

Research Paper: Effectiveness of Acceptance and Commitment-Based Therapy (ACT Rehab) on Quality of Life, Severity and Duration of Pain; in Women With Chronic Low Back Pain



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ABSTRACT

Objectives: Most of the women around the globe experience low back pain which often has a psychological overlay. Acceptance and Commitment Therapy (ACT) can enhance psychological condition and subsequently improve mental health. Thereby the quality of life of individuals with chronic low back pain gets improved. The study rationale aimed to assess the effectiveness of ACT on quality of life, severity and duration of pain in women with chronic low back pain.

Methods: Twenty subjects (women aged between 23 to 34 years) with chronic low back pain from a rehabilitation clinic in Rasht city in the year 2016 were included in the study by convenience sampling method. They were then randomly divided into experimental and control groups (in each group, n=10). Data were collected by a three-part checklist containing demographic characters, World Health Organization Quality of Life questionnaire and McGill Pain Questionnaire. The rehabilitation interventions were based on ACT carried out for eight sessions of one hour each, twice a week. The collected data were analyzed by SPSS software via Paired t-test and independent t-test method.

Results: There was a significant increase in all subscales of quality of life ($P < 0.001$) except subscale of physical health ($P < 0.38$) in experimental group. Independent t-test showed a significant decline in mean severity and duration of pain in the experimental group compared to control group.

Discussion: The effects of ACT rehabilitation technique on women with chronic low back pain were impressive, which augmented the quality of life. Hence this method can be used as a rehabilitation tool for women with chronic low back pain.

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1. Introduction

Pain is one of the most annoying phenomena that force people to seek medical attention. People are influenced not only by the stress and discomfort caused by pain but also by other distracting consequences like health care burden, inability to concentrate on routine jobs or family-related issues [1]. According to the International Association for the Study of Pain (IASP), pain can be differentiated into acute and chronic based on intensity and duration. Acute pain is usually caused by a disease or an injury, and lasts for less than three months. On the other hand, chronic pain gets prolonged for a period of minimum three months. This could lead to tissue damage, thereby considered as a disabling factor [2]. Chronic pain is a matter of concern which has been studied and discussed often in the field of psychophysical system and factors that affects pain perception in individuals [3]. Patients having chronic pain also experience different sensorimotor complications, mental and social constraints. Chronic pain reduces an individual's physical and emotional abilities, and a sense of relief from the pain becomes impossible, the reason that take it in the list of disabilities. Hence the patient always used to be in a state of depression, disappointment and demoralization, which ultimately affect the quality of life of the individual [2, 3]. So multi-dimensional rehabilitation technique seems to be an ideal tool to deal with these type of individuals.

Nowadays, back pain is one of the most prevalent problems, human beings are faced with; since about 80% of people experience it over the course of their lives [4]. Billions of dollars are lost directly by treating the pain or indirectly by the loss of working hours of the people caused due to pain. The estimated overall back pain related expenditure in UK and USA was found to be six billion and 75 to 100 billion respectively. According to an estimation, more than 185 and 116 million working days get lost due to back pain of people in the USA and UK respectively [5]. Low backache is one of the most common pain perceived by patients suffering from chronic pain. It is the second most prevalent fact due to which people visit physicians after having viral rhinitis [6]. Twenty-five percent of patients visiting doctors or pain rehabilitation clinics suffer from chronic low back pain [7]. Living with chronic pain demands immense capacity to endure a considerable amount of emotional stress. Many of the previous studies concluded that chronic pain was not just a symptom, but associated with movement limita-

tions, depression, sleeping problems, loss of appetite and reduction of the overall quality of life.

Because of the multi-dimensional nature of chronic pain, the current strategy to manage the pain is through rehabilitation therapy. The inter-disciplinary approach includes administration of analgesics along with physical, occupational, behavioral and psychological therapies [8]. The purpose of most of the existing psychological treatments is to improve the quality of life of patients, as well as to reduce pain [8, 9]. Current psychological approaches in chronic pain management include psychological interventions which aim to achieve better self-management of the pain. It also includes management of behavioral changes, acceptance-based interventions and cognitive changes which are also called rehabilitation methods [8]. Psychological interventions that have been frequently used in this field include mental and physical techniques, behavioral approaches, and cognitive-behavioral treatments. Acceptance-based therapies are known as the third wave of cognitive-behavioral treatment. It focuses on enhancing the psychological connection a person used to have with his thoughts and feelings rather than changing the cognitions. Acceptance and Commitment-based Therapy (ACT) is among the most prevalent types of treatment.

