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Effectiveness of the Therapeutic Interventions based on Acceptance and Commitment on the Body Image and Mental Health of Bodybuilding Athletes

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A B S T R A C T

Introduction: One of the most practical psychological interventions in the field of managing mental disorders is acceptance and commitment-based therapy (ACT). The purpose of this research was to investigate the effect of ACT on body image (BI) and mental health (MH) in male bodybuilding athletes.

Materials & Methods: The method of this research is a quasi-experimental type of pre-test-post-test design with a control group. The statistical population of the research is all the male bodybuilding athletes of Izeh city, of whom 30 people were selected as a sample using available and voluntary sampling in two experimental (15 participants) and control (15 participants) groups, of which the intervention group received 10 interventional sessions (weekly). The library method was used to collect the background and theoretical foundations of the research, and the standard Body Image and Goldberg's Mental Health were used. In order to analyze the data, MANCOVA and ANCOVA statistical tests were used with the help of SPSS V.24 ($P<0.05$).

Results: The results of the research showed that there is a significant difference between the two experimental and control groups after therapeutic interventions based on ACT in the variable of mental health (MH) (Partial Eta=0.56, P-value=0.001), but there was no significant difference in body image (BI) (Partial Eta=0.07, P-value=0.085).

Conclusion: Therapeutic interventions based on ACT improve the MH of bodybuilding athletes. Therefore, managers and sports coaches can use this method of intervention in order to reduce the negative emotions of athletes.

Keywords: Body Image, COVID-19, Mental Health, Psychological Interventions

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Introduction

In late 2019, healthcare centers began noticing a new respiratory illness affecting people, which led to the identification of a novel strain of coronaviruses (1). According to global statistics, the mortality rate for this disease has been recorded at 3.4% (1); however, a meta-analysis reported a mortality rate of 6.4% (2). Additionally, during its outbreak, this disease has had widespread psychological and social effects on communities. On an individual level, people may experience fear of getting sick or a sense of helplessness in the face of the disease, leading to significant stress and anxiety, which could adversely impact mental health (3). Various studies have shown that the lack of sport activities in daily life leads to obesity, premature aging, cardiovascular vulnerability, skeletal fragility, muscle atrophy, depression, and other physical and psychological disorders (4). According to the research results of Rezaei et al., the main factors influencing a healthy lifestyle and preventing COVID-19 include proper nutrition, moderate-intensity sport activities, stress management, and social distancing (5). Physical activity during critical situations, such as the COVID-19 pandemic, is associated with levels of stress, anxiety, depression, and mental health in communities (4). According to the research by Rezaei et al., during the COVID-19 period, 84% of indoor sports facilities and 66.6% of outdoor facilities in Iran were closed (6). Based on the research results of Yan et al., the functional connectivity of the brain differs significantly between inactive, low-active, and active individuals who have recovered from COVID-19 (post-illness). This indicates that sport activities and exercise have a positive and significant impact on the brain function of individuals who have contracted COVID-19 (7).

One of the critical factors that motivates bodybuilding athletes is body image (BI) (8). BI is a multidimensional, dynamic, variable, and social construct that encompasses personal and societal feelings, attitudes, and values (9). Bodybuilders invest significant time, effort, and resources to achieve their ideal BI. Thus, it is logical to expect that the COVID-19 pandemic may have affected bodybuilders' BI. Besides losing muscle mass and an ideal appearance, fat accumulation in certain areas of the body and psychological distress from inactivity can impact the BI of bodybuilders. Kolbadinejad et al. mentioned that understanding the meaning of BI, the factors influencing it, and its relationship with self-esteem among older adults can lead to a positive BI, ultimately improving their psychological and social well-being and quality of life (10).

One of the key indicators of athletes' general health is mental health (MH). MH is defined as the feeling of satisfaction and psychological well-being, social adaptation to acceptable norms, and the individual's adjustment to their environment, leading to happiness and a productive and effective life (11). Research has shown that measures taken during the COVID-19 pandemic have increased psychological stress, even in developed countries. Although quarantine and physical distancing measures may have helped reduce the spread of the virus and protect athletes' physical health, these measures, which led to lifestyle changes, may also have long-term negative psychological and social impacts, especially for athletes such as bodybuilders (12). The research by Andrade et al. showed a significant increase in stress, sleep disturbances, COVID-19 anxiety, depression, and other mental disorders among elite footballers during the pandemic, ultimately leading to severe damage to their MH (13).

