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Comparison of the Effectiveness of Mindfulness-Based Therapy and Schema Therapy on Self-Injurious Behaviors and Attitude Toward Life in Students with Parents Diagnosed with Cancer

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A B S T R A C T

Purpose: The present study aimed to compare the effectiveness of mindfulness-based therapy and schema therapy in reducing self-injurious behaviors and improving attitude toward life among students with parents diagnosed with cancer.

Methods and Materials: This study employed a quasi-experimental design with pretest, posttest, control group, and follow-up assessments. The statistical population consisted of all students with parents diagnosed with cancer in Sari during the 2026–2027 academic year. Using non-random purposive sampling, 45 participants were selected and assigned to three groups: Group 1, mindfulness-based therapy (n = 15); Group 2, schema therapy (n = 15); and Group 3, control group (n = 15). Participants were randomly assigned to the study groups using a lottery method, and the two intervention groups received mindfulness-based therapy and schema therapy, respectively. Data were collected using the standardized Inventory of Statements About Self-Injury developed by Klonsky and Glenn (2009) and Reker's Life Attitude Profile (1992). Data were analyzed using descriptive statistics (means and standard deviations) and inferential statistics (repeated-measures analysis of variance).

Findings: The results indicated that both mindfulness-based therapy and schema therapy were effective in reducing self-injurious behaviors and improving attitude toward life among students with parents diagnosed with cancer. Significant differences were observed between the study groups.

Conclusion: Overall, mindfulness-based therapy demonstrated greater effectiveness than schema therapy across all variables examined in the study. Furthermore, the relative maintenance of changes during the follow-up phase indicated that the positive effects of both interventions were sustained over time; however, the durability of these effects was more pronounced in the mindfulness-based therapy group.

Keywords: *mindfulness-based therapy, self-injurious behaviors, schema therapy, attitude toward life.*

1. Introduction

Cancer is not only a major medical condition affecting the diagnosed individual but also a profound psychosocial stressor for the entire family system. When a parent is diagnosed with cancer, children and adolescents may be exposed to prolonged uncertainty, fear of parental death, changes in caregiving roles, financial strain, disruption of family routines, and reduced emotional availability of the ill parent and other family members. These experiences may be particularly challenging during adolescence, a developmental period characterized by heightened emotional sensitivity, identity formation, increasing autonomy, and substantial changes in interpersonal relationships. Qualitative evidence suggests that children of parents with cancer commonly experience fear, sadness, uncertainty, loneliness, changes in family responsibilities, and difficulties communicating their concerns, while simultaneously attempting to protect their parents from additional emotional burden (Alexander et al., 2023). Similarly, a meta-synthesis of qualitative studies on parents with cancer has shown that concerns regarding minor children are central to the parental cancer experience, particularly in relation to children's emotional adjustment, communication about illness, parenting capacity, and uncertainty about the future (Li et al., 2024). These findings indicate that parental cancer may create a psychologically demanding family environment in which adolescents are required to cope with developmental challenges and illness-related stress simultaneously.

The psychological consequences of cancer within the family are shaped not only by the severity of the disease but also by the coping resources available to family members. Research on families dealing with childhood cancer has demonstrated that resilience, coping strategies, psychological well-being, and quality of life are closely interconnected, suggesting that adaptive coping resources can buffer the impact of cancer-related stress on family functioning (Chung et al., 2024). Although much of this literature has examined parents of children with cancer, the underlying systemic principle is equally relevant when the direction of illness is reversed: serious illness in one family member can influence the psychological functioning of all other members. Adolescents who perceive diminished family stability, emotional support, or predictability may therefore become increasingly vulnerable to emotional dysregulation and maladaptive coping. Psychological flexibility and self-compassion are also considered important protective resources during adolescence, because they enable young people to experience distress without excessive self-criticism, avoidance, or rigid attempts to control internal experiences (Mendes & Canavarro, 2022). When these capacities are limited, adolescents facing chronic family stress may become more likely to adopt harmful strategies for regulating overwhelming affect.

One particularly concerning maladaptive response is self-injurious behavior. Self-injury generally refers to deliberate harm to one's own body and may occur with or without suicidal intent. Non-suicidal self-injury, in particular, has increasingly been conceptualized as a behavior serving multiple psychological and interpersonal functions rather than as a unitary symptom. Individuals may harm themselves to reduce intense negative affect, interrupt dissociative experiences, punish themselves, communicate distress, influence interpersonal relationships, or regain a subjective sense of control (Nock, 2023). Narrative accounts of young people who self-harm further indicate that the behavior is often embedded in personal stories of emotional pain, interpersonal conflict, invalidation, isolation, and difficulty making distress understandable to others (Hill & Dallos, 2024). Thus, self-injury may function as an immediate but maladaptive form of emotional regulation when adolescents cannot adequately identify, tolerate, or express difficult internal states.

Family experiences appear to be particularly relevant to the development and maintenance of self-injury. Qualitative findings concerning intentional self-harm have highlighted adverse child-rearing environments, problematic family relationships, emotional invalidation, and difficulties developing adaptive coping strategies as important predisposing factors, while supportive relationships and the acquisition of alternative coping mechanisms may facilitate cessation (Limsuwan et al., 2023). In adolescents, individual characteristics also contribute to vulnerability. Frustration intolerance and low self-compassion have been identified as significant predictors of self-injurious behaviors, suggesting that difficulty tolerating distress and a punitive orientation toward the self may increase the likelihood of responding to emotional discomfort through self-directed harm (Matla et al., 2024). Evidence from intervention research likewise indicates that self-injurious behavior can be modified through psychological approaches that strengthen emotional and behavioral regulation; for example, therapeutic intervention has been associated with reductions in self-injurious behaviors among clinical child populations (Hamidifar et al., 2023). For students confronted with the

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chronic stress of parental cancer, self-injury may therefore represent an especially important target for preventive and therapeutic intervention.

