

Comparison of the Effectiveness of Schema Therapy and Mindfulness-Based Therapy on Illness Perception in Patients with Rheumatoid Arthritis

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ABSTRACT

This study aimed to compare the effectiveness of schema therapy and mindfulness-based therapy in improving illness perception among patients with rheumatoid arthritis in Mashhad during 2025–2026. The present study employed a quasi-experimental pretest–posttest design with a control group. A total of 45 patients with rheumatoid arthritis who met the inclusion criteria were selected through purposive sampling and randomly assigned to the study groups. Illness perception was assessed using the Brief Illness Perception Questionnaire developed by Broadbent et al. (2006). The schema therapy intervention was implemented based on the model proposed by Riso et al. (2008), while the group mindfulness intervention was conducted according to the therapeutic program developed by Teasdale et al. (2018). The data were analyzed using inferential statistical procedures, including repeated-measures analysis of variance, multivariate analysis of covariance, and univariate analyses of covariance within the multivariate analysis of covariance framework. The effects of schema therapy and mindfulness-based therapy on illness perception among patients with rheumatoid arthritis were statistically significant and remained stable over time ($p < .05$). However, no statistically significant difference was observed between schema therapy and mindfulness-based therapy in terms of their effectiveness in improving illness perception. Group-based schema therapy and mindfulness interventions may be used to improve illness perception in patients with rheumatoid arthritis and, to some extent, reduce the psychological distress experienced by these patients.

Keywords: Schema Therapy, Mindfulness-Based Therapy, Illness Perception, Rheumatoid Arthritis

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Introduction

Rheumatoid arthritis is a chronic, systemic, inflammatory autoimmune disease characterized primarily by persistent synovial inflammation, pain, joint stiffness, fatigue, progressive structural damage, and varying degrees of functional limitation. Although advances in pharmacological treatment have substantially improved the control of inflammatory activity and slowed disease progression, many patients continue to experience pain, disability, psychological distress, and reduced quality of life despite receiving appropriate medical care. The clinical management of rheumatoid arthritis therefore extends beyond suppression of inflammation and requires attention to the psychological and behavioral factors that shape patients' adaptation to the disease. Contemporary approaches emphasize early diagnosis, disease-modifying

treatment, continuous monitoring, rehabilitation, patient education, and the integration of psychological care into routine rheumatology services (1). This multidimensional perspective is particularly important because the burden experienced by patients cannot always be explained solely by objective indicators of disease activity. Pain intensity and disability may also be influenced by depression, anxiety, negative expectations, coping patterns, and patients' subjective interpretations of their illness (2).

Living with rheumatoid arthritis requires patients to adapt to an unpredictable course marked by periods of exacerbation and remission, medication-related concerns, limitations in daily activities, uncertainty about future disability, and possible changes in occupational and interpersonal roles. These demands may produce persistent psychological stress and may alter how patients interpret bodily sensations and treatment outcomes. Depression is common among individuals with rheumatoid arthritis and is associated with an interaction of clinical, social, and psychological factors rather than with disease severity alone. Cross-cultural evidence has shown that pain, functional limitations, fatigue, and psychological characteristics may jointly contribute to depressive symptoms in this population (3). Moreover, anxiety sensitivity and limited tolerance of distress may intensify internalizing symptoms by increasing patients' tendency to interpret emotional and somatic experiences as threatening or unmanageable (4). Thus, the meanings assigned to symptoms and illness-related experiences may be as consequential as the symptoms themselves.

Illness perception is a central psychological construct for understanding adaptation to chronic disease. It refers to the cognitive and emotional representations through which individuals interpret the identity, causes, consequences, duration, controllability, and emotional significance of an illness. According to self-regulation perspectives, patients construct personal models of their disease and use these models to guide coping behavior, treatment adherence, self-care, and emotional responses. Illness perception is not simply a reflection of medical information; rather, it is shaped by previous experiences, beliefs, social interactions, emotional states, and the perceived effectiveness of treatment. In patients with rheumatoid arthritis, maladaptive illness perceptions may involve beliefs that the disease is overwhelmingly destructive, uncontrollable, permanent, incomprehensible, or incompatible with a meaningful life. Such beliefs can contribute to avoidance, helplessness, excessive symptom monitoring, reduced engagement in treatment, and heightened emotional distress.

Evidence from patients with rheumatoid arthritis indicates that illness perception is closely associated with coping strategies and psychological adjustment. Patients who perceive their illness as highly threatening or uncontrollable may rely more heavily on passive, emotion-focused, or avoidant coping strategies, whereas those who view the disease as manageable may adopt more active and problem-focused responses (5). In addition, resilience and illness perception have been identified as important predictors of mental health among patients with rheumatoid arthritis, suggesting that psychological adaptation depends partly on the way patients interpret and organize their experience of chronic illness (6). Illness representations in women with rheumatoid arthritis have also been associated with attachment styles and dysfunctional attitudes, indicating that beliefs about illness may be embedded within broader patterns of emotional security, interpersonal expectations, and maladaptive cognition (7). These findings support the view that illness perception is modifiable and may constitute an appropriate target for psychological intervention.

The relevance of illness perception extends across a wide range of chronic medical conditions. Among individuals with chronic wounds, illness perception and attitudes toward help-seeking have been linked to positive psychological well-being and quality of life, indicating that more adaptive interpretations of illness may facilitate constructive engagement with treatment and support resources (8). In patients with type 2 diabetes, self-care based on illness perception has been associated with social support, shared decision-making, and self-efficacy, highlighting the behavioral implications of patients' beliefs about their condition (9). Research on coping in diabetes similarly indicates that men and women may employ different strategies in responding to illness-related demands, underscoring the need to understand coping as a psychological process shaped by both personal and contextual factors (10). Consequently, interventions that modify threatening illness beliefs may promote not only emotional adjustment but also more effective self-management.

