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The Effectiveness of Acceptance and Commitment Therapy on Depression and Mental Health of Patients with Migraine

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Quantitative Study

Abstract

Background: In patients with migraine, depression is associated with decreased mental health. However, behavioral interventions have rarely been investigated. The present study examines the effectiveness of acceptance and commitment therapy (ACT) on depression and mental health of patients with migraine.

Methods: The study was experimental, with a pre-test, a post-test, and a control group. The statistical population of this research was all people having migraine who visited Mehr and Tabib clinics in Tehran, Iran, from October to November 2022. In this study, 30 eligible patients were selected and invited to take part purposefully. Researchers randomly divided the participants into two groups: ACT according to the protocol of Timmerby et al. (n = 15) and a control group (n = 15). Eight 90-minute weekly counseling sessions were provided to the experimental group, while the control group received no intervention. Beck Depression Inventory-Second Edition (BDI-II) and the General Health Questionnaire (GHQ) were administered. SPSS software conducted a multivariate analysis of covariance (MANCOVA).

Results: The results of ACT intervention had a positive and significant effect on depression ($P < 0.001$, $F = 28.49$, $\eta^2 = 0.496$) and mental health ($P < 0.001$, $F = 33.26$, $\eta^2 = 0.543$) in patients with migraine. The highest effect size ($\eta^2 = 0.54$) was associated with mental health, which shows that 54% of the variance in the mental health variable between the experimental and control groups was because of the ACT.

Conclusion: ACT reduced depression and increased mental health in patients with migraine. Therefore, ACT is recommended for these patients to improve their mental health and quality of life (QOL).

Keywords: Acceptance and commitment therapy; Depression; Mental health; Migraine; Depression

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Introduction

Migraine headache is one of the most common neurological disorders. In addition to being the second most disabling disease in the world, it affects about 10% of the world's population, with an exceptionally high prevalence among women, students, and urban residents (Woldeamanue & Cowan, 2017). There are enormous social and economic ramifications associated with migraine. The disease affects around a billion people around the world. The Global Burden of Diseases (GBD) 2019 report states that it is the most common reason for job incapacity among young women and the second most common cause of disability globally (Stovner, Hagen, Linde, & Steiner, 2022). This illness has significantly impacted work productivity and quality of life (QOL) in recent years, necessitating significant healthcare investment (Kim, Chu, Yu, Dell'Agnello, Han, & Cho, 2021). Although new research indicates a connection between migraine and several comorbidities, it is still unknown how coexisting disorders affect the development and progression of migraine (Vernieri et al., 2021). The most often reported migraine-related comorbidities are sleep difficulties, depression, and anxiety (Caponnetto et al., 2021). In addition to the pain and disability associated with migraine, patients with migraine are at an elevated risk for psychiatric disorders mainly. Depression is three times more prevalent in migraine sufferers than in the general population, and this percentage is considerably more significant in patients with migraine who visit a clinic (Dindo et al., 2020).

Lastly, a Taiwanese study found that over 78% of migraineurs had comorbid mental health issues, including more than half (57%) who suffered from anxiety or depression (Vernieri et al., 2021). Migraines are more challenging to treat because they are associated with psychological illnesses like depression. Migraine sufferers exhibit a wide range of varying levels of function, with some functioning normally, whereas others are severely disabled, with social, emotional, and occupational restrictions (Lin, Klatt, McCracken, & Baumeister, 2018). Depression and mental health in patients with migraine are of significant importance because these problems are common and result in greater disability and overall worse prognosis than migraine alone (Barlow, Bullis, Comer, & Ametaj, 2013). Despite the high prevalence and deleterious impact, mental health problems are often underdiagnosed and undertreated in patients with migraine due to poor recognition of distress, lack of evidence to guide interventions, and a dearth of behavioral treatments that are appealing to a population that does not see itself as needing mental health care (Stovner et al., 2022). This represents a missed opportunity, as depression and low mental health are modifiable problems (Caponnetto et al., 2021). Psychological interventions have a long history of successfully managing patients suffering from mental health and medical conditions (Almarzooqi, Chilcot, & McCracken, 2017).

