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Comparison of the Effectiveness of Mindfulness-Based Compassion Therapy and Positive Cognitive-Behavioral Therapy on Ambiguity Tolerance in Female Heads of Households

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A B S T R A C T

Objective: The aim of this study was to examine the effectiveness of mindfulness-based compassion therapy and positive cognitive-behavioral therapy on ambiguity tolerance in female heads of households in Shahrekord.

Methods: The research design was a quasi-experimental one, employing a pre-test, post-test, and follow-up with a control group. The statistical population included female heads of households in Shahrekord. Sixty participants were selected through purposive sampling and randomly assigned to three groups (20 participants per group). The experimental groups underwent 8 sessions of mindfulness-based compassion therapy and positive cognitive-behavioral therapy, each lasting 120 minutes. To determine the effectiveness of the interventions, the McLain Ambiguity Tolerance Questionnaire (1993) was used, and the data were analyzed using repeated measures analysis of variance.

Findings: The findings showed that the effectiveness of mindfulness-based compassion therapy and positive cognitive-behavioral therapy compared to the control group on ambiguity tolerance in the post-test were (0.691) and (0.560), and in the follow-up were (0.755) and (0.632), respectively. Additionally, the results indicated that mindfulness-based compassion therapy was more effective than positive cognitive-behavioral therapy.

Conclusion: Based on the results of this study, mindfulness-based compassion therapy can be used as a more sustainable and effective intervention than positive cognitive-behavioral therapy to increase ambiguity tolerance in female heads of households.

Keywords: *Ambiguity Tolerance, Positive Cognitive-Behavioral Therapy, Mindfulness, Female Heads of Households, Compassion Therapy.*

1. Introduction

Problems have always been unpleasant for humans, and ambiguous situations, especially those related to change, have the potential to evoke destructive stress in individuals (Adamson, 2018). Frenkel-Brunswik (1949) defined ambiguity tolerance as an emotional and perceptual personality variable (Chesley & Wylson, 2016). She used the concept of ambiguity tolerance in various fields, including clinical psychology, management, and industrial and organizational psychology. This variable plays an undeniable role in selecting educational subjects and tendencies or aversions to substance use, creativity, and entrepreneurship (Hosseini & Dashti Nejad, 2017).

In simple terms, ambiguity can be defined as the lack of necessary information to understand a situation and choose predictable outcomes (Hassannejad Emamchay & Zabihi, 2024). Ambiguity tolerance is considered a significant contributing factor in anxiety disorders (Ren et al., 2021). Dugas et al. (2007) defined ambiguity tolerance as beliefs about negative problem orientation, worry, and avoidant coping style and believed that such factors are related to the severity of a person's issue and problem. Ambiguity tolerance is generally expressed as a person's perceived self-assessment ability when experiencing and tolerating negative emotional situations or the behavioral ability to continue goal-directed behavior during emotional distress (Dugas et al., 2007). Ambiguity can result from physical and cognitive processes, thus representing an emotional state, often marked by a desire to act to relieve that emotional experience (Arco, 2015). A certain level of uncertainty is expected and natural, existing in every stage and area of life. An individual may be uncertain about their job, spouse selection, and future goals but still feel in control of events. However, for some individuals, this can be overwhelming and become a source of psychological distress. Intolerance of ambiguity and uncertainty is among the factors contributing to the development of anxiety and depression, often affecting female heads of households (Kraemer et al., 2016), as this group frequently faces financial and social challenges, over-responsibility, and uncertain situations. Additionally, stress, depression, and cultural and financial poverty are among the imposed issues on this group, making them vulnerable in terms of physical and mental health (Hashim et al., 2015).

Ambiguity is a state of lack of clarity and purpose. Generally, people dislike ambiguity and seek to reduce it. Ambiguity can cause distress and increase an individual's cognitive load, ultimately imposing limitations on their thinking process (Chesley & Wylson, 2016).