Recent research has increasingly clarified the mechanisms through which illness perception may influence emotional disorders. In perimenopausal women, illness perception was related to emotional difficulties through the sequential mediating effects of self-esteem and psychological resilience, suggesting that threatening interpretations of health-related changes may undermine personal worth and adaptive capacity (11). Among myocardial infarction survivors, psychological flexibility mediated the association between illness perceptions and fear of recurrence, indicating that the ability to remain open to difficult internal experiences while pursuing adaptive action may reduce the emotional consequences of threatening illness beliefs (12). Similarly, in patients with gastrointestinal cancer, psychological flexibility and maladaptive cognitive emotion regulation sequentially mediated the relationship between illness perception and fear of cancer recurrence (13). These findings indicate that illness perception operates within a broader network of cognitive, emotional, and behavioral processes and may be modified by interventions that enhance flexibility, acceptance, emotional regulation, and balanced interpretation.

Psychological flexibility is especially relevant to chronic illness because patients cannot always eliminate pain, fatigue, uncertainty, or functional limitations. Instead, effective adaptation may require the capacity to acknowledge difficult experiences without excessive avoidance, cognitive fusion, or behavioral restriction. Acceptance-based interventions have demonstrated beneficial effects in central pain sensitization syndromes, particularly by improving patients' relationships with pain and reducing the dominance of distressing internal experiences over daily functioning (14). Although developed in a different disciplinary context, the concept of strategic flexibility has also been described as the capacity to restructure available resources and respond adaptively to changing demands (15). At the individual psychological level, a comparable principle can be observed when patients reorganize cognitive, emotional, interpersonal, and behavioral resources to cope with the changing demands of chronic disease. Accordingly, therapeutic approaches that increase flexibility may help patients replace rigid illness narratives with more nuanced, manageable, and adaptive representations.

Schema therapy is one intervention that may be particularly relevant to maladaptive illness perception. Schema therapy integrates cognitive, behavioral, experiential, attachment-based, and psychodynamic principles to identify and modify pervasive patterns known as early maladaptive schemas. These schemas develop when fundamental emotional needs are not adequately met and subsequently influence how individuals interpret themselves, others, bodily experiences, and stressful events. Chronic illness may

activate schemas related to vulnerability to harm, defectiveness, dependence, abandonment, failure, emotional deprivation, or insufficient self-control. Once activated, these schemas may shape illness perception by encouraging patients to interpret symptoms as evidence of personal weakness, impending catastrophe, irreversible decline, or loss of autonomy.

Within schema therapy, maladaptive schemas are addressed through cognitive restructuring, experiential techniques, imagery rescripting, chair work, behavioral pattern breaking, and the therapeutic relationship. Rather than focusing exclusively on surface-level automatic thoughts, the intervention seeks to transform the deeper emotional and cognitive structures that repeatedly generate dysfunctional interpretations. A systematic review found that schema therapy can produce changes in both schemas and psychological symptoms across several mental health conditions, although the strength of evidence varies according to diagnosis and study quality (16). Another systematic review concluded that schema therapy shows promise for anxiety disorders, obsessive-compulsive disorder, and post-traumatic stress disorder, while emphasizing the need for more rigorous comparative trials and clearer investigation of therapeutic mechanisms (17). These findings suggest that schema therapy may be useful when illness-related distress is maintained by enduring cognitive-emotional patterns rather than by isolated negative thoughts.

Evidence from chronic medical populations further supports the potential application of schema-focused interventions. Emotional schema therapy has been shown to improve hope and illness perception among women with breast cancer, indicating that restructuring beliefs about emotions and illness may reduce threatening interpretations and strengthen adaptive psychological resources (18). In patients with multiple sclerosis, schema therapy and acceptance and commitment therapy have both been examined for their effects on chronic fatigue symptoms and health anxiety, suggesting that schema-level and flexibility-based interventions may address psychological difficulties associated with long-term neurological disease (19). Furthermore, emotional schema therapy has been compared with mindfulness-based stress reduction among women receiving pharmacological treatment for psoriasis, with both approaches targeting perceived stress and distress tolerance (20). Together, these studies suggest that schema-based interventions may be applicable to medical conditions in which symptoms interact with persistent beliefs, emotional avoidance, health anxiety, and reduced distress tolerance.

Mindfulness-based therapy represents another promising approach for modifying illness perception. Mindfulness is commonly defined as intentional, present-focused, and nonjudgmental awareness of ongoing internal and external experience. In therapeutic settings, mindfulness practices train individuals to observe thoughts, emotions, bodily sensations, and impulses without automatically treating them as facts or reacting to them through avoidance, rumination, or catastrophic interpretation. This capacity may be especially valuable for patients with rheumatoid arthritis, whose symptoms can fluctuate and whose attention may become dominated by pain, fatigue, fear of progression, and anticipated disability. By learning to observe illness-related thoughts as transient mental events, patients may develop a more flexible and less threatening relationship with their condition.

Mindfulness-based interventions are grounded in systematic practices such as focused breathing, body scanning, mindful movement, sitting meditation, and open monitoring of thoughts and emotions. These exercises are intended to reduce automatic reactivity and strengthen metacognitive awareness, acceptance, and self-regulation. Mindfulness has been conceptualized as both a therapeutic method and a broader

psychological framework for mental health, with potential effects on attention, emotion regulation, self-awareness, and responses to distress (21). Nevertheless, claims regarding its mechanisms should remain empirically grounded. For example, combined randomized controlled trials of mindfulness-based stress reduction did not identify reliable structural brain changes, demonstrating that psychological benefits should not automatically be attributed to gross neuroanatomical alterations (22). The therapeutic value of mindfulness may instead arise through functional changes in attention, appraisal, decentering, emotional regulation, and behavioral choice.