In recent years, various methods have been employed to treat and reduce psychological disorders and regulate negative emotional states such as stress, depression, and anxiety. One of the newer cognitive-behavioral intervention methods for managing and improving emotional disorders is Acceptance and Commitment Therapy (ACT). The key components of ACT include defusion, acceptance, self as content, present moment, commitment, and values. The focus of ACT is on enhancing psychological flexibility in the presence of psychotic symptoms (14). The results

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of a study by Zemestani et al. showed that ACT interventions significantly impacted psychological components (such as anger rumination, emotional dysregulation, and competitive anxiety) and athletic performance in athletes (15). Various research findings indicate that ACT is significantly associated with anxiety and depression (16), resilience (17), athletes' mood states (18), and quality of life (19). Reviewing and summarizing the research background shows that the coronavirus pandemic has created serious threats to the lives and physical and mental health of individuals. This disease has also caused severe psychological disorders such as stress, depression, anxiety, and negative emotions among athletes, especially bodybuilding athletes. Accordingly, it is very important to identify treatment approaches that can affect mental health, such as anxiety, depression, body image concerns, and resilience. Therefore, this study was conducted to evaluate the effect of ACT on BI and MH in male bodybuilding athletes in Izeh during the Corona period.

Materials and methods

Study Design

The present research, in terms of its objective, is applied and, based on the method of data collection, is a quasi-experimental study using a pre-test-post-test design with a control group. It was conducted as a survey and cross-sectional study during the winter of 2022.

Setting and participants

The statistical population consisted of all male bodybuilders in the city of Izeh. Inclusion criteria were male bodybuilders from Izeh in 2022, filling out a consent form, and committing to participate in the ACT sessions. Exclusion criteria included any history of physical or psychological illnesses (mood disorders, anxiety disorders, cognitive disorders, depression, post-traumatic stress disorder), use of psychiatric medications, family members with acute mental illness, smoking, contracting COVID-19, failure to complete questionnaires, or absence from more than two sessions.

Sample Size, Randomization

For sampling, 100 bodybuilding athletes were first selected to perform a pre-test (screening) using a purposive and convenience sampling method and completed the MH and BI questionnaires. Considering the cut-off points of the questionnaires (score 40 for MH and score 45 for BI) in previous studies, 42 individuals who had simultaneously obtained low scores in the MH and BI variables were selected, and 30 individuals were selected from them by simple random selection and placed in two groups, experimental (15 participants) and control (15 participants), using the same method. In this study, bodybuilding athletes were people who had been training continuously for at least one year in fitness clubs.

Measurements & Validity and Reliability

Demographic Questionnaire

This questionnaire included information such as education level, age, sports activity history, marital status, and the number of training sessions.

Body Image Concern Inventory (BICI)

This tool is for Littelton, Axsom & Pury and includes 19 questions and two factors or subscales (dissatisfaction and concern). It is based on a five-point Likert scale, with the highest possible score being 95 and the lowest 19. A higher score indicates greater concern about body image or appearance. The scoring ranges from "never" (1 point) to "always" (5 points). The validity and reliability of this tool were confirmed by Littelton, Axsom & Pury (Cronbach's alpha=0.82). Also, the reliability of this questionnaire was confirmed by Noroozi Dashtaki et al. (20) with a Cronbach's alpha coefficient of 0.91 and by Ghorbani et al. (21) with a Cronbach's alpha coefficient of 0.89. Additionally, the content validity of this questionnaire was verified by seven expert

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professors, and its reliability coefficient was determined to be 0.88 using Cronbach's alpha.

Goldberg Mental Health

This tool consists of 28 questions and includes 4 subscales. The subscales are anxiety and insomnia, depression, physical symptoms, and social dysfunction, with each subscale comprising 7 questions. It uses a four-point Likert scale (scores ranging from 0 to 3), with the highest possible score being 84 and the lowest being 0. A higher score indicates poorer mental health. The validity and reliability of this tool were confirmed by Goldberg (using factor analysis). Also, the reliability of this questionnaire has been confirmed by Shahbazi et al. (22) and Mehri (11). Additionally, the content validity of this questionnaire was verified by seven expert professors, and its reliability coefficient was determined to be 0.94 using Cronbach's alpha.