Carleton (2016) believes that ambiguity tolerance increases through present-focused awareness and reducing cognitive load. Mindfulness can be associated with reducing cognitive load and increasing tolerance for ambiguity (Carleton, 2016). Therefore, a mindful individual may experience less threat, rely less on preconceived ideas such as bias, and have greater tolerance for ambiguity (Robinson, 2019). Research findings indicate that mindfulness has a negative correlation with intolerance of ambiguity and uncertainty, and high levels of mindfulness increase the ability to tolerate uncertain situations and reduce them (Kraemer et al., 2016). The reason is that mindfulness is non-judgmental, non-descriptive, and present-focused awareness towards an experience within an individual's attention span at a particular moment (Zeidan et al., 2010).

One of the interventions derived from the mindfulness approach is mindfulness-based compassion therapy, which simultaneously emphasizes mindfulness and self-compassion. In this therapeutic approach, participants learn self-compassion and emotional changes towards greater self-care and support, leading to increased acceptance of discomforts and reduced emotional distress (Neff & Germer, 2017; Neff & Germer, 2013). The goals of this therapy include reducing hostility towards oneself and enhancing psychological abilities and resources (Allen & Leary, 2010). In other words, this therapy can teach individuals emotional regulation, emotion control, and rumination control, thereby improving mental health (Brown & Percy, 2007). Individuals with higher self-compassion are more likely to accept their role and responsibility in negative events and see negative events as part of what they are, leading to less rumination on negative events. The results of Papenfuss et al.'s (2022) study, which examined the impact of mindfulness intervention on ambiguity tolerance and anxiety among students, showed that the intervention had a significant impact on social anxiety, and ambiguity tolerance acted as a mediating factor affecting the intervention's impact on anxiety and social worry symptoms (Papenfuss et al., 2022).

Another effective therapy for increasing psychological abilities and resources is positive cognitive-behavioral therapy, which combines two short-term solution-focused psychotherapeutic interventions and positive psychotherapy. Both approaches focus on positive attributes and pragmatism (Pourdel et al., 2023). This approach focuses on strengthening and expanding the individual's strengths rather

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than reducing problems (Allen et al., 2009). This therapy seeks to find exceptions regarding the individual's strengths and abilities. Exceptions are key to solving problems. The therapist identifies the client's strengths, even if exceptional, and challenges the client, changing their belief in their abilities (Zamani & Zolfaghari, 2022). The findings of Hashemi Saraj et al.'s (2022) study indicate that short-term solution-focused psychotherapy and schema therapy are effective on distress tolerance and intolerance of uncertainty in women with bulimia nervosa (Hashemi Saraj et al., 2022).

Considering the challenges faced by female heads of households and their deficiency in ambiguity tolerance, and given the statistics published by the Strategic Statistics and Information Center of the Ministry of Labor, Cooperatives, and Social Welfare (2021), indicating the increasing trend of female-headed households in Iran in line with the global average, it is necessary to have specific policies and programs to reduce and mitigate the adverse effects and outcomes of this social phenomenon and improve the psychological capital of this group of women. Given the background, theoretical foundations, and the novelty of the two aforementioned therapies, along with the lack and scarcity of research on the effectiveness of these two interventions on ambiguity tolerance among female heads of households, the researcher aimed to answer the following questions in this study:

Does mindfulness-based compassion therapy affect the ambiguity tolerance of female heads of households?

Does positive cognitive-behavioral therapy affect the ambiguity tolerance of female heads of households?

Is there a significant difference in the effectiveness of mindfulness-based compassion therapy and positive cognitive-behavioral therapy?

2. Methods

2.1. Study design and Participant

The present study is a quasi-experimental design with a pre-test, post-test, follow-up, and includes two experimental groups and one control group. To determine the difference in the effectiveness of the two approaches, mindfulness-based compassion therapy and positive cognitive-behavioral therapy, three groups were used: one group as the mindfulness-based compassion therapy group, one group as the positive cognitive-behavioral therapy group, and one control group. The statistical population included 820 female heads of households under the support of the Welfare Organization residing in Shahrekord in 2022. Based on the inclusion criteria, 60 women with an ambiguity tolerance score between 15 to 30 who had not participated in other therapeutic interventions were selected and randomly assigned to three groups. The exclusion criteria included any disorder during the intervention period, the participant's unwillingness to continue the therapy, and absence for more than two sessions. After sampling and random assignment to groups, each experimental group underwent 8 sessions of 120-minute interventions. After the interventions and three months later, the experimental and control groups were re-evaluated.