The purpose of this therapeutic method is to help patients have more valuable and satisfying life by enhancing their psychological flexibility. This method has six core processes such as acceptance, cognitive diffusion, contact with the present moment, self as context, values and committed actions [8, 10]. In case of chronic pain, this rehabilitation method targets inefficient avoidance and control strategies by nurturing the techniques that increase psychological flexibility [11]. This method can reduce individuals' chronic pain and improve the quality of life. It also helps them accept their pain and the associated thoughts, thereby, promoting meaningful aspects of life [12, 13]. McCracken et al. (2010) concluded the fact that people those who participate in daily activities despite of having chronic pain experience improved emotional, social and psychological abilities [14]. In addition, research results suggest that ACT is able to reduce depression, anxiety and pain in patients suffering from chronic low backache and enhances the quality of their lives [15, 16].

Chronic low back pain is common in women. The study rationale was rooted on the fact that, no Iranian study as focused on the effect of ACT on the management of chronic pain. Hence, it was an unprecedented

effort to check the effect of ACT on female patients suffering from chronic low back pain in Iran.

2. Methods

This study was a semi-experimental research, and its design consisted of pre and post-test with the control group. The study population included women suffering from chronic low back pain who had visited the rehabilitation clinic in the city of Rasht during winter in the year 2016. Available sampling method was used to select 20 of these women and were divided into two groups with 10 subjects in each group (experimental and control). Before the study subjects signed the consent agreement, it was ensured that all the subjects met the inclusion criteria. The inclusion criteria of the subjects as per IASP guide were, aged between 23-34 years, devoid of rheumatism, no past history of spine injury or surgery; have a high school diploma and not under any psychological intervention or consultation. The participants were allowed to get discontinued from the study at any moment as per their wish. The participants were individually informed that participation was confidential and voluntary. The study was approved by the department of psychology, Karaj Branch, Islamic Azad University, Karaj, Iran, (IR.IAU.RASHT.REC.1395.70).

Questionnaires

Following questionnaires were used to collect the study data.

Demographic Characteristics Questionnaire

Demographic characteristics questionnaire contained personal information such as gender, age, level of education, marital status; duration of diagnosis, type of disease and the subject's post history.

Quality of Life Questionnaire of the World Health Organization

Quality of life questionnaire of the World Health Organization (26-question) was designed by WHO for measuring the overall quality of life of individuals having chronic low back pain [17]. The quality of life scale of WHO has 26 questions and evaluates four dimensions of the quality life of individuals. The scale used had a five-option Likert scale which included physical health, psychological health, social health and environmental health. The questionnaire was validated for Persian Language speaking subjects. The al-

pha coefficient reported for the entire scale in Iran was equal to 0.89 [18].

McGill Pain Questionnaire Modified (MPQ)

McGill Pain Questionnaire Modified (MPQ) was proposed by Mine et al. (1980) and has a set of 20 phrases. The purpose of this questionnaire was to measure the individual's pain perception and different dimensions of pain. Four different dimensions of pain are there such as sensory perception, emotional perception, evaluative perception and various kinds of pain) [19]. McGill pain questionnaire has two independent factors, the first factor is sensory pain which describes an individual's experience of pain and the second one is the emotional pain which describes the emotional consequences of it.

McGill pain questionnaire modified had three sections, the first section contained 15 verbal descriptions in the two main groups. It contains 11 indexes for the sensory pain and 4 indexes for emotional pain each of which had a special rank (0: No pain; 1: Mild pain; 2: Moderate; and 3: Severe). The second section contains a Visual Analogue Scale which was ranked from 0 to 10 and the patients assessed their own rank based on the severity of pain they experienced from 0 (no pain) to 5 (severe pain) on a graded line. Visual Analogue Scale had a horizontal line graded from 0 (absolute lack of pain) to 10 (unbearable pain). The third section contained Present Pain Intensity (PPI) in the rank from 0 to 5 (0: No pain; 1: Mild; 2: Uncomfortable; 3: Agonizing; 4: Horrifying; and 5: Excruciating). The total pain score of a patient was calculated by considering the scores obtained from various dimensions of pain (Table 1).