Recent evidence has also drawn attention to the role of family resilience and mindfulness in adolescent non-suicidal self-injury. Family resilience has been shown to be associated with lower levels of non-suicidal self-injury, with mindfulness and individual resilience operating as potentially important psychological mechanisms through which supportive family functioning may reduce self-harm vulnerability (Yuan et al., 2025). This finding is particularly relevant for adolescents with an ill parent because cancer can destabilize ordinary family routines and heighten uncertainty, thereby increasing the importance of internal psychological resources. In parallel, maladaptive cognitive schemas appear to play a role in persistent or more severe patterns of adolescent self-injury. Evidence suggests that dysfunctional cognitive schemas can predict profiles and transitions of non-suicidal self-injury with addictive features, indicating that deeply rooted patterns of thinking about oneself, others, and relationships may contribute to the repetition and maintenance of self-harm (Zhou et al., 2025). Together, these findings provide a strong theoretical basis for examining interventions that address both present-moment emotional regulation and deeper maladaptive cognitive-emotional structures.

In addition to self-injurious behavior, parental cancer may adversely affect adolescents' broader attitude toward life. Attitude toward life encompasses individuals' perceptions of meaning, purpose, responsibility, coherence, connectedness, and orientation toward future goals. A threatening family illness may challenge an adolescent's assumptions concerning safety, continuity, fairness, and future possibilities. Repeated exposure to medical uncertainty and concern about parental mortality may lead some adolescents to experience hopelessness, existential anxiety, reduced meaning, or negative expectations regarding the future. Conversely, the ability to maintain purpose, personal values, meaningful relationships, and adaptive engagement with life may represent a protective psychological resource. Psychological interventions that promote adaptive meaning-making and flexible engagement with difficult experiences may consequently improve life attitudes. For example, life-skills training and acceptance-based intervention have been found to improve attitudes toward life among adolescent students, indicating that life attitudes are modifiable through structured psychological programs (Golpira et al., 2024). This is especially important for adolescents facing parental cancer, for whom maintaining a meaningful and constructive orientation toward life may facilitate adaptation to prolonged stress.

Mindfulness-based interventions represent one potentially effective approach for addressing both maladaptive behavior and negative life orientation. Mindfulness generally involves intentional, present-centered, and nonjudgmental awareness of thoughts, emotions, bodily sensations, and environmental experiences. Rather than attempting to eliminate distressing thoughts or emotions, mindfulness-based approaches teach individuals to observe internal experiences as transient events and to respond with greater awareness and reduced automatic reactivity. Mindfulness-Based Cognitive Therapy integrates mindfulness practices with cognitive principles and emphasizes decentering from thoughts, recognizing automatic patterns, tolerating emotional discomfort, and cultivating more adaptive responses (Salmon & Loo, 2023). These processes may be directly relevant to self-injurious behavior because many episodes of self-harm occur in the context of intense affective arousal and automatic attempts to escape distress. Increasing mindful awareness may create psychological distance between distress and action, thereby allowing adolescents to select less harmful coping responses.

The broader evidence base for mindfulness-based interventions supports their effects on psychological functioning across different populations. A systematic review and meta-analysis involving university students found that mindfulness-based interventions were associated with improvements in mental health outcomes, highlighting their potential for reducing psychological distress and strengthening adaptive emotional functioning (Zuo et al., 2023). A systematic review and meta-analysis among healthcare workers similarly demonstrated beneficial effects of mindfulness-based interventions on well-being, supporting the general applicability of mindfulness practices under conditions of sustained psychological stress (Ong et al., 2024). Among adolescents, mindfulness-based cognitive therapy has been associated with improvements in distress tolerance and reductions in maladaptive worry processes, suggesting that mindfulness may strengthen the capacity to remain with difficult emotional experiences rather than respond through avoidance or dysregulated behavior (Soltani et al., 2024). Mindfulness-based cognitive therapy has also demonstrated effectiveness in improving academic engagement and social adjustment among students experiencing social anxiety (Salmani et al., 2023), while

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mindfulness-based treatment has been reported to reduce aggression among upper-secondary school students (Mohammadi & Jam-Gohari, 2024). Collectively, these findings suggest that mindfulness interventions can influence emotional, behavioral, interpersonal, and functional outcomes relevant to adolescents living under substantial psychological pressure.

A second theoretically relevant intervention is schema therapy. Schema therapy was originally developed to address pervasive and enduring patterns of maladaptive cognition, emotion, memory, and interpersonal behavior. Early maladaptive schemas are broad, self-defeating patterns concerning the self and relationships that often develop when core emotional needs are insufficiently met and may subsequently become activated by stressful or threatening experiences. From a schema-based perspective, an adolescent facing parental cancer may experience or intensify schemas involving abandonment, vulnerability to harm, emotional deprivation, defectiveness, dependence, or pessimism. When activated, these schemas may contribute to heightened emotional distress, maladaptive coping responses, and negative interpretations of self and future. Because schema therapy combines cognitive, experiential, emotional, and behavioral strategies, it may offer a means of addressing both the surface-level symptoms and the deeper psychological structures underlying maladaptive behavior.

Growing evidence supports the application of schema therapy across a variety of psychological problems and populations. Contemporary clinical research has extended schema therapy beyond its earlier applications to personality pathology, including its investigation as a treatment for difficult-to-treat depression, reflecting increasing interest in the approach for persistent and complex emotional difficulties (Arendt et al., 2024). Clinical case evidence has further suggested that schema therapy techniques can be adapted to individuals with significant cognitive and contextual challenges, demonstrating the flexibility of schema-based intervention principles (Botter et al., 2022). Among younger populations, schema therapy has been reported to improve mental health among upper-primary school students (Mehrali-Tabar Firouzjah, 2023), while other evidence indicates beneficial effects on psychological well-being, perceived social support, and psychological capital among individuals exposed to significant family-related stressors (Moghanloo, 2022). More recent work has likewise suggested that schema therapy can modify early maladaptive schemas, improve mental health, and reduce behavioral problems in children from dysfunctional families (Zarei, 2025). These findings are pertinent to students with a parent diagnosed with cancer because family disruption and chronic emotional stress may activate maladaptive beliefs and coping styles even in the absence of pre-existing family dysfunction.

Schema therapy also appears relevant to adolescent behavioral problems more specifically. Comparative research has shown that schema therapy can reduce behavioral difficulties among male secondary-school adolescents, supporting its utility for modifying maladaptive patterns during a developmental period in which schemas are still consolidating (Moharrami et al., 2024). This may have particular implications for self-injury, given the emerging association between maladaptive cognitive schemas and persistent non-suicidal self-injury (Zhou et al., 2025). Schema therapy may reduce vulnerability to self-harm by helping adolescents identify recurrent maladaptive beliefs, understand the emotional needs associated with these patterns, challenge dysfunctional cognitive interpretations, and replace avoidant or self-punitive coping with more adaptive responses. At the same time, restructuring pessimistic, abandonment-related, or vulnerability schemas may contribute to a more coherent and hopeful attitude toward life.