Intervention

Acceptance and Commitment Therapy Intervention: Another tool in this study was the ACT intervention for the experimental group (the control group did not receive any intervention). The research implementation method was as follows: After the research proposal was approved by the Department of Sports Sciences at Ilam University, the necessary permissions to conduct the research were obtained by visiting the Sports and Youth Office of Izeh County in Khuzestan Province. Due to the COVID-19 pandemic, a total of 37 participants from various gyms in the city of Izeh expressed their willingness to participate in the study. Ultimately, after a clinical evaluation, 30 individuals met the research criteria and were randomly assigned to two groups: the experimental group (15 participants) and the control group (15 participants). Due to the COVID-19 pandemic, the intervention sessions were held both in person (following health protocols) and online. The ACT protocol was conducted over 10 sessions of 90 minutes (weekly) each and was monitored by the researcher. A summary of the sessions is provided in Table 1.

Table 1. ACT Protocol.

Session	**objective**	Content
Session 1	Introduction and Pre-test	In this session, after welcoming and introductions, the goals and process of the study were explained. Establishing relationships with group members. Then, the pre-test was conducted using demographic questionnaires, the Littleton, Axsom, and Pury Body Image Concern questionnaire, and the Goldberg (GHQ).
Session 2	Introduction of Research Variables and Therapy Orientation	Introduction to ACT, establishing a therapeutic relationship, creating a therapy contract, providing definitions and information about Mental health and body image, creating helplessness about the temporary and low effects of other interventions using metaphors, understanding the structure of sessions, assessing the individual's willingness to change.
Session 3	Assessment of Personal Experiences	Provide feedback from the previous session, review the limited effects of other interventions, explain that acceptance and commitment therapy seeks to control the problem, not solve it, practice focusing on the present moment, and understand the concept of auto-directedness, Exploring the interaction between thoughts, feelings, and actions, and creating hopelessness regarding previous methods used by the individual. Helping the person realise that any action to avoid or control unwanted mental experiences is ineffective, leading the client to creative hopelessness and clarifying their values. Using the "hole" metaphor to illustrate creative helplessness, Giving homework.
		Reviewing the previous session's assignment, practicing eating raisins, practicing body check meditation, creating a complete understanding of

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Session 4	Clarification and Identification of Values	the body's structure by presenting an analogy, Clarifying values and emphasising identification and awareness. Providing mindfulness exercises and continuing value clarification. Use of a polygraph, followed by a discussion of problems and the acceptance of COVID-19's existence.
Session 5	Mindfulness and Acceptance	Review of previous sessions, Mindfulness exercises focused on bodily sensations, discussion of obstacles, and exploration of the feasibility of value-related activities. Introduction to effective goal-setting related to values, exercises related to satisfaction and dissatisfaction with life's suffering. Using the "annoying guest" metaphor and providing mindfulness exercises.
Session 6	Cognitive Fusion an Self-as-Context (Self-Concept)	Review of previous sessions, Mindfulness exercises for bodily sensations along with a discussion about them, explaining cognitive defusion, using the "bus" metaphor, and performing mindfulness exercises, Observing oneself as a context, weakening the self-concept and expressing oneself as an observer, demonstrating the separation between self, inner experiences and behavior, reviewing the task and behavioral commitment.
Session 7	Application of Mental Techniques	Review of previous sessions, Setting effective goals related to values, and mindfulness exercises (breathing or body awareness), Recognizing ineffective control strategies and realizing their futility, accepting painful personal events without struggling with them.
Session 8	Creating Flexible Patterns (Openness)	Review of previous sessions, Discussion about activity stages and activity cycles, introducing values and assigning value-related tasks, continuing the discussion on finding satisfaction in suffering, and providing mindfulness exercises, Performance measurement, conflict between experience and mind, out-of-mind modeling, paying attention to thoughts and feelings and avoiding their content.
Session 9	Understanding the Nature of Willingness and Commitment (Acceptance and Action)	Review of previous sessions, Exercises for value clarification, motivation for goal-oriented activity along with acceptance of mental experiences, and an educational evaluation, Differences between values, showing the dangers of focusing on results, motivating clients to make changes and empowering clients, discovering practical values in life, committing to change, understanding the nature of desire and commitment, reviewing homework.
Session 10	Appreciation and Post-test	Athletes were thanked for their cooperation and regular participation in the classes. At the end, the post-test was conducted using demographic questionnaires, the Littleton, Axsom, and Pury Body Image Concern questionnaire, and the Goldberg (GHQ).

