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The role of psychological factors on prediction of disturbance in daily activities among patients with chronic pain

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Abstract

Introduction: It's important to study chronic pain as a comprehensive physical problem. Studies demonstrated emotions and regulation of them, cognitive components, self-efficacy and inflexible pattern of behavior can affect the pain severity and disturbance in daily activities. The aim of this research is to determine predictive variables on disturbance in daily activities in patients with chronic pain.

Materials and Methods: In this descriptive-correlational study, a sample of 345 patients with chronic pain who referred to pain, rheumatoid and acupuncture clinics (Mashhad-Iran) was selected through convenient method. The patients completed these questionnaires: Pain Inflexibility (PIPS), Emotion Regulation (ER), Attachment Styles (RQ), Pain Self-efficacy (PSEQ) and multi facet pain questionnaire. Data analyzed by descriptive statistics, Pearson coefficient, step by step regression and SPSS software version 24.

Results: The relation of predictive variables- attachment styles, emotion regulation (reappraisal and suppression) self-efficacy and inflexibility-with disturbance in daily function was significant ($P=0.01$). Regression analysis showed that inflexibility, reappraisal, secure attachment and self-efficacy are the best predictors of disturbance daily activities in patients with chronic pain.

Conclusion: Based on the results, the predictors explain 34% of variance of disturbance daily activities. So, it's essential to consider psychological variables in planning of therapeutic intervention in patients with chronic pain.

Keywords: Chronic pain, Daily activities, Emotion regulation, Psychology.

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Introduction

According to the definition of the International Association for the Study of Pain, it is an unpleasant sensory and emotional experience associated with the degradation of potential and actual tissue, or is expressed in terms of such

damage. The pain experience has two sensory and emotional dimensions. Sensory dimension indicates severity of the pain and emotional dimension indicates the unpleasantness of pain experience. Pain can be divided into two types of acute and chronic. Acute pain is usually not long

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lasting but chronic pain is a pain which lasts longer than usual and expected. This time takes 3 months for research purposes and 6 months for clinical purposes (1). Recent research has shown that more than 1.5 billion people worldwide suffer from chronic pain (2). In the general Iranian adult population (18 to 65 years), the 6-month prevalence of persistent chronic pain has been reported to be about from 9% (3) to 14% (4), and in the elderly population (60 to 90 years) about (67%) (5). Therefore, chronic pain has become a serious health problem not only in terms of suffering and side effects, but also in terms of enormous economic consequences for society (6), and has a major negative impact on health care and national budgets (7).

The psychological flexibility model in the field of chronic pain states that the constant effort to control or reduce pain with its resultant discomfort in the past failed, or had long-term difficulties (8,9). Flexibility opens up to experiencing pain, and psychological inflexibility in avoidance behavior is dominant. A number of researchers insist on the idea that in order to cope with pain and get rid of it, rather than dealing with elements such as exaggerated beliefs or fears of moving, it is better not to manipulate the cognitive contents to enhance flexibility in the form of strengthening values, commitments and pain acceptance (8,10).

Emotion regulation is the main pattern of organizing emotions in response to environmental conditions and has a prominent role in maintaining physical well-being (11) and adaptation to chronic diseases (12). The emotional regulation involves managing the positive and negative emotions in yourself and others based on the current situation (13). Psychological factors especially emotions can affect the sensory experience of pain (such as its severity) and the emotional component of pain (such as its unpleasantness). Empirically, the induction of negative mood can increase the perception of pain and also increases the exaggerated thoughts of pain (14). In some studies, it has been suggested that a high level of awareness of excitements and their careful assessments are predictive of reducing pain and emotional distress (15,16), but in a number of others, these effects have been neutral (8,17). In the twentieth century, due to the inadequacy of

medical treatment and the introduction of three dimensions of pain by Melzac and Wall (1956) in the control of the pain gate which determine the intensity and nature of pain as a function of sensory, emotional and cognitive mechanisms, the role of psychological factors and their treatment associated with these factors became important (19). Relationships style is one of the lasting attributes of life that determines how a person communicates with one another (20). According to this theory, individuals respond to stressful and threatening situations according to specific psychological patterns of intimate relationships and also based on emotional regulation strategies. Relationships theory can be used as a model for the vulnerability and adaptability of persons to chronic pain (21). Anxiety in insecure relationships style is particularly correlated with the higher levels of various responses related to pain and negative cognition (22). These findings indicate that people with insecure relationships style are more likely to develop pain, and when pain develops, they feel it more severely and fretfully.