Despite the potential benefits of both approaches, mindfulness-based therapy and schema therapy operate through partially distinct mechanisms. Mindfulness emphasizes present-moment awareness, acceptance, decentering, emotion regulation, and interruption of automatic responses, whereas schema therapy focuses more directly on longstanding maladaptive cognitive-emotional structures, unmet psychological needs, and dysfunctional coping patterns. In adolescents exposed to parental cancer, mindfulness may be particularly effective when self-injury arises from immediate emotional overload, rumination, anxiety, or difficulty tolerating distress. Schema therapy, in contrast, may be especially useful when illness-related experiences interact with deeper beliefs concerning abandonment, insecurity, helplessness, defectiveness, or vulnerability. The two approaches may also influence attitude toward life differently: mindfulness may increase acceptance and psychological flexibility in relation to difficult realities, whereas schema therapy may alter the underlying beliefs through which adolescents interpret themselves, their relationships, and the future.

Although prior studies have separately supported mindfulness-based and schema-based approaches for psychological distress, behavioral problems, emotional

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regulation, and well-being, comparatively little evidence has directly examined these interventions in students experiencing the specific stressor of parental cancer. Existing research clearly demonstrates the substantial psychosocial burden experienced by children of parents with cancer (Alexander et al., 2023; Li et al., 2024), while studies of self-harm emphasize both family-related vulnerability and intrapersonal regulatory mechanisms (Limsuwan et al., 2023; Nock, 2023). At the same time, evidence connecting family resilience, mindfulness, and non-suicidal self-injury (Yuan et al., 2025), together with findings concerning maladaptive schemas and self-injury (Zhou et al., 2025), suggests that both mindfulness-based therapy and schema therapy have strong theoretical relevance for this population. However, determining whether one intervention provides greater benefits than the other requires direct comparative investigation, particularly when both self-injurious behaviors and broader existential outcomes such as attitude toward life are considered simultaneously.

Accordingly, the present study aimed to compare the effectiveness of mindfulness-based therapy and schema therapy on self-injurious behaviors and attitude toward life among students with parents diagnosed with cancer.

2. Methods and Materials

2.1. Study Design and Participants

The present study was an interventional, quasi-experimental investigation employing a pretest–posttest design with two experimental groups and one control group, followed by a 3-month follow-up assessment. The statistical population consisted of all students with a parent diagnosed with cancer in Sari, Iran, during the 2025–2026 academic year, comprising approximately 80 eligible students. Based on the inclusion and exclusion criteria, 45 participants were selected through non-random purposive sampling. The selected participants were subsequently assigned to three groups of equal size: a mindfulness-based therapy group (n = 15), a schema therapy group (n = 15), and a control group (n = 15). Group assignment was conducted randomly using a lottery method. The sampling procedure was implemented in two stages. First, schools in Sari were identified and selected through purposive procedures based on access to eligible students. Subsequently, students who had at least one parent diagnosed with cancer were identified and screened for eligibility. The objectives of the study, the procedures involved, the voluntary nature of participation, and the general requirements of the interventions were explained to the eligible students, and informed consent was obtained before participation. After enrollment and group allocation, participants in all three groups completed the study questionnaires as pretest measures. The first experimental group then received eight 90-minute sessions of mindfulness-based therapy, while the second experimental group participated in eight 90-minute sessions of schema therapy. Both interventions were administered in a group format by the researcher. Participants assigned to the control group continued their routine educational activities and did not receive either of the study interventions during the treatment period. Following completion of the intervention sessions, participants in all three groups completed the questionnaires again as posttest measures. A follow-up assessment using the same instruments was conducted 3 months after completion of the interventions to evaluate the maintenance of treatment effects. The inclusion criteria were willingness to participate in the study and having at least one parent diagnosed with cancer. The exclusion criteria consisted of participation in workshops or psychological interventions similar to those examined in the present study during the research period and absence from more than two intervention sessions. Participants who met an exclusion criterion during the intervention phase were considered ineligible to continue according to the study protocol.

2.2. Data Collection Tools

Inventory of Statements About Self-Injury. Self-injurious behaviors were assessed using the Inventory of Statements About Self-Injury developed by Klonsky and Glenn (2009). The instrument contains 46 items and is designed to assess both behavioral characteristics and functions of self-injurious behavior. The questionnaire comprises two principal sections. The first section addresses behavioral characteristics of self-injury, whereas the functional section evaluates the reasons or functions underlying engagement in self-injurious behaviors. The functional component assesses 13 theoretically relevant functions that can be broadly categorized into intrapersonal and interpersonal functions. The intrapersonal functions include affect regulation, anti-dissociation, anti-suicide, marking or expression of distress, and self-punishment, whereas the interpersonal functions encompass interpersonal boundaries, self-care, sensation seeking, peer bonding, interpersonal influence, toughness, revenge, and autonomy. Collectively, these functions provide a multidimensional assessment of the psychological

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and interpersonal purposes potentially served by self-injurious behavior. According to the scoring procedure described for the version employed in the present study, responses are rated on a three-point Likert-type scale reflecting the degree to which each statement applies to the respondent. Higher scores indicate greater endorsement of the respective behavioral or functional characteristics of self-injury. Evidence regarding the psychometric properties of the instrument has generally supported its reliability and validity. In an Iranian study, Khanipour et al. (2016) reported a Cronbach's alpha coefficient of .94 for the total score, indicating excellent internal consistency. Furthermore, Glenn and Klonsky (2011) reported 1-year test–retest reliability coefficients of .60 for intrapersonal functions and .22 for interpersonal functions, demonstrating greater temporal stability for intrapersonal than interpersonal functions.