After obtaining an ethics code from the Islamic Azad University, Shahrekord branch, 500 questionnaires were distributed to Positive Life Centers affiliated with the Welfare Organization of Shahrekord, resulting in 288 completed McLain Ambiguity Tolerance Questionnaires. From these, 60 participants with low ambiguity tolerance scores were purposively sampled and, after obtaining informed consent and explaining participants' rights and ensuring confidentiality and privacy, were randomly assigned to three groups of 20. Then, the two experimental groups received 8 weekly 120-minute sessions of interventions, and after the interventions, post-tests were administered to all three groups, with a follow-up test conducted three months later. It should be noted that no dropout occurred in any of the groups.

2.2. Measures

2.2.1. Ambiguity Tolerance

This questionnaire, developed by McLain in 1993, assesses individuals' ambiguity tolerance and is a single-component questionnaire with 13 items. Items are rated on a five-point Likert scale from strongly agree (5) to strongly disagree (1). A total score between 15 to 30 indicates low ambiguity tolerance, 30 to 45 indicates moderate ambiguity tolerance, and a score above 45 indicates high ambiguity tolerance. The reliability of this questionnaire was reported by McLain with a Cronbach's alpha of 0.82. In Iran, Feizi reported a reliability coefficient of 0.85 using Cronbach's alpha and a validity coefficient of 0.48 through construct validity (Narimani et al., 2009).

2.3. Intervention

2.3.1. Mindfulness-Based Compassion Therapy

This protocol was first implemented by Kristen Neff and Christopher Germer in 2010 in Fritz Perls House in Big Sur

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on a group of 12 participants in 8 sessions of two hours and forty-five minutes. The experimental group in this study received this intervention in weekly 120-minute sessions over two months (Moulton-Perkins et al., 2022; Wilson et al., 2019).

Session 1:

Welcome participants, outline researcher and group expectations and goals, introduce concepts of self-compassion and mindfulness. Conduct exercises including sitting quietly, soothing touch, and self-compassion break.

Homework: Practice sitting quietly, soothing touch, and self-compassion break.

Session 2:

Introduce compassionate breathing and mindfulness exercises (foot practice, quiet sitting). Explain resistance in mindfulness and dealing with distress during self-compassion practice. Teach mindfulness and self-compassion in daily life.

Homework: Practice compassionate breathing, mindfulness and self-compassion in daily life, use "here and now" stone.

Session 3:

Practice compassionate breathing, loving-kindness meditation, differentiate between loving-kindness and compassion. Conduct class exercises (waking our hearts, quiet sitting, loving-kindness towards a dear person, finding loving-kindness phrases).

Homework: Practice loving-kindness towards a dear person, find loving-kindness phrases.

Session 4:

Loving-kindness meditation towards oneself, review progress in self-compassion training, discuss self-criticism and feelings of safety. Class exercise on motivating oneself with compassion.

Homework: Practice loving-kindness towards oneself, write a compassionate letter to oneself.

Session 5:

Meditation on giving and receiving compassion, discuss living deeply, class exercises (discovering core values, living with commitment, quiet sitting). Teach compassionate listening.

Homework: Practice giving and receiving compassion, live with commitment, practice compassionate listening.

Session 6:

Introduce retreat session, conduct retreat exercises (compassionate body scan, sensory and pleasurable walking, grounding, savoring food, mindful walking, self-compassion, giving and receiving compassion, emerging from silence).

Homework: Continue practicing retreat exercises.

Session 7:

Loving-kindness meditation towards oneself, discuss handling painful emotions, practice quiet sitting, explain shame and sources of shame.

Homework: Work with painful emotions, address feelings of shame.

Session 8:

Meditation on compassionate friend, explore challenging relationships, class exercises (address unmet needs and humorous movement, quiet sitting), discuss relational pain and caregiver burnout.

Homework: Practice self-compassion in relationships, maintain balanced compassion.

