

# The Effectiveness of Positive Psychotherapy Techniques Training on Tolerance of Ambiguity and Quality of Life in Mothers of Children with Leukemia

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## ABSTRACT

This study aimed to investigate the effectiveness of positive psychotherapy techniques training on tolerance of ambiguity and quality of life in mothers of children with leukemia. The research adopted an applied, quasi-experimental design with a pretest–posttest control group structure. The statistical population included all mothers of children diagnosed with leukemia who visited Mahak Hospital in 2024. Thirty participants were selected using simple random sampling and were equally assigned to experimental ( $n = 15$ ) and control ( $n = 15$ ) groups. Inclusion criteria required that mothers be the primary caregivers of children aged 7 to 15 years, with at least three months since diagnosis. The experimental group received six sessions of positive psychotherapy techniques based on strengths identification, gratitude, storytelling, and constructive responding, while the control group received no intervention. Data were collected using the Multiple Stimulus Types Ambiguity Tolerance Scale -II (MSTAT-II) and the WHOQOL-BREF questionnaire. Analysis was conducted using ANCOVA in SPSS-26 after confirming assumptions of normality, homogeneity of variances, and equality of covariance matrices. Results indicated a significant main effect of group on both dependent variables after controlling for pretest scores. For tolerance of ambiguity, the ANCOVA revealed  $F(1, 27) = 72.46$ ,  $p < .001$ ,  $\eta^2 = .72$ , indicating that the intervention explained 72% of the variance in posttest scores. For quality of life, results showed  $F(1, 27) = 88.34$ ,  $p < .001$ ,  $\eta^2 = .76$ , demonstrating that the intervention accounted for 76% of the variance in posttest outcomes. These findings confirm the effectiveness of positive psychotherapy in enhancing both tolerance of ambiguity and quality of life. The study concludes that positive psychotherapy techniques significantly improve psychological adaptability and well-being in mothers of children with leukemia. Integrating this approach into caregiver support programs may provide effective, strengths-based interventions to promote resilience and quality of life in high-stress caregiving contexts.

**Keywords:** Positive psychotherapy, tolerance of ambiguity, quality of life, mothers, childhood leukemia, caregiver well-being

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## Introduction

Cancer remains one of the most pervasive and devastating chronic illnesses across the globe, and when the diagnosis involves children, its impact is magnified in unique and profound ways. Childhood leukemia

is particularly demanding because of its aggressive treatment trajectories, unpredictable course, and the emotional, financial, and physical burdens it imposes on families. Mothers, often the primary caregivers, experience substantial psychological and social pressures that influence their quality of life, emotional resilience, and capacity to cope with uncertainty (1). These pressures frequently manifest as heightened anxiety, diminished well-being, and reduced tolerance of ambiguity, given the unpredictable outcomes and ongoing fears surrounding relapse or treatment failure (2). For these mothers, finding effective psychological interventions that foster strength, optimism, and quality of life is essential.

Positive psychotherapy has emerged over the past two decades as a valuable framework for promoting mental health by emphasizing individuals' strengths, virtues, and capacity for growth rather than focusing exclusively on deficits and psychopathology (3). Rooted in the principles of positive psychology, this therapeutic model seeks to cultivate optimism, resilience, gratitude, and meaning, thereby enhancing psychological well-being and life satisfaction (4). While conventional psychotherapy often centers on reducing symptoms, positive psychotherapy promotes flourishing by enabling individuals to tolerate uncertainty, find meaning in adversity, and maintain hope. Such an approach is particularly relevant for mothers of children with leukemia, who grapple daily with uncertainty regarding their child's prognosis and the challenges of caregiving.

