The Effectiveness of Acceptance and Commitment Therapy on Cognitive Emotion Regulation and Experiential Avoidance in Individuals with Leprosy in Tabriz

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ABSTRACT

Objective: The present study aimed to determine the effectiveness of Acceptance and Commitment Therapy (ACT) on cognitive emotion regulation and experiential avoidance in individuals with leprosy in Tabriz.

Methods and Materials: The research method was a quasi-experimental design with a pretest-posttest control group. The study population consisted of all individuals with leprosy in Tabriz in 2023. After a clinical interview and considering the inclusion and exclusion criteria, 32 participants were selected through convenience sampling and randomly assigned to experimental (n=16) and control (n=16) groups. Both groups were assessed using the Cognitive Emotion Regulation Questionnaire (Garnefski et al., 2002) and the Acceptance and Action Questionnaire (Bond et al., 2011). The experimental group received eight sessions of ACT over two months, with one 90-minute group therapy session per week. At the end of the treatment, both groups completed the cognitive emotion regulation and experiential avoidance questionnaires again. The data were analyzed using multivariate covariance analysis.

Findings: The results of the data analysis showed a significant difference between the experimental and control groups in terms of cognitive emotion regulation and experiential avoidance in individuals with leprosy (P<0.01). After the intervention, the level of maladaptive emotion regulation and experiential avoidance in the experimental group significantly decreased compared to the pretest and control group, while adaptive emotion regulation in the experimental group significantly increased compared to the pretest and control group, leading to significant changes in cognitive emotion regulation and experiential avoidance.

Conclusion: Therefore, the findings suggest that ACT affects cognitive emotion regulation and experiential avoidance in individuals with leprosy. The results of this study highlight some of the capabilities of this method in treating cognitive emotion regulation and experiential avoidance, demonstrating its potential as an effective therapy for individuals with leprosy.

Keywords: *Acceptance and Commitment Therapy, emotion regulation, experiential avoidance, leprosy*

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1. Introduction

Leprosy is a neglected skin disease. Progress in treatment and the implementation of control strategies have significantly reduced its prevalence worldwide. However, its severe and debilitating nature still makes it a public health issue in 123 countries (World Health Organization, 2021). Leprosy is an infectious disease caused by Mycobacterium leprae, primarily affecting peripheral nerves and the skin. Nerve damage may impair sensory, motor, and autonomic functions, ultimately leading to disability (Siagian et al., 2022). Leprosy causes physical impairments, which, if left untreated or diagnosed late, can result in irreversible damage, thereby worsening the disease outcomes. Therefore, the consequences of this skin disease are not merely physical but are also the result of multiple pathogenic factors, such as stigma, social exclusion, and psychological distress. These factors can contribute to the exacerbation of the disease, maintaining it as a highly complex chronic illness (van Dorst et al., 2020).

Despite significant progress in diagnosis and treatment, leprosy remains the most common cause of psychological issues among patients (Li et al., 2024). Psychological responses, such as emotion regulation and experiential avoidance, influence individuals' responses to the disease, self-management, adherence to treatment, and adaptation following diagnosis (Barcelos et al., 2021). Research evidence suggests that emotion regulation is modifiable and may change over time (Sanchez et al., 2021). In fact, it can be argued that with a better understanding of the disease, the impact of psychological factors on adherence to medical instructions and treatment outcomes increases (Siagian et al., 2022). Furthermore, leprosy treatment outcomes are largely dependent on the level of experiential avoidance and acceptance of the disease (Shokre & Souilm, 2018). Experiential avoidance is a major issue in the life of an individual with leprosy. It refers to the avoidance of experiences related to pain, suffering, and discomfort, which are serious concerns for leprosy patients (Hassan, 2023). Experiential avoidance has garnered increasing attention in the field of clinical psychology. It is described as a behavior used to control emotions, focusing on both the subjective experience and the physiological arousal of emotions (Hayes-Skelton & Eustis, 2020; Na et al., 2022; Wen et al., 2020). Hooper et al. (2018) demonstrated that individuals who accept their illness and have lower experiential avoidance exhibit higher adherence to recommended treatments (Hooper et al., 2018).