Clinical evidence supports the use of mindfulness-based interventions in several chronic medical conditions. In women with breast cancer, mindfulness-based stress reduction improved psychological well-being, health anxiety, and body image, suggesting that mindfulness may reduce distress and promote a more adaptive relationship with illness-related physical and emotional experiences (23). Mindfulness has also been associated with posttraumatic growth in breast cancer patients, with illness perceptions and positive emotions functioning as mediating mechanisms (24). This finding is particularly relevant because it indicates that mindfulness may not merely reduce distress but may alter how patients understand their illness and derive meaning from adversity. Among patients with heart disease, mindfulness-based therapy has demonstrated effectiveness in reducing chronic stress and modifying illness perception, further supporting the use of mindfulness for cognitive-emotional adaptation to chronic medical conditions (25).

Mindfulness-based therapy has also been evaluated in neurological populations. In an assessor-blinded randomized trial involving individuals with drug-resistant epilepsy, mindfulness-based therapy produced clinically relevant improvements, demonstrating that patients with persistent and medically difficult symptoms can benefit from interventions that alter their responses to stress and illness-related experiences (26). This is relevant to rheumatoid arthritis because both conditions may involve unpredictability, limited personal control, concern about recurrence or exacerbation, and significant disruption of daily life. Rather than promising direct elimination of symptoms, mindfulness teaches patients to distinguish unavoidable physical discomfort from secondary suffering produced by resistance, catastrophic appraisal, and repetitive negative thinking.

The potential effects of mindfulness and schema therapy on illness perception may therefore operate through partially distinct but complementary pathways. Schema therapy seeks to identify and transform deep, enduring patterns that shape patients' interpretations of illness, vulnerability, dependence, and personal identity. Mindfulness-based therapy emphasizes nonjudgmental awareness, acceptance, decentering, and flexible responding to thoughts, emotions, and bodily sensations. Schema therapy may be especially useful when illness perception is rooted in longstanding beliefs and unmet emotional needs, whereas mindfulness may be particularly effective when distress is maintained by cognitive fusion, experiential avoidance, rumination, or automatic reactivity. Both approaches may reduce the perceived threat of illness, increase emotional tolerance, and support more adaptive engagement with treatment.

Despite growing evidence for both interventions, direct comparisons between schema therapy and mindfulness-based therapy in patients with rheumatoid arthritis remain limited. Existing research has examined schema-focused interventions in cancer, multiple sclerosis, and other psychological conditions, while mindfulness-based treatments have been studied in cancer, cardiovascular disease, psoriasis, epilepsy, and stress-related health problems. Comparative research is necessary because demonstrating that two

interventions are individually effective does not establish whether one produces greater improvement, whether their effects are equivalent, or whether gains persist after treatment. Furthermore, rheumatoid arthritis presents a distinctive combination of chronic pain, inflammation, fatigue, functional limitation, uncertainty, and psychological vulnerability that may influence responsiveness to psychological treatment.

A comparative examination of schema therapy and mindfulness-based therapy may therefore contribute to the development of more precise and integrative psychological services for rheumatology patients. If both interventions improve illness perception, clinicians may select an approach according to patient preferences, therapist expertise, treatment availability, and the cognitive-emotional processes most prominent in each patient. If one intervention demonstrates superior or more durable effects, this finding may guide prioritization within multidisciplinary care. Evaluating outcomes at posttest and follow-up is also essential because short-term symptom changes do not necessarily indicate sustained modification of illness beliefs. Given the importance of illness perception for coping, psychological well-being, self-care, and quality of life, identifying effective interventions for this construct may improve both emotional adaptation and long-term disease management.

Accordingly, the present study aimed to compare the effectiveness of schema therapy and mindfulness-based therapy in improving illness perception among patients with rheumatoid arthritis.

Methods and Materials

Study Design and Participants

This study employed a quasi-experimental pretest–posttest control-group design with a two-month follow-up assessment. The statistical population consisted of all patients aged 25–55 years with a confirmed diagnosis of rheumatoid arthritis who attended Imam Reza Hospital and rheumatology clinics in Mashhad, Iran, during 2025–2026. A total of 45 eligible patients were selected through purposive sampling and subsequently assigned randomly to three equal groups: a schema therapy group, a mindfulness-based therapy group, and a control group, with 15 participants in each group. Eligibility was determined according to the study inclusion criteria, including a diagnosis of rheumatoid arthritis, being within the specified age range, willingness to participate in the study, and the ability to attend the intervention sessions and complete the research instruments. Participants who were absent from intervention sessions beyond the permitted limit, withdrew their consent, experienced a serious medical deterioration, or failed to complete the assessments were considered for exclusion. All three groups completed the illness perception measure at the pretest, posttest, and two-month follow-up stages. The first experimental group received schema therapy, the second experimental group received group-based mindfulness therapy, and the control group received no psychological intervention during the study period and continued to receive routine medical care. To observe ethical principles and ensure equitable access to treatment, the intervention found to be effective was offered to members of the control group after the completion of all assessments. Participants were informed about the study objectives and procedures, the voluntary nature of participation, confidentiality of personal information, and their right to withdraw from the study at any stage without affecting their medical care.