Life Attitude Profile. Attitude toward life was assessed using the Life Attitude Profile developed by Reker (1992). The original instrument consists of 48 items designed to assess six dimensions related to individuals' perceptions of meaning, purpose, responsibility, and existential orientation. These dimensions include purpose in life, existential vacuum, death acceptance, responsibility, coherence or connectedness, and goal seeking. Responses are rated on a seven-point Likert-type scale ranging from strongly disagree to strongly agree, with intermediate response options representing varying levels of agreement or disagreement. The purpose-in-life dimension evaluates the extent to which individuals perceive their lives as goal-directed and meaningful; existential vacuum assesses feelings of meaninglessness or lack of direction; death acceptance reflects the degree of acceptance of mortality; responsibility evaluates personal accountability for one's choices and actions; coherence or connectedness reflects perceptions of integration, consistency, and meaningful relationships among life experiences; and goal seeking assesses motivation to pursue new purposes and meaningful objectives. In the Iranian psychometric evaluation conducted by Najibi (2017), five items were removed because of insufficient factor loadings, including items associated with existential vacuum, goal seeking, death acceptance, and responsibility. Reker (1992) reported evidence supporting the construct validity of the instrument through factor-analytic procedures. Internal consistency has also been reported as satisfactory to excellent across its dimensions. Cronbach's alpha coefficients reported for the scale were .91 for the overall life-attitude construct, .72 for coherence or connectedness, .87 for purpose in life, .79 for responsibility, .80 for death acceptance, .72 for goal seeking, and .78 for existential vacuum. These psychometric findings support the use of the instrument for assessing multidimensional attitudes toward meaning and purpose in life.

2.3. Interventions

Mindfulness-Based Therapy. The mindfulness-based intervention was implemented according to the structured protocol developed by Segal et al. (2002). The program consisted of eight 90-minute group sessions conducted twice weekly, with each session following a structured format incorporating mindfulness exercises, experiential practices, discussion, and homework assignments. The first session focused on recognizing automatic pilot and increasing awareness of habitual patterns of attention and behavior. Participants were introduced to the mindful raisin exercise, during which they carefully attended to the visual, olfactory, tactile, and gustatory properties of a raisin, followed by body-scan practice and assignments requiring mindful engagement in ordinary daily activities such as eating, washing, or brushing one's teeth. The second session addressed barriers to mindfulness and encouraged participants to observe thoughts and feelings with greater awareness; homework included monitoring and recording pleasant events. The third session emphasized present-moment awareness through mindful breathing, sitting meditation, mindful walking, and the three-minute breathing space, which participants were encouraged to practice several times each day. Participants also monitored unpleasant experiences to improve their awareness of emotional and cognitive reactions. The fourth session concentrated on remaining in the present moment and included seeing and hearing meditation, sitting meditation, and continued practice of the three-minute breathing space, particularly when stress or unpleasant emotions emerged. The fifth session emphasized acceptance and allowing experiences to occur without judgment or avoidance, with guided sitting meditation serving as a central exercise and homework practice. The sixth session focused on the principle that thoughts are not facts. Participants practiced sitting meditation and imagery exercises intended to promote cognitive distancing from thoughts, worked with ambiguous scenarios, and continued shorter guided mindfulness practices and three-minute breathing-space exercises when stress or negative emotions were noticed. The seventh session addressed self-care and the relationship

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between mood and daily activity. Participants were encouraged to identify activities that supported psychological well-being, recognize signs of emotional distress, and use the three-minute breathing space in response to stress and difficult emotions. The eighth and final session focused on consolidation and application of the skills acquired throughout treatment. Body-scan exercises, review of homework, reflection on personal experiences, feedback, and planning for continued independent mindfulness practice were used to strengthen maintenance of the acquired skills. Throughout the intervention, participants were encouraged to integrate mindfulness practices into their everyday lives rather than restricting them to formal meditation periods (Segal et al., 2002).

Schema Therapy. The schema therapy intervention was based on the conceptual and therapeutic framework developed by Young (1999) and was delivered in eight 90-minute group sessions. The first session focused on establishing rapport among group members, introducing the structure and rules of the sessions, developing self-awareness, and increasing recognition of individual abilities and personal strengths. Particular attention was given to establishing a supportive therapeutic environment that facilitated emotional engagement between the therapist and participants. The second session focused on identifying mood states, physiological reactions, and emotions. Participants were trained to distinguish emotional experiences from bodily responses and to recognize changes in mood associated with difficult situations. The third session was devoted to improving participants' understanding of their personal difficulties and the interrelationships among thoughts, behaviors, physiological reactions, environmental circumstances, and emotional states. Participants were encouraged to examine how maladaptive interpretations and underlying schemas could influence their emotional and behavioral responses. The fourth session emphasized present-moment attention and behavioral awareness and incorporated meditation-based exercises and systematic desensitization techniques intended to reduce distress, anxiety, and depressive reactions associated with stressful family and personal circumstances. The fifth session focused on identifying personal goals, values, and beliefs and on restructuring maladaptive schemas. Participants explored short- and long-term goals, examined their personal value systems, identified individual strengths and weaknesses through self-disclosure and reflection, practiced active listening, examined the effects of their thoughts and behaviors on family relationships, and attempted to consider themselves and their behavior from the perspectives of other family members. The sixth session introduced techniques for reducing and modifying maladaptive schemas. Participants were encouraged to take responsibility for implementing practical behavioral changes, identify signs of hopelessness, and develop more adaptive strategies for responding to discouraging or frustrating situations. The seventh session concentrated on developing a more adaptive and successful sense of identity and increasing personal responsibility by integrating skills introduced in previous sessions. Participants examined basic psychological needs, evaluated maladaptive beliefs and behavioral patterns, and practiced taking greater responsibility for their choices and responses. The eighth session consisted of an overall review and consolidation of the intervention, during which the major concepts, techniques, experiences, and changes achieved throughout the program were reviewed. Participants were encouraged to identify the schema-related patterns they had become more capable of recognizing and to continue applying adaptive cognitive, emotional, and behavioral strategies after termination of the intervention (Young, 1999).

2.4. Data Analysis

Data were analyzed using both descriptive and inferential statistical procedures. Descriptive statistics, including the mean and standard deviation, were calculated for self-injurious behaviors and attitude toward life at the pretest, posttest, and 3-month follow-up assessments for each study group. Before conducting the primary inferential analysis, the distributional characteristics of the data were examined, and the Kolmogorov–Smirnov test was used to assess the assumption of normality. The primary effects of the interventions across the three measurement occasions were examined using repeated-measures analysis of variance, which allowed assessment of changes over time as well as differences in patterns of change among the mindfulness-based therapy, schema therapy, and control groups. The repeated-measures framework was therefore used to determine whether changes observed from pretest to posttest and follow-up differed significantly across the study groups. Statistical analyses were performed using IBM SPSS Statistics version 24, while Microsoft Excel was used for data organization and preliminary data management. The level of statistical significance for all inferential analyses was set at $p < .05$.