In addition to the aforementioned issues, prolonged treatment periods, social relationship problems, and the side effects of leprosy may all affect the psychological well-being of these patients (Lee et al., 2020). Given the maladaptive emotion regulation and uncertainty in coping with a serious illness, identifying and understanding the factors involved in the psychological issues of individuals with leprosy is crucial for promoting their psychological health (Prakoeswa et al., 2021). Maladaptive emotion regulation is recognized as one of the most prominent issues in this population, with negative consequences for managing leprosy-related symptoms and treatment (Bonkass et al., 2024). Evidence suggests that maladaptive emotion regulation is among the most common problems in individuals with leprosy (Somar et al., 2020). It can affect physiological functioning, treatment adherence, psychological functioning, and the quality of life of leprosy patients, and may even be a significant factor in the worsening of psychological problems (Haverkort & van't Noordende, 2022). In other words, emotion regulation is a process through which individuals consciously or unconsciously modulate their emotions to respond appropriately to diverse environmental demands. Throughout daily life, individuals consistently employ structured strategies to adjust the intensity or types of emotional experiences triggered by various events (Prakoeswa et al., 2021). Emotion regulation comprises a heterogeneous set of processes that regulate emotions, influencing which emotions individuals experience and how they express their feelings (Azami et al., 2014).

Another psychological issue in individuals with leprosy is experiential avoidance, a prevalent concern in leprosy patients (Serrano-Coll et al., 2016). Research shows that experiential avoidance is a key factor impacting the quality of life of both patients and their caregivers (Amaral et al., 2021). Given the aforementioned complications and issues faced by individuals with leprosy, research indicates a widespread prevalence of psychological distress in this population (van Dorst et al., 2020). Hence, it is essential to employ therapeutic methods that are effective in addressing these problems for both the treatment and prevention of leprosy-related issues. The increasing challenges faced by leprosy patients, along with high levels of maladaptive emotion regulation and experiential avoidance, highlight the need for specialized interventions and education in this area. One of the novel approaches in the treatment of leprosy patients is Acceptance and Commitment Therapy (ACT). ACT is a psychotherapy approach that aims to help individuals better cope with life's challenges by increasing

acceptance of painful experiences and maintaining commitment to life values (Na et al., 2022). The effectiveness of ACT on various issues faced by leprosy patients has been demonstrated in numerous studies; thus, the present research seeks to answer the question: Is ACT effective on cognitive emotion regulation and experiential avoidance in individuals with leprosy?

2. Methods and Materials

2.1. Study Design and Participants

The current study employed a quasi-experimental method with a pretest-posttest control group design. The study population included all individuals with leprosy in Tabriz in 2023. Considering an effect size of 0.3, a confidence level of 0.05, and statistical power of 0.8, with two experimental and control groups and two measurement points, the sample size was calculated to be 32 using G-power software. Initially, the Bababaghi Medical Complex was visited, and the sample members were selected through convenience sampling from among those receiving treatment at the center. The sample members were then randomly assigned to the control and experimental groups. Following the selection of the sample from leprosy patients, they were randomly divided into two groups using random substitution. The experimental group received ACT, while the control group did not receive any intervention. The inclusion criteria included a diagnosis of leprosy, the absence of other clinical disorders, no history of addiction, and the absence of medical conditions. The exclusion criteria involved missing sessions and sudden issues that could affect participants' regular attendance or completion of session tasks. The study was conducted over eight sessions of ACT, with one 90-minute session per week in a group format.

The implementation of the study involved coordination with the Bababaghi Medical Complex, where structured interviews were conducted to assess inclusion criteria, and individuals with leprosy were randomly assigned to control and experimental groups. After selecting the sample from individuals with leprosy, the participants were divided into two groups using random substitution. Prior to starting the intervention, both groups completed pretests by filling out the relevant questionnaires. Following this, the experimental group underwent ACT over eight 90-minute sessions. Posttests were administered to both groups at the end of the sessions. The intervention sessions were conducted weekly at the Bababaghi Medical Complex. Ethical considerations, such as confidentiality and protection of personal privacy, were adhered to throughout the study.

