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## Comparing the effectiveness of mindfulness-based cognitive therapy and acceptance and commitment-based therapy on anxiety caused by Covid-19 and cognitive discipline of adolescents in Kermanshah city

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### Abstract

**Background:** Adolescence is a time of significant physical and social change, leading to potential mismatches between physical and social maturity, which may contribute to emotional distress and antisocial behaviors. The purpose of this study was to investigate the impact of cognitive therapy focused on mindfulness and therapy centered on acceptance and commitment on anxiety stemming from the Covid-19 pandemic and the cognitive regulation abilities of adolescents in Kermanshah, over a two-month follow-up period.

**Method:** This randomized clinical trial, conducted in 2022, involved 45 teenagers from Kermanshah, who were allocated into three different intervention groups using a stepwise cluster sampling method. Group 1 (15 participants) received cognitive therapy centered on mindfulness, Group 2 (15 participants) underwent acceptance and commitment therapy, and Group 3 (15 participants) served as the control. The Corona Virus Anxiety Scale and the Cognitive Emotion Regulation Questionnaire (CERQ) were the assessment tools used, and the data were processed using SPSS version 26.

**Findings:** The study's results revealed that both mindfulness-based cognitive therapy and acceptance and commitment therapy significantly alleviated Covid-19-related anxiety and improved cognitive regulation strategies, both adaptive and maladaptive, when compared to the control group.

**Conclusion:** The study supports the use of mindfulness-based cognitive therapy and acceptance and commitment therapy as effective, enduring strategies for reducing Covid-19-related anxiety and enhancing cognitive regulation among adolescents, making them valuable in health and therapeutic contexts.

**Keywords:** Cognitive therapy, mindfulness, acceptance and commitment therapy, Covid-19, anxiety, cognitive regulation, adolescents.

## Introduction

In the cycle of psychological development, between childhood and adulthood, adolescence is a very important period. This transitional stage begins at the age of 10-11 and ends around the age of 18-22. Adolescence is a period of profound changes that separates children from adults. This stage includes biological, social, emotional and cognitive development and is literally a period of change and transformation (Newman and Newman, 2019).

Covid-19-related anxiety has recently become a significant concern among teenagers (Zolfaqari and Elahi, 2019). The coronavirus (Covid-19) is part of a large group of viruses known to cause respiratory infections, ranging from mild cases like the common cold to more severe conditions such as MERS and SARS. The novel virus, now known as Covid-19, emerged in December 2019 in Wuhan, China (World Health Organization, 2020). The Middle East Respiratory Syndrome (MERS), another viral respiratory illness, was first identified in Saudi Arabia in 2012 and has since spread to several other countries (Tong et al., 2020).

The severity of symptoms caused by this virus can vary widely, from mild to severe cases. Typical signs of infection include fever, cough, and difficulty in breathing (Wu and McCoogan, 2020). Anxiety is frequently observed in patients with chronic respiratory conditions and can substantially diminish their quality of life. This anxiety often includes physical symptoms that may overlap with those of chronic respiratory conditions and the side effects of medications (Dong et al., 2017).

Numerous studies conducted in China during the Covid-19 outbreak have identified various psychological issues, such as anxiety, fear, depression, emotional instability, insomnia, and post-traumatic stress disorder, which have been reported at high rates among patients (Yang et al., 2020; Liu et al., 2020). Factors like the rapid spread of the virus, the severe condition of patients in intensive care units with acute respiratory issues, the lack of effective treatment, and the mortality associated with the disease are critical factors that profoundly impact the mental health of those infected (Xiang et al., 2020; Lima et al., 2020).