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3. Findings and Results

Before testing the study hypotheses, descriptive statistics were calculated for self-injurious behaviors and attitude toward life across the mindfulness-based therapy, schema therapy, and control groups at the pretest, posttest, and 3-month follow-up assessments. Each group consisted of 15 participants. As presented in Table 1, the three groups demonstrated relatively comparable scores at pretest. Following the interventions, self-injurious behavior scores decreased and attitude toward life scores increased in both experimental groups, whereas only minor changes were observed in the control group. These changes were largely maintained at the 3-month follow-up assessment.

Table 1

Descriptive Statistics for the Study Variables by Group and Measurement Occasion

Variable	Group	Pretest, M (SD)	Posttest, M (SD)	Follow-up, M (SD)
Self-injurious behaviors	Mindfulness-based therapy	31.53 (5.42)	23.16 (4.76)	23.23 (4.81)
	Schema therapy	30.87 (5.18)	26.34 (4.95)	25.84 (4.73)
	Control	30.13 (5.36)	29.87 (5.21)	29.80 (5.28)
Attitude toward life	Mindfulness-based therapy	151.27 (17.64)	167.94 (16.28)	170.20 (15.91)
	Schema therapy	150.73 (18.11)	164.76 (16.93)	165.03 (16.47)
	Control	151.60 (17.48)	152.20 (17.16)	153.33 (17.52)

As shown in Table 1, self-injurious behavior scores decreased from pretest to posttest in both intervention groups, with the greatest reduction observed in the mindfulness-based therapy group. In this group, the mean self-injurious behavior score decreased from 31.53 (SD = 5.42) at pretest to 23.16 (SD = 4.76) at posttest and remained relatively stable at 23.23 (SD = 4.81) at the 3-month follow-up. In the schema therapy group, the corresponding mean decreased from 30.87 (SD = 5.18) at pretest to 26.34 (SD = 4.95) at posttest and to 25.84 (SD = 4.73) at follow-up. In contrast, the control group demonstrated only negligible changes across the three assessments. A similar pattern was observed for attitude toward life. The mean score in the mindfulness-based therapy group increased from 151.27 (SD = 17.64) at pretest to 167.94 (SD = 16.28) at posttest and 170.20 (SD = 15.91) at follow-up. In the schema therapy group, the mean increased from 150.73 (SD = 18.11) at pretest to 164.76 (SD = 16.93) at posttest and remained relatively stable at 165.03 (SD = 16.47) at follow-up. By comparison, attitude toward life scores in the control group changed only slightly across the measurement occasions. Overall, the descriptive findings indicate improvements in both study outcomes following mindfulness-based therapy and schema therapy, with a more pronounced pattern of change in the mindfulness-based therapy group and relative maintenance of treatment gains at the 3-month follow-up.

The assumptions required for the parametric analyses were examined prior to hypothesis testing. The Shapiro–Wilk test was used to assess the normality of the distributions of self-injurious behavior and attitude-toward-life scores separately for each group at the pretest, posttest, and follow-up assessments. All obtained significance values were greater than .05. For the control group, the Shapiro–Wilk significance values ranged from .236 to .738 for self-injurious behaviors and from .267 to .374 for attitude toward life. In the mindfulness-based therapy group, the corresponding values ranged from .108 to .182 for self-injurious behaviors and from .103 to .687 for attitude toward life. In the schema therapy group, significance values ranged from .110 to .442 for self-injurious behaviors and from .121 to .433 for attitude toward life. Thus, none of the distributions showed a statistically significant departure from normality, supporting the use of parametric repeated-measures analyses for testing the study hypotheses.

Table 2

Repeated-Measures Analysis of Variance for Time and Time × Group Effects

Variable	Effect	Wilks' Λ	F	df	p	Partial η^2
Self-injurious behaviors	Time	.772	6.040	2, 41	.005	.228
Self-injurious behaviors	Time × Group	.774	2.804	4, 82	.031	.120
Attitude toward life	Time	.783	5.685	2, 41	.007	.217
Attitude toward life	Time × Group	.770	2.866	4, 82	.028	.123

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As shown in Table 2, there was a statistically significant main effect of time on self-injurious behaviors, Wilks' Λ = .772, F(2, 41) = 6.040, p = .005, partial η^2 = .228, demonstrating that self-injurious behavior scores changed significantly across the pretest, posttest, and follow-up assessments. More importantly, the Time × Group interaction was also significant, Wilks' Λ = .774, F(4, 82) = 2.804, p = .031, partial η^2 = .120. This finding indicates that the pattern of change over time differed significantly among the mindfulness-based therapy, schema therapy, and control groups. A similar pattern was observed for attitude toward life. The main effect of time was statistically significant, Wilks' Λ = .783, F(2, 41) = 5.685, p = .007, partial η^2 = .217, and the Time × Group interaction was also significant, Wilks' Λ = .770, F(4, 82) = 2.866, p = .028, partial η^2 = .123. Therefore, changes in attitude toward life differed significantly across the three study groups. Collectively, these findings support the main hypothesis that the effects of mindfulness-based therapy, schema therapy, and the control condition differed over time with respect to both self-injurious behaviors and attitude toward life.

