of chronic pain suggests that pain assessment and understanding of the biological processes involved in the initiation, timing and persistence of chronic pain (e.g., adjustment disorder in Hypothalamic - adrenal Axis, sympathetic flow, and safety) is affected by mental pressure (Sperry, 2006). In addition, the model claimed that social and psychological factors can affect the physiological responses (Turk & Flor, 1999). One such variable is the psychological fear of pain in individuals affecting family function and performance. For example, behavioral responses, such as avoidance of activity due to variables such as pain, fear of pain or expecting to have more injuries could lead to a general inability (Vlaeyen & Linton, 2000). Jensen et al (2011) in this case stated that chronic pain leads to limiting self movements which creates a cycle of constraints and the inability to participate in activities and wider inabilities. In addition to shrinking social and meaningful activities (Parkinson et al, 2010), the reduced physical activity due to

pain, leads to overweight and obesity in adults which increases the musculoskeletal pain (McCarthy et al, 2009). Some studies have shown the relationship between chronic pain, depression (Glicher et al, 2011; Lum et al, 2013) and social isolation and suicidal ideation (Almeida et al, 2012).

Fears associated with pain, like other forms of fear and anxiety, disturb human cognitive functions. This fear causes patients to pay more attention to symptoms of threat and less focus to pain and other issues. Many family interests may move around this subject also verbal communications may focus on this issue and this could cost lack of attention to other issues and in other words it is affected by the problem solving factor.

The cognitive-behavioral model attempts to explain this effect and it is always introduced by detailed description of the fear avoidance model and through the individual's symptoms, beliefs and behaviors explains how this vicious circle emerged causes sustention of the individuals' pain issues (Vlaeyen et al, 1995). This model implies that if the pain is caused by an injury, it is interpreted as a threatening factor (catastrophic pain) and fear of pain evolves. This leads to avoidance-oriented behaviors and hyperawareness to physical feelings the result of which includes: inability, failure and depression.

Therefore, considering past and present research findings it is concluded that the persistence of pain in the individual ruins the balance in the family. This fear persistence leads to avoidance symptoms in a patient which might cause a person in order to avoid this fear and achieve piece, reduce and avoid some of the activities that might increase the pain which affects the family function.

Behaviors such as avoidance of activity due to fear of pain and poor family communication cause lack of progress in treatment (Guidelines for the pharmacological management of chronic pain in primary care, 2012).

In addition, scores of family function in most components explained a part of the variance of the fear of pain (second hypothesis). A large number of studies show that fear of pain is actually one of the predictors of physical performance and disability levels expressed by individual. In a study conducted by Vlaeyen and colleagues (1995) on 104 patients with low back pain, the most relationship was between the measures of fear of pain and related disability and Behavioral performance reported by patients. McCracken et al (1996) also proved that incapacity has a strong correlation with more specific measures of fear of pain and its relationship with these specific criteria is more than its association with a more general criterion of anxiety. The researchers also proved that not only the level of pain-related fear predicts disability, but also causes non-specific physical complaints other than the primary complaints of chronic pain, thus they make the pain problem more complicated.

In general it can be said that pain imposes serious problems on individuals and families through its serious threats on human life and physical and psychological pressures on the patients. The first ones who suffer from consequences are the person, his/ her spouse, their children and the family as a whole. This study, like other previous research in this regard, showed that the social context of chronic pain, especially family and close ones, play a crucial role in the experience of pain and the resulting fear. Therefore, through identifying the effective dimensions of a family in this area it is possible to pay attention to the affected dimensions and the consequences of pain.

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