Emotional dysregulation, on the other hand, is a significant factor contributing to conditions like dyslexia in children and adolescents (Beauregard, Levensque, & Paquete, 2014) and is linked to various psychological disorders (Beauchaine, Gatzke-Kopp, & Mead, 2016). Managing emotions involves using behavioral and cognitive strategies to adjust the duration or intensity of emotional experiences (Gross and Thompson, 2007). Research has explored these emotion regulation strategies, categorizing them as either adaptive or maladaptive (Kring and Sloan 2010). Garnefski, Kraaij, and Spinhoven (2001) identified nine cognitive emotion regulation strategies, including self-blame, acceptance, rumination, positive refocusing, planning-focused refocusing, positive reappraisal, perspective-taking, catastrophizing, and blaming others. Of these, strategies like blaming others, rumination, and catastrophic thinking are considered maladaptive, while strategies such as positive reappraisal and planning-focused refocusing are viewed as adaptive.

Research has demonstrated the critical role of emotion regulation in preventing the development of emotional and behavioral disorders during adolescence (Cole, Dennis, Smith, and Cohen, 2018). Studies indicate a strong correlation between cognitive emotion regulation strategies and emotional problems (Garnefsky, Ban, and Karij, 2005; Garnefsky et al., 2001; Garnefsky,

Legerstee, Krige, van den Kommer, and Teerds, 2002). Generally, the research suggests that individuals who frequently engage in maladaptive cognitive styles, such as rumination, catastrophizing, and self-blame, are more susceptible to emotional issues. In contrast, those who use more adaptive styles, like positive reappraisal, tend to exhibit less vulnerability (Garnefsky and Karij, 2006).

One approach proven to be effective in treating conditions such as anxiety, depression (Shallcross, Duberstein, Sperber et al., 2021; Lori, Heiter, and Caroline, 2021; Victoria, Grunberg, and Ryan, 2021; Xingmin, Ping, Zhengying et al., 2019; Spek, Van Ham, Nykliček, 2013; Talebizadeh, Shahmir, and Jafar Fard, 2012), and stress management (Conner and White, 2014) is mindfulness-based cognitive therapy. This therapeutic approach involves techniques that reshape behavior and includes interventions aimed at altering maladaptive beliefs (Carroll & Onken, 2009). Research by Maher and Cordova (2019) indicates that mindfulness training enhances family dynamics, boosts satisfaction in marital relationships, improves job satisfaction, and reduces risks associated with psychological and social issues, including depression, anxiety, and substance abuse, through the enhancement of coping mechanisms and improved emotional regulation strategies.

Various studies have documented that mindfulness-based cognitive therapy effectively addresses anxiety, including anxiety related to Covid-19 (Biglari, Azad Azad, and Miri Sengtarashani, 2001; Garji, Aghaei, and Golparvor, 2010; Azhdari Kazeroni, Nami Pashe, and Mazloumin, 2019; Mostafazadeh et al., 2019; Shalkros et al., 2021; Xingmin et al., 2019) and aids in emotional regulation (Chiragpour, 2019; Nist, Bjorngard, Whittington, and Palamstrina, 2021).

Mindfulness-based cognitive therapy is structured around three primary objectives: (a) enhancing attention regulation, (b) fostering metacognitive awareness, and (c) developing a decentralization of and a reorientation toward mental states and content (Baer, 2003; Diodona, 2009). The overarching aim is to help individuals perceive their thoughts as mere mental events, to view them as testable, and to separate the occurrence of negative thoughts from the usual emotional reactions, eventually altering their significance (Segal et al., 2002).

Another well-established treatment effective in addressing anxiety and depression (Alfone, Imani, and Sarafaraz, 2019; Yeraghchi et al., 2018; Viskovich, Pakenham, and Fowler, 2021; Hill, Schaefer, Spencer, and Masuda, 2020; Twohig and Levin, 2017; Zettle, 2015; Fledderus, Bohlmeijer, and Schreurs, 2013) as well as in stress reduction (Brinkborg et al., 2011; Flaxman and Bond, 2010) is acceptance and commitment therapy. This approach involves two key processes: one being the acceptance or readiness to experience pain and other distressing events without attempting to control them, and the other focusing on value-based action or commitment with the intent of pursuing meaningful personal goals before addressing unwanted experiences (Fang & Ding, 2020). The primary goal of teaching acceptance and commitment is to cultivate psychological flexibility, meaning the ability to select actions and solutions that are more appropriate and practical among available options, rather than simply engaging in avoidance behaviors that steer clear of distressing thoughts, feelings, and desires (Han, Liu, Su, & Qiu, 2019).

