

# Effectiveness of compassion focused therapy on stress and headache in patients with tension-type headache

*Efectividad de la terapia centrada en la compasión sobre el estrés y el dolor de cabeza en pacientes con dolor de cabeza de tipo tensional*

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## Abstract

**Introduction:** Tension headache accounts for roughly 80% of all headache cases and is associated with significant reductions in productivity with significant socio-economic costs. The purpose of this study was to investigate the effectiveness of compassion-focused therapy on stress, anger and headache in women with tension headache.

**Method:** The research method was semi-experimental, with pretest-posttest design and control and experimental groups. The study population consisted of all patients with tension headaches in Isfahan who referred to neurology clinics in 1397, of whom, 34 patients were selected by available sampling method and then randomly located into 2 experimental group (17 patients) and control group (17 patients). The intervention included 8 sessions of 90 min compassion focused therapy. All participants were assessed by Harry Stress Questionnaire (HSQ) Harry Rayan, Buss Perry Aggression Questionnaire (BPAQ) Buss & Perry; and Blanchard Headache Diary (BHD), before and after the intervention. Result: Data analysis was done by multivariate analysis of covariance and using SPSS version 24. The finding showed a significant difference between the mean post-test scores of duration and severity of headache in people with tension headache and stress in subjects with tension headache in the experimental and control groups.

**Conclusion:** The results of this study showed that compassion-focused therapy can have an impact on the reduction of stress and headache in people with tension headache.

**Keywords:** Tension headache, Compassion-focused therapy, Stress, Anger.

## Resumen

**Introducción:** el dolor de cabeza por tensión representa aproximadamente el 80% de todos los casos de dolor de cabeza y se asocia con reducciones significativas en la productividad con costos socioeconómicos significativos. El propósito de este estudio fue investigar la efectividad de la terapia centrada en la compasión sobre el estrés, la ira y el dolor de cabeza en mujeres con dolor de cabeza por tensión.

**Método:** El método de investigación fue semi-experimental, con diseño y control pretest-post-test y grupos experimentales. La población del estudio consistió en todos los pacientes con cefaleas tensionales en Isfahan que se remitieron a clínicas de neurología en 1397, de los cuales, 34 pacientes fueron seleccionados por el método de muestreo disponible y luego se ubicaron al azar en 2 grupos experimentales (17 pacientes) y grupo control (17 pacientes). La intervención incluyó 8 sesiones de 90 min de terapia centrada en la compasión. Todos los participantes fueron evaluados por Harry Stress Questionnaire (HSQ) Harry Rayan, Buss Perry Aggression Questionnaire (BPAQ) Buss & Perry; y Blanchard Headache Diary (BHD), antes y después de la intervención. Resultado: el análisis de los datos se realizó mediante el análisis multivariado de la covarianza y el uso de SPSS versión 24. El hallazgo mostró una diferencia significativa entre las puntuaciones medias de la duración de la prueba y la severidad del dolor de cabeza en personas con dolor de cabeza y estrés en sujetos con estrés. Grupos experimentales y de control.

**Conclusión:** los resultados de este estudio mostraron que la terapia centrada en la compasión puede tener un impacto en la reducción del estrés y el dolor de cabeza en las personas con dolor de cabeza por tensión.

**Palabras clave:** Dolor de cabeza por tensión, terapia centrada en la compasión, estrés, ira.

**T**ension-type headache is one of the most prevalent cases of having headaches (almost 80%)<sup>1</sup>. The prevalence of tension-type headache has been widespread all over the world since 1989<sup>2</sup>. Tension-type headache is accompanied by eye-catching social and economic expenses due to reduced efficiency, imposing costs on Health organization of the society and significant reduction of the life quality<sup>3</sup>. According to global health organization's report, tension-type headache is placed in the group of 10 diseases having the highest disability rate<sup>4</sup>. Despite problems caused by tension-type headache to the patients, most of the individuals use OTC psycholeptic drugs instead of following their treatments<sup>5</sup>. Using such a kind of psycholeptics may be effective when having tension-type headache. However, half of those having chronic tension-type headache have reported that their headache was out of control<sup>6</sup>. Moreover, those having periodical tension-type headaches who have used psycholeptic drugs for a long time, get a status called "medication-overuse headache", which intensifies the headache and its following social psychological disorders.