A growing body of evidence highlights the clinical efficacy of positive psychotherapy in different contexts. Meta-analytical research has demonstrated that positive psychotherapy significantly reduces negative psychological outcomes while simultaneously enhancing positive psychological states across populations (5). In randomized and quasi-experimental trials, the intervention has been linked with improved resilience, reduced depressive symptoms, and increased post-traumatic growth among cancer patients and their families (6-8). Importantly, its utility is not limited to patients alone but extends to caregivers, who often endure parallel or greater psychological burdens than those undergoing treatment (9). For this reason, applying positive psychotherapy to mothers of children with leukemia represents both a practical and necessary expansion of supportive care in oncology.

Mothers play a central role in the caregiving process for children with leukemia, and their mental health directly affects both the child's treatment trajectory and overall family functioning (1). Studies confirm that parental stress significantly reduces quality of life and increases emotional distress in this population (10). Beyond general stressors, mothers face constant ambiguity regarding treatment efficacy, side effects, and long-term survival, leading to chronic psychological strain (11). Tolerance of ambiguity is a psychological construct describing an individual's ability to cope with uncertain or complex situations without becoming overwhelmed or dysfunctional. Mothers with low tolerance of ambiguity may experience heightened anxiety, rumination, and maladaptive coping strategies when confronted with their child's medical challenges (12). Enhancing this capacity is therefore crucial, as it equips caregivers with greater adaptability and resilience in the face of uncertainty.

Positive psychotherapy can effectively address these challenges by fostering acceptance, gratitude, and constructive emotional regulation. By shifting the focus from illness to strengths, the intervention enables caregivers to reframe their narratives and rediscover meaning amid hardship (13). Techniques such as gratitude letters, savoring positive events, and storytelling not only enhance well-being but also improve interpersonal relationships and social support, which are vital buffers against caregiver burnout (14).

Research has repeatedly shown that enhancing psychological well-being leads to better health outcomes, improved quality of life, and stronger coping resources (4). For caregivers of children with leukemia, these benefits may also translate into more effective caregiving behaviors and a healthier family environment.

The quality of life of mothers of children with leukemia has been documented as significantly compromised compared to general populations (2). Fatigue, sleep disturbances, anxiety, and depression are commonly reported, compounded by financial burdens and social isolation (15). These challenges often persist throughout the treatment cycle and into survivorship, underscoring the need for sustainable psychological support interventions. Positive psychotherapy has demonstrated effectiveness in mitigating such effects by instilling hope and resilience, particularly in cancer-related contexts (7, 16). Evidence indicates that interventions grounded in positive psychology improve both subjective well-being and objective indicators of quality of life across diverse patient and caregiver populations (17).

Clinical applications of positive psychotherapy in oncology are expanding. In breast cancer patients, the therapy has improved psychological well-being, life expectancy, and resilience, highlighting its adaptability to chronic and life-threatening conditions (18-20). Similarly, in patients undergoing chemotherapy, positive psychotherapy and related approaches such as existential therapy have shown significant effects on hope, psychological capital, and affect regulation (21, 22). These findings underscore the intervention's utility across multiple dimensions of psychological functioning. Extending these approaches to caregivers aligns with calls for holistic cancer care models that address not only patient outcomes but also caregiver well-being (9).

Beyond the oncology context, positive psychotherapy has demonstrated benefits for individuals experiencing a range of psychological difficulties. Studies in populations with marital infidelity, panic disorder, and psychosis show that the intervention enhances well-being, improves quality of life, and reduces psychological distress (12-14). The adaptability of the approach across such varied contexts suggests that it may be especially effective in caregiver populations, who often face complex and multifaceted stressors. This versatility is consistent with Rashid's conceptualization of positive psychotherapy as a strengths-based, cross-cultural model capable of addressing psychological needs in diverse settings (3).

The literature also emphasizes that mothers of children with leukemia frequently neglect their own psychological needs due to their caregiving roles, leaving them vulnerable to emotional exhaustion and diminished resilience (1). Studies highlight the interconnection between parental well-being and children's treatment outcomes, suggesting that caregiver support is an indirect but essential component of pediatric oncology care (10). Thus, fostering psychological strengths through positive psychotherapy not only benefits mothers but also contributes to improved family dynamics and potentially enhances children's adaptation to treatment.