2.3.2. Positive Cognitive-Behavioral Therapy

This protocol was first comprehensively presented by Prasko et al. in 2016. The experimental group in this study received this intervention in weekly 120-minute sessions over two months (Prasko et al., 2016).

Session 1:

Introduce group members and psychologist, establish therapeutic relationship, discuss current activities, outline group goals and expectations, explain the logic of positive cognitive-behavioral therapy.

Homework: Observe daily events or anticipate future events, reflect on and discuss the best possible self.

Session 2:

Discuss clients' goals, talk about previous successes, explain the importance of noticing exceptions, explore and discuss each client's positive traits.

Homework: List best moments and supporters to help achieve goals.

Session 3:

Discuss daily good deeds, explore findings on personal strengths, talk about five of the best experiences for better living.

Homework: Develop a positive self-perspective.

Session 4:

Explain the concept of shining moments and self-compassion, conduct class exercise.

Homework: Write a letter from your future self.

Session 5:

Review clients' feedback on therapy, discuss positive self-perspective, explore findings on beneficial beliefs and

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schemas, implement upward arrow technique for some clients.

Homework: Practice better moments, engage in daily optimistic thinking.

Session 6:

Discuss the meaning of life for each client, identify five preferences for building a better world, practice kind acts.

Homework: Record daily better moments, perform five kind acts during the week, practice gratitude and write a thank-you letter.

Session 7:

Discuss maintaining behaviors.

Homework: Record daily better moments, write a gratitude letter.

Session 8:

Conduct group compliment box exercise, read compliments, celebrate clients' successes.

Homework: Continue recording daily better moments.

2.4. Data Analysis

The data were analyzed using repeated measures analysis of variance via SPSS-26.

3. Findings and Results

Sixty female heads of households participated in this study, divided into two experimental groups and one control group, each with 20 participants. The age group of 36-45 years had the highest frequency at 45% (27 participants), while the age group above 55 years had the lowest frequency at 7% (4 participants). About 88.3% of the women (53 participants) had education levels below or at high school diploma, and 80% (48 participants) had only one or two children. The reasons for the women becoming heads of households were as follows: 25% (15 participants) due to divorce, 20% (12 participants) due to the death of their spouse, 18.3% (11 participants) due to the spouse's imprisonment, 16.7% (10 participants) due to the spouse's addiction, 15% (9 participants) due to disability, 1.7% (1 participant) due to the spouse being missing, and 3.3% (2 participants) due to the spouse being on the run. Table 1 presents the mean and standard deviation of the research variable by stages and group.

Table 1

Descriptive Statistics for Ambiguity Tolerance

Group	Indicator	Pre-test	Post-test	Follow-up
Positive Cognitive-Behavioral Therapy	Mean	30.95	46.20	46.65
	Standard Deviation	2.81	3.95	4.47
Mindfulness-Based Compassion Therapy	Mean	30.85	47.25	47.85
	Standard Deviation	5.03	7.01	4.45
Control	Mean	32.10	31.10	31.60
	Standard Deviation	3.86	5.43	5.44

To examine the research hypotheses, repeated measures analysis of variance (ANOVA) was used. This analysis requires several assumptions to be met. Based on the results, the significance level of the Shapiro-Wilk test for all groups in all three stages (pre-test, post-test, and follow-up) was greater than .05, supporting the null hypothesis that the distribution of scores on the ambiguity tolerance variable is normal in the experimental and control groups across the three stages. Levene's test was used to check the equality of variances (F=2.726, p=.074), confirming the equality of error variances across the three groups. Mauchly's test (p=.151, χ^2=.935) indicated that the assumption of sphericity was met. The results of Box's M test (p=.183, F=1.348, Box's M=17.528) suggested the equality of covariance matrices for the dependent variable (ambiguity tolerance) among the different groups.