So far, in most of the experimental and theoretical efforts, there have used biomedical Model for recognizing and treatment of headache disease. Meanwhile, researchers and experts who have investigated and treated the headache, have noticed that the kind of headache one experiences is not consistent with the biometric medical patterns<sup>7</sup>. The existence of psychological factors such as having disorders in controlling anger<sup>8,9</sup> sleep disorders, psychological distresses, behavioral disorders, stress and depression have been accompanied by tension-type headache<sup>5</sup>. On the other hand, emotional disorders, stress and mental tension-type have been known as tension-type headache's risk factors<sup>10</sup>. Whereas the aforementioned psychological factors have been accompanied by tension-type headache, if the welfare of the one having headache is considered, the psychological treatment of the patient would be essential in the same way that there is a need for pain reduction<sup>35</sup>.

Psychological interventions doesn't have side effects of medical treatment. However, it reduces psychological-social complications of tension-type headache and educates the necessary skills for taking care this disease<sup>34,35</sup>. Although, psychological treatments are slower than medical treatments, this kind of treatment affects the disease for a longer period (for some years) without necessitating the patient to participate in regular sessions or referring to the clinics. Cognitive-behavioral interventions such as stress management programs can effectively reduce the tension-type headache. However, this method is effective the time when it is integrated with biofeedback or relaxation treatments in patients having higher levels of daily problems<sup>31</sup>.

Recently, the preference of behavioral-cognitive pattern to the traditional pattern of "the third wave on the behavioral-cognition treatment" have been challenged, which has focused on increasing the capability of the patient toward accepting and tolerating negative conditions<sup>11</sup>. Studies have shown that most of the people, especially those having features like shame and self-criticism, despite their ability for doing cognitive-behavioral duties, respond weakly to the treatment. The growing evidences depict that "self-compassion therapy" has a vital role in helping to control the stress management and behavioral related issues endangering chronic disease cares. Moreover, self-compassion therapy helps to the welfare life and facilitates self-management of diseases<sup>12,13</sup>. According to the results of the studies, compassion could be used as a main factor when treating physiologic distresses<sup>14</sup>. Additionally, researches have shown that compassion-focused therapy have had positive effects on reducing the pain and physiologic distresses on patients having chronic backaches<sup>15</sup>. Furthermore, the results of the studies have indicated the improvement of comparative strategies due to doing compassion-focused practices<sup>33</sup>. Using self-compassion have been suggested as a comparative strategy while getting along with negative emotions<sup>11</sup>. Gilbert believed that compassion-focused therapy could be used as a framework whose inside could focus on the other psychological interventions, since stimulating affiliation system, psychological interventions' effects may have been increased<sup>32</sup>. Regarding the stress role as a main important risk factor for having tension-type headache<sup>7,16,17</sup> as well as the effective role of compassion-focused therapy in reducing stress<sup>12,13</sup> and improving comparative strategies<sup>18,19</sup>, the current research aimed at answering the following question:

Is compassion-focused therapy effective on reducing stress and headache of people having chronic headaches?

**T**he current study was applied and its design was quasi-experimental having pre-test and post-tests and a control group. The statistical population of the study included all people having tension-type headache who had referred to neuro-clinics of Alzahra hospital in Esfahan in 2019. The current research selected neuro-clinic of Alzahra hospital among Esfahan neuro-clinics. Having coordinated with the management section of this clinic, those being recognized by neurological experts as having tension-type headaches, included 34 individuals (those who had the inclusion criteria), which

were selected through convenient sampling. Then, they were randomly classified into two groups of experimental (17 individuals) and control (17 individuals). It is noteworthy that the men participants were excluded from the study due to not cooperating. Due to the attritions of the samples, 12 individuals were included in the experimental group and 17 individuals remained in the control group.

### Inclusion criteria

People having tension-type headaches were in the age range of 30-60 years old. They should have not had any psychological disorders or physical diseases other than tension-type headache during last 12 months.