In this therapeutic approach, the individual learns to increase acceptance of psychological experiences, recognizing the futility of avoidance behaviors when faced with psychological experiences, and instead accepts these experiences without internal or external resistance. The next phase involves developing self-awareness across all moments of life, enabling the individual to define personal actions and values independently of those experiences, ultimately leading to a commitment to action (Ong, Lee, and Twohig, 2018).

The results of various researches have shown that treatment acceptance and commitment on anxiety (esmaili, Sholah, Abedi and Molavi, 2017; Baradaran, Zare, Alipour and Farzad, 2015; Yadavaia, Hayes and Vilardaga, 2014; Bluett, Homan, Morrison, Levin and Twohig, 2014; Hoffman, Eilenberg, Jensen, & Frostholm, 2014; Mental Health (Viskevich et al., 2021; Beringborg, Michank, Hessier, & Bridgland, 2011 and Flaxman & Bond, 2010), the cognitive regulation of emotion (Hosseini, Ahmadi and Mami, 2014; Yaraqchi et al., 2018; Seliminejad, Rezaei and Azmoudeh, 2017; Jahangiri, Shirdel and Qara Chorlu, 2017; Mohammadi et al., 2014) has had an impact .

Given the significance of factors influencing adolescent mental health and the rising prevalence of these issues among young people, addressing psychological challenges, preventing harm, and enhancing the mental well-being of adolescents who seek help from counseling and psychological services due to these challenges is crucial. This includes developing the skills needed to alleviate anxiety related to Covid-19 and promoting cognitive order among adolescents. Moreover, the scarcity of clinical and controlled studies on this topic has prompted this research, which aims to compare the effectiveness of mindfulness-based cognitive therapy and acceptance and commitment therapy in reducing Covid-19-related anxiety and enhancing cognitive order among adolescents in Kermanshah.

## **Method**

This research was designed as a clinical trial. The study population comprised all adolescents from Kermanshah city during the spring of 2021. To establish the sample size, the Stevens table (Bahrami et al., 2018) was applied, taking into account an 80% test power, an average effect size, and a 5% error probability. The potential for participant dropout was also considered, resulting in the selection of 15 participants for each group, ensuring an equal number of participants in both the experimental and control groups. Participants were chosen using a multi-stage cluster sampling technique after fulfilling the study's eligibility criteria. Specifically, four secondary schools in Kermanshah were randomly chosen, with two classes selected from each school. From these classes, 20 students were chosen, and ultimately, 45 students who scored at least one standard deviation above the mean were selected as the final sample.

The criteria for inclusion in the study required participants to be adolescents aged between 12 and 18 years, without any significant physical or mental health issues, and with parental consent to participate. Additionally, participants could not have any acute physical or mental illnesses during the study, miss more than one session, or be unable to complete any assigned homework outside of the therapy sessions.

The first group in the intervention received cognitive therapy based on mindfulness, which was delivered over eight sessions, each lasting 90 minutes. The second group underwent acceptance and commitment therapy, also over eight 90-minute sessions, while the control group was placed on a waiting list. The cognitive therapy sessions based on mindfulness were conducted following the method outlined by Segal et al. (2002), and the sessions for acceptance and commitment therapy were carried out according to Hayes' (2004) methodology.