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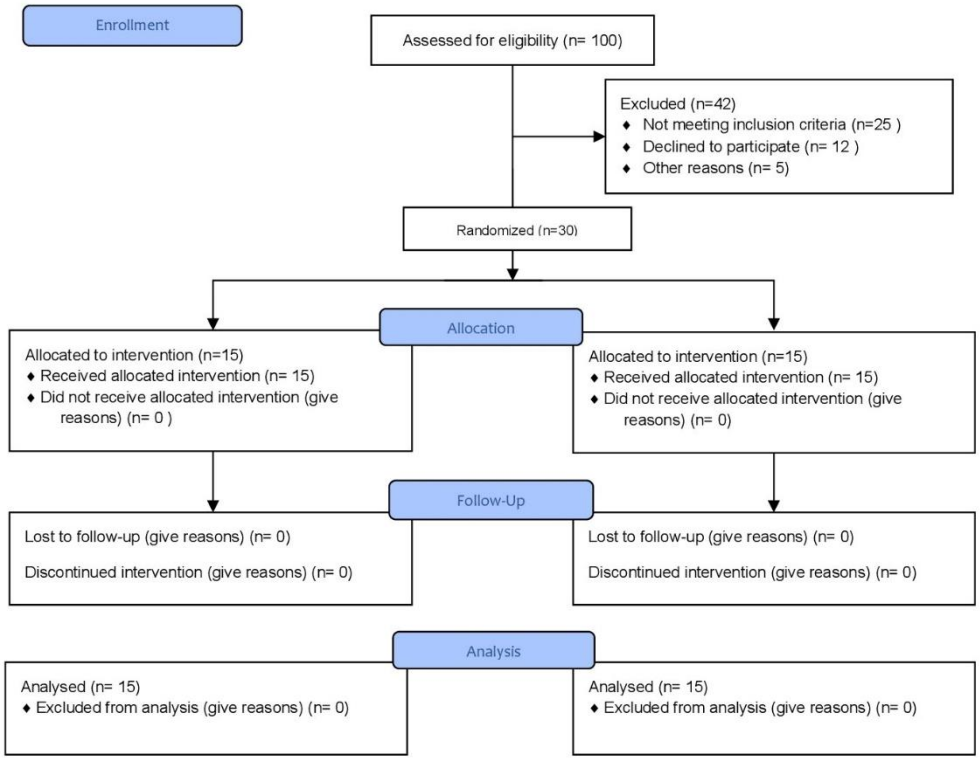


Figure 1. Flow diagram of the sampling process.

Statistical and Data Analysis

After data collection, for analysis, descriptive statistics (frequency distribution tables, mean, and standard deviation) and inferential statistics (Kolmogorov–Smirnov test, Bax's M test, Levene's test, MANCOVA, and ANCOVA) (at a significance level of 0.05) were used with SPSS-24.

Results

The descriptive statistics results of the study showed that the average age of bodybuilders in both the experimental and control groups was 28.55 years. Further descriptive statistics are given in Table 2.

Table 2. Descriptive research statistics.

Group	N	Mean age	Marriage		Education			
			Single	Married	associate's degree or lower	bachelor's degree	master's degree	doctoral degree
Experimental	15	28.67	10	5	2	7	5	1
Control	15	28.43	11	4	1	9	5	-

Table 3. Descriptive Indices of Research Variables

Variable	Group	Test	N	Min Score	Max Score	Mean	Standard Deviation
	Experimental	Before	15	28	81	48.25	2.12
		After	15	27	78	47.88	3.95
		Before	15	30	80	49.91	3.43

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Body Image (BI)	Control	After	15	29	81	50.23	4.12
Mental Health (MH)	Experimental	Before	15	30	65	41.18	3.23
		After	15	36	72	57.76	2.87
	Control	Before	15	32	66	42.06	3.10
		After	15	31	68	45.54	2.95

The results in Table 3 indicate that the mean scores for BI in the pre-test and post-test in both the control and experimental groups do not show a significant difference, which may suggest that ACT did not have an effect on BI. However, the comparison of mean scores for the MH variable across all groups indicates a significant effect of ACT on the MH of the athletes. Before analyzing the research hypotheses, the assumptions of the analysis of covariance test were examined: the normality test, the Bax's M test (homogeneity of covariance matrices), the Levene's test (homogeneity of variances), linear correlation, and the test of the linearity of regression slopes. According to the results of the K-S test, the significance level for all variables is greater than 0.05; therefore, the distribution of the data is normal. Additionally, the results of Bax's M test for examining the equality of covariance matrices of the dependent variables between the experimental and control groups indicated that the covariance matrices of the dependent variables are equal across the two groups (P = 0.37, F = 1.09, and Boxes M = 7.41). The results of Levene's test indicate that the significance levels for all variables are greater than 0.05; therefore, the homogeneity of variances across groups is satisfied. The results of the linearity test (the assumption of linearity for the covariance analysis test) between the covariate variables (pre-test) and the dependent variables were also significant. Additionally, the results of the homogeneity of regression slope test at a 5% error level were confirmed for both dependent variables. The results of the chi-square ($\chi 2$) homogeneity test indicated no difference in the distribution of subjects in terms of demographic variables between the post-test and pre-test groups (P > 0.05). Table 4 shows the results of the MANCOVA test.