### Exclusion criteria

Not participating in the session more than 2 times and not cooperating during sessions were among the exclusion criteria.

One of the instruments used in this study was Harry's stress questionnaire (HSQ) (2005). This questionnaire measures the stress amount in various conditions of life and includes 39 questions. In Adineh's research<sup>20</sup>, Cronbach's alpha has been used to estimate the reliability of this questionnaire. To evaluate the validity of the questionnaire, internal consistency method between questions were used. Finally, internal consistency of the whole exam, i.e. Cronbach alpha was utilized. The following results were obtained accordingly:

The results of the previous (Table 1) indicated that the calculated Cronbach alpha coefficient was equal to 0.887. Thus, it could be concluded that the questionnaire had sufficient validity. This means that the responses were not provided by chance and accidentally, which showed the high validity of the questionnaire. Another instrument used in this study, was Blanchard Headache Diary (BHD) (1992), which is usually for evaluating the headache throughout the day. Using this questionnaire, the measures related to the three indexes of headache was obtained (frequency, intensity and duration). The scoring of this test was such that the tested person obtained various scores during 4 times in a day for 1 month regarding the amount of headache he experienced in terms of three indexes of frequency, intensity and duration of headache. The frequency of headache index included the frequency the tester reported about his headache for 28 times, and 4 times in the seven days of a week. Thus, he obtained a score between 0 to 28. The mean of weekly reported headache intensities have been considered as the intensity index based on Likert scale in 5 degrees (ranging between 1 to 5). The related mean was obtained through dividing the intensity scores of headache to the frequency of having headache. The mean of having headache was obtained through the sum of time duration having headache based on hours divided to the frequency of having headache.

**Table 1. The reliability of Herry's inventory stress**

Alpha value	Cronbach alpha value based on standard analysis	Number
0.887	0.886	39

To analyze the data and investigate the normality of distributed data, Kolmogorov-Smirnov test was utilized (Table 2).

As it is observed in (Table 2), considering the fact that Kolmogorov-Smirnov test value was not significant in the mean scores of stress, anger and duration, intensity and frequency of headaches in individuals having tension-type headache, the assumption of statistical population's normal distribution could be accepted having the confidence level of 0.95.

**Table 2. The results of Kolmogorov-Smirnov test. Assuming that the statistical distribution of data were normal according to tension-type headache indexes of stress, duration and intensity**

Variable	Statistics	Significance level
Stress	1.01	0.24
Headache duration	0.66	0.57
Headache intensity	1.24	0.16
Headache frequency	0.91	0.29

Among participant individuals in this study, some had diploma education in the experimental group (66.7%) and control group (47.1%) and some had university degree in the experimental (33.3%) and control (52.9%) groups. Moreover, in the experimental group, the highest frequency belonged to the age group of 30-38 years old and in the control group, the highest frequency belonged to two age groups of 39-47 and 48-56 years old. On the other hand, the highest frequency of the experimental group (58.3%) belonged to single individuals and in the control group, it (58.3%) belonged to married ones.

To investigate the effect of compassion- focused therapy on stress, intensity, duration and frequency of headaches regarding individuals having tension-type headaches, multiple variate covariance analysis was utilized in (Table 3).