Table 1. The content of sessions of the cognitive therapy model based on mindfulness (Segal et al., 2002)

First session	Explaining the rules and goals of group meetings
	Mindful Raisin Eating (a meditation in which participants spend a few minutes exploring the sensory properties of a single raisin – sight, smell, taste, and touch). Homework: Physical examination within 6 days.
	Physical examination, homework: Mindful performance of a normal daily activity every day (washing, eating, brushing teeth, etc.).
Second session	Practicing thoughts and feelings, homework: recording pleasant events
Third session	Sitting observation; Homework: 3 minute breathing space three times per day
	Walkin with conscious mind; Homework: Mindful walking.
Fourth session	3-minute breathing space; Homework: Record unpleasant events
	Seeing meditation/hearing meditation; Homework: sitting observation
	Sitting observation; Homework: 3 minute breathing space not only three times a day but any time they notice stress and unpleasant emotions.
Fifth session	Sitting meditation; Homework: Guided Sitting Meditation
Sixth session	seated visualization meditation; Homework: A shorter guided meditation of at least 40 minutes.
	Ambiguous scenarios; Homework: 3 minute breathing space not only three times a day but any time they notice stress and unpleasant emotions.
Seventh session	Referring to the connection between creativity and activity; Homework: 3 minute breathing space not only three times a day but any time they notice stress and unpleasant emotions.
	Discussing the symptoms of the disease; homework
Eighth session	Physical examination, homework, reflection, feedback

Table 2. Subjects of acceptance and commitment therapy sessions

First session	Establishing a therapeutic relationship, concluding a therapeutic contract, psychological training
Second session	Discussing experiences and evaluating them, efficiency as a measure, generating creative frustration
Third session	Articulating control as a problem, introducing desire as another response, engaging in purposeful action
Fourth session	Using cognitive fault techniques, interfering with the functioning of problematic language chains, weakening one's alliance with thoughts and emotions.
Fifth session	Viewing the self as context, undermining the self-concept and expression of the self as the observer, demonstrating the separation between the self, internal experiences, and behavior
Sixth session	Application of mental techniques, patterning of leaving the mind, training to see inner experiences as a process
Seventh session	Introducing value, showing the dangers of focusing on results, discovering the practical values of life
Eighth session	Understanding the nature of desire and commitment, determining action patterns in accordance with values

In this study, the Corona Disease Anxiety Scale (CDAS) and the Cognitive Emotion Regulation Questionnaire (CERQ) were administered at three different points: pre-test, post-test, and follow-up.

**Corona Disease Anxiety Scale (CDAS):** This instrument, developed and validated by Alipour et al. in 2019, consists of 18 items divided into two components. Items 1 through 9 assess mental symptoms, while items 10 through 18 measure physical symptoms. The questionnaire uses a 4-point Likert scale, ranging from 0 (never) to 3 (always). The total possible scores range from 0 to 54, with higher scores indicating greater anxiety levels. The reliability of the CDAS was confirmed using Cronbach's alpha, with values of 0.879 for the first component, 0.861 for the second, and 0.919 for the entire questionnaire. To validate the questionnaire, it was compared with the GHQ-28, revealing significant correlations with the GHQ-28's total score and its subcomponents of anxiety, physical symptoms, social functioning impairment, and depression. These correlations were 0.483, 0.507, 0.418, 0.333, and 0.269, respectively, all significant at the 0.01 level (Alipour et al., 2019).

**Cognitive Emotion Regulation Questionnaire (CERQ):** Compiled by Garnefski et al. (2002), this multidimensional tool assesses cognitive coping strategies following negative events or situations. The CERQ measures strategies like self-blame, acceptance of circumstances, rumination, positive refocusing, planning-focused refocusing, positive reappraisal, perspective-taking, catastrophizing, and blaming others. Each subscale contains 4 items, scored on a scale from 1 (never) to 5 (always). The Persian version of this questionnaire, adapted by Hosni (2010), demonstrated good validity, with internal consistency ranging from 0.76 to 0.92, retest reliability between 0.51 and 0.77, and criterion validity confirmed through correlation with Beck's second depression inventory (1996), with scores between 0.25 and 0.48. The structure of the questionnaire was validated using principal component analysis with varimax rotation, explaining 74% of the variance (Hasani, 2010). Besharat's study (2011) also reported the psychometric properties,

including internal consistency, reliability, retest, content validity, and both convergent and differential validity, to be satisfactory.