2.2. Measures

2.2.1. Cognitive Emotion Regulation

This 36-item questionnaire was developed by Garnefski et al. (2001) to assess how individuals think after experiencing threatening or stressful life events. Responses are given on a Likert scale ranging from 1 (never) to 5 (always). The questionnaire measures nine strategies, with each strategy's score ranging from 4 to 20. Negative strategies include self-blame (items 1, 10, 19, 28), other-blame (items 9, 18, 27, 36), catastrophizing (items 8, 17, 26, 35), and rumination (items 3, 12, 21, 30), while positive strategies include acceptance (items 2, 11, 20, 29), positive refocusing (items 4, 13, 22, 31), planning (items 5, 14, 23, 32), positive reappraisal (items 6, 15, 24, 33), and perspective-taking (items 7, 16, 25, 34). The reliability of the positive strategies was reported as 0.91, and for the negative strategies, 0.87, using Cronbach's alpha. In a study by Garnefski et al. (2001), test-retest reliability for the questionnaire subscales over a 14-month period ranged from 0.48 to 0.61 (Garnefski et al., 2001). In a study by Yousefi (2006), the internal consistency for this questionnaire was reported as 0.82. The validity of this questionnaire was assessed by correlating negative strategies with depression and anxiety scores on the 28-item General Health Questionnaire, yielding coefficients of 0.35 and 0.37, respectively, both significant at the 1% level (Yousefi, 2006). The structural validity and reliability of this scale have been confirmed in Iran, with Cronbach's alpha values between 0.64 and 0.82 for each subscale (Abdi et al., 2010). In the present study, Cronbach's alpha for positive emotion regulation was 0.89, and for negative emotion regulation, it was 0.87.

2.2.2. Experiential Avoidance

Acceptance and Action Questionnaire-II, developed by Hayes et al. (2011), is designed to assess acceptance, experiential avoidance, and psychological flexibility. It consists of 7 items, with responses on a 7-point Likert scale from strongly disagree (1) to strongly agree (7). Higher scores indicate lower flexibility. Bond et al. (2011) revised the original version of the questionnaire to address its limitations and created the second version, which has a single-factor structure (Bond et al., 2011). Bond et al. (2011)

also reported test-retest reliability over 3 and 12 months as 0.81 and 0.79, respectively (Bond et al., 2011). Ameri and Najafi (2021) reported a Cronbach's alpha of 0.87 for this questionnaire (Ameri & Najafi, 2021). In this study, internal consistency was 0.91 using Cronbach's alpha.

2.3. Intervention

2.3.1. Acceptance and Commitment Therapy (ACT)

The ACT used in this study consisted of 8 weekly sessions, each lasting 90 minutes. The therapeutic techniques were based on ACT (Hayes et al., 2011).

Session 1: Introduction, Explanation of Therapy, Treatment Contract, Case Conceptualization

The first session begins with introductions and an explanation of the therapy process, including outlining the treatment contract. Participants complete baseline questionnaires to assess cognitive emotion regulation and experiential avoidance. The therapist provides an overview of Acceptance and Commitment Therapy (ACT), explaining its goals and structure. This session focuses on familiarizing participants with the nature of therapy and setting expectations. The expected behavioral change is the recognition of problematic behaviors, which participants will begin tracking. Homework involves identifying and recording problematic behaviors encountered during the week.

Session 2: Creating Creative Hopelessness

In the second session, participants explore their painful experiences through metaphors such as the "man in a hole," "tug of war with a monster," and the "hungry tiger" metaphor, where feeding the tiger represents ineffective coping strategies. The goal is to help participants recognize that their previous strategies for solving problems have been ineffective and to encourage openness to new solutions. The expected behavioral change is the abandonment of ineffective strategies and openness to finding more helpful approaches. Homework involves journaling weekly events and reporting associated thoughts and emotions.

Session 3: Identifying Control as the Problem and Introducing Willingness

This session introduces control as a problematic strategy using metaphors like the "polygraph" and "jelly donut" (e.g., trying not to think about a jelly donut but failing to do so). The aim is to demonstrate that attempts to control thoughts and emotions can be counterproductive. The expected behavioral change is increased awareness that control does not lead to desired outcomes. Homework requires

participants to identify behaviors they engage in that function as attempts at control.