Procedure

The method of conduction in this study was as follows. After the samples were selected and randomly divided into two groups (experimental and control groups), the same questionnaires were distributed among the research sample. They were comprehensively explained how to answer the questions in the distributed questionnaires. The participants were reassured that their information will remain anonymous and confidential. After filling out the questionnaires, the participants in the experimental group took part in 8 one-hour sessions of ACT twice a week in addition to their usual treatments. On the other hand, the participants in the control group were kept on the waiting list and received only their usual treatment programs. After these sessions, the participants in both the groups filled out the distributed questionnaires. As mentioned previously, ACT was used as the therapeutic

Table 1. Components of the McGill Pain Questionnaire

Dimension	Related Questions
Sensory perception of pain	Sets 1 to 10
Emotional perception of pain	Sets 11 to 15
Evaluative perception of pain	Set 16
Various kinds of pain	Sets 16 to 20

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method in this research. This method focuses on enhancing an individual’s psychological connection with his or her thoughts and feelings instead of focusing on changing the cognitions. In the present study, the rehabilitation interventions were planned based on the Vowel’s

and Sorrel treatment protocol. In addition, to confirm the content validity of the treatment package and comply it with the research objectives, the text was given to five clinical psychology specialists who were fluent in English and familiar with the topic so as to confirm the

Table 2. Description of the acceptance and commitment-based therapy

Sessions	Topic	Content
First	Introduction and fundamental basics of rehabilitation therapy	Establishing a therapeutic relationship, familiarity of participating members with each other and with the therapist, familiarity of subjects with the topic of research, explaining the rules to the groups, signing a the consent agreement, comprehensive description of the therapeutic approach, home assignments, listing out five of the most important problems the patients experienced during the entire phase of pain endurance.
Second	Options and determining the path of treatment	Evaluating the previous session’s assignments, measuring patients’ problems from the perspective of ACT (extracting individuals’ experiences associated with avoidance, mélange and personal values), establishing a relationship between pain, creation and function, mindfulness, home assignments. Preparing a list of advantages, disadvantages and methods for controlling problems.
Third	Learning how to live without chronic pain	Evaluating the previous session’s assignments, explaining the inefficiency of controlling negative occurrences using different metaphors and teaching tendency to negative emotions and experiences; accepting chronic pain, values and mindfulness; home assignment: recording the cases where patients have been able to successfully put aside inefficient control methods.
Fourth	Values and actions	Evaluating the previous session’s assignments, explaining the concept of values, recognizing patients’ life values, and measuring these values based on their importance. Introducing a three-dimensional behavioral model in order to express the interaction between behaviors and emotions, psychological functions and observable behaviors; discussing the efforts made for changing the behaviors accordingly; motivating the patients to change; and giving them the strength to live a better life; concentration exercises; receiving feedback; and submitting the assignments.
Fifth	Motivation, thoughts and emotions	Evaluating the previous session’s assignments, creating a connection with the present time and considering self as a context (a chess-related metaphor) and teaching mindfulness techniques. Home assignment: recording the cases where patients have been able to monitor their thoughts using the mindfulness-related techniques.
Sixth	Action, beginning to move	Evaluating the previous session’s assignments, explaining how to avoid painful experiences and be aware of their consequences, teaching acceptance step by step, changing the concepts of language using allegories, teaching body relaxation, receiving feedback, and teaching how to separate assessments from personal experiences. Home assignments: recording the cases where patients have been able to observe and not evaluate the experiences and emotions.
Seventh	Commitment	Evaluating the previous session’s assignments, satisfaction, teaching how to commit to actions, recognizing behavioral plans according to values and committing to taking action in regard with these plans, committing to actions and values and facing the barriers, implementing the mindfulness-related techniques, feedback and submitting assignments.
Eighth	Lifelong maintenance	Evaluating the previous session’s assignments, committing to action despite the negative occurrences and preventing their reoccurrence, summing up the sessions, saying goodbye to the group, taking the post-test and doing the lifelong assignment.