**Data Analysis:** The research data was analyzed in two sections: descriptive statistics (demographic data) and inferential statistics (mean and standard deviation). Additionally, analysis of variance was employed to assess group homogeneity. The data was analyzed using SPSS version 26, applying mixed variance analysis between and within subjects. Assumptions of mixed variance analysis, including the Shapiro-Wilks test and the Levine test, were verified and reported.

**Findings**

Table 3 displays the mean and standard deviation of anxiety related to Covid-19 and cognitive order seeking, categorized by different stages and groups.

Table 3. Descriptive indices of anxiety caused by Covid-19 and cognitive order-seeking by group and test stage

Variable		Cognitive therapy based on mindfulness (n=15)		Treatment based on acceptance and commitment (n=15)		Control group (n=15)	
		Average	Standard deviation	Average	Standard deviation	Average	Standard deviation
Anxiety caused by Covid-19	pre-test	36	5.37	41	7.29	33.38	6.04
	post-test	23.66	4.43	11.53	5.51	37	3.79
	follow-up	24.46	4.91	12.40	5.57	53.37	4.47
Adaptive strategies	pre-test	37.60	8.54	41	8.31	39.26	8.93
	post-test	54.73	12.49	64	7.46	38.39	8.77
	follow-up	54.20	12.55	65.73	7.68	39.46	8.84
Non-adaptive strategies	pre-test	68.33	8.50	70.73	11.11	67.20	12.45
	post-test	38.60	13.38	27.33	9.59	67.86	12.49
	follow-up	37.26	13.72	26.53	1.50	69.06	12.98

As shown in Table 3, there were noticeable changes in the scores of participants in the test groups concerning anxiety caused by Covid-19 and the search for cognitive order during the post-test and follow-up stages. To determine if these changes were statistically significant, a mixed variance analysis was conducted both between and within the subjects. This analysis relies on several key assumptions, including the normal distribution of scores and the homogeneity of variances, which were first tested. The Shapiro-Wilks test was employed to check for normality, and since the test values were not significant at any stage ( $p > 0.05$ ), it was concluded that the score distribution was normal. Additionally, Levine’s test was used to assess the homogeneity of variances, and the results showed no statistically significant differences in variances across the three evaluation stages ( $p > 0.05$ ), confirming the assumption of equal variances. The assumption of homogeneity of variance-covariance matrices (MBox) was also tested and met ( $p > 0.05$ ). Furthermore, the SPSS Explorer was used to check for outliers, and none were found. Given that all assumptions for conducting mixed variance analysis between and within subjects were met, this statistical test was deemed appropriate.

The results of the statistical test for the Kervit test, which is an assumption of variance analysis with repeated measures, indicated a significance level below 0.05, meaning the assumption of the Kervit test was not established. However, since the results of the internal test were significant, the Greenhouse-Geisser correction was applied to determine the effect within subjects on anxiety caused by Covid-19 and cognitive order seeking (adaptive and non-adaptive strategies). These results are presented in Table 4.

Table 4. The results of the effects within the groups for the variable of anxiety caused by Covid-19 and cognitive order seeking (adaptive strategies and non-adaptive strategies)

	Effect	Sum of squares	df	average of squares	F	Meaningful level	Effect size
Anxiety caused by Covid-19	Accepted Kervit	3975.896	4	993.974	76.741	0.001	0.785
	Greenhouse - Geysere	3975.896	2.159	1841.515	76.741	0.001	0.785
Adaptive strategies	Accepted Kervit	3003.319	4	750.830	41.189	0.001	0.662
	Greenhouse - Geysere	3003.319	2.159	1397.517	41.189	0.001	0.662
Non-adaptive strategies	Accepted Kervit	10737.896	4	2684.474	135.594	0.001	0.866
	Greenhouse - Geysere	10737.896	2.159	4929.232	135.594	0.001	0.866