Table 4. Results of MANCOVA for Comparing the Experimental and Control Groups.

Source	Test Name	Observed Value	Hypothesis df	Error df	F	Significance level
Group	Pillai's Trace	0.47	3	22	6.54	0.002
	Wilk's lambda	0.53	3	22	6.54	0.002
	Hotelling's Trace	0.89	3	22	6.54	0.002
	Roy's largest root	0.89	3	22	6.54	0.002

The results of the MANCOVA indicate that the significance level for all tests is less than 0.05. Therefore, there is a significant difference between the experimental and control groups in at least one of the dependent variables' components (P=0.002). Thus, ACT has a significant effect on at least one of the two variables: BI and MH. Finally, to clarify this issue, the effect of the intervention on each dependent variable was performed separately using ANCOVA. Table 5 shows the results of the ANCOVA test for the BI variable:

Table 5. Results of ANCOVA for BI Variable of Athletes.

Source of Variation	SS	Df	MS	F	P	Partial η^2

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Pre-Test Body Image	320.85	1	320.85	49.25	0.000	0.64
Main Effect (Training)	12.16	1	12.16	1.86	0.085	0.07
Residual Error	175.81	27	6.51			

The results of the ANCOVA indicate that after controlling for the effect of pre-test BI scores as a covariate, the main effect of ACT on BI in the post-test is not significant, with a partial eta squared of 0.07 ($F(1,27)=1.86$, $p=0.085$, $\eta2=0.07$). This means that ACT does not have a significant impact on the athletes' BI. Table 6 shows the results of the ANCOVA test for the MH variable:

Table 6. Results of ANCOVA for the MH Variable in Athletes.

Sources of Variance	SS	Df	MS	F	P	Partial η^2
Pre-test Mental Health	4432.50	1	4432.50	45.64	0.000	0.85
Main Effect(Training)	865.50	1	865.50	25.33	0.001	0.56
Residual Error	1593.95	27	59.04			

The results of the ANCOVA show that, after controlling for the pre-test MH scores as a covariate, the main effect of ACT on post-test MH is significant, with an intervention effect size of 0.56 ($F(1,27)=25.33$, $p=0.001$, $\eta2=0.56$). This indicates that the ACT-based intervention had a significant positive impact on the athletes' MH.

Discussion

This study aimed to investigate the effect of ACT on BI and MH of male bodybuilders in Izeh city. The COVID-19 pandemic, by imposing restrictions to reduce the number of infections, had limited opportunities for outdoor sports activities. Nevertheless, physical exercise is so essential for both our physical and mental health that we must maintain a regular schedule for it. Engaging in any type of physical activity was one of the ways to prevent the negative effects of physical inactivity and excessive weight gain during the home quarantine period due to the COVID-19 outbreak (4).

The inferential results of the study indicated that ACT had no significant effect on the BI of bodybuilding athletes in Izeh. This finding aligns with the results of Abbasi et al. (23) but contrasts with the research outcomes of Ghorbani et al. (21), Noroozi Dashtaki et al. (20), and Rashidi Zafar (24). To explain this finding and the discrepancy with most previous research, it should be noted that none of the contrasting studies were conducted during the COVID-19 pandemic. This suggests that the psychological and emotional impacts of the COVID-19 pandemic may have been significantly greater than the effects of therapeutic interventions such as ACT. Additionally, it should be noted that the sample in this study comprised elite bodybuilders, who may not have a negative BI of themselves. It is possible that participating in bodybuilding activities has enhanced both physical and psychological abilities, which may have led bodybuilders to experience less concern about their BI. Additionally, the tools used in this study were different from those used in the majority of other research. Overall, it can be said that the emergency situation of COVID-19, the specific study population, the experience and background of the athletes, and the research tools used could be reasons for the discrepancy between the results of this study and those of other studies.