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accuracy of the translation. Here, it should be noted that the treatment package was completely standard and had been confirmed in foreign clinical psychology institutes and assemblies. Then, the translated text was presented to a few university students in the form of an unofficial class so as to confirm the accuracy of the understanding of the text. After this stage, the treatment package was directly used and the sessions of this package have been briefly explained in Table 2. Considering the goal of the study and to control the effect of the pretest variable, descriptive and inferential statistics have been used in this study. In the descriptive statistics, the mean and standard deviation have been examined, and at the inferential level, due to the conditions of the parametric tests, the correlated t-test and independent t-test were used. SPSS 20 software was used for data analysis.

3. Results

According to the descriptive findings, the mean and standard deviation of the age of the subjects was 40.3 ± 8.2 , and the mean and standard deviation of the duration of pain was 6.5 ± 3.4 . According to the results presented in Figure 1, the percentage of variances of the components of quality of life in the experimental group had increased compared to that of the control group. All the components of quality of life (psychological health ($P < 0.001$), social health ($P < 0.001$), and environmental health ($P < 0.001$) significantly increased, except for physical health ($P < 0.38$).

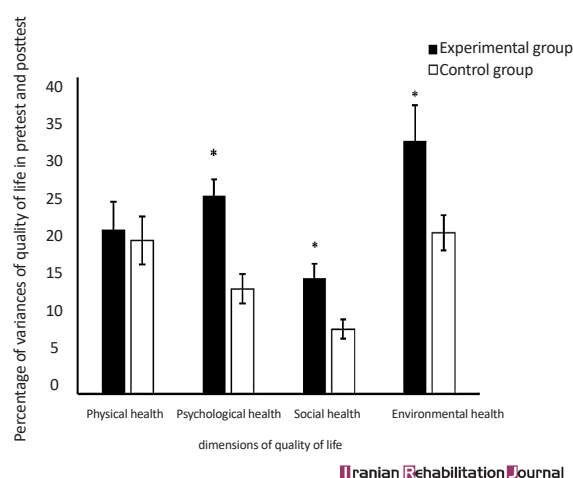


Figure 1. Comparing the percentage of variances of the dimensions of quality of life among the participants

Significance level is $P < 0.05$; *An indication of a significant difference between the control group and experimental group

In addition, the results of the present study, as displayed in Figure 2, indicate that there is no significant difference between the control group and the experimental group in pretest ($P < 0.23$). On the other hand, the mean score of pain in the post-test did not show a significant difference. In other words, ACT has a significant impact on the reduction of pain score ($P < 0.001$).

4. Discussion

The purpose of the present study was to examine the effectiveness of ACT on quality of life, severity and duration of pain in women suffering from chronic low back pain. The results of this study suggest that an effective ACT period has a significant effect on the quality of life of women suffering from chronic low back pain. Our results comply with those of Mason et al. (2004), McCracken et al. (2014) and Turk et al. (1984) [15, 20-22]. For instance, Mason et al. (2008) have shown that accepting low back pain improves the quality of life of those who suffer from chronic low back pain [15].

In this study, the ACT approach and all of its six core components were used, and it was concluded that by educating patients, ACT will be able to improve psychological flexibility and, therefore, committed and effective behavioral performance. One of these components is self as a context, which means that the individuals become aware of their thoughts, feelings and inner desires, and they are asked to prevent controlling and avoiding them. Then, cognitive diffusion is encouraged, which means adjusting one's reaction to their thoughts. In fact, in ACT, thoughts and contents are not validated and/or

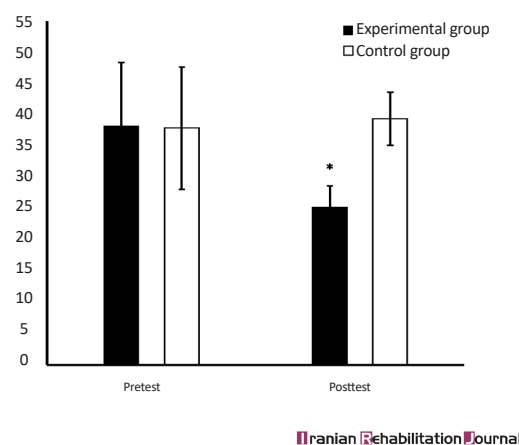


Figure 2. Comparing mean and standard deviation of pain score among the participants

Significance level is $P < 0.05$; *An indication of a significant difference between the control group and experimental group

thoughts are not challenged; only the performances are challenged in this approach. Another component is acceptance, which means accepting a situation that cannot be avoided; for example, experiencing pain.