In migraineurs, there is a lack of effective therapeutic strategies that target depression and anxiety directly. Acceptance and commitment therapy (ACT) is a behavioral intervention that effectively treats chronic pain, depression, anxiety, and an increasing number of other psychiatric and medical diseases (Dimidjian, Arch, Schneider, Desormeau, Felder, & Segal, 2016). Recently, a new type of ACT has been developed to treat migraines (Dindo, Weinrib, & Marchman, 2019) that targets a limited set of experiential processes to promote cognitive flexibility, or the ability to engage with the present moment (Gloster & Karekla, 2020). These processes develop the dominant ACT approach with methods that focus on how people can answer migraine with flexibility, placing the focus on enhancing daily functioning (Dimidjian et al., 2016). Prior research has shown that ACT processes modulate the effects of

therapy on functioning, life satisfaction, and psychological distress in people with chronic pain (Stovner et al., 2022; Lin et al., 2018). Cross-sectional research on migraineurs shows that more pain acceptance and values-based behavior are linked to lower levels of depression, headache-related impairment, interference, and catastrophizing (Almarzooqi et al., 2017; Foote, Hamer, Roland, Landy, & Smitherman, 2016). Importantly, when used as a quick intervention, ACT has had fruitful results (Dindo et al., 2019). In one short, uncontrolled pilot study, individuals with co-occurring depression and migraine were randomized to either a one-day ACT therapy or treatment as usual (TAU).

In the ACT arm, 77% of patients reported remission from depression, compared to just 8% of those in the TAU arm, which is promising (Dindo et al., 2020). Based on ACT, the intervention focused on behavioral avoidance and encouraged participation in values-based living, processes linked to sadness and impairment in patients with chronic pain, including migraineurs (Hayes, Strosahl, & Wilson, 2011). The new and creative "1-day workshop" approach promotes the ability to continue treatment and follow treatment orders, the lack of which is often the biggest obstacle to continuing effective mental health services. For those not specifically seeking professional mental health care, presenting the therapy as a "workshop" was also more appropriate (Dindo et al., 2020). Based on this promising research, we conducted a randomized controlled study to assess the efficacy of ACT-based group therapy on depression and mental health in a group of patients with co-occurring major depressive disorder (MDD) and migraine. The control group was considered to control for treatment elements (such as therapist attention, waiting for improvement, and group support) that provide competing explanations for the effectiveness of ACT-based group therapy. With the use of this approach, we were able to evaluate the effectiveness of an ACT-based group therapy.

Methods

The current research was a quasi-experimental study with a pretest-posttest and control group design. The statistical population of this research was all people suffering from migraine who visited Mehr and Tabib clinics in Tehran, Iran, from October to November 2022. Based on the result of the previous study with a mean difference of 8 and standard deviation (SD) of 2.40, power of 0.8, probability of type I error as 0.05, and attrition rate of 10%, a total of 30 samples were calculated (Lin et al., 2018).

Inclusion criteria were: age between 18 and 70 years, obtaining a score of 2 or more on the ID Migraine test – a widely used 3-item screening tool with high positive predictive value for the presence of migraines (Lipton & Spelke, 2003), reporting 4-12 migraine days over the previous month, no history of brain injury, the diagnosis of "major depression", either a single episode or recurrent depression, according to the International Classification of Diseases, 10th Revision (ICD-10), established by a psychiatrist and verified by the Mini International Neuropsychiatric Interview (MINI) (Timmerby, Austin, Ussing, Bech, & Csillag, 2016), and no history of schizophrenia, bipolar disorder, or current substance abuse. Exclusion criteria were: a severe suicidal or psychotic disorder, a suicide attempt or severe non-suicidal self-injury that required hospitalization within three months of admission, failure to attend more than two sessions in therapeutic interventions, and reluctance to continue treatment. First, the researchers referred to two clinics, Mehr and Tabib, in Tehran from October to

November 2022. Researchers took eligible participants' informed consent. In this study, 30 eligible patients were selected and invited to participate purposefully. Moreover, the assignment of individuals to experimental and control groups was done randomly. Each participant received an envelope containing a number, and a randomly selected identifier to determine whether they were in the experimental (n = 15) or control (n = 15) group (Moloudi, Arian, Mahdavi, Madah, & Roghaeeh Taghipour, 2022).