**Table 3. Summary of contents regarding compassion-focused therapy (Gilbert, 2010)**

First session	Second session	Third session	Forth session
Introducing group members Representing current problems and signs Validating and current problems Creating treatment relationship Determining duties Getting feedbacks	Getting first session's feedback Investigating cultural and previous textures The life story of referents by themselves Attitudes toward main emotional memories of referents about themselves and others Official conceptualizing of four domains Determining strategies for regulating the emotions of referents (prohibition, mind rumination, drug abuse...)	Getting previous session's feedback Describing and clarifying the model (developed mind) Differentiating between what was your fault and responsibility Determining three rings Renewed conceptualizing Mind diagram Presenting exercises	Getting previous session's feedback Educating how to exist from old mind cycle, new mind with mindfulness Practicing mindfulness Getting feedback from the practice Explaining the advantages of third mind recognition and its use Presenting exercises
Fifth session	Sixth session	Seventh session	Eighth session
Getting previous session's feedback  Clarifying defensive systems, motivation and security regarding referents' life  Describing limbic system and its effective role in creating emotions, even when the main stimulator was lacking  Clarifying kindness to self and others  Practicing mindfulness  Getting feedback from the practice  Presenting exercises	Getting previous session's feedback  Formulization of treatment exercises through observational and behavioral experiments  Activating self-kindness  Practicing mindfulness (getting kindness from others and being kind to others)  Getting feedback from the exercise  Presenting exercises	Getting previous session's feedback  Introducing referents with compassionate reasoning and creating it in the referents  Introducing the types of competitor-self with the kind-self  Practicing mindfulness  Getting feedback about the exercise  Recognizing values in various fields of referents' life  The metaphor of a wonderful day  Educating the type of kindness behaviors (kindness attention, kindness imagination, emotional experience of kindness)  Presenting exercises	Re-observation of previous conceptualization while improving the exercises and new information  Creating and regulating treatment practices  Practicing life  Getting ready to put an end to the sessions ( writing a kind letter)

## Results

**T**he results of this section have been presented regarding research hypotheses.

First hypothesis: Compassion-focused therapy affects the stress of individuals having tension-type headache in (Table 4).

**Table 4. The results of Levin test, assuming that the variance of the stress scores of people having tension-type headache is homogeneous.**

Variable	F value	Degree of freedom 1	Degree of freedom 2	Significance level
Stress	1.79	1	27	0.19

The observed F value for the Levin test didn't indicate a significant difference between stress scores' variance of people having tension-type headache in  $\alpha=0.05$  level. Therefore, the null hypothesis, assuming the homogeneity of variance was accepted in (Table 5).

**Table 5. The results of Box test regarding stress scores of people having tension-type stress**

Variable	F value	Degree of freedom 1	Degree of freedom 2	Significance level
Stress	1.43	1	4.29	0.12

The observed F value for the Box test didn't indicate a significant difference between stress scores' variance of

people having tension-type headache in  $\alpha=0.05$  level. Therefore, having confirmed the equivalence of variances between two groups, it became possible to use covariance analysis for inferential analysis of the data.

(Table 6) indicated that the observed F in the  $\alpha=0.05$  level had a significant difference between the mean score of post-test regarding stress in people having tension-type headache in experimental and control groups. Thus, it could be concluded that compassion- focused therapy had an influence toward reducing the stress of people having tension-type headache. The intensity of effect regarding stress variable in people having tension-type headache was 0.70 in post-test, this meant that 70% of the post-test scores of reducing stress variable of people having tension-type headache was attributed to group membership (the effect of compassion- focused therapy). The statistical power 1 indicated that the sample volume was sufficient for testing this hypothesis.

The second research hypothesis: Compassion- focused therapy affects the headache of people having tension-type headache.

To analyze the results related to the third hypothesis, the scores of headache regarding those having tension-type headaches, have been presented in three fields of duration, intensity and frequency in (Table 7).

The observed F value for Levin test didn't show a significant difference between score variances of headache duration, intensity and frequency for people having tension-type headaches in  $\alpha=0.05$  level. Thus, the null hypothesis, assuming the homogeneity of variance have been accepted in (Table 8).

**Table 6. The results of covariance analysis regarding the effect of compassion- focused therapy on the stress of people having tension-type headache**

The resources of changes	The sum of squares	Degree of freedom	The mean of squares	F value	Significance level	The amount of effect	Statistical power
Pre-test	6019.44	1	6019.44	38.25	0.001	0.59	1
Post-test	9449.74	1	9449.74	60.05	0.001	0.70	1

**Table 7. The results of Levin test, assuming the homogeneity of score variances regarding duration, intensity and frequency of headaches in people having tension-type headaches**

Variable	F value	Degree of freedom 1	Degree of freedom 2	Significance level
Headache duration	1.98	1	27	0.17
Headache intensity	1.92	1	27	0.18
Headache frequency	0.87	1	27	0.32

**Table 8. The results of Box test regarding the scores of duration, intensity and frequency for people having tension-type headaches**

Variable	F value	Degree of freedom 1	Degree of freedom 2	Significance level
Headache duration	0.61	1	2.10	0.75
Headache intensity	1.72	1	5.01	0.19
Headache frequency	1.98	1	5.57	0.14

The observed F value for Box test didn't show a significant difference in  $\alpha=0.05$  level regarding the scores of headache duration, intensity and frequency for people having tension-type headaches. Therefore, having approved the equality of variance between two groups, it was possible to use covariance analysis for inferential analyzing of the data.