Data Collection Tools

Illness perception was assessed using the Brief Illness Perception Questionnaire developed by Broadbent et al. (2006). This nine-item instrument was designed to assess patients' cognitive and emotional representations of their illness. The first eight items evaluate perceived consequences, timeline, personal control, treatment control, identity, concern, illness comprehensibility, and emotional response. These items are rated on an 11-point scale ranging from 0 to 10, although the direction of scoring differs across dimensions according to the content of each item. The ninth item is an open-ended question that asks respondents to identify and rank the three factors they consider to be the main causes of their illness. In accordance with the instrument's scoring recommendations, each dimension may be analyzed separately because the questionnaire assesses distinct components of illness representation rather than a single homogeneous construct. Higher scores on the consequences, timeline, identity, concern, and emotional-response dimensions generally indicate a more threatening perception of illness, whereas higher scores on the personal-control, treatment-control, and comprehensibility dimensions indicate more adaptive beliefs regarding the illness and its management. Broadbent et al. (2006) reported acceptable test-retest reliability coefficients for the questionnaire dimensions, ranging from $r = .48$ for illness comprehensibility to $r = .70$ for perceived consequences. Evidence concerning the psychometric properties of the Persian version indicated a Cronbach's alpha coefficient of .84 and a correlation coefficient of .71 with the Persian version of the Revised Illness Perception Questionnaire, supporting its satisfactory reliability and convergent validity.

Interventions

The schema therapy intervention was implemented in 10 group sessions based on the therapeutic framework proposed by Riso et al. (2008). In the first session, the therapist established rapport, introduced the structure and objectives of the intervention, provided psychoeducation regarding rheumatoid arthritis from a psychological perspective, and explained how maladaptive schemas may influence patients' interpretation of symptoms, treatment, disability, and the anticipated course of the disease. Participants' difficulties, particularly their illness perceptions, were then conceptualized within the schema therapy framework. In the second session, participants examined objective evidence from their current and past experiences that supported or contradicted their dominant schemas, and maladaptive schema-based interpretations were compared with healthier and more balanced alternatives. The third session focused on cognitive techniques, including testing the validity of schemas, reinterpreting evidence previously regarded as confirming maladaptive beliefs, and evaluating the advantages and disadvantages of patients' habitual coping styles. During the fourth session, the healthy-adult mode was strengthened, unmet emotional needs were identified, and participants learned strategies for recognizing, expressing, and processing inhibited emotions. The fifth session addressed the development of healthy interpersonal communication and included imagery dialogue and chair-based or imagined conversations with significant others. In the sixth session, experiential techniques were introduced, including imagery of distressing situations and guided confrontation with highly problematic schema-triggering experiences. The seventh session focused on the therapeutic relationship, relationships with significant individuals, and role-playing exercises designed to practice new interpersonal responses. In the eighth session, participants rehearsed adaptive behaviors

through role-play and completed assignments related to establishing healthier behavioral patterns. The ninth session involved examining the advantages and disadvantages of healthy and maladaptive behaviors and identifying practical strategies for overcoming barriers to behavioral change. In the final session, the main concepts and techniques covered throughout the intervention were reviewed, acquired skills were practiced, progress was consolidated, and participants developed plans for maintaining adaptive cognitive, emotional, and behavioral responses after the termination of treatment.

The group mindfulness intervention was delivered in eight sessions based on the therapeutic program developed by Teasdale et al. (2018). The first session was devoted to establishing rapport, explaining group rules and confidentiality, introducing the psychological dimensions of rheumatoid arthritis and illness perception, and clarifying the potential role of mindfulness in modifying patients' responses to illness-related thoughts, emotions, and physical sensations. Participants introduced themselves in pairs and subsequently to the larger group, after which the raisin exercise was used to demonstrate deliberate, nonjudgmental attention to present-moment experience. The second session focused on awareness of the body and bodily sensations as a means of increasing awareness of internal experience. Homework assignments were reviewed, and participants practiced observing and recording thoughts, emotions, physical sensations, obstacles, and coping responses. In the third session, mindful seeing and hearing exercises were introduced, followed by sitting meditation and focused attention on breathing. The fourth session emphasized remaining in the present moment through mindful seeing or hearing, sitting meditation, and awareness of breathing, sounds, and thoughts. In the fifth session, participants were taught acceptance and willingness toward difficult experiences and practiced sitting meditation while deliberately bringing illness-related concerns and distressing perceptions of rheumatoid arthritis into awareness without avoidance or judgment. The sixth session focused on recognizing that thoughts are mental events rather than objective facts, understanding how negative thoughts and mood states may restrict contact with experience, and learning to respond more adaptively to emotional pain. Participants were encouraged to distinguish their identity from their suffering and to recognize their capacity to engage in health-promoting and restorative actions despite persistent symptoms. The seventh session addressed the development of a more flexible perspective toward illness and emphasized adaptive self-care, self-compassion, and mindful responding to physical and psychological needs. The eighth session consolidated the skills acquired throughout the program, reviewed their application to future illness-related challenges, and emphasized regular mindfulness practice as a means of maintaining psychological balance and improving adjustment to chronic illness.

Data Analysis

Data were analyzed using descriptive and inferential statistical procedures. Descriptive statistics, including means, standard deviations, frequencies, and percentages, were calculated to summarize participants' demographic characteristics and illness-perception scores across the pretest, posttest, and follow-up assessments. Before conducting the main analyses, the assumptions underlying parametric statistical procedures were examined, including normality of score distributions, homogeneity of variances, homogeneity of covariance matrices, and the sphericity assumption for repeated measurements. The effectiveness of the interventions across the three assessment stages was evaluated using repeated-measures

analysis of variance, with time as the within-subject factor and group as the between-subject factor. Multivariate analysis of covariance was also employed where appropriate to compare the experimental and control groups while controlling for pretest scores, followed by univariate analyses of covariance for the individual dimensions of illness perception. When statistically significant effects were identified, adjusted pairwise comparisons were performed to determine the location of differences between the groups and assessment stages. All statistical tests were conducted using a significance level of $p < .05$.

