



# The Effectiveness of Acceptance and Commitment Therapy on Anxiety, Depression, and Stress in Patients with Spinal Cord Injuries

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## Abstract

**Background:** Since the number of patients with spinal cord injuries is increasing, paying attention to these patients' psychological problems is a priority. This study aimed to evaluate the effect of acceptance and commitment therapy on anxiety, depression, and stress in patients with spinal cord injuries.

**Methods:** The present study had utilized a single-subject approach in the form of multiple baseline design. The samples were selected using purposive sampling based on convenience sampling method. The statistical population included all patients in Hamadan city with spinal cord injuries who referred to the Shahid Beheshti hospital in this city. The total numbers of them were 181 people in 2016. The researchers informed the patients about the research and presented them with informed consent forms. Among 50 screened patients, five patients (4 males and one female) selected and entered the treatment process: anxiety, depression, and stress measured by Depression Anxiety Stress Scales (DASS-21). Acceptance and commitment therapy conducted in 8 treatment sessions on anxiety, depression, and stress in patients with spinal cord injuries.

**Results:** The results of the graphic and chart analysis, reliable change index (RCI) and the percentage of recovery showed that acceptance and commitment therapy affected anxiety, depression, and stress in the patients with spinal cord injuries.

**Conclusion:** Findings indicated that acceptance and commitment therapy improved people's mental health by working on acceptance and mindfulness processes and behavior change processes. This therapy decreased anxiety, depression, and stress in patients with spinal cord lesion.

**Keywords:** Acceptance and commitment therapy; Anxiety; Depression; Stress; Spinal cord lesions.

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## Introduction

When a human accepts something beyond his control, he commits himself to the acts that can improve his or her life quality. This fact can help individuals to initiate a meaningful and prolific life so that he efficiently manipulates and adjusts the pains and pressures which inevitably has entered into his life.<sup>1</sup> Such commitment and acceptance could take from a type of treatment called acceptance and commitment therapy that is rooted in behavioral therapy and is one of the empirical clinical psychology branches. The aim of acceptance and commitment therapy is to decrease experiential avoidance (experiential avoidance, attempt to adjust or control unwelcome inner experiences of cognitions, memories or feelings) and foster mental flexibility that is the ability of flexible communicating with internal experiences and adaptive responses to the situations for the worthwhile

purpose of life.<sup>2</sup> There is empirical support for the effectiveness of acceptance and commitment therapy on the treatment of psychological distress.<sup>3</sup>

Acceptance and commitment therapy is the third wave therapy behavior. This method ostensibly accepts changing the thoughts and feelings function instead of changing their form, content or frequency. Acceptance and commitment therapy is rooted in a philosophical theory called functional contextualism. Moreover, it based on a research program in line with the language and cognition that is called relational frame theory. Acceptance and commitment therapy has 6 processes that lead to psychological flexibility.<sup>1</sup> The research results have designated that acceptance and commitment therapy has a long-lasting effect on depression, anxiety, and stress in patients.<sup>4</sup>

The incidence of anxiety in individuals with a spinal cord

lesion leads to his or her isolation from the community and activities. Anxiety is a painful feeling that is related to a current traumatic state or a risk expectation that its root is unclear and causes many mental and emotional disorders, such as depression. Some researchers have designated that high levels of anxiety have associated with depression and increasing impulsive behaviors. Depression is a state of mind that is related to reduced self-esteem, feelings of incompetence and an unpleasant impression of oneself.<sup>5</sup>

Anxiety becomes a clinical concern when it disrupts the capability to practice in everyday life so that a person feels maladaptive that is characterized by severe physical and psychological reactions. People with anxiety disorders cannot do their everyday activities. Their anxiety is unpleasant and does not let them enjoy normal situations. Also, they try to avoid situations that make them feel anxious. They lose opportunities to have fun or act according to their tendencies.<sup>6</sup> People with anxiety disorders become helpless when they feel chronic or severe anxiety.<sup>7</sup>

The other studied variable is depression. Depression is a psychological problem in which a person sustainably experiences deep, persistent distress and diminished interest in all activities for at least 2 weeks. People with depression feel that they are exhausted and confused. The life of these people, due to impairment in their work and their families, is chaotic. The depressed individual becomes tired and lethargic and experiences the slowness of his physical movements.<sup>8</sup>

The other inspected variable is stress. Stress could see in abundance in everyday life, and all people are often affected by stress or tension. All individuals become affected severally by stress and force, which is called stressor or tension factor in psychology. This may be any other incentive that causes stress in human beings. When someone experiences stress in the family, all family members that have interactions with that person could be affected with stress, and it might transmit to them.