Beck Depression Inventory-Second Edition (BDI-II): The BDI-II, a self-reporting tool, is used to evaluate depressive disorders. The list consists of 21 statements describing various types of depression (Beck, Steer, & Brown, 1996). Compared to its first version, the changed version (BDI-II) is more adaptable to Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition (DSM-IV) and covers all elements of depressive disorders. Like the first edition, the second one consists of 21 items with four response choices indicating depression. The items are scaled from zero to 3, which makes a comprehensive range of 0-63. As far as no depression is concerned, the inventory does not predict a cut-off point. The cut-off points suggested for this inventory are scores of 0-13, indicating minor depression, 14-19 suggesting mild depression, 20-28 showing moderate depression, and the score range of 29 to 63, which demonstrates severe depression. Cronbach's alpha was 0.86, and the internal consistency coefficient was 0.92 among the United States (US) people (Beck et al., 1996) and 0.91 and 0.94 among Iranian people, respectively (Moloudi et al., 2022).

The General Health Questionnaire (GHQ): The GHQ is frequently used to gauge one's mental state, particularly for identifying emotional problems like distress. This questionnaire was created by Goldberg and Hillier (1979). This questionnaire consists of 28 questions, four components of physical symptoms (questions 1 to 7), anxiety and sleep disorder (questions 8 to 14), physical perception disorder (questions 15 to 21), and depression (questions 22 to 28). In each part of the scale, a score of 6 and above and a total score of 22 and above indicate pathological symptoms. At first, a raw score is obtained for each subscale, and then it is converted to a standard score between 0 and 100. A higher score indicates a higher QOL (Goldberg & Hillier, 1979). The reliability coefficients of the questionnaire range from 0.78 to 0.95 (Goldberg & Bridges 1988). In Iran, Palahang et al. (1996) and Yaghobi and Hormozi (2010) reported the reliability coefficients as 0.91 and 0.88 for anxiety and depression, respectively.

Procedure

The treatment goals and the working method were explained to the people of the experimental group, and the time and place of the treatment sessions were coordinated over the phone. Then, they were asked to fill out the BDI-II and the GHQ. To protect patient data privacy, researchers assured them their data would be kept confidential. Then the ACT group treatment was performed in 8 sessions once a week for 90 minutes. In table 1, a summary of the content of the meetings according to the protocol of Timmerby et al. (2016) is stated. The control group did not receive psychological training during these two months. Researchers answered participants' questions and alleviated any concerns they might have had throughout the procedure.

Two psychologists implemented the ACT component with extensive training in ACT. A manual was developed for the treatment, and all workshop administrations followed the protocol closely.

Table 1. Summary of the meetings of acceptance and commitment therapy (ACT) approach

Sessions	Contents
1	Introduction: creating a relationship based on collaboration, checking the basic concepts of treatment and goals, completing the questionnaire
2	Options for learning to live despite the presence of illness: teaching the mental model of "if-then" and control methods, explaining the relationship between "pain, mood, and function"
3	Learning to live with an illness: description of the concepts of acceptance, cognitive dissonance, self-observation as context, weakening of self-concept and self-expression as an observer of values, task
4	Values: practicing mindfulness, reviewing assignments, discussing values and obstacles in the way of discovering the practical values of life, and presenting assignments
5	Action: reviewing the task, dealing with the concept of cognitive dissonance, action planning, mindfulness and self-observation, committed action, presenting the task
6	Commitment: practicing mindfulness, reviewing homework, committing to actions and values despite obstacles, submitting homework
7	Reviewing the experiences of the previous session, reviewing assignments, applying mindfulness techniques, and observing inner experiences as a process
8	Reviewing the experiences of the previous meeting, topics of commitment, prevention of relapse

The workshop included training in acceptance and values-based committed action. The acceptance portion emphasized new ways of managing troubling thoughts, feelings, and pain sensations (e.g., learning how to recognize and develop cognitive distance from unhelpful thoughts such as "I cannot take this pain anymore" or "I am not good enough") and learning how to face experiences that cannot be changed willingly, while promoting effective and committed actions to achieve life goals. Training in values-based committed action involves teaching patients how to recognize ineffective patterns of behavior and habits, explore and set life goals and those related to health, and promote effective and committed actions to achieve these goals despite the urge to do otherwise. This study met all the standards of ethical behavior in research. The Ethics Committee of the Islamic Azad University of Tehran (IR.IAU.KHUISF.REC.1400.098) approved the study.