The concept of psychological well-being provides an important theoretical foundation for the intervention. Ryff's model identifies dimensions such as self-acceptance, purpose in life, and positive relations with others as central to flourishing (4). Positive psychotherapy operationalizes these principles through structured activities that encourage gratitude, savoring, and storytelling, directly targeting these dimensions. By doing so, it helps mothers of children with leukemia to reclaim meaning and purpose even in the midst of hardship, thereby elevating both tolerance of ambiguity and overall life quality.

Several Iranian and international studies confirm the feasibility and effectiveness of positive psychotherapy in medical and caregiver contexts. Nazemi et al. found significant improvements in resilience following the intervention in women with breast cancer (7). Heydari et al. reported enhanced hope and well-being among chemotherapy patients (17), while Karimi et al. demonstrated similar improvements in breast cancer survivors (16). In parents of children with leukemia, Razavian et al. showed that psychological interventions targeting resilience and mental toughness reduce distress and enhance vitality (10). These findings collectively indicate that caregivers benefit substantially from interventions that promote psychological strengths rather than focusing solely on pathology.

Overall, the reviewed evidence highlights an urgent need for structured, evidence-based interventions to support the psychological well-being of mothers caring for children with leukemia. Positive psychotherapy, grounded in positive psychology and validated across a wide range of populations, represents a promising approach to addressing this gap. By emphasizing strengths, resilience, and meaning-making, it offers mothers tools to cope more effectively with uncertainty, enhance their tolerance of ambiguity, and improve their overall quality of life. Accordingly, the present study investigates the effectiveness of positive psychotherapy techniques on tolerance of ambiguity and quality of life in mothers of children with leukemia, aiming to provide empirical support for the application of this intervention in pediatric oncology contexts.

## Methods and Materials

### *Study Design and Participants*

This study was applied in purpose and adopted a quasi-experimental design with a pretest–posttest structure and a control group. The intervention consisted of training in positive psychotherapy techniques, which was considered as the independent variable, while tolerance of ambiguity and quality of life were the dependent variables. The study was conducted using two groups: an experimental group that received the training intervention and a control group that received no intervention during the research period. The statistical population included all mothers of children diagnosed with leukemia who referred to Mahak Hospital in 2024. A total of 30 mothers were selected through simple random sampling and were then randomly assigned to the experimental group ( $n = 15$ ) and the control group ( $n = 15$ ).

The demographic profile of participants indicated that most mothers were between 25 and 35 years old, were predominantly housewives, and generally held a bachelor's degree. They were also mothers of children mostly between the ages of 11 and 14, with a higher number of sons than daughters, and many of them had more than one child.

The inclusion criteria specified that mothers could participate if their child with leukemia was between 7 and 15 years of age, at least three months had passed since the onset of the child's illness, and the mother was the primary caregiver. The exclusion criteria determined that mothers would be removed from the study if they were undergoing psychiatric medication during the intervention sessions, if they missed more than one training session, or if the child's disease had entered a new or advanced phase during the course of the intervention.

### *Data Collection*

The first instrument used in the present study was the Multiple Stimulus Types Ambiguity Tolerance Scale-II (MSTAT-II), originally developed by McLain in 1993 to measure tolerance of ambiguity. This instrument consists of 13 items designed to assess individuals' ability to deal with uncertain and ambiguous situations. The items are scored on a five-point Likert scale ranging from "strongly disagree" (1) to "strongly agree" (5). However, items 1, 2, 3, 4, 5, 6, 9, 11, and 12 are reverse scored. Therefore, for these items, responses are scored from "strongly disagree" (5) to "strongly agree" (1). The minimum possible score on the scale is 15 and the maximum is 75, with scores between 15 and 34 reflecting low tolerance of ambiguity, scores between 34 and 45 reflecting moderate tolerance of ambiguity, and scores above 45 reflecting high tolerance of ambiguity. The psychometric properties of the MSTAT-II have been reported as satisfactory. McLain (1993) reported an internal consistency reliability coefficient of 0.82 using Cronbach's alpha. In addition, research conducted in Iran has confirmed its validity and reliability, with Fazeli, Mahboobi, Zare, and Mostafayi reporting a Cronbach's alpha reliability coefficient of 0.85 and a construct validity coefficient of 0.48. These results indicate that the MSTAT-II is a reliable and valid instrument for evaluating tolerance of ambiguity in the Iranian context.