Consequently, disability in an individual, such as spinal cord lesion, can increase the stress level in the person and his or her family or relatives since the appeared disability can bring pressures and limitations to the individuals that these pressures bring about stress.<sup>9</sup> The obtained results have specified that acceptance and commitment therapy has a permanent effect on anxiety and depression in patients.<sup>4</sup>

Up to now, various studies have confirmed the global interest in the behavioral modification model from the theoretical perspective of the relational frame theory and acceptance and commitment therapy. Among these studies, studying chronic pain with online acceptance and commitment therapy, depression and anxiety, intellectual obsessive-compulsive disorder, the flexibility of managers, auditory hallucination, psychosis and anxiety, depression, and stress can be highlighted.<sup>4,10-12</sup>

The statistics designated that spinal cord injuries occurred mainly at young ages. So, more than half (53%) of the spinal cord lesions seen in the age range of 16 to 30 years. Likewise, spinal cord lesion was more common among young and active males. Generally, the ratio of males with spinal cord lesion concerning females was 4 to 1, but this ratio in the younger age group reduced to 5 to 1.<sup>13</sup> As these figures express, spinal cord lesion was increasing in the country that was, unfortunately, a severe threat to the physical and mental health of young people and their families. These statistics were the risk alarm for societies, that as result of the lack of attention to the needs of this damaged stratum of society, the consequences are expected to harm people, their families, and the community. In addition to the financial losses imposed on society, the mental health of the community also faced with the chaos. Likewise, research has revealed that the incidence of spinal cord lesion in any person would have profound and widespread effects on physical, mental and lifestyle health.<sup>14</sup> Though these patients cannot treat, the injured ones should be supported.<sup>15</sup> In 30 percent of these people, the experiences of depression, anxiety, and stress continue until 2 years after the injury. The psychological effects of spinal cord lesion during the first five years of this problem reach the maximum level, and the most important ability to recognize the difficulties they see for their disability is related to its first years.<sup>16</sup> So the professional protection and intervention of these individuals and their families are very invaluable. On-time intervention and appropriate social and specialized support may decrease stress, anxiety and depression and other psychological disorders in the group of patients so that they can empirically manage their own life.<sup>17</sup>

Based on what was said, spinal cord lesion is one of the most hazardous injuries that have the potential of disruptions in body organs, the creation of psychological stress, and threatening one's life. On the other hand, the World Health Organization (WHO) has reported the incidence of spinal cord lesion in the world between 15 and 40 million people globally. Based on this report, 12 to 40 million people every year suffer from spinal cord lesion,<sup>18</sup> and these concerns made the researcher focus on the effectiveness of acceptance and commitment therapy on anxiety, depression, and stress in patients with spinal cord lesion. Since, no research has investigated the effect of this treatment on the 3 components of anxiety, depression, and stress so far. Consequently, the current study focused on this problem and tried to answer this question that "whether acceptance and commitment therapy affected anxiety, depression, and stress in patients with spinal cord lesion."