This research used SPSS software (version 20, IBM Corporation, Armonk, NY, USA) to analyze the multivariate analysis of covariance (MANCOVA) method to determine the significance of the difference between the scores of the test and the control groups in the dependent variables of depression and mental health. The linearity of the relationship between each dependent variable and its covariate was tested.

Results

The subjects were 18 women and 12 men who were randomly assigned to two control and experimental groups**.** The mean age of the subjects was 37.20 ± 1.77 and 37.91 ± 1.95 years in the experimental and control groups, respectively. The age difference between the two groups was insignificant according to an independent t-test (P = 0.064) (Table 2).

The linear significance level of the relationship between the pre-test and the post-test of depression (r = 0.78) and mental health (r = 0.71) was obtained (all correlation coefficients are significant at the P < 0.05 level). According to the Kolmogorov-Smirnov test, the assumption of normality of the distribution of the variables is more significant than 0.05; therefore, this assumption has been met. P-value less than 0.05 was considered as statistical significance. Levene's test was insignificant in the depression variable (F = 0.66, P = 0.24) and mental health (F = 0.81, P = 0.19).

Table 2. Mean and standard deviation (SD) of variables in experimental and control groups

Variable	Groups	Statistical index	Mean ± SD
Depression	Pre-test	Control	56.18 ± 7.02
		Experimental	55.31 ± 7.93
	Post-test	Control	55.39 ± 6.71
		Experimental	41.24 ± 5.29
Mental health	Pre-test	Control	59.61 ± 7.67
		Experimental	58.34 ± 8.52
	Post-test	Control	60.83 ± 8.03
		Experimental	75.91 ± 8.20

SD: Standard deviation

Considering dependent variables, table 3 shows a significant difference between the test and control groups at a $P \leq 0.001$. As a result, at least one of the dependent variables differs significantly between the two groups (depression and mental health). In MANCOVA's text, two covariance analyses were conducted to determine this difference. In the experimental and control groups, 51% of the variances were explained by the independent variable based on the calculated effect size. A test with a statistical power of 1.00 rejects the null hypothesis with 100% power.

According to the findings of table 4, ACT had a favorable and substantial impact on depression ($P < 0.001$, $F = 28.49$) and mental health ($P < 0.001$, $F = 33.26$) in people living with migraine. In addition, it can be seen that the most significant effect size was related to the mental health variable (0.543), which shows that 54% of the total variances of the experimental and control groups in the mental health variable were caused by the effect of the independent variable and the smallest effect size was related to the depression (0.496), which shows that 49% of the total variances of the experimental and control groups in the depression variable of the patients with migraine caused by the effect of the independent variable.

Discussion

The purpose of the present study was to determine the effectiveness of ACT on depression and mental health of patients with migraine. The results show that depression and mental health differ significantly between the experimental and control groups. The results of many studies (Alonso-Fernandez, Lopez-Lopez, Losada, Gonzalez, & Wetherell, 2016; Grau, Sripada, Ganoczy, Weinstein, & Pfeiffer, 2023; Han, Wilroy, & Yuen, 2023; Wang, Chen, Liu, & Wu, 2022) align with this study findings. Alonso-Fernandez et al. (2016) investigated the effectiveness of ACT treatment for older adults with chronic pain and depression. The results of their studies showed that an ACT treatment could help older adults with chronic pain and depression to improve their emotional well-being and functional ability. The underlying assumptions of ACT for pain are based on the concepts of universal suffering, promotion of acceptance attitudes, reduction of efforts to struggle with pain, identification of valued life directions, and the commitment to act by personal values to improve role function and activity levels, regardless of pain severity (Almarzooqi et al., 2017).