As demonstrated in Table 4, the multivariate analysis of variance revealed that the effect of time, as measured by the Greenhouse-Geisser test ( $F=76.741$ ,  $P < 0.001$ ), is significant. This indicates that there are significant differences in the scores related to anxiety caused by Covid-19 and cognitive order seeking (both adaptive and non-adaptive strategies) among participants across the pre-test, post-test, and follow-up stages

Table 5. The results of the effects between groups for the variable of anxiety caused by Covid-19 and cognitive order seeking (adaptive strategies and non-adaptive strategies)

	Source	Sum of squares	df	average of squares	F	Meaningful level	Effect size
Anxiety caused by Covid-19	Group	5819.748	2	2909.874	53.381	0.001	0.718
	Error		42	54.511	-	0.001	-
Adaptive strategies	Group	2289.467	2	3483.830	15.162	0.001	0.419
	Error	6967.659	42	229.767	-	0.001	-
Non-adaptive strategies	Group	17169.526	2	8584.763	22.855	0.001	0.521
	Error	15775.911	42	375.617	-	0.001	-



As shown in Table 5, there is a significant difference between the control and experimental groups ( $P > 0.05$ ). Specifically, cognitive therapy based on mindfulness and acceptance and commitment therapy significantly impact anxiety caused by Covid-19 and cognitive discipline, including both adaptive and non-adaptive strategies.

Furthermore, Table 6 presents a pairwise comparison of the average adjustments across different test stages (pre-test, post-test, and follow-up) concerning anxiety related to Covid-19 and cognitive order seeking (both adaptive and non-adaptive strategies). To identify at which stage the differences in anxiety and cognitive order seeking were significant, the Benferoni post hoc test was applied, comparing the pairwise averages.

Table 6. The results of the follow-up Ben Feroni test of anxiety caused by Covid-19 and cognitive order seeking (adaptive strategies and non-adaptive strategies) in the pre-test, post-test and follow-up stages

Variable	Steps differences	Average differences	Meaningful
Anxiety caused by Covid-19	pre-test - post-test (intervention effect)	14.378*	0.001
	Pre-test - follow-up (time effect)	13.644*	0.001
	Post-test - follow-up (intervention stability effect)	0.733*	0.004
Adaptive strategies	pre-test - post-test (intervention effect)	-13.378*	0.001
	Pre-test - follow-up (time effect)	-13.844*	0.001
	Post-test - follow-up (intervention stability effect)	-0.467	0.210
Non-adaptive strategies	pre-test - post-test (intervention effect)	24.156*	0.001
	Pre-test - follow-up (time effect)	24.467*	0.001
	Post-test - follow-up (intervention stability effect)	0.311	0.120

Table 6 indicates that both mindfulness-based cognitive therapy and acceptance and commitment therapy significantly impacted anxiety related to Covid-19 and cognitive order seeking (including both adaptive and non-adaptive strategies) in the post-test and follow-up stages.

The results from Table 6 also demonstrate that the average differences between pre-test and post-test, as well as between pre-test and follow-up, are larger and more significant than the difference between post-test and follow-up. This suggests that the effects of mindfulness-based cognitive therapy and acceptance and commitment therapy on anxiety related to Covid-19 and cognitive order seeking were present in the post-test phase and continued into the follow-up phase. However, the results did not clearly indicate which treatment method was more effective in the post-test and follow-up stages.

Therefore, to further investigate the differences in the effectiveness of these therapies on anxiety related to Covid-19 and cognitive order seeking, a Benferoni post hoc test was conducted. The outcomes of this test are presented in Table 7.