Another component is being in contact with the present moment and being aware of what's going on at the moment instead of focusing on the past or what might happen in the future. Another component is specification of one's values and ultimately committed and effective performance in compliance with the predetermined objectives. All of these components and processes contribute to the psychological flexibility of individuals and improve the quality of their lives [19]. In this respect, some studies have shown that a mind consciousness program based on stress reduction is effective on improving the total score of quality of life, mental, spiritual, emotional, and physical well-being [23, 24].

On the other hand, this finding does not comply with the findings of Andersson et al. (2004) [25] and Hayes et al. (2011) [11]. For example, using this therapeutic method on patients suffering from sensorimotor defects can be helpful in terms of achieving another opportunity for assessing the physiological reactions of their bodies and acquiring the ability to control these involuntary reactions [25]. Dissimilarity of the results of these studies with the present study is probably due to the gender and age of the subjects and the method used in the research.

According to the research results, chronic low back pain affects patients' sleeping, emotional and psychological status, social relations and other aspects of quality of life [26]. Given the relationship between psychological factors and chronic low back pain, the negative psychological and social effects of chronic low back pain cannot be determined by using other medical models alone and focusing only on the physical dimension. Hence, it is necessary to pay attention to psychological interventions and approaches [27]. Over the past ten years, cognitive-behavioral therapy is the most common psychological approach in treating chronic pain that directly focuses on changing thoughts and emotions associated with pain and other disturbing and stressful conditions in addition to behavioral interventions. Many studies have shown that in the best situation, the success of the aforementioned approach was not considerable. In contrast, some other studies have shown that among the third wave treatments, ACT improves psychological flexibility, reduces chronic pain, and enhances quality of life. The purpose of this rehabilitation method is to help patients

have a more valuable and satisfying life by enhancing psychological flexibility [15, 16].

The results of the present study suggest that therapeutic commitment and acceptance is effective in reducing severity and duration of pain in women suffering from chronic low back pain. This result complies with the results obtained by Veehof et al. (2016), Veehof et al. (2011) and Breivik et al. [28-30]. Veehof et al. (2016) have shown that accepting back pain improves quality of life of individuals suffering from chronic low back pain [30]. Breivik et al. (2006) have also shown that a mind consciousness program based on stress reduction is effective in improving the total score of quality of life, mental, spiritual, emotional and physical well-being. In addition, Chisholm et al. (2016), in their study, concluded that ACT affects mental distress, anxiety, depression, stress and enhancement of quality of life [28]. The results of the study of Veehof et al. (2011) suggest that ACT interventions improve health and reduce mental pressures by changing psychological flexibility and paying conscious attention to the symptoms of anxiety [29].

Wicksell et al. (2009) reported that flexibility throughout the interventions reduces symptoms of depression and anxiety [31]. Moreover, this study shows that ACT affects anxiety-related disorders [15, 16]. The results of the studies of Tamannaefar et al. (2014) have suggested that ACT has been effective in reducing the pain experienced by women suffering from chronic headaches [32]. Furthermore, Mohabbat et al. (2015) reported that ACT has significantly increased the quality of life of participants in the experimental group and their physical and mental health subscales in comparison with those in the control group [33].

5. Conclusion

The results of this study have shown that ACT can reduce the severity and duration of pain and increase the quality of life of women suffering from chronic low back pain. The findings of this research are indicative of the necessity of creating a connection between various branches of sciences to solve the problems associated with various physical, psychological and social aspects. Such therapeutic methods make the patients' lives more meaningful, improve the quality of their lives, and reduce the costs of rehabilitation and treatment. Further, these therapeutic methods can be used in rehabilitation clinics and psychological services centers in order to solve the psychological problems of patients suffering from chronic pains.

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Conflict of Interest

The authors declared no conflicts of interest.