According to the results of (Table 9), the observed F value indicated a significant difference between the score means of post-test of headache duration as well as intensity in people having tension-type headaches regarding experimental and control groups. Therefore, it could be concluded that compassion- focused therapy had an influence on the reduction of headache duration and intensity regarding those having tension-type headaches. The amount of effect regarding the headache duration and intensity variables of people having tension-type headaches were respectively 0.51 and 0.35 in post-test. This meant that 51% and 35% of post-test scores regarding the reduction of anger variable in people having tension-type headaches were related to the group membership (compassion- focused therapy's effect). Statistical power 1 indicated that sample volume was sufficient for testing this hypothesis. While, there were no significant difference between the score means of post-test regarding the headache frequency in people having tension-type headaches in both experimental and control groups.

**Table 9. The results of multivariate covariance analysis and the effect of compassion- focused therapy on headache duration, intensity and frequency for people having tension-type headaches**

Resource of changes	The sum of squares	Degree of freedom	The mean of squares	F value	Significance level	The amount of effect	Statistical power
Group (post-test of headache duration)	6.72	1	6.72	15.35	0.001	0.51	1
Group (post-test of headache intensity)	3.70	1	3.70	11.97	0.002	0.35	1
Group (post-test of headache frequency)	0.15	1	0.15	2.05	0.22	0.07	0.29

The results of the effect of compassion- focused therapy on reducing the stress of people having tension-type headaches showed that there was a significant difference between the mean scores of post-test regarding those having tension-type headaches in both experimental and control groups. Thus, it could be stated that compassion- focused therapy affected the reduction of stress regarding those having tension-type headaches. The amount of effect in the stress variable of those having tension-type headaches equaled to 0.70 in post-test. This meant that 70% of post-test scores of stress variable of people having tension-type headaches were related to group membership (the effect of compassion- focused therapy).

The findings of the current research regarding stress reduction field through compassion- focused therapy `s effects were consistent with the findings of Berin et al.21. The indicated that self-compassion therapy could act as a protective factor against physiologic changes caused by stress37,40. Sel-compassion therapy of teenagers indicated low salivary alpha-amylase reactivity (a signifier of sympathetic nervous system's activation) in relation to psychological repetitive stresses. Moreover, the results of the current study were in line with the results of Lutz, Brefczynski-Lewis, Johnstone and Davidson. They signified that compassion-focused therapy and loving-kindness meditation might have caused the reduction of stress. In addition, the results of a study by Hofmann, Grossman and Hinton showed that both meditations of loving-kindness and compassion- focused therapy increased positive emotions, reduced negative emotions and stress. The results

of the current study regarding stress reduction through compassion- focused therapy confirmed this fact.

To clarify the results of the study, firstly this issue should be mentioned that brain has three main regulating emotions` systems: threatening system and protecting self, driving stimulator system, smoothening system as well as satisfaction and security. The equilibrant and consistent operation of the aforementioned systems while interacting with each other guarantee the psychological health of individuals. The features related to the modern current societies, excessively stimulate the threatening system and driving stimulator system of human beings. Factors like inconsistent employment, poverty, society's attitude toward androgenism, technology and education stimulate the threatening system. In addition, factors like being luxury, migration, attaining special position and social ranking, stimulate the driving system24,38. Excessive stimulation of threatening system results in explosions of stress, anxiety and anger in human beings25. On the other hand, although the driving stimulator system emphasizes on positive emotions and motivations, sometimes some of the motivations and purposes of people such as attaining a position, convenience , being recognized and face problems which become threats later. At that point, the threatening system acts against stress, anxiety and anger31. On the contrary, the smoothening system, satisfaction and security enable human to have peace and calmness. It helps them to obtain equilibrium again32. This system is the main center of focus while teaching compassion. Mental systems producing peace and security are like those systems that provide peaceful emotions associated with satisfaction and wants through excreting endorphin. Exotoxin hormone is also related to social security emotion, which helps us feel a better life through endorphin. A growing evidence has shown that exotoxin is related to social support and protects you against stress26,39. Exotoxin also affects the threatening process in amygdala24. According, it may be possible to conclude that using compassion- focused therapy in the current study balanced the performance of two threatening and driving systems and reduced the complications resulting from excessive stimulating of them like stress and anxiety. This would be possible through aiming at positing security system via imagining a secure place, compassion with self-experience and self-compassion therapies based on physical calmness and mindfulness.