Session 4: Introducing Cognitive Defusion

The fourth session focuses on cognitive defusion, using metaphors such as "passengers on a bus," "soldiers marching," and exercises like the "mindful walk" and repeating the word "milk" until it loses its meaning. These activities help participants distance themselves from their thoughts, learning to observe rather than react to them. The expected behavioral change is the development of cognitive defusion skills. Homework involves practicing cognitive defusion techniques at home.

Session 5: Introducing Self as Context

In this session, participants learn to see themselves as the context for their thoughts, not the content of their thoughts, through metaphors like the "chessboard" and the "house with furniture." The goal is for participants to develop an ability to observe their thoughts without becoming overly attached to them. The expected behavioral change is becoming an observer of one's own thoughts. Homework involves practicing self-as-context exercises at home.

Session 6: Mindfulness Practice

The sixth session involves the application of mindfulness techniques, focusing on seated meditation and the "three-second pause" exercise to bring attention to bodily sensations. Participants practice staying present and in the moment. The expected behavioral change is improved mindfulness skills, allowing participants to remain grounded in the present. Homework involves practicing mindfulness and seated meditation at home.

Session 7: Clarifying Values

This session focuses on clarifying participants' values, helping them explore what is truly important to them, and measuring the alignment between their actions and their values. The expected behavioral change is a deeper understanding of personal values and their significance. Homework includes completing a values ranking form to assess how well participants are living in line with their values.

Session 8: Committed Action

In the final session, participants engage in a mental rehearsal of what actions are necessary to achieve their goals and make a commitment to these actions. Metaphors like the "beggar at the door" and "tree planting" are used to illustrate that avoiding discomfort does not bring long-term peace of mind. The expected behavioral change is the development of committed action and psychological flexibility, along with

reduced suicidal ideation. Homework includes completing post-treatment questionnaires and reflecting on progress.

2.4. Data analysis

Descriptive statistics, including frequency, percentages, means, and standard deviations, were calculated. Inferential statistics, specifically multivariate covariance analysis, were used to examine the research hypotheses.

3. Findings and Results

The results indicate that there were no significant differences between the groups in terms of demographic variables, based on the chi-square test results ($\chi2=0.71$, $p>0.05$), confirming that the groups were homogeneous in terms of demographic characteristics. Descriptive statistics for each research variable, separated by sample participants, are presented in the following:

Table 1

Descriptive Statistics of the Study Variables by Group in the Pre-Test Stage

Variable	Group	Mean	Standard Deviation	Variance	Skewness	Kurtosis	Min	Max
Self-blame	Experimental	13.94	3.82	36.17	0.13	0.89	6	19
	Control	14.12	3.46	39.15	1.17	-0.05	4	15
Other-blame	Experimental	12.38	3.05	32.14	0.12	0.23	5	17
	Control	11.94	3.06	36.17	0.09	0.36	8	18
Catastrophizing	Experimental	13.13	3.16	15.23	0.26	0.22	5	18
	Control	13.44	3.05	36.39	-0.22	0.17	6	19
Rumination	Experimental	14.81	2.97	26.13	0.13	-0.07	7	14
	Control	14.50	2.65	34.12	0.30	0.19	7	20
Acceptance	Experimental	9.88	3.38	30.05	0.10	0.78	7	19
	Control	10.06	3.41	26.16	0.24	0.21	6	18
Positive Refocusing	Experimental	9.12	2.15	21.14	0.18	0.93	4	18
	Control	9.63	2.94	18.74	-0.07	0.14	5	17
Planning	Experimental	9.75	4.18	31.28	0.22	0.46	9	19
	Control	9.44	1.78	19.75	0.17	0.33	7	20
Positive Reappraisal	Experimental	9.75	3.25	14.21	0.02	0.14	4	19
	Control	10.01	3.79	23.27	0.56	0.10	4	20
Perspective Taking	Experimental	9.25	2.56	41.33	0.37	-0.09	5	20
	Control	10.19	3.08	48.56	0.21	0.16	4	18
Experiential Avoidance	Experimental	31.38	12.24	41.75	0.11	-0.06	9	37
	Control	30.19	11.19	36.53	0.17	0.15	11	41