## Methods

The current study conducted in the form of a single case (subject) study design as multiple baselines. In this design, the success or failure of the intervention was

determined by the graph immediately. A single case research method is a research project which considers the 2 critical characteristics of the complexity and uniqueness of the participants explicitly during its process. Unlike the research reports that their dominant features were statistics and figures; in the current study the human aspect was undeniable. A multiple baselines design referred to a set of designs that testing circumstances presented in a time series of behaviors, situations, and participants. One of the possible advantages of this design is that we can see the effects of treatment in different circumstances and different mental behaviors (treatment effects repetition).<sup>19</sup>

Data analyzing methods in single-case methods were so that the standard tests could not be used routinely because in these studies observations were dependent on each other. Though, the best way to display data of single case research method was using graphical representations. Having used this method, the change in the mean, the level, the curve slope, and the amount of delay in making the change could observe. Nonetheless, the basic weakness of this method was that there was no significant threshold and range for these methods. This means that, after obtaining the results, it could not infer the data was significant at the 5% level and no reference could point to the statistical meaningfulness. Of course, a suitable alternative to this state was paying attention to clinical significance concept.

The statistical population of the current study (n=181) included all patients with spinal cord lesion in Hamadan referring to Shahid Beheshti hospital in this city in 2016. The statistical sampling of this study was conducted through purposive sampling and based on convenience sampling. The researcher informed the patients about the study and provided an informed consent form for them. In the case of confirmation and signing this form, the patients entered the treatment procedure as the research participants. Likewise, the inclusion criterion for entering the participants to the group was that they had to be over the age of 20 years and should have had spinal cord lesion. According to the criteria, as mentioned earlier and based on this method, out of 50 screened patients, five patients with spinal cord lesion met the inclusion criteria of the research and signed a consent form (4 men and one female). Thus, they were selected and entered the treatment process.

In the current research, to collect the information including theories, theoretical foundations, and statistical data 2 methods of library and questionnaire were used. In the library method, the researcher used domestic and foreign articles related to research literature and books consistent with the research purposes. In the questionnaire method, after assigning the participants, patients were at a baseline level for 2 weeks without any treatments. In the beginning, to obtain the baseline depression, anxiety and stress scales (DASS21) were given to each of the studied

five participants during the 2 consecutive weeks before the treatment, in order to create a steady state in the baseline. At the base level, the therapist met each patient for 20 minutes each week to complete the questionnaires and assessment, while they did not receive any treatment, then they received acceptance and commitment therapy. This treatment included eight sessions that held once a week and each session lasted an hour. At the beginning of each treatment session, the questionnaires answered, and then the treatment started. One month after the treatment process, in order to follow up the therapeutic effects, depression, anxiety and stress scales were offered to each of the five participants once again. Data collected in numerous sessions. Before the treatment and during each session and one month after the treatment, the questionnaires data analyzed.

### Depression Anxiety Stress Scale

This scale has 21 items that assess stress (items 3-5-10-13-16-17-21), anxiety (items 2-4-7-9-15-19-20) and depression (items 1-6-8-11-12-14-18). Scoring this questionnaire was done based on the 4-point Likert scale (It is not true for me at all = 0 (never), it is somehow true for me = 1 (sometimes), It is true for me to a considerable level = 2 (often), and It is almost true for me = 3 (almost always)). This scale prepared by Lovibond.<sup>20</sup> Sahebi et al obtained the mean of depression as 5.85 and the level of anxiety and stress for healthy individuals were calculated as 4.73 and 7.75, respectively. On the other hand, the standard deviation of depression, anxiety, and stress for healthy participants was 4.19, 3.73, and 4.39, respectively. Also, Cronbach  $\alpha$  of depression was 0.77 and for anxiety and stress was 0.77 and 0.78, respectively. The cut-off scores for depression, anxiety and stress were 15.78, 14.17 and 13.1, respectively.<sup>21</sup>

The data analysis method has done through graphic analysis. In the current study, data about therapeutic changes (coping strategies, anxiety and depression) analyzed graphically.