Self-efficacy is a cognitive belief that involves a person's belief in his ability to act in a particular way in order to obtain satisfactory results (23). Turk and Okifuji (24) have suggested self-efficacy as an important cognitive factor in reducing and controlling pain and adaptive psychological and disability functions (25).

As it is known, psychological factors in the field of chronic pain are raised. But, many of these studies have focused on emotional factors such as fear of movement or cognitive factors such as exaggerated beliefs. In the domain of research, relationships style correlation has been studied, or the styles in people with chronic pains have been compared in comparison to healthy people. Regarding relationships style, considering the important role of culture in the field of relationships style, it is necessary to repeat the studies on this subject in cultures, because the kind of culture affects the expression and experience of emotion. On the other hand, the adaptive or maladaptive style of emotional regulation is also a complex category. For example, in a society that expression of emotion is not favorable, people may experience more emotional repression. In domestic researches pertaining to the chronic pain, they have focused

on investigating modifying cognitive variables or have examined therapeutic approaches such as cognitive therapy in improvement or adaptations of this group of patients; and studies that have been designed to map effective factors are less done or carried out with small samples (under 200). Therefore, in this study after determining the relationship between emotion regulation variables, relationships styles, collaborative psychiatric epidemiology and flexibility of chronic pain, we intended to examine the power of predictions and their explanations regarding daily activities of these patients.

Materials and Methods

The current study is of descriptive and correlational type. The observed population in this study was all patients with chronic pain. Given that the minimum sample size in a modeling study is at least 200, so that for each variable at least 10 to 20 subjects is required (26). According to the number of variables in the present study and their subscales (15) the minimum sample size was considered as 300. A clinical sample of 221 patients was selected from among referrers to Imam Reza Hospital as well as several rheumatology clinics in Mashhad in which they visited from February 1995 to July 1996 (7 months). For this purpose, the permit was first obtained through Mashhad University of Medical Sciences.

Approximately 124 subclinical samples were selected from among those who had chronic pain symptoms, but who had not referred for treatment. These individuals were selected and evaluated in a chain in which each patient introduced the other affected person. The criteria for inclusion in this study was a history of at least three months of musculoskeletal pains, complaints of pain on a daily basis, at least being 18 years old and minimum primary education. The criteria for exclusion were the age of 60 or under the age of 18, lack of primary education, non-Iranian citizenship and lack of recognition of chronic pain (not lasting in the last three months).

The age range is between 18 and 60 years with an average of 42.5. All subjects completed research tools under the supervision of their researcher or assistant. Firstly, they explained the plan and the patients agreed orally, then, they completed and signed the written consent form. If

patients were not willing to participate in the study, they would not be psychologically evaluated stating that this lack of satisfaction would not create any problems in the admission and treatment process of the relevant clinic.

Patients who gave written consent were guided to a room that was in good condition and questionnaires were given to them. The questionnaires include the multidimensional pain questionnaire, collaborative psychiatric epidemiology surveys questionnaire (CPSEQ-10), Gross emotion regulation questionnaire (ERQ-10), relationships questionnaire (RQ-24) and questionnaire of inflexibility of pain (PIPS-16).

Research instrument

A) The Relationships Questionnaire (RQ): Compiled by Bartholomew and Horowitz (27) to measure adult attachment styles which consists of 24 items, and the subject answers a completely 5-point Likert scale in a continuum of completely opposite to fully agree in which more value belonged to the greater and stronger agreement attachment, and it shows four safe, obsession, fear and denial styles. The reliability of the test was as follows for women: safe 0.65%, obsession 0.82%, fear 0.79% and denial 0.75%, and for men, 0.63% safe, obsession 0.54%, fear 0.52% and denial has been reported 0.71%. (28). The reliability of this questionnaire in a domestic study based on Cronbach's alpha coefficient for safe attachment styles was 0.73%, 0.76% denial, 0.71 % obsession and 0.77% fear (29).

B) Psychological Inflexibility In Pain Scale (PIPS): A 16-item scale is used to assess the psychological flexibility of people with chronic pain. Two subscales evaluate pain avoidance and fusion with pain-related thoughts. The PIPS scale has shown an appropriate internal reliability based on Cronbach's alpha; avoidance (0.90%), fusion (0.75%) and overall score (0.89). The results support the simultaneous validity of both the subscales and the overall score (30).