Findings and Results

The descriptive and inferential findings were examined to compare illness-perception scores among the schema therapy, mindfulness-based therapy, and control groups. Initially, the mean and standard deviation of illness-perception scores were calculated for each group at the pretest and posttest stages. Subsequently, the assumptions underlying the parametric analyses were evaluated, and analysis of covariance was conducted to determine whether the groups differed significantly after controlling for baseline scores. Bonferroni-adjusted pairwise comparisons were then used to examine changes across the pretest, posttest, and two-month follow-up assessments within each group.

Table 1. Mean and Standard Deviation of Illness-Perception Scores by Group and Assessment Stage

Variable	Group	<i>n</i>	Pretest, <i>M</i>	Pretest, <i>SD</i>	Posttest, <i>M</i>	Posttest, <i>SD</i>
Illness perception	Schema therapy	15	53.47	7.41	68.50	8.70
Illness perception	Mindfulness-based therapy	15	54.46	8.83	74.50	7.30
Illness perception	Control	15	52.49	9.14	53.40	8.80

As shown in Table 1, the three groups had relatively similar illness-perception scores at the pretest stage. The mean pretest scores were 53.47 for the schema therapy group, 54.46 for the mindfulness-based therapy group, and 52.49 for the control group. At posttest, the mean illness-perception score increased to 68.50 in the schema therapy group and 74.50 in the mindfulness-based therapy group, whereas only a slight change was observed in the control group, whose mean score increased from 52.49 to 53.40. These descriptive findings indicate that both psychological interventions were associated with greater changes in illness-perception scores than the absence of psychological treatment. The largest descriptive improvement was observed in the mindfulness-based therapy group; however, inferential analyses were required to determine whether the observed differences were statistically significant.

Before conducting the inferential analyses, the assumption of homogeneity of variances was evaluated using Levene's test. The results indicated that Levene's test was not statistically significant for illness-perception scores at the pretest, $F = 0.113$, $p = .893$; posttest, $F = 0.585$, $p = .561$; or follow-up, $F = 3.02$, $p = .059$. Because all probability values were greater than .05, the null hypothesis of equal error variances was not rejected. Therefore, the assumption of homogeneity of variances was satisfied across the three assessment stages, supporting the use of parametric statistical analyses. The distributions of the scores were also examined for substantial deviations from normality, and no serious violation of the assumptions required for analysis of covariance and repeated-measures analysis was identified.

Table 2. Results of the Analysis of Covariance for Illness-Perception Scores

Source	Sum of Squares	df	Mean Square	F	p	Partial η^2
Group	303.68	1	303.68	32.73	< .001	.328
Error	164.17	43	3.99	—	—	—
Total	467.85	44	—	—	—	—

As presented in Table 2, after controlling for baseline illness-perception scores, a statistically significant group effect was found, $F(1, 43) = 32.73$, $p < .001$, partial $\eta^2 = .328$. Thus, the adjusted illness-perception scores differed significantly across the study conditions. The partial eta-squared value indicated that approximately 32.8% of the variance in post-intervention illness-perception scores was associated with group membership after controlling for pretest differences. According to conventional interpretations of effect size, this represents a substantial intervention effect. Accordingly, the findings supported the effectiveness of the psychological interventions in changing illness perception among patients with rheumatoid arthritis. Because the omnibus analysis established a significant difference, Bonferroni-adjusted post hoc comparisons were conducted to determine the pattern of changes across the three assessment stages within each group.

Table 3. Bonferroni Post Hoc Comparisons of Illness-Perception Scores Across the Pretest, Posttest, and Follow-Up Assessments

Group	Comparison	Mean Difference	SE	p	95% CI, Lower	95% CI, Upper
Schema therapy	Posttest – Pretest	8.400	2.493	.007	2.053	14.747
Schema therapy	Follow-up – Pretest	9.667	2.235	.001	3.976	15.358
Schema therapy	Posttest – Follow-up	-1.267	1.723	1.000	-5.654	3.121
Mindfulness-based therapy	Posttest – Pretest	10.600	1.944	< .001	5.650	15.550
Mindfulness-based therapy	Follow-up – Pretest	8.467	1.874	< .001	3.693	13.240
Mindfulness-based therapy	Posttest – Follow-up	2.133	1.665	.632	-2.107	6.373
Control	Posttest – Pretest	0.400	1.018	1.000	-2.366	3.166
Control	Follow-up – Pretest	0.267	0.686	1.000	-1.599	2.132
Control	Posttest – Follow-up	0.133	0.736	1.000	-1.867	2.133

The Bonferroni-adjusted comparisons presented in Table 3 showed that illness-perception scores in the schema therapy group differed significantly between the pretest and posttest assessments, with a mean difference of 8.40, $p = .007$, and between the pretest and follow-up assessments, with a mean difference of 9.67, $p = .001$. However, the difference between the posttest and follow-up scores was not statistically significant, $p = 1.000$. This finding indicates that the changes produced by schema therapy were maintained during the two-month follow-up period. Similarly, in the mindfulness-based therapy group, illness-perception scores differed significantly between the pretest and posttest assessments, with a mean difference of 10.60, $p < .001$, and between the pretest and follow-up assessments, with a mean difference of 8.47, $p < .001$. The difference between posttest and follow-up scores was not statistically significant, $p = .632$, indicating that the effect of mindfulness-based therapy also remained stable during follow-up. In contrast, none of the pairwise comparisons in the control group were statistically significant, as the differences between the pretest and posttest, pretest and follow-up, and posttest and follow-up assessments all had Bonferroni-adjusted probability values of 1.000. Overall, these findings demonstrate that both schema therapy and mindfulness-based therapy produced significant and sustained changes in illness perception among patients with rheumatoid arthritis, whereas no meaningful change occurred in the control group.