The second instrument applied was the World Health Organization Quality of Life-BREF (WHOQOL-BREF), developed in 1996 following an international evaluation of quality of life measures across diverse cultural contexts. This questionnaire is widely used to assess individual quality of life and includes 26 items covering four domains: physical health, psychological health, social relationships, and environment. Two additional items assess overall health and general quality of life. Each item is rated on a five-point Likert scale, ranging from 1 to 5, with higher scores representing better quality of life. Three items (items 3, 4, and 26) are reverse scored. Domain scores are calculated by summing relevant items: physical health (seven items), psychological health (six items), social relationships (three items), and environment (eight items). The instrument has been shown to possess strong psychometric properties, with international studies reporting Cronbach's alpha coefficients ranging from 0.73 to 0.89 across domains. Validation studies in Iran also demonstrated satisfactory reliability through test-retest, split-half, and Cronbach's alpha methods, with coefficients ranging from 0.67 to 0.89. Confirmatory factor analysis has further supported its construct validity in the Iranian population, making the WHOQOL-BREF an appropriate and robust tool for this study.

### *Intervention*

The intervention protocol consisted of six structured sessions of positive psychotherapy, each lasting 45 minutes and delivered once a week. In the first session, mothers participated in an interview aimed at identifying three positive personality traits and strengths, followed by recognition of existing challenges and barriers. They completed the VIA questionnaire, and the discussion centered on potential ways of using their identified strengths in daily life. As homework, participants were asked to choose one strength and apply it at least three times a day in social situations, while recording the effects and outcomes. The second session focused on aligning the participants' core abilities with their VIA results, evaluating the previous homework, and encouraging mothers to identify and share additional positive traits. For homework, they were instructed to write a gratitude letter in three parts: specifying the person who did something significant, describing the action and its impact, and arranging a face-to-face meeting to deliver the gratitude and report

back on its effects. In the third session, the gratitude letter was read aloud, and participants reflected on the positive effects of expressing gratitude. For homework, each mother was asked to write a one-page real-life story about herself that conveyed her emotions and feelings clearly, with a defined beginning and ending. The fourth session introduced the skill of active and constructive responding, and participants were guided to practice this approach. Their homework required them to employ active constructive responses characterized by showing natural emotions, sharing experiences with others, and increasing joy through conversation. They also had to answer three reflective questions: with whom they interacted, what positive news or event they shared, and how others responded. The fifth session involved reviewing and evaluating the previous assignments, resolving ambiguities, and practicing dialogue and visualization of positive events. Homework had two parts: identifying at least three positive daily events and recording their causes in a table, and keeping a detailed log of pleasurable experiences throughout the week. Finally, in the sixth session, participants reflected on prior assignments, discussed the overall therapeutic journey, and reinforced the continuity of treatment effects. For sustained practice, mothers were encouraged to select one of the previously assigned exercises and incorporate it into their everyday lives to maintain the therapeutic gains.

### Data analysis

Data were analyzed using SPSS version 26. Descriptive statistics, including means and standard deviations, were computed to summarize participant demographics and baseline characteristics. For inferential analysis, analysis of covariance (ANCOVA) was employed to compare posttest scores between the experimental and control groups while controlling for pretest values. The assumptions of ANCOVA were carefully examined through statistical tests. The Kolmogorov–Smirnov test was used to assess the normality of data distribution. Levene’s test was applied to verify the homogeneity of variances. The Box’s M test was employed to examine the equality of covariance matrices. Furthermore, multivariate tests including Pillai’s Trace, Wilks’ Lambda, Hotelling’s Trace, and Roy’s Largest Root were used to assess the overall model significance. This comprehensive statistical approach ensured the rigor and validity of the findings and provided robust evidence regarding the effectiveness of positive psychotherapy techniques on tolerance of ambiguity and quality of life in the study participants.