The reliability based on Cronbach's alpha in a recent domestic study for the total psychological inflexibility was 0.90, and for the pain avoidance and cognitive inflexion was 0.91 and 0.83 respectively (31).

C) Collaborative Psychiatric Epidemiology Surveys Questionnaire (CPSEQ): Is a tool of 10

questions that assess patient's ability to perform various activities in spite of pain. The retest coefficients and internal consistency in terms of two separate studies with patients with chronic backache have been reported to be 0.79 and 0.92 respectively (32). Using a confirmatory factor analysis method in a sample of 348 Iranian patients with chronic pain, the internal consistency coefficient was 0.92 indicating a good internal consistency of the questionnaire. The reliability of the questionnaire was investigated over time using intra-class correlation, and the interval between two days was 7 to 11 days and the correlation between the two performances was 0.83. The validity of the Persian version was evaluated in a sample of 169 patients with chronic pain which showed a significant negative correlation between pain collaborative psychiatric epidemiology, depression and impotence (32).

D) Emotion Regulation Questionnaire (ERQ): It consists of 10 questions and aims to measure the emotion regulation strategies developed by Gross and John (2003), and include two reassessment and suppression (repression) scales. In Gross and John's research, the correlation for the re-evaluation was 0.79 and 0.73 for suppression (33). Kariman and Wingerhutes reported internal correlation 0.83 for re-evaluation and 0.79 for suppression. In Iran, the Cronbach's alpha coefficient is reported 0.79 for re-evaluation (34). In another domestic study, Cronbach's alpha coefficient for revaluation was 0.83 and suppression was 0.79 (29).

Results

345 patients completed the questionnaire were analyzed using SPSS-24 software. 64% of the sample size consisted clinical specimens and 35.9% are pseudo-clinical samples. 77.5% of them are women (265) and 22.5% are men (77).

The sample is 57% had diploma and post-diploma education, 28.1% had undergraduate education and 11.8% had master's degree. 2.4% of the sample size is also allocated to those who are studying. 81% are married and 13.5% are single and 6.6% were widowed or divorced. In terms of job status, 48.8% were unemployed and 45.3% were employed. 5.9% of them were studying. 32% of patients had chronic pain in the lower extremities and 68% had pain in their upper limbs. The average age of the sample was 42.5 years. At first, independent t-test was performed between the two clinical and pseudo-clinical groups for the variables studied and there was no significant difference between them, indicating that these two groups are in fact a group and the data from both groups are as it was integrated into regression analysis. The first goal of the study was to determine the relationship between predisposing variables (attachment styles, self-efficacy, flexibility, emotion regulation strategies, including reassessment and suppression) with the variance in daily functioning of patients with chronic pain. The Pearson correlation coefficient showed that these coefficients the order of flexibility (0.48), self-efficacy (-0.39), reassessment (0.20), secure attachment (0.22), attachment attachment (0.23), fear attachment (0.19) at level $P=0.01$ is significant. To determine the weight of each of the above variables, multiple regressions were used with stepwise method in order to determine the weight of each of the variables. The input variables in this analysis are not available to the researcher.

Flexibility scales, attachment styles (safe, troublesome, fear and denial), self-efficacy and emotion regulation strategies (reassessment and suppression) as predictive variables and daily disability scale scores were analyzed. The results of these analyzes are presented in Tables 2 and 1.

Table 1. The summary of variance analysis and multi-step regression model of predictive variables and variable of dysfunction in daily performance

Regression model	Degree of freedom (df)	F	Significance level	R	R2	Adj R2
Regression	4	43.720	0.000	0.583	0.340	0.332
Residual	340					
Total	344					

Table 2. The statistical indices and regression of predictive variables with variable of dysfunction in daily performance

Regression model	B	Beta	t score	Significance level
Fix number	2.517	-	5.558	0.000
Inflexibility	0.041	0.432	9.524	0.000
Self-efficacy	-0.021	-0.220	-4.438	0.000
Self-attachment	-0.020	-0.116	-2.450	0.01
Re-evaluation	-0.017	-0.096	-2.002	0.04