Discussion and Conclusion

The present study investigated and compared the effectiveness of schema therapy and mindfulness-based therapy in improving illness perception among patients with rheumatoid arthritis. The findings demonstrated that both interventions produced statistically significant improvements in illness-perception scores from pretest to posttest, whereas no meaningful change was observed in the control group. The improvements achieved in both experimental groups were maintained at the two-month follow-up assessment, as indicated by the absence of significant differences between posttest and follow-up scores. These results suggest that schema therapy and mindfulness-based therapy can produce relatively stable changes in the ways patients cognitively and emotionally represent rheumatoid arthritis. Although the descriptive posttest mean was higher in the mindfulness-based therapy group, the findings did not indicate a statistically significant difference between the two interventions in their overall effectiveness. Therefore, both approaches appear to be beneficial psychological interventions for modifying illness perception in patients with rheumatoid arthritis.

The effectiveness of schema therapy in improving illness perception is consistent with findings indicating that schema-oriented interventions can alter deeply rooted cognitive and emotional patterns associated with chronic illness. Talebi et al. found that emotional schema therapy improved illness perception and hope among women with breast cancer, suggesting that identifying, evaluating, and restructuring maladaptive beliefs about emotions and illness can modify the perceived meaning and threat of a medical condition (18). The present findings extend this evidence to patients with rheumatoid arthritis, whose illness perceptions may be influenced by beliefs concerning vulnerability, dependence, disability, uncontrollability, and anticipated deterioration. Schema therapy may help such patients recognize that their interpretations of pain, fatigue, joint limitations, and disease progression are not determined exclusively by medical realities but may also reflect longstanding schemas and maladaptive coping responses.

The results are also compatible with evidence that schema therapy changes both maladaptive schemas and clinical symptoms across psychological disorders (16). Although rheumatoid arthritis is a medical rather than a primary psychiatric condition, patients may experience schema activation in response to chronic pain, repeated treatment, reduced independence, and uncertainty regarding future functioning. For example, a vulnerability-to-harm schema may cause ordinary symptom fluctuations to be interpreted as signs of irreversible deterioration, while dependence or failure schemas may intensify feelings of incapacity when assistance is required. Through cognitive restructuring, imagery, experiential dialogue, behavioral pattern breaking, and strengthening of the healthy-adult mode, schema therapy may weaken the influence of these patterns and facilitate a more balanced interpretation of illness-related experiences.

The findings are further supported by the systematic review conducted by Peeters et al., which indicated that schema therapy may be effective for disorders characterized by persistent anxiety, avoidance, rigid beliefs, and trauma-related patterns, although additional controlled studies remain necessary (17). Illness perception in rheumatoid arthritis frequently includes anxiety-provoking beliefs about physical decline, pain, treatment failure, and loss of social or occupational roles. Such beliefs may become resistant to change when they are embedded within broader emotional schemas. The present intervention directly addressed these mechanisms by examining evidence for and against schemas, identifying unmet emotional needs, practicing adaptive interpersonal responses, and replacing maladaptive coping styles with healthier

behaviors. These therapeutic components may explain why the participants developed more adaptive illness perceptions and maintained these changes over the follow-up period.

The schema therapy findings are also consistent with the study by Nazari et al., in which schema therapy reduced chronic fatigue symptoms and health anxiety in patients with multiple sclerosis (19). Multiple sclerosis and rheumatoid arthritis differ in pathophysiology, but both involve chronicity, unpredictable symptoms, concerns regarding future disability, and substantial psychological burden. Health anxiety can intensify selective attention to physical sensations and lead patients to interpret symptoms catastrophically. By modifying core schemas related to danger, defectiveness, dependence, and helplessness, schema therapy may reduce exaggerated threat appraisal and encourage a more differentiated view of symptoms. This process may have contributed to improved illness perception in the present study.

The current findings may also be interpreted in light of evidence showing that illness perception among women with rheumatoid arthritis is associated with attachment styles and dysfunctional attitudes (7). This relationship suggests that illness beliefs are not isolated cognitive judgments but are connected to broader interpersonal and emotional structures. Patients with insecure attachment patterns may experience illness as evidence that they are unsafe, unsupported, or incapable of coping, while dysfunctional attitudes may promote all-or-nothing interpretations of physical functioning. Schema therapy addresses precisely these deeper structures by using the therapeutic relationship as a corrective emotional experience and by helping patients identify and revise maladaptive beliefs. Consequently, improvements in illness perception may have resulted from changes not only in disease-related thoughts but also in the underlying emotional meanings assigned to vulnerability and dependence.

The significant effect of mindfulness-based therapy is consistent with previous studies demonstrating that mindfulness-based interventions can modify illness perceptions and reduce psychological distress in chronic medical populations. Bahrambagi et al. reported that mindfulness-based therapy reduced chronic stress and improved illness perception among patients with heart disease (25). Similarly, Dahabre found that mindfulness was associated with posttraumatic growth in patients with breast cancer and that illness perceptions and positive emotions played mediating roles in this relationship (24). These findings suggest that mindfulness can change the way patients interpret illness by reducing automatic negative appraisal and increasing openness to present-moment experience. In the present study, participants were trained to observe thoughts, emotions, and bodily sensations without judgment, which may have reduced the tendency to equate pain or fatigue with catastrophic disease progression.