### Findings and Results

The descriptive statistics of the study variables, including tolerance of ambiguity and quality of life, are presented first. Means and standard deviations were calculated separately for the experimental and control groups across pretest and posttest stages.

**Table 1. Descriptive Statistics of Tolerance of Ambiguity and Quality of Life across Groups and Time**

Variable	Group	Pretest M (SD)	Posttest M (SD)
Tolerance of Ambiguity	Experimental	31.80 (4.12)	48.27 (3.65)
	Control	32.13 (4.05)	33.00 (3.92)
Quality of Life	Experimental	61.40 (5.28)	82.93 (4.71)
	Control	60.87 (5.16)	61.60 (5.02)



The descriptive results in Table 1 show that participants in the experimental group demonstrated substantial improvements from pretest to posttest in both tolerance of ambiguity and quality of life. Specifically, tolerance of ambiguity increased from a mean of 31.80 (SD = 4.12) to 48.27 (SD = 3.65), while the control group showed little change (M = 32.13, SD = 4.05 at pretest and M = 33.00, SD = 3.92 at posttest). Similarly, the mean score of quality of life in the experimental group improved significantly from 61.40 (SD = 5.28) at pretest to 82.93 (SD = 4.71) at posttest, whereas the control group's scores remained almost constant (60.87 at pretest, SD = 5.16; 61.60 at posttest, SD = 5.02).

Before conducting the main analyses, the assumptions of an analysis of covariance were carefully checked and confirmed to ensure the accuracy and validity of the findings. The Kolmogorov–Smirnov test indicated that the distribution of scores for both tolerance of ambiguity and quality of life did not significantly deviate from normality, confirming that the data met the normal distribution assumption. Levene's test results demonstrated that the variances across groups were homogeneous, supporting the assumption of equality of error variances. In addition, Box's M test revealed no significant violation of the equality of covariance matrices, thereby confirming the multivariate homogeneity assumption. Finally, multivariate indices including Pillai's Trace, Wilks' Lambda, Hotelling's Trace, and Roy's Largest Root were examined and indicated consistency in supporting the adequacy of the model. Taken together, these results showed that all the required assumptions for ANCOVA were satisfied, allowing the analyses to proceed with confidence in the robustness of the results. To determine the statistical significance of these differences, an analysis of covariance (ANCOVA) was conducted for both dependent variables, controlling for pretest scores.

**Table 2. ANCOVA Results for Tolerance of Ambiguity and Quality of Life**

Source	SS	df	MS	F	p	$\eta^2$
Tolerance of Ambiguity						
Group (Experimental/Control)	1105.23	1	1105.23	72.46	<.001	.72
Error	429.40	27	15.90			
Quality of Life						
Group (Experimental/Control)	2436.18	1	2436.18	88.34	<.001	.76
Error	744.19	27	27.56			

The ANCOVA results in Table 2 demonstrate significant group effects on both outcome variables after controlling for pretest scores. For tolerance of ambiguity, there was a significant main effect of group,  $F(1, 27) = 72.46$ ,  $p < .001$ ,  $\eta^2 = .72$ , indicating that the intervention accounted for 72% of the variance in posttest scores. For quality of life, the analysis also revealed a highly significant group effect,  $F(1, 27) = 88.34$ ,  $p < .001$ ,  $\eta^2 = .76$ , suggesting that the intervention explained 76% of the variance in posttest quality of life scores. These findings confirm that training in positive psychotherapy techniques had a strong and statistically significant impact on both tolerance of ambiguity and quality of life among mothers of children with leukemia.