Other inferential results of this study showed that ACT has a significant effect on the MH of bodybuilders in the city of Izeh. This finding is consistent with the results of Shahbazi et al. (22), Mehri (11), Ning et al. (25), and Myall et al. (26). To explain the effectiveness of ACT in improving psychological disorders in athletes, it can be stated that athletes across various sports and levels are likely

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to face psychological pressures related to their situations, competition, and performance expectations. These pressures lead to the experience of various negative emotions in them, ultimately impacting their sports performance negatively. Athletes who suffer from psychological disorders and negative emotional states often have a strong tendency to deny these psychological issues, which in turn perpetuates and exacerbates such unpleasant conditions (27). On the other hand, excessive engagement with mental and emotional disturbances and the effort to reduce or suppress them can lead to a decrease in self-regulation. Self-regulation refers to an individual's ability to voluntarily control internal processes and behavioral outputs, encompassing cognitive, emotional, and behavioral components. It facilitates the development of emotional intelligence and mental well-being. In ACT interventions, individuals learn to use fewer strategies to reduce negative thoughts and emotions and to accept them non-judgementally as they are. This approach helps improve self-regulation and emotional regulation, preventing the onset or exacerbation of psychological symptoms and issues (15). The mechanism of the impact of ACT works by teaching individuals to accept experiences instead of avoiding or escaping them. This acceptance improves self-regulation, as ACT shifts the focus from judgmental attention on negative thoughts and physical feelingstowards non-judgmental awareness. This shift helps reduce negative emotional states and enhances MH (24). In fact, acceptance and commitment-based exercises are essential for individuals with emotional disorder symptoms, as they reduce attention to negative internal thoughts and feelings while increasing the activity of brain connections responsible for emotion regulation. Studies have shown that ACT, by regulating emotions, raising body awareness, and providing insight into one's internal state, can act as a mediator. It significantly reduces negative emotions and improves individuals' MH (15).

In conclusion, it should also be noted that various studies indicate that physical activities (aerobic, anaerobic, and various types of exercise) have an impact on individuals' MH (3). Regular sport activities reduce the function of the sympathetic nervous system and the central activity of the adrenal-pituitary-hypothalamic axis. This hormone plays a crucial role in the development of adaptive responses to physical and psychological stressors, and long-term dysregulation and disruption of this hormone are fundamental in the development of psychological disorders (28). Studies have shown that sport activities can lead to changes in the accumulation of monoamine receptors (serotonin, dopamine, or norepinephrine) or endogenous analgesics (endorphins and enkephalins), thereby playing a significant role in positive mood changes and enhancing MH (29). Various studies indicate that resistance training, such as bodybuilding, improves cognitive performance, enhances concentration, reduces psychological disorders, improves insulin sensitivity, improves blood lipid profile, lowers blood sugar, increases basal metabolism, manages body weight, and provides many other physiological benefits (30).

This research faced certain limitations. The small sample size and the research method led to restrictions in generalizing the results. Due to the limitations caused by the spread of COVID-19, it was not possible to access a larger sample of bodybuilding athletes in the city of Izeh.

Conclusion

The results of this study showed that training in ACT can help improve psychological disorders, cognitive-emotional functions, and athletic performance in athletes. Implementing this therapy alongside physical training can enhance their athletic performance. Additionally, this technique is a useful and effective strategy for managing and improving MH in critical conditions such as the COVID-19 pandemic. It is recommended that future studies examine the effects of ACT on other variables of sports psychology in athletes of team sports such as football and volleyball or in non-coronavirus

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conditions and in other cities and with more samples in order to achieve greater generalizability of the findings. It is recommended that this intervention be conducted over more sessions and with a longer follow-up period to better reveal the sustainability of its effects.

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Ethical considerations

To ensure research ethics, all participants were informed that their data would be collected solely for research purposes, and their responses would remain confidential. Additionally, participants were reminded that they could withdraw from the study at any time or request access to the results. The Medical Ethics Committee of Ilam University approved this research (Ethics code: IR.ILAM.REC.1403.013).

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Competing Interests' Disclosure

The authors of this study have declared no conflicts of interest.

Authors' contributions

Investigation, writing– Original Draft Preparation, Writing– Review & Editing, Supervision Conceptualization, Methodology, Data Curation, Project Administration: SR, Formal Analysis, Software, Validation, Funding Acquisition: AK, Visualization, Resources: HG.

Writing Disclosure

They verify that the authors conducted the writing and preparation of this manuscript independently and without the assistance of any professional writing services. Only the authors' original labor and contributions are represented in the content.

Data Availability Statement

Upon reasonable request, the corresponding author can provide the data that substantiates the findings of this study.

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