Table 2

Descriptive Statistics of the Study Variables by Group in the Post-Test Stage

Variable	Group	Mean	Standard Deviation	Variance	Skewness	Kurtosis	Min	Max
Self-blame	Experimental	11.69	3.84	34.14	0.28	0.47	5	17
	Control	13.25	3.04	38.17	0.14	0.21	4	19
Other-blame	Experimental	8.19	1.60	26.24	0.12	1.14	4	18
	Control	11.56	2.47	28.31	0.18	0.22	4	19
Catastrophizing	Experimental	8.06	2.26	39.44	0.44	0.27	6	20
	Control	12.01	3.07	29.27	0.75	0.11	4	17
Rumination	Experimental	9.13	2.27	28.51	0.23	-0.10	5	18
	Control	13.38	3.07	16.37	0.26	0.09	4	18
Acceptance	Experimental	12.31	4.02	25.32	0.06	0.22	7	20
	Control	10.44	2.55	19.17	0.63	0.27	5	19
Positive Refocusing	Experimental	13.13	2.63	24.20	0.48	0.43	5	17
	Control	10.25	2.67	31.19	0.22	0.28	4	17
Planning	Experimental	14.19	1.87	29.27	0.19	0.13	6	17
	Control	10.19	2.16	24.22	0.17	0.17	6	19
Positive Reappraisal	Experimental	12.06	3.95	19.36	0.37	0.11	4	20
	Control	10.56	3.03	20.54	0.29	0.09	4	19
Perspective Taking	Experimental	12.94	3.02	20.11	0.11	0.47	5	18
	Control	10.75	2.49	30.31	0.03	-1.12	4	18

Experiential Avoidance	Experimental	26.75	13.95	41.04	0.52	0.07	8	45
	Control	31.20	11.10	39.56	0.11	0.14	7	48

The results show no significant differences between the two groups in the study variables at the pre-test stage. However, in the post-test stage, the experimental group's means for the study variables exhibited notable changes. To analyze the main results, covariance analysis was employed. Before conducting the analysis, assumptions were tested. One assumption of covariance analysis is the normality of the data distribution. The Shapiro-Wilk test results indicated that the scores of the examined variables were normally distributed (p>0.05). Additionally, the skewness and kurtosis values fell within the acceptable range of -2 to +2. Thus, the results of the Shapiro-Wilk test and skewness and kurtosis indices indicated that the data distribution was normal for both groups. Moreover, the homogeneity of variances was examined using Levene's test, and homogeneity of the variance-covariance matrix was assessed using Box's M test.

The non-significant results of Box's M test for the study variables confirmed the homogeneity of the variance-covariance matrix (p>0.05). Additionally, none of the variables showed significant results in Levene's test (p>0.05), indicating homogeneity of variances. Another assumption of covariance analysis, homogeneity of regression slopes, was also assessed. As none of the scales showed significant results in the homogeneity of regression slopes (p>0.05), the assumption was considered satisfied. Overall, the basic assumptions for parametric covariance analysis were met. After controlling for pre-test effects, multivariate covariance analysis was used to compare the experimental and control groups' post-test scores and examine the first research hypothesis regarding the effectiveness of ACT on cognitive emotion regulation in individuals with leprosy. The results of the multivariate analysis of covariance are presented in Table 3.

Table 3

Multivariate Covariance Analysis of Cognitive Emotion Regulation

Variable	Value	F Statistic	Hypothesis df	Error df	Significance	Eta Squared
Pillai's Trace	0.96	36.89	9	13	0.001	0.69
Wilks' Lambda	0.03	36.89	9	13	0.001	0.69
Hotelling's Trace	25.54	36.89	9	13	0.001	0.69
Roy's Largest Root	25.54	36.89	9	13	0.001	0.69

As shown in Table 3, Wilks' Lambda, the most commonly used test, indicated a significant difference between the experimental and control groups in at least one of the dependent variables at the post-test stage. Group membership accounted for 69% of the variance (p<0.001). The results of the univariate covariance analysis for the dependent variables' post-test scores are presented in Table 4.