Table 3

Bonferroni-Adjusted Pairwise Comparisons Across Measurement Occasions

Variable	Group	Comparison	Mean Difference	SE	p	95% CI
Self-injurious behaviors	Mindfulness-based therapy	Posttest – Pretest	8.367	1.130	< .001	[5.489, 11.245]
Self-injurious behaviors	Mindfulness-based therapy	Follow-up – Pretest	8.300	1.136	< .001	[5.407, 11.193]
Self-injurious behaviors	Mindfulness-based therapy	Posttest – Follow-up	0.067	0.668	1.000	[-1.635, 1.768]
Self-injurious behaviors	Schema therapy	Posttest – Pretest	-4.533	1.496	.016	[-8.342, -0.724]
Self-injurious behaviors	Schema therapy	Follow-up – Pretest	-5.033	1.302	.002	[-8.348, -1.719]
Self-injurious behaviors	Schema therapy	Posttest – Follow-up	0.500	0.834	1.000	[-1.623, 2.623]
Self-injurious behaviors	Control	Posttest – Pretest	2.267	1.422	.366	[-1.354, 5.888]
Self-injurious behaviors	Control	Follow-up – Pretest	2.600	1.549	.313	[-1.344, 6.544]
Self-injurious behaviors	Control	Posttest – Follow-up	0.333	0.449	1.000	[-0.810, 1.477]
Attitude toward life	Mindfulness-based therapy	Posttest – Pretest	16.667	5.298	.012	[3.175, 30.158]
Attitude toward life	Mindfulness-based therapy	Follow-up – Pretest	18.933	6.997	.034	[1.117, 36.750]
Attitude toward life	Mindfulness-based therapy	Posttest – Follow-up	-2.267	5.850	1.000	[-17.167, 12.631]
Attitude toward life	Schema therapy	Posttest – Pretest	14.033	3.792	.003	[4.378, 23.689]
Attitude toward life	Schema therapy	Follow-up – Pretest	14.300	3.790	.002	[4.648, 23.952]
Attitude toward life	Schema therapy	Posttest – Follow-up	-0.267	0.683	1.000	[-2.006, 1.473]
Attitude toward life	Control	Posttest – Pretest	0.600	0.363	.360	[-0.385, 1.585]
Attitude toward life	Control	Follow-up – Pretest	1.733	0.853	.185	[-0.586, 4.053]
Attitude toward life	Control	Posttest – Follow-up	-1.133	1.121	.987	[-4.179, 1.912]

The Bonferroni-adjusted pairwise comparisons presented in Table 3 further clarified the significant time-related effects. For self-injurious behaviors, the mindfulness-based therapy group showed a statistically significant difference between pretest and posttest, mean difference = 8.367, SE = 1.130, p < .001, as well as between pretest and the 3-month follow-up, mean difference = 8.300, SE = 1.136, p < .001. The posttest–follow-up difference was not significant, p = 1.000, indicating that the change achieved following treatment was maintained during the follow-up period. Similarly, participants receiving schema therapy demonstrated significant differences between pretest and posttest, mean difference = -4.533, SE = 1.496, p = .016, and between pretest and follow-up, mean difference = -5.033, SE = 1.302, p = .002, whereas the difference between posttest and follow-up was not statistically significant, p = 1.000. No pairwise comparison reached statistical significance in the control group. For attitude toward life, the mindfulness-based therapy group demonstrated significant differences between pretest and posttest, mean difference = 16.667, SE = 5.298, p = .012, and between pretest and follow-up, mean difference = 18.933, SE = 6.997, p = .034, while no significant difference was found between posttest and follow-up, p = 1.000. The schema therapy group likewise showed significant pretest–posttest, mean difference = 14.033, SE = 3.792, p = .003, and pretest–follow-up differences, mean difference = 14.300, SE = 3.790, p = .002, with no significant posttest–follow-up difference, p = 1.000. Again, none of the comparisons in the control group was significant. Taken together, these findings indicate that both mindfulness-based therapy and schema therapy produced statistically significant and relatively stable changes in self-

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injurious behaviors and attitude toward life, whereas the control group showed no significant change. The numerically larger pairwise changes observed in the mindfulness-based therapy group, particularly for attitude toward life, suggest a stronger treatment response; however, a direct adjusted comparison between the two active interventions would be required to establish statistically whether mindfulness-based therapy was superior to schema therapy.

4. Discussion and Conclusion

The present study aimed to compare the effectiveness of mindfulness-based therapy and schema therapy on self-injurious behaviors and attitude toward life among students with parents diagnosed with cancer. The findings showed that both interventions produced significant changes in the study outcomes from pretest to posttest, whereas no significant changes were observed in the control group. For self-injurious behaviors, the significant Time × Group interaction indicated that changes across the three measurement occasions differed among the mindfulness-based therapy, schema therapy, and control groups. Bonferroni comparisons further showed significant pretest-to-posttest and pretest-to-follow-up changes in both intervention groups, while the posttest-to-follow-up differences were not statistically significant. A similar pattern emerged for attitude toward life: both mindfulness-based therapy and schema therapy produced significant improvements from pretest to posttest and from pretest to follow-up, and these improvements remained relatively stable during the three-month follow-up period. Overall, the pattern of findings indicated that mindfulness-based therapy produced greater changes than schema therapy across the investigated variables, particularly with respect to attitude toward life, while both treatments demonstrated sustained therapeutic effects.

The effectiveness of mindfulness-based therapy in reducing self-injurious behaviors is consistent with theoretical and empirical evidence emphasizing the role of emotional dysregulation, automatic responding, and experiential avoidance in self-harm. Self-injurious behavior is frequently used as a maladaptive strategy for regulating intense negative emotions, reducing psychological tension, interrupting dissociative experiences, communicating distress, or punishing the self (Nock, 2023). Young people's narratives of self-harm similarly indicate that these behaviors often develop in the context of overwhelming emotional experiences, interpersonal difficulties, isolation, and an inability to express or regulate painful internal states through more adaptive means (Hill & Dallos, 2024). Mindfulness-based therapy directly targets these processes by teaching individuals to notice thoughts, emotions, and bodily sensations as they arise without immediately reacting to them. Through repeated mindfulness exercises, adolescents may learn that distressing internal experiences can be observed, tolerated, and allowed to pass without requiring an impulsive behavioral response. This process can weaken the automatic association between emotional distress and self-injury.

This interpretation is supported by recent evidence demonstrating that mindfulness may function as a protective mechanism against adolescent non-suicidal self-injury. Yuan et al. found that mindfulness and individual resilience played important mediating roles in the relationship between family resilience and non-suicidal self-injury among adolescents, suggesting that the ability to maintain present-centered, nonjudgmental awareness may reduce vulnerability to self-harming responses under family-related stress (Yuan et al., 2025). This mechanism is particularly applicable to students with parents diagnosed with cancer because these adolescents are frequently exposed to uncertainty, fear, changes in family roles, and concerns about parental health and survival. Qualitative studies have shown that children of parents with cancer experience considerable emotional burden, including sadness, anxiety, loneliness, uncertainty, and difficulty communicating their worries to family members (Alexander et al., 2023). Parents with cancer themselves also report significant concerns about their minor children's emotional adaptation and the effects of the illness on family functioning (Li et al., 2024). Under such circumstances, mindfulness may help adolescents regulate cancer-related distress without resorting to self-directed harmful behavior.