### Results

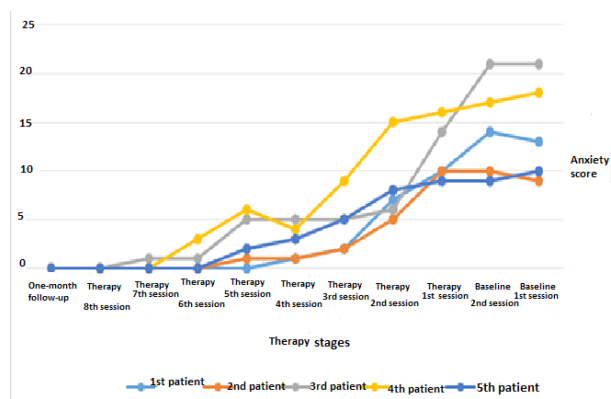
Table 1 inspects the percentage of recovery, the reliable change index (RCI), and the percentage of overall patient recovery in line with anxiety.

Table 1 indicated that for the patients, the RCI was more than 1.96. However, since the treatment sessions' mean scores in all five patients were less than the cut-off score, it could be mentioned that the effect of acceptance and commitment therapy on patients' anxiety with spinal cord lesion was clinically significant. It can also indicate that the recovery percentage in line with anxiety among all the patients was 100%, and all of the patients had recovered entirely regarding anxiety. Consequently, it can indicate that acceptance and commitment therapy could affect anxiety in patients with spinal cord lesion (Figure 1).

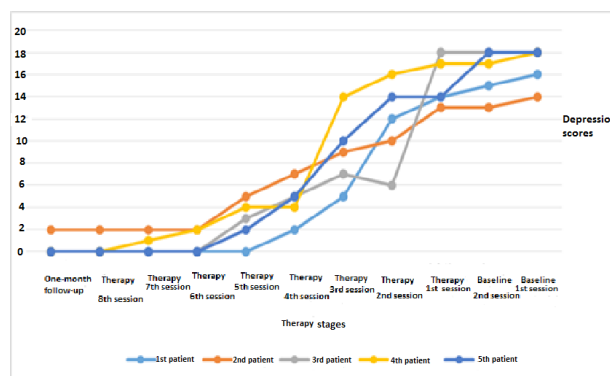
Table 2 indicates that for the patients, the RCI was

**Table 1.** The Effect of Acceptance and Commitment Therapy on Patients' Anxiety

Treatment Stages	The First Patient	The Second Patient	The Third Patient	The Fourth Patient	The Fifth Patient
Baseline (first session)	13	9	21	18	10
Baseline (second session)	14	10	21	17	9
Treatment (first session)	10	10	14	16	9
Treatment (second session)	7	5	6	15	8
Treatment (third session)	2	2	5	9	5
Treatment (fourth session)	1	1	5	4	3
Treatment (fifth session)	0	1	5	6	2
Treatment (sixth session)	0	0	1	3	0
Treatment (seventh session)	0	0	1	0	0
Treatment (eighth session)	0	0	0	0	0
One month follow up	0	0	0	0	0
Average of treatment sessions	2.5	2.37	2.64	6.62	3.37
The standard deviation of the baseline	0.5	0.5	0.01	0.5	0.5
Percentage of recovery	100	100	100	100	100
RCI	20.14	14.17	233.33	26.11	14.17
Cut-off score	14.17	14.17	14.17	14.17	14.17
Patient status	Full recovery	Full recovery	Full recovery	Full recovery	Full recovery
Clinical significance	Significant	Significant	Significant	Significant	Significant
Total recovery percentage	100				



**Figure 1.** Line Chart of Patients' Anxiety Scores During Treatment Stages.



**Figure 2.** Line Chart of Patients' Depression Scores During Treatment Stages.

more than 1.96, but since the treatment sessions' average scores in all five patients were less than the cut-off score, it could mention that the effect of acceptance and commitment therapy on patients' depression with spinal cord lesion was clinically significant. It can also indicate that the percentage of recovery from depression in all of the patients was 97.33%, and all patients had achieved complete recovery in depression. Consequently, it can claim that acceptance and commitment therapy could affect depression in patients with spinal cord lesion (Figure 2).

Table 3 indicates that for patients, the RCI was more than 1.96, but due to the fact that the mean scores of treatment sessions for all five patients were less than the cut-off score, it could indicate that the effect of acceptance and commitment therapy on the patients' stress with spinal cord lesion was clinically significant. It can also note that the percentage of recovery in stress among all patients was 100% and all patients had achieved complete

recovery from stress. Consequently, it can conclude that acceptance and commitment therapy affected patients with spinal cord lesion (Figure 3).