Table 4

Univariate Covariance Analysis of Group Differences in Study Variables

Component	Sum of Squares	df	Mean Square	F Statistic	Significance	Eta Squared
Self-blame	40.01	1	40.01	10.61	0.004	0.33
Other-blame	69.82	1	69.82	23.79	0.001	0.53
Catastrophizing	78.30	1	78.30	14.12	0.001	0.40
Rumination	72.27	1	72.27	11.11	0.003	0.34
Acceptance	35.16	1	35.16	5.33	0.031	0.20
Positive Refocusing	59.08	1	59.08	16.71	0.001	0.44
Planning	94.89	1	94.89	20.34	0.001	0.49
Positive Reappraisal	32.72	1	32.72	8.50	0.008	0.28
Perspective Taking	57.93	1	57.93	9.62	0.005	0.31

As Table 4 shows, after controlling for the pre-test scores, significant differences were observed between the experimental and control groups in the post-test scores of cognitive emotion regulation at the significance level of

p<0.05. It can be concluded that negative cognitive emotion regulation and its components (self-blame, other-blame, catastrophizing, and rumination) significantly decreased in the experimental group compared to the control group after the intervention. Additionally, positive cognitive emotion regulation and its components (acceptance, positive refocusing, planning, positive reappraisal, and perspective-taking) significantly increased in the experimental group compared to the control group after the intervention. Based on the results of the multivariate covariance analysis of positive and negative cognitive emotion regulation and their components, it can be concluded that the scores significantly changed in the experimental group compared to the control group, confirming the first hypothesis that ACT improves cognitive emotion regulation and its components. Thus, ACT enhanced the cognitive emotion regulation of individuals with leprosy.

To examine the first research hypothesis and determine the effectiveness of ACT on experiential avoidance in individuals with leprosy, a univariate covariance analysis was used after controlling for pre-test effects. The results of the univariate covariance analysis are presented in Table 7.

Table 5

Univariate Covariance Analysis of Group Differences in Experiential Avoidance

Variable	Source of Variation	Sum of Squares	df	Mean Square	F Statistic	Significance	Eta Squared
Experiential Avoidance	Pre-test	3994.39	1	3994.39	26.85	0.001	0.48
	Group	2774.98	1	2774.98	18.65	0.001	0.39
	Error	4313.35	29	148.73			

As Table 5 shows, after controlling for pre-test scores, there was a significant difference between the experimental and control groups in post-test scores of experiential avoidance at the significance level of p<0.05. It can be concluded that experiential avoidance significantly decreased in the experimental group compared to the control group after the intervention. Based on the results of the univariate covariance analysis, it can be concluded that the scores significantly changed in the experimental group compared to the control group, confirming the first hypothesis that ACT reduces experiential avoidance. Therefore, ACT reduced experiential avoidance in individuals with leprosy, and throughout the treatment, their experiential avoidance improved. In other words, ACT led to lower experiential avoidance in the group that received the treatment, and it was effective in reducing their experiential avoidance at the post-test stage.

4. Discussion and Conclusion

The results of this study indicated that Acceptance and Commitment Therapy (ACT) significantly improves cognitive emotion regulation in individuals with leprosy. This finding demonstrates a meaningful improvement in the ACT group. Accordingly, ACT enhances the ability to regulate emotions cognitively. This conclusion aligns with the prior findings (Fahlekar et al., 2020; Rouhi et al., 2023; Zarling et al., 2015), suggesting that ACT is effective in improving cognitive emotion regulation. Although there is limited research on the effectiveness of ACT in leprosy patients, studies focusing on this therapy have provided satisfactory results and logical reasons for its use in clinical practice, especially with individuals suffering from mood and anxiety disorders (Zarling et al., 2015). Studies utilizing ACT with leprosy patients have generally shown that one of its characteristics is improving cognitive emotion regulation abilities. Research has shown that following ACT, changes in cognitive emotion regulation were observed in individuals with leprosy (Na et al., 2022). Overall, it can be concluded that there is an improvement in cognitive emotion regulation abilities in individuals with leprosy.