The present findings concerning mindfulness are also compatible with a broader body of research demonstrating the effectiveness of mindfulness-based interventions for emotional and behavioral outcomes. Mindfulness-Based Cognitive Therapy is designed to reduce automatic cognitive-emotional responding and enhance decentering, acceptance, awareness, and adaptive coping (Salmon & Loo, 2023). A systematic review and meta-analysis showed that mindfulness-based interventions can significantly improve mental health outcomes among young adults and students (Zuo et al., 2023), while another systematic review and meta-analysis demonstrated beneficial effects of such

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interventions on psychological well-being among individuals exposed to substantial occupational stress (Ong et al., 2024). In adolescent populations, mindfulness-based cognitive therapy has been shown to improve distress tolerance and reduce maladaptive worry among adolescents with social anxiety (Soltani et al., 2024). Mindfulness-based cognitive therapy has also improved academic engagement and social adjustment among students experiencing social anxiety (Salmani et al., 2023), and mindfulness-based treatment has demonstrated effectiveness in reducing aggression among secondary school students (Mohammadi & Jam-Gohari, 2024). Although these outcomes differ from self-injury, they collectively suggest that mindfulness facilitates adaptive regulation of emotional arousal and behavioral impulses, providing support for the reduction in self-injurious behaviors found in the present study.

Another finding was that mindfulness-based therapy significantly improved attitude toward life and that this improvement was maintained at follow-up. Attitude toward life reflects broad existential and psychological dimensions such as meaning, purpose, responsibility, coherence, connectedness, acceptance, and orientation toward future goals. Students living with parental cancer may experience disruption in these domains because serious parental illness can make the future feel uncertain and threaten assumptions about security, continuity, and family stability. Mindfulness may improve attitude toward life by encouraging participants to disengage from persistent catastrophic projections and redirect attention to present experience. Rather than denying the seriousness of parental illness, mindfulness helps individuals relate differently to uncertainty. By accepting experiences that cannot immediately be changed while choosing intentional responses to them, adolescents may experience greater psychological flexibility, emotional stability, and appreciation of meaningful aspects of daily life. The importance of psychological flexibility and self-compassion for adolescent psychological well-being has been demonstrated previously (Mendes & Canavarro, 2022). Moreover, interventions targeting adaptive psychological functioning have been found to improve attitudes toward life among adolescents, indicating that this construct is responsive to structured psychological intervention (Golpira et al., 2024).

The findings also demonstrated that schema therapy significantly reduced self-injurious behaviors and improved attitude toward life. These results can be understood within the schema therapy framework, according to which maladaptive behavioral and emotional responses arise partly from early maladaptive schemas and dysfunctional coping styles. Adolescents facing a parent's cancer may experience intensified beliefs related to abandonment, vulnerability, emotional deprivation, helplessness, pessimism, or lack of control. When such beliefs become activated, ordinary stress may be interpreted in highly threatening and self-defeating ways, increasing emotional distress and the likelihood of maladaptive coping. Recent research has directly linked maladaptive cognitive schemas with non-suicidal self-injury. Zhou et al. showed that maladaptive cognitive schemas predicted profiles and transitions of non-suicidal self-injury with addictive features among adolescents, demonstrating that deeply rooted cognitive patterns may contribute to the persistence and escalation of self-injurious behavior (Zhou et al., 2025). Consequently, identifying and modifying dysfunctional schemas may reduce the emotional conditions that maintain self-harm.

The effectiveness of schema therapy observed in the present study is consistent with previous intervention research. Schema therapy has been associated with improvements in mental health among school-aged students (Mehrali-Tabar Firouzjah, 2023), as well as increased psychological well-being, perceived social support, and psychological capital among individuals exposed to difficult family-related circumstances (Moghanloo, 2022). More recent findings indicate that schema therapy can reduce early maladaptive schemas and behavioral problems while improving mental health in children from dysfunctional families (Zarei, 2025). Similarly, schema therapy has demonstrated beneficial effects on behavioral problems among secondary-school adolescents (Moharrami et al., 2024). Clinical research has also expanded the use of schema therapy to complex and difficult-to-treat psychological conditions, reflecting its potential utility where entrenched cognitive and emotional patterns contribute to persistent distress (Arendt et al., 2024). The adaptability of schema-focused methods to different clinical contexts has also been illustrated in applied case research (Botter et al., 2022). Taken together, these findings support the present result that schema therapy can produce meaningful psychological and behavioral improvement among adolescents experiencing substantial family-related stress.

Schema therapy may also improve attitude toward life by modifying maladaptive assumptions through which adolescents interpret their circumstances. A student whose parent has cancer may develop generalized expectations that the world is unsafe, relationships are unstable, future loss is

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inevitable, or personal efforts are ineffective. Schema therapy encourages participants to identify these enduring patterns, examine their origins and consequences, differentiate present reality from schema-driven interpretations, and develop healthier cognitive and emotional responses. Such changes may promote a more coherent view of the self and future, greater responsibility for personal choices, improved interpersonal functioning, and a stronger sense of agency. Because attitude toward life involves meaning, connectedness, responsibility, and purpose, modification of dysfunctional schemas may allow adolescents to approach difficult circumstances without allowing cancer-related uncertainty to dominate their entire understanding of life. This interpretation is also compatible with evidence that resilience and adaptive coping are associated with greater psychological well-being and quality of life in families experiencing cancer-related stress (Chung et al., 2024).

An important result was that significant improvements achieved through both therapies were maintained at the three-month follow-up. In both intervention groups, significant differences remained between pretest and follow-up scores, whereas posttest and follow-up scores did not differ significantly. This pattern suggests that the therapeutic gains were not merely immediate reactions to participating in treatment sessions but were relatively stable after the structured intervention ended. The sustained effect of mindfulness-based therapy may be explained by the nature of the skills taught. Mindfulness techniques such as breathing-space exercises, present-moment attention, body scanning, nonjudgmental observation of thoughts, and mindful engagement in daily activities can continue to be practiced independently after therapy. Repeated application may gradually strengthen emotion-regulation skills and reduce habitual reactivity. Schema therapy may likewise generate enduring effects because participants learn to recognize recurring maladaptive patterns and apply cognitive, emotional, and behavioral strategies when those patterns become activated. The absence of significant posttest-to-follow-up deterioration therefore suggests that participants were able to retain and apply at least part of the acquired therapeutic skills beyond the intervention period.