Table 2

Results of Repeated Measures ANOVA for Ambiguity Tolerance in Pre-test, Post-test, and Follow-up

Source	Sum of Squares	df	Mean Square	F	Significance	Eta Squared	Power
Time	Sphericity Assumed	32.86	2	16.43	112.52	.0001	.664
	Greenhouse-Geisser	32.86	1.88	17.50	112.52	.0001	.664
	Huynh-Feldt	32.86	2	16.43	112.52	.0001	.664

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	Lower-bound	32.86	1	32.86	112.52	.0001	.664
Time * Group	Sphericity Assumed	19.60	4	4.90	33.56	.0001	.541
	Greenhouse-Geisser	19.60	3.75	5.22	33.56	.0001	.541
	Huynh-Feldt	19.60	4	4.90	33.56	.0001	.541
	Lower-bound	19.60	2	9.80	33.56	.0001	.541

The results of the repeated measures ANOVA for ambiguity tolerance are presented in Table 2. Various sources indicate that the interaction of time and group for ambiguity tolerance is significant. This result demonstrates the effectiveness of positive cognitive-behavioral therapy and mindfulness-based compassion therapy on ambiguity tolerance in female heads of households. Based on the eta squared value for the interaction of time and group, it was determined that 54.1% of the changes in ambiguity tolerance are explained by positive cognitive-behavioral therapy and mindfulness-based compassion therapy.

Table 3

Results of Bonferroni Post-Hoc Test for Pre-test, Post-test, and Follow-up and Pairwise Comparison of Ambiguity Tolerance Means

Comparison 1	Comparison 2	Mean Difference	Standard Error	Significance
Pre-test	Post-test	-.886*	.074	.0001
Pre-test	Follow-up	-.926*	.060	.0001
Post-test	Follow-up	-.040	.074	1
Positive Cognitive-Behavioral Therapy	Mindfulness-Based Compassion Therapy	-.255*	.064	.001
Positive Cognitive-Behavioral Therapy	Control	.743*	.064	.0001
Mindfulness-Based Compassion Therapy	Control	.998*	.064	.0001

Based on the results in Table 3, the Bonferroni post-hoc test was used to compare the mean differences across the three stages in the three groups. The results indicate that the mean difference between pre-test and post-test (intervention effect) and between pre-test and follow-up (time effect) are significant, but the difference between post-test and follow-up (intervention stability effect) is not significant. This indicates that both positive cognitive-behavioral therapy and mindfulness-based compassion therapy had a significant impact on ambiguity tolerance in the post-test stage, and their effects persisted in the follow-up stage. The non-significant difference between post-test and follow-up suggests that the effects of the treatments were stable over time. Additionally, the results showed that both treatments were effective compared to the control group, and there was a significant difference in the mean ambiguity tolerance scores between the two experimental groups.

Table 4

Parameter Estimates for Comparing Ambiguity Tolerance Across Three Groups in Study Stages

Stage	Comparison	Statistic	Significance	Effect Size
Pre-test	Positive Cognitive-Behavioral Therapy vs. Control	-.088	.368	.014
	Mindfulness-Based Compassion Therapy vs. Control	-.096	.329	.017
Post-test	Positive Cognitive-Behavioral Therapy vs. Control	1.16	.0001	.560
	Mindfulness-Based Compassion Therapy vs. Control	1.54	.0001	.691
Follow-up	Positive Cognitive-Behavioral Therapy vs. Control	1.16	.0001	.632
	Mindfulness-Based Compassion Therapy vs. Control	1.55	.0001	.755

The results presented in Table 4 estimate the impact of positive cognitive-behavioral therapy and mindfulness-based compassion therapy on ambiguity tolerance by group. The results indicate that there were no significant differences between the experimental and control groups in the pre-test stage ($p > .05$). However, in the post-test stage, the mean ambiguity tolerance score of the control group was significantly lower than that of the positive cognitive-behavioral therapy group ($p < .0001$) and the mindfulness-based compassion therapy group ($p < .0001$). The effect sizes of the treatments on ambiguity tolerance in the post-test were .560 for positive cognitive-behavioral therapy and .691 for mindfulness-based compassion therapy. Additionally, the effects of both therapies remained

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significant in the follow-up stage, with effect sizes of .632 and .755, respectively.

4. Discussion and Conclusion

This study examined the effectiveness of mindfulness-based compassion therapy and positive cognitive-behavioral therapy on ambiguity tolerance in female heads of households in Shahrekord, and the effectiveness of the interventions was statistically significant according to repeated measures ANOVA. Additionally, mindfulness-based compassion therapy had a greater impact on ambiguity tolerance than positive cognitive-behavioral therapy.