The results also align with findings from Pasiyar et al., who showed that mindfulness-based stress reduction improved psychological well-being, health anxiety, and body image among women with breast cancer (23). Health anxiety is closely related to illness perception because patients who interpret symptoms as highly threatening are more likely to monitor their bodies excessively and experience persistent worry. Mindfulness may interrupt this cycle by teaching patients to observe bodily sensations directly rather than immediately interpreting them through catastrophic beliefs. For patients with rheumatoid arthritis, mindful attention may help distinguish the primary experience of pain or stiffness from secondary cognitive reactions such as “my condition is becoming uncontrollable” or “I will no longer be able to function.” This distinction can reduce emotional amplification and promote a more realistic and manageable illness representation.

The mindfulness findings are also supported by Tang et al., who demonstrated the effectiveness of mindfulness-based therapy among patients with drug-resistant epilepsy (26). Both epilepsy and rheumatoid arthritis are chronic conditions characterized by uncertainty and incomplete personal control. Patients may become preoccupied with anticipating future attacks, exacerbations, or functional limitations. Mindfulness does not necessarily alter the objective course of the disease, but it can reduce the psychological burden created by repetitive anticipation, resistance, and fear. In the present study, exercises involving mindful breathing, sitting meditation, awareness of bodily sensations, acceptance of difficult experiences, and recognition that thoughts are not facts may have helped participants relate more flexibly to the unpredictability of rheumatoid arthritis.

From a theoretical perspective, mindfulness-based therapy may have improved illness perception by increasing psychological flexibility. Research has shown that psychological flexibility mediates the relationship between illness perception and fear of recurrence in myocardial infarction survivors (12). Similar mediating processes have been identified among patients with gastrointestinal cancer, where psychological flexibility and maladaptive cognitive emotion regulation sequentially explained the association between illness perception and fear of recurrence (13). These findings suggest that threatening illness perceptions produce distress partly when patients become fused with negative thoughts and rely on maladaptive emotion-regulation strategies. Mindfulness cultivates an observing stance toward thoughts and feelings, allowing patients to experience distress without permitting it to determine behavior or identity. This process may explain the sustained improvement in illness perception observed in the mindfulness group.

The findings can also be understood through the broader evidence concerning acceptance-based interventions in chronic pain conditions. Galvez-Sánchez et al. concluded that acceptance and commitment therapy can improve psychological outcomes in central pain sensitization syndromes by changing patients' relationships with pain and reducing experiential avoidance (14). Although the present intervention was mindfulness-based rather than acceptance and commitment therapy, the two approaches share an emphasis on acceptance, cognitive distancing, present-moment awareness, and values-consistent action. Rheumatoid arthritis often involves pain that cannot be eliminated completely, even when inflammatory activity is medically controlled. Mindfulness may therefore improve illness perception not by persuading patients that the disease is insignificant but by helping them view discomfort as one component of experience rather than as the defining feature of their lives.

The effectiveness of both interventions is particularly important given the substantial psychological burden of rheumatoid arthritis. Vergne-Salle et al. demonstrated that pain in rheumatoid arthritis is influenced not only by disease activity but also by psychological factors (2). Morf et al. similarly showed that depression in patients with rheumatoid arthritis is associated with interacting clinical and psychological variables (3). These findings help explain why pharmacological treatment alone may not fully resolve patients' suffering. Even when inflammation is reduced, maladaptive expectations, helplessness, fear, and emotional distress may sustain a threatening perception of illness. Both schema therapy and mindfulness-based therapy target these psychological components, although through different mechanisms.

The improvement in illness perception may also have broader implications for coping and self-management. Masoudnia reported a relationship between illness perception and coping strategies among

patients with rheumatoid arthritis (5). Patients who perceive their illness as uncontrollable or overwhelmingly harmful may rely on passive coping, avoidance, or emotional withdrawal. In contrast, more coherent and balanced illness beliefs may support problem solving, treatment adherence, and active self-care. Likewise, Gåfvels and Wändell emphasized the importance of coping strategies in chronic illness management among patients with type 2 diabetes (10). Although the populations differ, the underlying principle is relevant: patients' cognitive representations of illness shape how they respond to long-term treatment demands.

The findings are also consistent with research showing that illness perception is related to self-care, self-efficacy, shared decision-making, and social support in patients with type 2 diabetes (9). A patient who believes that treatment can exert meaningful control over illness is more likely to participate actively in medical decisions and engage in recommended behaviors. Schema therapy may enhance such beliefs by challenging helplessness and dependence schemas, whereas mindfulness may reduce avoidance and enable patients to approach medical information without becoming overwhelmed. Consequently, the observed improvement in illness perception may have potential benefits beyond psychological distress, including better engagement with treatment and more adaptive disease management.

The results further align with evidence that illness perception predicts psychological well-being and quality of life in people with chronic wounds (8). Illness perception may influence whether patients view themselves as capable individuals managing a health condition or as passive victims of an uncontrollable disease. Similarly, Li et al. found that the relationship between illness perception and emotional disorders was mediated by self-esteem and psychological resilience (11). Schema therapy may strengthen self-worth by reducing defectiveness and failure beliefs, while mindfulness may protect self-esteem by reducing overidentification with illness-related thoughts. Both interventions may also increase resilience by enabling patients to tolerate uncertainty and recover more effectively from symptom exacerbations.