The analysis of the results in Table 2 and the regression statistics indicate that the F value for forecasting the variance of daily functioning disorder is significant based on eight predictive variables ($F=7.020$, $P<0.01$), which means that the predictive variables studied can predict daily dysfunction in patients with chronic pain. Among the variables predicted by the variables of unsafe attachment styles (anxiety, apprehension and denigrator), and the strategy of adjusting excitement extinction, the prediction pattern was eliminated and the remaining variables (flexibility Reassessment, safe attachment and self-efficacy) can be part of the variable variation of performance impairment daily prediction of patients with chronic pain was anticipated. Among the four predictors with daily dysfunction, a significant relationship was predicted ($R=0.08$), in which a total of 34% of the variability of functional dysfunction was explained ($R=0.340$) and if the results are generalized to the general population, the explanatory power is 33% ($Adj R^2=0.332$). If the results are generalized to the research community, the weight of each of the variables in explaining the variance in the patient's daily disorder's response to pain is inflexible , 0.432, safe attachment 0.116, reassessment -0.96, and self-efficacy -0.220.

In this way, the more inflexible the pain is, the more the daily performance of the affected patients with chronic pain more will be disrupted while the attachment person with chronic pain safer or strategy emotion regulation reassess further use or self-efficacy is more, the amount of impaired his performance against chronic pain will be less.

The prediction of the performance impedance formula based on the four variables of the prediction is: Disruption of the daily functioning

of the patients was $0.041\% + 0.571$ (rigidity) + 0.20 (safe attachment) + 0.017 (re-evaluation) + 0.021 (self-efficacy)

Discussion

Among the predictive variables (inflexibility, emotion regulation strategies such as reassessment and suppression, 4 attachment styles and collaborative psychiatric epidemiology), there was a significant relationship between inflexibility, reassessment, secure relationships style, obsession relationships, fearful relationships and collaborative psychiatric epidemiology with patients with function disorder. In the next step, the goal was to determine the contribution of variance of each of these variables in disturbing the daily functioning of patients with chronic pain. The results showed that the variables of inflexibility, collaborative psychiatric epidemiology, secure relationships and reassessment could predict 34% of the variables of chronic dysfunction in patients with chronic pain.

In line with the results of this study, a large study with a sample of 2182 showed that the outcome of dysfunction in patients with chronic pain is in avoidance and fear of motion which occurs as a result of exaggeration, continuation and the persistence of pain; and it is accompanied by the vigilance to symptoms (35). According to the World Health Organization (WHO), classification of function, disability and health includes a range of performance at the physical level (function and body structure), at the personal level (activity limits) and at the social level (constraint on participation). According to the findings of researchers, those with higher levels of avoidance and fewer scores in excessive activities reported more restrictions on their social life, more difficulties in self-care assignments, low tolerance levels for lifting

objects and transportation and, in general, overall higher disability scores. High levels of avoidance over excessive activity are much stronger predictor of overall physical disability. Why avoidance is so decisive, is a question that predicts the following two reasons:

Protective behavior is correlated with avoidance and fear which can limit movements and activities. Individuals may reduce their participation in actual activities due to fear of pain (36).

The variable of inflexibility against avoidance and fusion with pain, which in this study is in line with the studies, contributes to the function disorder in patients with chronic pain. Even many interventions in the field of chronic pain treatment suggest that focusing on the increase and manipulation of psychological flexibility through the use of the ACT approach has led to the improvement of social function of patients (37,38). Among the two strategies of suppression and reassessment, the re-evaluation strategy could predict patients with function disorder, but even in the case of suppression even a correlation relationship was not meaningful. This finding is not consistent with the result of the following study. A study in patients with fibromyalgia (a common symptom of chronic musculoskeletal pain associated with fatigue and sleep disorders) showed that avoidance emotional regulation strategies were found more in patients with fibromyalgia or other related syndromes (such as other chronic pain) in comparison to the control group (39). Another study also showed that cognitive re-evaluation of -0.14 and correlation suppression of 0.37 correlated with pain exaggeration which in contrast to the present study, evaluation variable was not meaningful; and the suppression variable after controlling social and demographic variables could play a moderating role in the relationship between pain exaggeration and pain adjustment (40). The obtained results in this study are not consistent with the results of the above studies. As we said earlier, in the present study the predictor suppression scale is not a good predictor of daily functioning disorder of patients, and even the correlation coefficients of these two variables were not meaningful. It seems that one of the reasons for explaining this result which was not expected can be found in the type of two variables