**Discussion**

The purpose of the current study was to explore the effect of acceptance and commitment therapy on patients' anxiety, depression, and stress in with spinal cord lesion. In this regard, the results of some studies that displayed the effectiveness of different treatments on anxiety, depression, and stress, were consistent with the result of the current study.<sup>4,9,22-28</sup>

Regarding the first hypothesis, it can conclude that acceptance and commitment therapy led to anxiety reduction. Such as having a feeling of tremor in the body, worrying about the work consequences, feeling of fear and fearfulness, the abnormal performance of heart, false fear of future events, the unclear concern of events that have not happened, fears and concerns about unknown events,

**Table 2.** The Effect of Acceptance and Commitment Therapy on Patients' Depression

Treatment Stages	The First Patient	The Second Patient	The Third Patient	The Fourth Patient	The Fifth Patient
Baseline (first session)	16	14	18	18	18
Baseline (second session)	15	13	18	17	18
Treatment (first session)	14	13	18	17	14
Treatment (second session)	12	10	6	16	14
Treatment (third session)	5	9	7	14	10
Treatment (fourth session)	2	7	5	4	5
Treatment (fifth session)	0	5	3	4	2
Treatment (sixth session)	0	2	0	2	0
Treatment (seventh session)	0	2	0	1	0
Treatment (eighth session)	0	2	0	0	0
One month follow up	0	2	0	0	0
Average of treatment sessions	4.12	6.25	4.87	7.25	5.62
The standard deviation of the baseline	0.5	0.5	0.01	0.5	0.01
Percentage of recovery	100	85.18	100	100	100
RCI	22.46	16.66	200	25.36	200
Cut-off score	15.78	15.78	15.78	15.78	15.78
Patient status	Full recovery	Full recovery	Full recovery	Full recovery	Full recovery
Clinical significance	Significant	Significant	Significant	Significant	Significant
Total recovery percentage	97.03				

**Table 3.** The Effect of Acceptance and Commitment Therapy on Patients' Stress

Treatment Stages	The First Patient	The Second Patient	The Third Patient	The Fourth Patient	The Fifth Patient
Baseline (first session)	12	10	18	17	11
Baseline (second session)	13	10	19	16	10
Treatment (first session)	9	9	16	15	10
Treatment (second session)	6	7	10	15	7
Treatment (third session)	2	3	8	10	6
Treatment (fourth session)	1	2	3	5	2
Treatment (fifth session)	0	1	2	5	2
Treatment (sixth session)	0	0	1	2	0
Treatment (seventh session)	0	0	0	1	0
Treatment (eighth session)	0	0	0	0	0
One month follow up	0	0	0	0	0
Average of treatment sessions	2.25	2.75	5	6.625	3.375
The standard deviation of the baseline	0.5	0.5	0.01	0.5	0.5
Percentage of recovery	100	100	100	100	100
RCI	18.25	14.6	191.01	24.09	15.33
Cut-off score	13.1	13.1	13.1	13.1	13.1
Patient status	Full recovery	Full recovery	Full recovery	Full recovery	Full recovery
Clinical significance	Significant	Significant	Significant	Significant	Significant
Total recovery percentage	100				

and so on. This was due to the effect of the execution of six procedures of acceptance and commitment therapy, which has created psychological flexibility and has led to the participants' lasting and complete recovery. These procedures are as follows:

Moreover, it can indicate that acceptance and commitment therapy decreased depression such as lack of comfort, showing an extreme reaction in stressful situations, spending much energy for everyday tasks, having a sense of isolation and loneliness, lack of patience and tolerance in solving problems, impatience, excessive sensitivity, and so on. As acceptance and commitment

therapy reduced depression, the subjects abandoned their useless efforts to control and experiential avoidance and accept their thoughts and feelings as an alternative solution. Depressed people had an extreme reaction to the problems they faced, and instead of focusing on balance and moderation, they realized their thoughts and feelings and magnified the issues. This increased their depression and isolation. These people had very little patience and endurance against the issues which made problems and difficulties more pronounced for them. Diffusion exercises interrupt this vicious circle and break down the threatening state of these thoughts.