To explain these findings, it can be suggested that individuals with leprosy may not be fully aware of their negative and positive emotions and may not be able to effectively use their emotions when facing stressful life situations. This is because their challenges may cause them to negatively evaluate themselves in social situations, leading to reduced social engagement, which in turn manifests as problems with emotional regulation (Haverkort & van't Noordende, 2022). However, ACT helps individuals become aware of their negative emotions and the negative impact these emotions have on them. Through emotional reevaluation in various situations, they work to maintain emotional health, which in turn improves emotional regulation (Mirbagheri et al., 2022). ACT helps individuals with leprosy recognize beliefs about their emotional regulation difficulties and, instead of avoiding these emotions, accept them and use emotional regulation skills.

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ACT is based on principles of acceptance and cognitive strategies. According to the principle of acceptance, ACT, like other third-wave therapies, encourages individuals to accept their emotions rather than avoid them, helping them to adopt a new perspective on their emotions and view them as integral parts of life (Sari & Pranoto, 2022). Based on the studies conducted, it can be concluded that ACT and the use of cognitive and emotional techniques can change an individual's beliefs about events, release emotions, improve negative feelings, and ultimately enhance emotional regulation in individuals with leprosy.

Additionally, ACT helps therapists define and organize chronic and deeper issues in a comprehensible way. By using this model, individuals can view their beliefs as inconsistent, which increases their motivation to overcome these issues through awareness. Therefore, based on the findings of this study, ACT can improve emotional regulation problems in individuals with leprosy. Another explanation is that emotional acceptance enables individuals to gain a more rational and realistic understanding of the perceived threat by focusing on the stressful situation. This therapeutic model also posits that when an emotion is triggered, how individuals interpret and respond, as well as their emotion regulation strategies, will determine whether the emotion persists, intensifies, or diminishes (Miller et al., 2018). One emotion regulation strategy used by individuals with leprosy to cope with emotional experiences is control or suppression. Controlling emotions is an ineffective emotion regulation strategy that aims to reduce anxiety but often leads to increased anxiety. Individuals may feel the need to control their thoughts and emotions but realize that such control is unattainable, resulting in heightened anxiety (Rajabzadeh, 2017). ACT helps reduce anxiety symptoms by teaching patients to adopt a non-judgmental approach to their emotions and observe them instead. By integrating mindfulness and acceptance techniques, ACT can enhance emotional regulation skills and reduce emotional suppression (Prakoeswa et al., 2021). In ACT, individuals are encouraged to observe and accept their emotions rather than suppress or avoid them. Simultaneously, the therapist uses techniques such as emotion induction and normalization to welcome emotions and use them as motivators for emotional expression. Additionally, ACT helps improve emotion regulation strategies, such as cognitive reappraisal, by explaining the disadvantages of suppression and helping individuals recognize their emotions and thoughts as separate entities, allowing them to better understand and manage their emotions (Somar et al.,

2020). By engaging individuals with their emotions and improving emotional processing, therapists using ACT can help improve emotion regulation in individuals with leprosy.

The findings also showed that ACT significantly reduces experiential avoidance in individuals with leprosy. This finding indicates a meaningful reduction in the ACT group. Accordingly, ACT reduces experiential avoidance. This conclusion aligns with the prior findings (Salazar & Ballesteros, 2015; Smith et al., 2020; Zakiei et al., 2021), which indicate that ACT is effective in reducing experiential avoidance. Studies using ACT with leprosy patients have generally shown that one of its features is reducing experiential avoidance. Research has shown that ACT leads to changes in experiential avoidance in individuals with leprosy (Salazar & Ballesteros, 2015). Overall, it can be said that individuals with leprosy experience a reduction in experiential avoidance, meaning that ACT has effectively reduced their level of experiential avoidance. Experiential avoidance refers to the unwillingness to experience painful and distressing personal events. While experiential avoidance may function as a short-term adaptive emotion regulation strategy, it becomes problematic when it develops into a rigid pattern of avoiding inner experiences (Shokre & Souilm, 2018). Since experiential avoidance alleviates discomfort and pain in the short term through negative reinforcement, it can lead to the maintenance of negative emotions and behaviors in the long term (Hassan, 2023). Thus, experiential avoidance plays a crucial role in the psychological problems of leprosy patients and acts as a barrier to treatment engagement, making ACT a potentially effective solution for these individuals (Serrano-Coll et al., 2016).