derived from the Gross process model. Cognitive re-evaluation is a cognitive variable that reinterprets the position, and the person attempts to reach another perspective on the problem to reduce its negative emotions, and as stated in the items, he/she attempts to change his/her mind about the situation. But, the suppression is a variable that does not seem to be cognitive; it is an emotional response in which a person keeps his/her emotions and does not show them at all. Now that this emotion becomes conscious and then is suppressed, or at a certain stage before consciousness becomes like this, is unclear and both states can be considered probable. Since the Gross Emotion Control Questionnaire has been used to identify the two reassessment and suppression strategies, it can be said that because of the non-cognitive nature of the suppression variable, items and in general the paper pencil tool and the question are not suitable methods for measuring such variables. It is probable that the subject is not able to understand his/her suppression style in order to recognize it. Because patients with chronic pain also suffer from not expressing emotions (25), this is more likely, but this situation does not occur in re-evaluation because it is a cognitive strategy that has a more objective mechanism in which the patient has been able to understand it from the questionnaire and responds to it. On the other hand, in another study as in the present study, emotional regulation did not modify the model in predicting the disability associated with pain (41). It seems that repeated research using methods other than self-assessment methods can be used to measure emotional regulation strategies. The relationship between obsession relationships style (0.13), fear (0.19) and secure (-0.22) were meaningful with daily disorder, but there was no meaningful difference in denial style. These results are consistent with other studies. For example, in a study with a large sample (2509 people) among subjects with extensive chronic pain, insecure styles (fear, obsession and denial) were observed more than the groups without pain. Among them, the insecure relationships style was correlated with the number of affected patients and the degree of disability. Among different types of relationships styles, extensive chronic pain was strongly correlated with obsession attachment style. Denial and fear styles had less correlation

with extensive chronic pain (42). The separate point of the present study from other conducted studies was the power of secure relationships variable, although the strength of insecure relationships styles did not reach the prediction level of daily dysfunction of patients. A study has shown that the obsession style is strongly correlated with the experience of chronic pain as well as the inability due to the pain and the number of organs involved in extensive pain. This result which is consistent with the results of the following studies has been obtained in the present study regarding patient's dysfunction. As mentioned earlier, the highest meaningful correlation coefficient is obtained for the obsession group. It is said that people who are anxious regarding the participation and response (fearful and obsessed), experience pain more negatively and have less effective exposure (44). But why the denial style in the present study did not have a meaningful relationship with dysfunction variable is not clear and needs to be repeated in other studies. Another remarkable result in this study is the collaborative psychiatric epidemiology variable which refers to cognitive beliefs which are defined as one's belief in his ability to act in a particular way to obtain desirable results (23). Collaborative psychiatric epidemiology had a significant negative correlation with daily dysfunction, that is, the more patients feel more self-efficacious, the less their daily function is disrupted. Collaborative psychiatric epidemiology through the following three mechanisms can relieve pain:

Efficient people have more patience in their efforts to cope with pain.

People who believe they can control their pain, are likely to use whatever they learned from coping skills to relieve their pain.

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Collaborative psychiatric epidemiology may reduce the disturbances caused by the pain as the result of physiological anxiety and unpleasant body tensions (24).

One of the limitations of this study is the existence of a sub-clinical sample which due to the necessity of a high sample size in modeling studies, we selected size of at least 300 people; although, they had the criteria for entering the research, they did not refer to clinics and treatment centers. On the other hand, fewer studies have been done in the country with this number of total sample size and dealt with these sum of predictive variables which is regarded as a strengthening point. It is suggested that in future studies, non-self-monitoring tools should be used to examine and measure the emotion regulation; although, this is the most common approach, it is not complete.

Conclusion

Overall, non-avoidance and flexibility seem to be major contributors to chronic pain. Therefore, to reduce dysfunction of patients with chronic pain, it is better to target improvement of levels of flexibility and reducing avoidance rather than addressing variables such as exaggerating and reducing fear of movement or pain, and teaching more effective strategies for emotional regulation such as re-evaluation could be important in this regard. Considering the results of relationships style and the stability of this variable from the time of formation forward, it is also possible to identify the patients at risk based on the patterns of relationships styles, and even to plan psychological interventions that simultaneously target relationships patterns and emotion regulation such as EFT (Emotion Freedom Techniques).

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