Table 7. Pairwise comparison with Ben Feroni's post hoc test in order to determine the effect of the more effective method on anxiety caused by Covid-19 and cognitive order seeking

Variable	Steps differences	Average differences	Meaningful
Anxiety caused by Covid-19	Cognitive therapy based on mindfulness with therapy based on acceptance and commitment	6.40*	0.001
	Cognitive therapy based on mindfulness with a control group	9.57*	0.001
	Treatment based on acceptance and commitment with control group	-15.97*	0.001
Adaptive strategies	Cognitive therapy based on mindfulness with therapy based on acceptance and commitment	-8.067*	0.046
	Cognitive therapy based on mindfulness with a control group	9.511*	0.014
	Treatment based on acceptance and commitment with control group	17.758*	0.001
Non-adaptive strategies	Cognitive therapy based on mindfulness with therapy based on acceptance and commitment	6.533	0.352
	Cognitive therapy based on mindfulness with a control group	-19.978*	0.001
	Treatment based on acceptance and commitment with control group	-26.511*	0.001

According to the data presented in Table 7, it can be concluded that both mindfulness-based cognitive therapy and acceptance and commitment therapy significantly improved anxiety levels caused by Covid-19 and cognitive order seeking (including both adaptive and non-adaptive strategies) when compared to the control group ( $P < 0.05$ ). There is a statistically significant difference in the effectiveness between mindfulness-based cognitive therapy and acceptance and commitment therapy in reducing anxiety related to Covid-19 and improving adaptive strategies ( $P < 0.05$ ). Specifically, treatment focused on acceptance and commitment has proven to be more effective than mindfulness-based cognitive therapy in addressing anxiety related to Covid-19 and enhancing adaptive strategies. However, there is no statistically significant difference between the two therapies in their effectiveness on non-adaptive strategies ( $P < 0.05$ ).

**Results and Discussion**

This study aimed to compare the effectiveness of mindfulness-based cognitive therapy and acceptance and commitment therapy on reducing anxiety caused by Covid-19 and enhancing cognitive order among adolescents in Kermanshah city. The findings revealed that both therapies were effective in improving anxiety levels related to Covid-19, with a more significant impact observed in the acceptance and commitment therapy group compared to the control group. The effects of acceptance and commitment therapy were found to be more enduring, continuing into the follow-up phase. These results are consistent with findings from previous studies conducted by Biglari et al. (2022); Gorji et al. (2021); Azhdari Kazeroni et al. (2019); Cheraghpour Khonakdar (2020); Mustafazadeh et al. (2019); Esmaili et al. (2018); Zare, Baradaran et al. (2016);

Shalcross et al. (2021); Viskovich et al. (2021); Xingmin et al. (2019); Hoffman and Gomez (2017); Yadavaya et al. (2014); Bellotti et al. (2014); Hoffman et al. (2014); Fliddiros et al. (2013); and Swain et al. (2013).

Regarding the observed findings, it can be suggested that mindfulness techniques help individuals with anxiety identify and change habitual thinking patterns that hinder their ability to lead a stable life. By replacing these patterns with more adaptive emotional regulation strategies, individuals can manage anxiety more effectively. Researchers also argue that emotions and physiological states can trigger anxiety, leading to agitation, avoidance, and emotional exhaustion, which exacerbate the anxiety. Therefore, the initial step in assisting those with anxiety symptoms involves breaking the cycle of anxiety and replacing maladaptive habits with healthier ones that boost self-esteem and promote relaxation, such as mindfulness (Goldin and Gross, 2010).

Additionally, acceptance and commitment therapy specifically supports individuals in acknowledging their thoughts and feelings rather than avoiding them. This approach encourages individuals to focus on their goals and values, experiencing their thoughts and feelings as part of the process. This technique has been shown to significantly reduce anxiety levels related to Covid-19.