Furthermore, this effect can be explained by the fact that when individuals are placed in a therapeutic environment where cognitive awareness, acceptance, and modification of maladaptive behaviors and beliefs are emphasized, they may reduce their avoidance of stress when encountering future psychological pressures (Zakiei et al., 2021). In ACT, there is no attempt to reduce avoidance or suppress or control inner experiences; instead, patients learn to reduce dysfunctional thoughts and emotions by focusing on awareness. They learn to accept their problematic cognitions and maladaptive behaviors, which helps them manage and reduce them. Therefore, ACT's interventions focus on accepting uncontrollable inner experiences and committing to living a value-driven life by changing maladaptive behaviors. Given the changes that occur in cognition and emotions through this therapeutic approach, ACT can

theoretically be considered an effective method for reducing experiential avoidance in individuals with leprosy (Taghizadeh, 2022).

In ACT, problems are conceptualized behaviorally. The three fundamental issues that form the basis of psychological disorders include awareness-related problems, avoidance of inner experiences, and failure to engage in value-driven activities. Therefore, therapists guide clients to see their thoughts and emotions as separate from themselves, allowing them to reframe negative cognitive frameworks and address maladaptive emotional responses (Rouhi et al., 2023). ACT teaches individuals to accept their emotions rather than avoid them and encourages them to shift from avoidance to value-based actions (Mirbagheri et al., 2022). Accordingly, the results of this study suggest that mindful awareness of the present moment, exposure to unpleasant thoughts and emotions, and non-avoidance of emotions lead to cognitive changes and improvements in psychological symptoms. One feature of ACT is changing one's coping strategy from avoidance to acceptance of emotions and thoughts. Observing distressing thoughts and emotions without judgment and being open to them rather than avoiding them leads to greater awareness of one's experience, facilitating more adaptive emotional and cognitive responses. Thus, ACT exercises lead to behavioral changes that improve self-care.

In conclusion, ACT, through the use of weekly scheduling, self-care activities, seeking social support, pleasurable and beneficial activities, and assertiveness training, has significantly impacted reducing experiential avoidance. ACT focuses on individuals' cognitions, negative emotions, and maladaptive thoughts, leading to a new perspective on observing experiences and promoting acceptance, which helps reduce emotional dysregulation and experiential avoidance. In essence, ACT breaks the cycle of negative internal experiences related to past events, thereby reducing experiential avoidance in individuals with leprosy.

5. Limitations & Suggestions

In this study, due to time and location constraints, follow-up assessments were not conducted, which could have shown the potential long-term efficacy of the intervention. Another limitation was the lack of precise control over participants' demographic characteristics. As this research was cross-sectional, the observed relationships are not causal. Therefore, no causal interpretations can be made based on the findings. Future research should include follow-up assessments to evaluate the sustained effects of the intervention. It is recommended that similar research be conducted with individuals suffering from other psychologically related diseases, such as cardiovascular and diabetic patients, and on a broader population of leprosy patients to improve generalizability. Future studies should also use clinical interviews and additional measures for assessing variables. It is suggested that future studies investigate the effects of ACT on other psychological variables in leprosy patients.

Based on the findings, it is recommended that the results of this study be shared with treatment centers that care for individuals with leprosy to enhance the mental health of these patients. Given that psychological health significantly impacts the treatment of physical illnesses, this study suggests that alongside medical treatments, psychologists and mental health professionals be involved in patient care. Additionally, in order to help individuals with leprosy live better lives, it is essential to thoroughly examine the mentioned variables and identify the underlying factors. Therefore, specialists and clinicians are encouraged to use ACT alongside other treatment protocols when working with leprosy patients. Finally, it is recommended that policymakers develop programs for training psychologists and therapists in this therapeutic approach to reduce the psychological and behavioral harm experienced by individuals with leprosy.

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Declaration of Interest

The authors of this article declared no conflict of interest.

Ethical Considerations

The study protocol adhered to the principles outlined in the Helsinki Declaration, which provides guidelines for ethical research involving human participants. The present research was approved by the Ethics Committee of the Islamic Azad University, Tehran Medical Sciences Branch, under the code IR.IAU.TMU.REC.2024.100.

Transparency of Data

In accordance with the principles of transparency and open research, we declare that all data and materials used in this study are available upon request.

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Authors' Contributions

All authors equally contributed in this article.

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