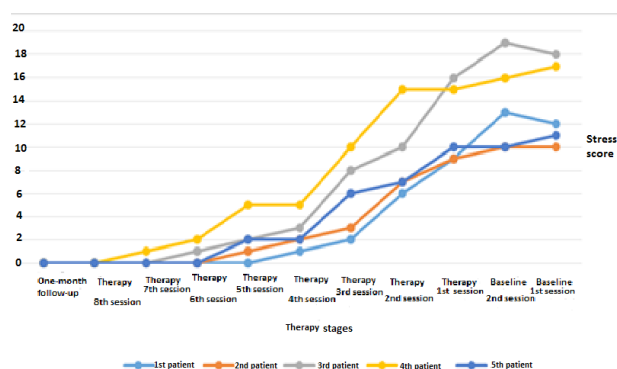


Figure 3. The Line Chart of Patients' Stress Scores During Treatment Stages

On the other hand, acceptance and commitment therapy can decrease the level of stress in patients with spinal cord injuries. Such as lack of having good feelings about different issues in life, lack of being the pioneer in different issues, feeling of agony, confusion, feelings of dejection, disappointment, lack of understanding of values and abilities, feelings of fear in the context of new and emergent issues and fears about the future). The reason is that the person in such a treatment is committed to observing different matters of his life, which would distract confusion and distress from him. Since planning affairs cause a person not to be afraid of any stress rely more on the abilities, they come along with shortcomings and problems. Having understood their values, they make deficiencies an opportunity for growth and development.

Acceptance that means facing pains in line with reaching values rather than experiential avoidance plays a significant role in reducing anxiety and depression. Experiential avoidance in the long term would cause more anxiety. Moving on the path of life's values involves pains that using experiential avoidance, one cannot have a precious life. In acceptance and commitment therapy, acceptance is a propensity to deal with pain and adversity. Similarly, the lack of clear values for life can be another reason for the symptoms emerging. Value means the deepest heart longings for what is to being sought in life. If an individual cannot identify these values, cannot take steps on this regard. Values, like flavors, vary from person to person, and damage would occur from lack of exact value. It seems that due to the lack of recognition or participants' values rejection, by implementing acceptance and commitment therapy, their level of trust would be increased, and they would accept others' unpleasant feelings and thoughts and take steps towards their values. Cognitive diffusion also causes disorder symptoms' reduction. Realizing the verbal meanings and sticking to them emerges the symptoms of a disorder. In other words, the anxious patient always increases problems and difficulties due to disease-related deficiencies and regards himself on the low level in line with the ability to deal with issues. This has done in a way that, in acceptance and commitment therapy a person pays more attention

to other aspects of his or her abilities rather than realizing his or her thoughts and uses them to reduce the level of anxiety.

Consequently, separating the meanings of words from them, in line with not realizing them, causes diffusion and less threatening thoughts. Also, humans consider emotions and feelings as part of their own. In this approach, adopting the state of being an observer of feelings and emotions is one of the therapeutic components. Commitment means that a person takes steps in the path of his values despite the pain, and tends to experience it. Since a person must follow up his values with commitment, using mindfulness exercises and returning to the present time instead of sinking in the inner world and the journey to the past and future can also be useful in reducing the symptoms of the disorder.

## Conclusion

Findings indicated that acceptance and commitment therapy improved people's mental health by working on acceptance and mindfulness processes and behavior change processes. This therapy decreased anxiety, depression, and stress in patients with spinal cord lesion.

## Conflict of Interest Disclosures

The authors declare that they have no conflict of interests.

## Ethical Statement

All ethical principles considered in this article. The participants were informed about the purpose of the research and its implementation stages and signed the informed consent; they also assured about the confidentiality of their information; Moreover, they were allowed to leave the study whenever they wish, and if desired, the results of the research would be available to them.

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