In this therapeutic approach, the first step involves fostering psychological acceptance of mental experiences (thoughts and feelings) while simultaneously reducing ineffective control behaviors. Patients are taught that attempts to avoid or control unwanted mental experiences are counterproductive, often intensifying these experiences. Instead, full acceptance without internal or external attempts to eliminate them is encouraged. The second step involves increasing the individual's awareness in the present moment, allowing them to observe all mental states, thoughts, and behaviors in real-time. The third step focuses on helping individuals distance themselves from these mental experiences (cognitive defusion), enabling them to act independently of them. Fourth, individuals are guided to reduce excessive focus on negative self-images or narratives they have created in their minds, such as seeing themselves as victims. Fifth, the therapy helps individuals identify and clarify their core values and translate these values into specific behavioral goals. Finally, the therapy aims to motivate committed actions aligned with these goals and values, accepting mental experiences as they arise. These experiences may include depressive thoughts, obsessions, trauma-related thoughts, fears, and more (Forman and Herbert, 2008).

The study results demonstrated that both mindfulness-based cognitive therapy and acceptance and commitment therapy significantly enhanced cognitive order seeking (adaptive and non-adaptive strategies) when compared to the control group. A statistically significant difference was found between the effectiveness of these therapies, with acceptance and commitment therapy being more effective in improving adaptive strategies. However, there was no significant difference between the two therapies concerning non-adaptive strategies, and the effects continued into the follow-up phase. These findings align with the research conducted by Hosseini et al. (2021), Yaraqchi et al. (2019), Saliminejad, Rezaei, and Azmoudeh (2018), Jahangiri, Shirdel, and Qara Chorlo (2018), Mohammadi et al. (2015), Nessel et al. (2021), Brinkborg et al. (2011), and Flaxman and Bond (2010).

In interpreting these findings, research suggests that mindfulness can alter an individual's emotional responses by modifying cognitive and emotional processes, leading to lower levels of issues related to cognitive emotion regulation, fear, and avoidance of emotions. Mindfulness exercises help individuals manage their thoughts, future habits, and unhealthy behavior patterns, thereby playing a critical role in cognitive emotion regulation (Hosseini et al., 2021). Mindfulness-Based Cognitive Therapy (MBCT) encourages individuals to repeatedly focus on neutral stimuli and develop internal awareness, helping them manage preoccupations, mental ruminations, and negative emotions. Consequently, these exercises reduce negative emotional experiences (Izadi and Taghizadeh, 2021).

Explaining the process of acceptance and commitment therapy, it is essential to highlight that the core of this treatment involves identifying personal values and committing to actions aligned with those values. By encouraging patients to recognize their values, set goals, overcome obstacles, and take committed actions despite difficulties, they can achieve their goals and experience the happiness that follows, preventing them from becoming trapped in a negative emotional cycle. This approach helps eliminate anxiety, tension, despair, hopelessness, depression, and sadness, which can otherwise exacerbate problems. Another key aspect of this treatment is introducing an alternative to inhibition, emphasizing willingness and acceptance. This approach allows clients to accept unpleasant internal experiences without attempting to control them, making these experiences seem less threatening and reducing their impact on the person's life (Shawyer et al., 2017). Additionally, mindfulness in this therapy provides a new perspective on mental events, enabling individuals to observe these events as occurrences rather than integral parts of themselves (Hayes et al., 2012). Therefore, due to its focus on acceptance and voluntary actions, this therapy can effectively improve the conditions and performance of individuals with disorders and diseases.

The limitations of this research include low external validity and generalizability due to the controlled nature of the study, the specific adolescent population sampled, and the limited duration of the educational course. Future research should include more controlled experimental studies with clinical samples. It is also recommended that educational CDs of therapy sessions be developed by researchers and therapists, with financial support from relevant organizations, to be made available to teachers and families as part of an educational package. Practical treatment programs should be implemented to enable counselors, teachers, families with teenage children, and others experiencing anxiety related to Covid-19 and seeking cognitive order to benefit from these findings and treatment methods.

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