## Discussion and Conclusion

The results of this study demonstrated that positive psychotherapy training had a significant effect on improving tolerance of ambiguity and enhancing quality of life among mothers of children with leukemia. Mothers in the experimental group showed substantial increases in their ability to cope with uncertain and stressful circumstances compared to those in the control group. Similarly, quality of life scores improved

considerably following the intervention, encompassing domains such as physical health, psychological well-being, social relationships, and environmental satisfaction. These findings support the central hypothesis of the study, affirming that positive psychotherapy represents an effective intervention strategy for promoting psychological adaptation in mothers facing the unique and complex challenges of caregiving for children with leukemia.

The improvement in tolerance of ambiguity is particularly noteworthy. Mothers of children with leukemia frequently encounter unpredictable medical conditions, treatment side effects, and uncertainty about the future, making tolerance of ambiguity a crucial psychological resource (1). The increase in scores observed in this study suggests that positive psychotherapy successfully equipped participants with cognitive and emotional tools to reframe uncertainty as a manageable aspect of life rather than an overwhelming stressor. This is consistent with theoretical frameworks emphasizing that tolerance of ambiguity reduces maladaptive anxiety responses and fosters greater flexibility in coping (11). Furthermore, it aligns with prior empirical findings showing that interventions enhancing acceptance and positive reframing lead to improved outcomes for caregivers of chronically ill children (12).

The improvements in quality of life observed in this study further reinforce the growing body of evidence supporting positive psychotherapy's effectiveness in oncological and caregiving contexts. Studies on cancer patients have repeatedly shown that interventions focusing on strengths, gratitude, and meaning-making can improve psychological well-being, resilience, and overall life satisfaction (7, 16, 17). Similarly, Ochoa et al. demonstrated that positive psychotherapy reduced post-traumatic stress and facilitated growth among cancer survivors (8). The present findings extend these results to caregivers, highlighting that the benefits of positive psychotherapy are not confined to patients but also apply to their families, who are equally vulnerable to psychological distress (9). These results underscore the potential of strengths-based therapeutic approaches to address the multidimensional nature of quality of life, which includes physical, emotional, and relational domains (4).

The findings are in agreement with earlier work by Douki et al., who demonstrated that positive thinking interventions improved anxiety, depression, and quality of life in mothers of children with leukemia (15). This suggests that interventions rooted in positive psychological principles are well-suited to address the unique stressors of this population. In addition, Razavian et al. highlighted that enhancing psychological constructs such as mental toughness could increase distress tolerance and vitality in parents of children with leukemia (10). Together, these studies provide converging evidence that caregivers can benefit substantially from psychological training focused on strengthening adaptive capacities rather than only alleviating negative symptoms.

The observed outcomes can also be interpreted through the lens of prior research documenting the efficacy of positive psychotherapy in diverse clinical and non-clinical settings. Brownell et al. conducted a randomized controlled trial with individuals experiencing psychosis and found that positive psychotherapy increased well-being by focusing on character strengths and positive emotions (14). Similarly, Sabzi Arablou and Abdolali Zadeh demonstrated improvements in quality of life and psychological well-being among individuals with panic disorder following the intervention (13). These findings resonate with the present study, suggesting that the approach is flexible and generalizable across populations experiencing high levels of stress and uncertainty.



Another dimension of the results relates to the enhancement of hope and meaning. Positive psychotherapy often incorporates activities such as writing gratitude letters, savoring positive events, and storytelling, all of which are designed to foster purpose and optimism (3). These elements are particularly beneficial for mothers of children with leukemia, who must sustain motivation and emotional stability over long periods of treatment. Studies have confirmed that such techniques are associated with increased hope and resilience, which in turn buffer against depression and anxiety (6, 18). By encouraging mothers to focus on strengths and positive experiences, the intervention helped counterbalance the overwhelming presence of uncertainty and fear, thereby enhancing both tolerance of ambiguity and quality of life.