References

- [1] Taub CJ, Sturgeon JA, Johnson KA, Mackey SC, Darnall BD. Effects of a pain catastrophizing induction on sensory testing in women with chronic low back pain: A pilot study. *Pain Research and Management*. 2017; 2017:1-10. doi: 10.1155/2017/7892494
- [2] Paige NM, Miake-Lye IM, Booth MS, Beroes JM, Mardian AS, Dougherty P, et al. Association of spinal manipulative therapy with clinical benefit and harm for acute low back pain. *JAMA*. 2017; 317(14):1451. doi: 10.1001/jama.2017.3086
- [3] Ayorinde AA, Bhattacharya S, Druce KL, Jones GT, Macfarlane GJ. Chronic pelvic pain in women of reproductive and post-reproductive age: A population-based study. *European Journal of Pain*. 2016; 21(3):445-55. doi: 10.1002/ejp.938
- [4] Kofotolis N, Kellis E, Vlachopoulos SP, Gouitas I, Theodorakis Y. Effects of pilates and trunk strengthening exercises on health-related quality of life in women with chronic low back pain. *Journal of Back and Musculoskeletal Rehabilitation*. 2016; 29(4):649-59. doi: 10.3233/bmr-160665
- [5] Macfarlane GJ. The epidemiology of chronic pain. *PAIN*. 2016; 157(10):2158-9. doi: 10.1097/j.pain.0000000000000676
- [6] Cooper NA, Scavo KM, Strickland KJ, Tipayamongkol N, Nicholson JD, Bewyer DC, et al. Prevalence of gluteus medius weakness in people with chronic low back pain compared to healthy controls. *European Spine Journal*. 2015; 25(4):1258-65. doi: 10.1007/s00586-015-4027-6
- [7] Manchikanti L, Singh V, Falco FJE, Benyamin RM, Hirsch JA. Epidemiology of low back pain in adults. *Neuromodulation: Technology at the Neural Interface*. 2014; 17:3-10. doi: 10.1111/ner.12018
- [8] Roditi D, Roditi. The role of psychological interventions in the management of patients with chronic pain. *Psychology Research and Behavior Management*. 2011; 4:41. doi: 10.2147/prbm.s15375
- [9] Vartiainen P, Heiskanen T, Sintonen H, Roine RP, Kalso E. Health-related quality of life and burden of disease in chronic pain measured with the 15D instrument. *PAIN*. 2016; 157(10):2269-76. doi: 10.1097/j.pain.0000000000000641
- [10] Gaudiano BA, Davis CH, Epstein-Lubow G, Johnson JE, Mueser KT, Miller IW. Acceptance and commitment therapy for inpatients with psychosis (the REACH Study): Protocol for treatment development and pilot testing. *Healthcare*. 2017; 5(2):23-28.
- [11] Hayes SC, Strosahl KD, Wilson KG. Acceptance and commitment therapy: The process and practice of mindful change. New York: Guilford Press; 2011.
- [12] Vowles KE, McCracken LM, Sowden G, Ashworth J. Psychological flexibility in coping with chronic pain. *The Clinical Journal of Pain*. 2014; 30(4):324-30. doi: 10.1097/ajp.0b013e31829ea187
- [13] McCracken LM, Eccleston C. A prospective study of acceptance of pain and patient functioning with chronic pain. *Pain*. 2005; 118(1):164-9. doi: 10.1016/j.pain.2005.08.015
- [14] McCracken LM, Velleman SC. Psychological flexibility in adults with chronic pain: A study of acceptance, mindfulness, and values-based action in primary care. *Pain*. 2010; 148(1):141-7. doi: 10.1016/j.pain.2009.10.034
- [15] Mason VL, Mathias B, Skevington SM. Accepting low back pain: Is it related to a good quality of life. *The Clinical Journal of Pain*. 2008; 24(1):22-9. doi: 10.1097/ajp.0b013e318156d94f
- [16] Johnston M, Foster M, Shennan J, Starkey NJ, Johnson A. The Effectiveness of an acceptance and commitment therapy self-help intervention for chronic pain. *The Clinical Journal of Pain*. 2010; 26(5):393-402. doi: 10.1097/ajp.0b013e3181cf59ce
- [17] Oyama MA, Citron L, Shults J, Cimino Brown D, Serpell JA, Farrar JT. Measuring quality of life in owners of companion dogs: Development and validation of a dog owner-specific quality of life questionnaire. *Anthrozoös*. 2017; 30(1):61-75. doi: 10.1080/08927936.2016.1228774
- [18] Timareh M, Rhimi M, Abbasi P, Rezaei M, Hyaidarpoor S. Quality of life in diabetic patients referred to the Diabetic research Center in Kermanshah. *Journal of Kermanshah University of Medical Sciences*. 2012; 16(1):63-9.
- [19] Main CJ. The modified somatic perception questionnaire (MSPQ). *Journal of Psychosomatic Research*. 1983; 27(6):503-14. doi: 10.1016/0022-3999(83)90040-5
- [20] Sandhu SS. Validating the factor structure and testing measurement invariance of modified Short-Form McGill Pain Questionnaire (Ortho-SF-MPQ) for orthodontic pain assessment. *Journal of Orthodontics*. 2017; 44(1):34-43. doi: 10.1080/14653125.2016.1275442
- [21] McCracken LM, Vowles KE. Acceptance and commitment therapy and mindfulness for chronic pain: Model, process, and progress. *American Psychologist*. 2014; 69(2):178-87. doi: 10.1037/a0035623
- [22] Turk D, Meichenbaum D, Genest M, Berntzen D. Pain and behavioral medicine: A cognitive-behavioral perspective. *Scandinavian Journal of Behaviour Therapy*. 1984; 13(4):243-4. doi: 10.1080/16506078409455719
- [23] Gatchel RJ, Peng YB, Peters ML, Fuchs PN, Turk DC. The biopsychosocial approach to chronic pain: Scientific advances and future directions. *Psychological Bulletin*. 2007; 133(4):581-624. doi: 10.1037/0033-2909.133.4.581
- [24] Ardebil M, Banth S. Effectiveness of mindfulness meditation on pain and quality of life of patients with chronic low back pain. *International Journal of Yoga*. 2015; 8(2):128. doi: 10.4103/0973-6131.158476