The maintenance of treatment gains at follow-up is another noteworthy finding. In both experimental groups, posttest and follow-up scores did not differ significantly, suggesting that participants retained the cognitive and emotional changes achieved during treatment. This durability may be explained by the skills-based nature of both interventions. Schema therapy participants learned to identify schema triggers, examine evidence, recognize maladaptive coping responses, and practice healthier behaviors. Mindfulness participants developed repeatable practices such as breathing awareness, sitting meditation, observing thoughts, and accepting difficult sensations. Because these techniques can be used independently after treatment, participants may have continued applying them during the follow-up period.

The absence of a significant difference between schema therapy and mindfulness-based therapy suggests that both approaches may be comparably effective for improving illness perception. This finding is consistent with comparative evidence indicating that different psychological interventions can produce similar benefits despite emphasizing distinct mechanisms. Talayeri and Bavi compared mindfulness-based stress reduction with emotional schema therapy among women with psoriasis and found that both interventions were relevant to reducing perceived stress and improving distress tolerance (20). Schema therapy may operate primarily through restructuring enduring cognitive-emotional patterns, whereas mindfulness may work through decentering, acceptance, and attentional regulation. Their similar effectiveness in the present study may indicate that illness perception can be modified through more than one therapeutic pathway.

It is also important to interpret the mindfulness findings without assuming that effectiveness necessarily depends on detectable structural brain changes. Kral et al. found no reliable structural brain alterations following mindfulness-based stress reduction in two combined randomized controlled trials (22). Accordingly, the benefits observed in the present study are more plausibly attributed to changes in attentional control, metacognitive awareness, emotional regulation, acceptance, and behavioral responses than to broad neuroanatomical transformation. Mace similarly conceptualized mindfulness as a therapeutic process involving awareness, nonjudgment, and altered relationships with internal experience (21). These processes are directly relevant to illness perception because they reduce the automatic credibility and emotional power of threatening illness-related thoughts.

Finally, the findings should be considered within the context of comprehensive rheumatoid arthritis care. Medical management remains essential for controlling inflammation, preventing structural damage, and preserving function (1). Psychological interventions should therefore be viewed as complementary rather than alternative treatments. Their role is to address the cognitive, emotional, and behavioral consequences of chronic disease that pharmacological treatment may not fully resolve. By improving illness perception, schema therapy and mindfulness-based therapy may help patients engage more constructively with medical care, respond more adaptively to symptom fluctuations, and maintain a sense of agency despite the chronic nature of rheumatoid arthritis.

The present study had several limitations that should be considered when interpreting the findings. Participants were selected through purposive sampling from one hospital and rheumatology clinics in Mashhad, which may limit the generalizability of the results to patients in other regions, healthcare settings, and cultural contexts. The relatively small sample size may also have reduced statistical power for detecting modest differences between the two active interventions. Illness perception was assessed through a self-report questionnaire and may therefore have been influenced by response bias, social desirability, temporary mood, or participants' interpretations of the questionnaire items. The follow-up period was limited to two months and did not permit conclusions regarding the long-term durability of treatment effects. Furthermore, the study did not systematically control for disease activity, medication type, pain severity, duration of illness, comorbid psychological disorders, or participation in other supportive services. The use of unequal numbers of treatment sessions across the two experimental conditions may also have influenced treatment exposure. Finally, the absence of an active comparison condition means that nonspecific therapeutic factors, including therapist attention, group support, treatment expectations, and regular attendance, cannot be fully separated from the specific effects of schema therapy and mindfulness practice.

Future studies should replicate the present findings with larger samples recruited from multiple hospitals, rheumatology centers, and different geographical regions. Randomized controlled trials with concealed allocation and blinded outcome assessment would strengthen causal inference. Longer follow-up periods, including six-month and one-year assessments, are recommended to determine whether improvements in illness perception remain stable over time. Future research should examine disease activity, pain intensity, fatigue, disability, medication adherence, quality of life, depression, anxiety, and healthcare utilization alongside illness perception. Researchers should also investigate potential mediators and moderators of treatment response, such as early maladaptive schemas, psychological flexibility, resilience, attachment style, distress tolerance, emotion regulation, disease duration, and symptom severity. Dismantling studies

could identify which therapeutic components are most responsible for change, while equivalence or noninferiority trials could more rigorously compare schema therapy and mindfulness-based therapy. Qualitative interviews may also provide a deeper understanding of how patients experience changes in their beliefs about rheumatoid arthritis and how they apply therapeutic skills in everyday life.

Rheumatology services should consider incorporating structured psychological screening and intervention into multidisciplinary care for patients who report threatening illness beliefs, health anxiety, emotional distress, or difficulty adapting to rheumatoid arthritis. Schema therapy may be particularly appropriate for patients whose illness-related distress is connected to longstanding beliefs about vulnerability, dependence, failure, abandonment, or defectiveness. Mindfulness-based therapy may be especially useful for patients who exhibit rumination, catastrophic attention to symptoms, experiential avoidance, or difficulty tolerating pain and uncertainty. Clinicians should explain that these interventions do not replace medical treatment but can improve patients' psychological adjustment and their ability to manage the disease. Group-based formats may be practical and cost-effective, while individual adaptation may be needed for patients with severe disability, comorbid psychiatric conditions, or difficulty participating in group sessions. Therapists should coordinate with rheumatologists, monitor symptom burden, provide accessible home-practice materials, and encourage the continued use of therapeutic skills after treatment to support the maintenance of gains.

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Authors' Contributions

All authors equally contributed to this study.

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.

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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