Table 3. Results of multivariate analysis of covariance (MANCOVA) on variables

Test statistics	Value	F	df	df error	P-value	Effect size
Pillai's trace	0.752	46.12	2	28	0.001	0.513
Wilks' lambda	0.361	46.12	2	28	0.001	0.513
Hotelling's trace	7.930	46.12	2	28	0.001	0.513
Roy's largest root	8.270	46.12	2	28	0.001	0.513

df: Degree of freedom

Table 4. Results of analysis of covariance (ANCOVA) in the multivariate ANCOVA (MANCOVA) context

Dependent variable	SS	df	MS	F	P-value	Effect size
Depression	3216.34	1	3216.34	28.49	0.001	0.496
Mental health	1983.48	1	1983.48	33.26	0.001	0.543

SS: Sum of squares; df: Degree of freedom; MS: Mean squares

ACT has received increased empirical support for several mental and physical health problems, including chronic pain (Dimidjian et al., 2016). Instead of attempting to control or change sources of discomfort, studies suggest that the process of acceptance of chronic pain is associated with better emotional, physical, and social outcomes, less disability, better pain tolerance, and a decrease in the use of health resources (Alonso-Fernandez et al., 2016). The findings of Alonso-Fernandez et al. (2016) showed a significant increase in acceptance of chronic pain between before and after treatment for participants in the ACT group, while no significant difference was found for the control group. Considering that acceptance of pain has been associated positively with less depression and with higher levels of physical functioning and pain tolerance, these results are encouraging.

Grau et al. (2023) in their research found that ACT-based group therapy treatment was effective in improving depression and psychological inflexibility. Psychological inflexibility has decreased more in ACT than in traditional cognitive behavioral therapy (CBT) treatments while also covarying with depression symptom reduction (Dindo et al., 2020). Psychological flexibility is also typically viewed as the most critical metric (and mechanism) of change in ACT, as ACT emphasizes the importance of expanding the focus of treatment beyond symptom reduction and evaluating change in the six core processes of change, all of which fall under the overall umbrella of psychological flexibility. Thus, in practice, clinicians are trained to focus on increasing psychological flexibility rather than directly attempting to decrease symptoms of depression (Hayes, Luoma, Bond, Masuda, & Lillis, 2006). This study of ACT-based group therapy reduced depression and increased mental health in patients with chronic pain. These findings are consistent with Han et al. (2023) and Wang et al. (2022) studies. ACT is only to improve psychological flexibility, not committed to solving the symptoms of the disease but has the abilities such as acceptance of the status quo, letting patients see negative thoughts in the mind of the border, being better aware of the current situation, reducing depression, and improving mental health (Han et al., 2023). This treatment can face the pain, solve the symptoms that are caused by negative emotions, relieve negative emotions, and improve the clinical purpose of adverse symptoms (Wang et al., 2022).

In explaining these findings, ACT emphasizes accepting as many mental experiences as possible, relating to the present moment, and participating in activities that align with personal values (Dindo et al., 2020). Acceptance is the critical process in the effectiveness of this type of treatment. The main structure of ACT is psychological flexibility, which means the ability to perform practical actions in line with individual values despite problems and sufferings such as chronic pain (Wang et al., 2022). It can also be said that emotional control strategies, performing behavioral commitment exercises, clarifying values, techniques identifying behaviors based on values along with metaphors, the concept of cognitive dissonance, and acceptance all lead to the reduction of depression symptoms and improvement of mental health (Faryabi, Rafieepoor, hajializade, & Khodaverdian, 2020). In general, ACT teaches people how to let go of inhibiting thoughts, get rid of disturbing

thoughts, strengthen the observing self instead of the conceptualized self, and accept events instead of controlling them (Gloster & Karekla, 2020).

This study was limited in scope by the high age dispersion of the participants and the self-reported nature of the measure, which may have led to response bias. Thirdly, the sample was taken from only two hospitals in Tehran. This may limit the generalizability of the findings to patients with migraine presenting at other hospitals from other regions or cities. It is suggested that in future studies, this approach should be implemented on demographically homogenous groups and the effectiveness of these studies should be compared, so that the treatment groups can be separated demographically for better benefit from the approach.

Conclusion

The present study showed that ACT had a favorable effect on reducing depression and increasing the mental health of people living with migraine. Group support and treatment strategies are promising and practical approaches to dealing with this patient population. It also highlights the significant impact of group support and education in providing re-moralization, as well as the additional benefit that can be attained from learning the ACT. This study is an essential milestone from an applied perspective because it provides psychologists with a detailed intervention program that can be replicated, adapted, and implemented in a wide range of chronic diseases.

Conflict of Interests

Authors have no conflict of interests.

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