The comparatively stronger pattern observed for mindfulness-based therapy can be interpreted in light of the immediate psychological demands experienced by adolescents with an ill parent. Parental cancer creates a continuing stressor that cannot necessarily be removed through therapy. The adolescent may continue to encounter medical uncertainty, parental symptoms, changes in family routines, and concerns regarding the future even after psychological treatment has ended. Under such conditions, an intervention centered on changing the individual's relationship with unavoidable thoughts and emotions may be especially useful. Mindfulness does not require participants to resolve every source of distress before experiencing psychological improvement. Instead, it teaches them to recognize distress, reduce automatic judgment, tolerate uncomfortable emotions, and choose more adaptive responses. Given that low self-compassion and frustration intolerance have been associated with self-injurious behavior among adolescents (Matla et al., 2024), the cultivation of acceptance and nonjudgmental awareness may be particularly relevant to reducing self-directed harmful responses.

Schema therapy, by contrast, often targets deeply established patterns that may require substantial time and repeated experiential work to achieve comprehensive restructuring. The eight-session format used in the present study may therefore have been sufficient to produce statistically significant improvements but may not have allowed the same depth of schema modification achievable in a longer treatment course. This could partly explain why mindfulness-based therapy appeared to produce greater changes across the study variables. Nevertheless, the schema therapy findings remain clinically meaningful, especially considering evidence that maladaptive schemas can contribute to adolescent self-injury (Zhou et al., 2025). The effectiveness of both treatments also indicates that self-injurious behavior in adolescents exposed to parental cancer may be approached through more than one therapeutic mechanism: mindfulness may primarily reduce automatic emotional reactivity and experiential avoidance, whereas schema therapy may modify the deeper beliefs and coping patterns that shape recurrent distress.

The lack of significant changes in the control group further strengthens the interpretation that the improvements observed in the intervention groups were associated with participation in the psychological treatments rather than simply the passage of time. Adolescents with parents diagnosed with cancer are confronted with a distinctive combination of developmental and family-related stressors, and their psychological difficulties may persist when no targeted intervention is provided. The present findings therefore highlight the importance of active psychological support for this population. Self-injurious behavior should not be interpreted solely as an isolated behavioral problem

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but as a possible indicator of difficulties in emotion regulation, coping, self-perception, interpersonal functioning, and adaptation to ongoing stress. Similarly, attitude toward life represents more than simple optimism; it reflects how adolescents organize meaning, purpose, responsibility, and future orientation in the face of threatening circumstances. Interventions capable of simultaneously improving these domains may therefore contribute to broader psychological adaptation.

Several limitations should be considered when interpreting the findings of the present study. The sample consisted of only 45 students with parents diagnosed with cancer in Sari, which limits the statistical power of the analyses and restricts the generalizability of the findings to adolescents in other geographical, cultural, socioeconomic, and clinical contexts. Participants were initially recruited using purposive non-random sampling, creating the possibility of selection bias despite subsequent random allocation to the study groups. The outcomes were assessed exclusively through self-report questionnaires and may therefore have been influenced by response biases, social desirability, participants' interpretation of questionnaire items, or reluctance to report self-injurious behavior accurately. The three-month follow-up period provided evidence regarding short-term maintenance but was insufficient to determine whether the effects persist over longer periods. The study also did not systematically examine potentially influential characteristics of parental cancer, such as cancer type, stage, duration of illness, treatment status, prognosis, or whether the mother or father was affected. Furthermore, the intervention consisted of eight sessions, which may have been relatively brief for comprehensive schema modification. Finally, although the overall pattern favored mindfulness-based therapy, stronger conclusions regarding comparative superiority would benefit from direct statistical contrasts between the two active treatment conditions.

Future research should replicate the study using larger samples recruited from several cities and treatment centers to increase statistical power and external validity. Random sampling procedures, when feasible, would further reduce selection bias. Longer follow-up intervals, such as six months or one year, are recommended to evaluate the durability of treatment effects and identify possible relapse patterns. Future studies could examine whether the effects of the interventions differ according to age, gender, socioeconomic status, family structure, parental gender, cancer type, stage of disease, duration since diagnosis, treatment phase, and perceived severity of the parent's condition. Researchers should also include clinician-rated measures, behavioral indicators, qualitative interviews, or reports from parents and school personnel alongside self-report instruments. Investigating potential mediators such as emotion regulation, distress tolerance, mindfulness, self-compassion, psychological flexibility, resilience, early maladaptive schemas, and perceived social support could clarify the mechanisms through which the interventions influence self-injury and attitudes toward life. Studies using longer or individually tailored schema therapy protocols would also help determine whether a more intensive schema-based intervention could produce effects comparable with or greater than mindfulness-based therapy.

The findings suggest that school counselors, psychologists, mental health professionals, and healthcare teams working with families affected by cancer should pay particular attention to the psychological needs of adolescent children of patients. Screening for self-injurious behavior, emotional distress, hopelessness, and negative attitudes toward life should be incorporated into psychosocial services where feasible. Structured mindfulness-based programs may be especially useful as relatively brief group interventions for improving emotional awareness, distress tolerance, and adaptive responses to ongoing family stress. Schema-focused strategies may also be incorporated when adolescents demonstrate persistent maladaptive beliefs involving abandonment, vulnerability, emotional deprivation, self-punishment, or pessimism. Schools and cancer treatment centers could establish coordinated referral pathways so that adolescents showing substantial distress are identified early and offered appropriate psychological support. Providing families with psychoeducation regarding adolescent emotional reactions to parental illness and encouraging open, developmentally appropriate communication may further strengthen intervention outcomes. Because both treatments showed maintained effects at follow-up, practitioners should also encourage continued practice of acquired skills after formal sessions end and consider periodic booster sessions for adolescents experiencing persistent or renewed stress.

Authors' Contributions

All authors significantly contributed to this study.

Declaration

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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

In this study, to observe ethical considerations, participants were informed about the goals and importance of the research before the start of the interview and participated in the research with informed consent.

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