These findings also echo the work of KhodaBakhsh and colleagues, who reported that positive psychotherapy reduced depressive symptoms and enhanced resilience among cancer patients (19). In addition, Khodabakhsh et al. demonstrated similar effects on character strengths and emotional well-being (20). Mahdavi et al. showed that other therapeutic approaches, such as intensive short-term dynamic psychotherapy, improved emotional expressiveness and defense mechanisms in breast cancer patients (22). Together, these studies highlight the importance of psychosocial interventions in oncology and caregiver populations, reinforcing the notion that psychological resilience is a modifiable factor that can be strengthened through structured therapy.

Importantly, the present study confirms the international literature on the adaptability of positive psychotherapy across cultural contexts. Thole Hilko and Morina's meta-analysis revealed that positive psychotherapy was effective across diverse populations and settings, reducing negative outcomes while enhancing positive ones (5). By applying these principles in an Iranian caregiving context, the study demonstrates the universality of the approach while also addressing culturally specific challenges faced by mothers in this setting. This further supports the argument advanced by Rashid that positive psychotherapy is inherently cross-cultural, capable of being tailored to a wide range of social and clinical environments (3).

The role of mobile and technological interventions should also be considered in interpreting these results. El-Jawahri et al. developed and tested a mobile psychological application for leukemia patients and found significant improvements in psychological outcomes (9). While the current study focused on face-to-face group sessions, the integration of mobile technologies may represent a future direction to expand accessibility and sustainability of positive psychotherapy for caregivers. The alignment of these findings suggests that whether delivered digitally or in person, interventions grounded in positive psychological principles can yield meaningful improvements in quality of life and tolerance of uncertainty.

Overall, the findings of the present study strongly support the efficacy of positive psychotherapy as a valuable intervention for mothers of children with leukemia. The improvements in both tolerance of ambiguity and quality of life are consistent with prior research across oncology, chronic illness, and caregiver populations, and they highlight the intervention's potential to fill critical gaps in psychosocial support for caregivers.

Despite the promising results, several limitations must be acknowledged. First, the study employed a relatively small sample size, with only 15 participants in each group. While significant effects were detected, the small sample may limit the generalizability of the findings to broader populations of mothers of children with leukemia. Second, the study used self-report measures, which may be subject to biases such as social desirability or underreporting of distress. Third, the intervention was relatively short-term, consisting of six

sessions, and no follow-up data were collected to determine whether the observed benefits were maintained over time. Additionally, the study did not consider potential moderating factors such as socioeconomic status, severity of the child's illness, or availability of social support, all of which could influence the outcomes.

Future research should seek to address these limitations by employing larger and more diverse samples, thereby enhancing the generalizability of findings. Longitudinal designs with follow-up assessments are needed to examine the durability of the effects of positive psychotherapy over time. Researchers should also consider using mixed-method approaches that combine quantitative outcomes with qualitative interviews to capture participants' subjective experiences in greater depth. Moreover, future studies could explore the integration of digital and mobile platforms to deliver positive psychotherapy, increasing accessibility for caregivers who may be unable to attend in-person sessions. Finally, examining potential moderating and mediating variables—such as resilience, coping strategies, or social support—would provide a more nuanced understanding of the mechanisms through which positive psychotherapy influences tolerance of ambiguity and quality of life.

From a practical perspective, the results suggest that positive psychotherapy should be integrated into psychosocial care programs for families of children with leukemia. Health care providers and hospital support teams can implement group-based sessions to foster resilience, gratitude, and tolerance of ambiguity among mothers, thereby improving their psychological well-being and caregiving capacity. Training nurses, psychologists, and social workers in positive psychotherapy techniques would expand the availability of these interventions and ensure consistent delivery across clinical settings. Additionally, incorporating positive psychotherapy into broader caregiver support initiatives could help reduce caregiver burden, enhance family functioning, and indirectly support better treatment outcomes for children.

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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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