The results regarding the effect of compassion-focused therapy on reducing the headache of people having tension-type headaches in three field of duration, intensity and frequency indicated that there was a significant difference between the score means of headache duration and intensity of post-test in people having tension-type headaches in both experimental and control groups. Thus, it could be concluded that compassion- focused therapy affected the reduction of headache duration and intensity in people having tension-type headaches. The amount of the effect in headache duration and intensity variables of people having tension-type headaches were respectively,

0.51 and 0.35 in the post-test. This meant that 51% and 35% of the post-test scores in headache duration and intensity variable of people having tension-type headaches were related to group memberships (the effect of compassion-focused therapy). However, there was no significant difference between the score means of post-test regarding the headache frequency of people having tension-type headaches. Accordingly, it could be mentioned that compassion-focused therapy didn't have a significant effect on the reduction of headache frequencies in people having tension-type headaches.

The results of the current study were consistent with the findings of Cathcart et al.<sup>1</sup> regarding the reduction of headache due to the compassion- focused therapy. The indicated that short-term mindfulness therapy could be considered as an effective intervention for chronic tension-type headaches. Moreover, the results of the research conducted by Carson et al.<sup>15</sup> confirmed the results of the current study in terms of reducing headache through compassion- focused therapy<sup>29,30</sup>. Since they had introduced loving-kindness meditation as an effective method for reducing chronic pains (chronic backache).

To clarify this finding, it could be mentioned that , the research taught how to maintain calm in any condition so that not to have headaches through compassion- focused therapy and using self-compassion therapy exercises based on physical calmness, mindfulness, self-compassion therapy as well as techniques like educating anxious mind to people having tension-type headaches. They have taught that when one has headache, he can use physical calmness and mindfulness techniques to reduce his headache.

## Conclusions

**B**ased on previous studies, stress has been recognized as one of the risk factors of tension-type headaches<sup>16,27,37</sup>. Also, anger has been recognized as one of the underlying factors of headache<sup>28</sup>. Therefore, the researcher in the current study has reduced stress and anger through improving the security system and has balanced the two threatening and driving systems using compassion- focused therapy techniques such as thinking, imagining a secure place, working with an empty chair, mindfulness meditation education to patients. Doing so, it has led to the reduction of headache as the second phase regarding two factors of duration and intensity.

The limitation of this study was as followings: 1. Due to the attrition of male samples, all of the samples of this study were female. Hence, the results of this study can't be generalized to all human beings having tension-type headaches, rather the results could only be generalized to female

groups. 2. The results of the study were limited to people having tension-type headache in Esfahan. Thus, generalizing the results to other cities should to be done cautiously. 3. Due to time limitations, no followings for investigating the sustainability of the treatment were occurred.

Considering the results of the study in terms of "the effectiveness of compassion- focused therapy on the stress of people having tension-type headaches", it is suggested to use of compassion-focused therapy with other psychological treatments in counseling centers. Moreover, In light of further research, it is suggested that the use of compassion- focused therapies be used to treat various types of stress-related headaches throughout the country as a preventive treatment on people having high levels of stress. Finally, it is suggested to check the effectiveness of compassion- focused therapy on the stress and headache of people having tension-type headaches through short-term and long-term followings for investigating the sustainability of the treatment effect.

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