- [25] Andersson HI. The course of non-malignant chronic pain: A 12-year follow-up of a cohort from the general population. *European Journal of Pain*. 2004; 8(1):47-53. doi: 10.1016/s1090-3801(03)00064-8
- [26] Heidari J, Hasenbring M, Kleinert J, Kellmann M. Stress-related psychological factors for back pain among athletes: Important topic with scarce evidence. *European Journal of Sport Science*. 2016; 17(3):351-9. doi: 10.1080/17461391.2016.1252429
- [27] Carlesso LC, Rampersaud YR, Davis AM. Clinical classes of injured workers with chronic low back pain: A latent class analysis with relationship to working status. *European Spine Journal*. 2017; 1-8. PMID:28138782
- [28] Breivik H, Collett B, Ventafridda V, Cohen R, Gallacher D. Survey of chronic pain in Europe: Prevalence, impact on daily life, and treatment. *European Journal of Pain*. 2006; 10(4):287-287. doi: 10.1016/j.ejpain.2005.06.009
- [29] Veehof MM, Oskam M-J, Schreurs KMG, Bohlmeijer ET. Acceptance-based interventions for the treatment of chronic pain: A systematic review and meta-analysis. *Pain*. 2011; 152(3):533-42. doi: 10.1016/j.pain.2010.11.002
- [30] Veehof MM, Trompetter HR, Bohlmeijer ET, Schreurs KMG. Acceptance- and mindfulness-based interventions for the treatment of chronic pain: A meta-analytic review. *Cognitive Behaviour Therapy*. 2016; 45(1):5-31. doi: 10.1080/16506073.2015.1098724
- [31] Wicksell RK, Melin L, Lekander M, Olsson GL. Evaluating the effectiveness of exposure and acceptance strategies to improve functioning and quality of life in longstanding pediatric pain: A randomized controlled trial. *Pain*. 2009; 141(3):248-57. doi: 10.1016/j.pain.2008.11.006
- [32] Tamannaefar S, Gharraee B, Birashk B, Habibi M. A comparative effectiveness of acceptance and commitment therapy and group cognitive therapy for major depressive disorder. *Zahedan Journal of Research in Medical Sciences*. 2014; 16(10):60-3.
- [33] Mohabbat-Bahar S, Maleki-Rizi F, Akbari ME, Moradi-Joo M. Effectiveness of group training based on acceptance and commitment therapy on anxiety and depression of women with breast cancer. *Iranian Journal of Cancer Prevention*. 2015; 8(2):71-6. PMID: PMC4411466