Regarding the first and third research questions, it was found that mindfulness-based compassion therapy significantly increased ambiguity tolerance in female heads of households and was more effective than positive cognitive-behavioral therapy. These findings are consistent with previous studies on the impact of mindfulness-based compassion therapy on increasing ambiguity tolerance (Bibi et al., 2022; Papenfuss et al., 2022). It can be explained that individuals with higher levels of self-compassion are simultaneously kind to themselves and more responsible when facing hardships, accepting events more easily. Compassion-based therapeutic approaches foster higher levels of self-compassion through compassionate techniques, identifying self-compassionate thoughts, and removing barriers to kindness. This therapy can protect individuals against negative states and enhance positive emotional states. Increasing self-compassion boosts motivation, preparing individuals to accept negative thoughts (Papenfuss et al., 2022). The self-kindness component in compassion therapy helps individuals end constant self-judgment, transforming punitive internal dialogues into benevolent ones, accepting flaws and shortcomings unconditionally, and responding kindly to themselves amid emotional turmoil and life's ambiguities. This compassionate self-support helps protect against harm. The common humanity component in compassion therapy reminds individuals that challenges, life ambiguities, and weaknesses are part of being human, and everyone shares similar experiences despite differences in circumstances and pain (Allen & Leary, 2010). Mindfulness increases awareness of daily activities, familiarizing individuals with their automatic mental features and fostering moment-to-moment awareness, countering preoccupation with worries and anxieties. This can enhance ambiguity tolerance among female heads of households when facing new and difficult conditions (Zamani & Zolfaghari, 2022).

Regarding the second research question, positive cognitive-behavioral therapy also had a statistically significant impact on increasing ambiguity tolerance in female heads of households. No research consistent with this finding was found; however, the therapeutic techniques in this approach lead to changes in individuals' thinking and perception of life's issues and problems. The foundation of this therapy is recognizing individuals' strengths and successes, creating a positive self-perception, shifting focus from problems and weaknesses to available solutions, enabling individuals to evaluate themselves as capable (Hashemi Saraj et al., 2022). Ultimately, this self-empowerment increases ambiguity tolerance and uncertainty. Since psychological and emotional balance is crucial when facing ambiguous situations and events, and low ambiguity tolerance is associated with higher stress and anxiety (Narimani et al., 2009), and because ambiguity can result from physical and cognitive processes, it manifests as an emotional state, often accompanied by a desire to act to escape that emotional experience (Arco, 2015), mindfulness-based compassion therapy seems more effective because it focuses on emotions, reducing negative and increasing positive emotions, while positive cognitive-behavioral therapy focuses on problem-solving.

5. Suggestions and Limitations

Based on the research findings, it is recommended that psychotherapy centers and organizations supporting female heads of households (such as the Relief Committee and the Welfare Organization) utilize these approaches, especially mindfulness-based compassion therapy, to enhance ambiguity tolerance in female heads of households.

This research, like other studies in the human domain, faced limitations. The study was quasi-experimental; therefore, some confounding variables (family conditions, economic and social status, personality traits, etc.) that could affect the generalizability of the results were uncontrollable. It is recommended to repeat the research as a fully experimental study.

Authors' Contributions

All authors have contributed significantly to the research process and the development of the manuscript. This article is derived from the first author's doctoral dissertation.

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Declaration

In order to correct and improve the academic writing of our paper, we have used the language model ChatGPT.

Transparency Statement

Data are available for research purposes upon reasonable request to the corresponding author.

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Declaration of Interest

The authors report no conflict of interest.

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Ethical Considerations

The study protocol adhered to the principles outlined in the Helsinki Declaration, which provides guidelines for ethical research involving human participants. The purpose and application of the research were explained to all participants, and they were assured of the confidentiality of their information and identity, with the right to withdraw at any time without any explanation. This study has the ethical code IR.IAU.SHK.REC.1401.092 from the Islamic Azad University, Shahrekord branch.

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