

## Resilience-based interventions for parents of children with cancer: a systematic review

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### ABSTRACT

Childhood cancer diagnosis and treatment can have a negative impact, not only on the child but also on the parents. The study aims to systematically summarize the effectiveness of resilience-based interventions in parents of children with cancer. A systematic review was conducted on eight studies that met the eligibility criteria. Article searches were conducted using the PICO framework through six databases PubMed, Scopus, ScienceDirect, Proquest, WoS, and Clinical Key. The literature search followed the preferred reporting items for systematic reviews and meta-analyses (PRISMA) guidelines. Article searches were limited to publication years ranging from 2019 to 2023 using the keywords "resilience" "intervention" and "parents of children with cancer" and only in English. Studies have shown that interventions can improve parental resilience, reduce psychological distress, improve family functioning, and improve quality of life. These interventions also reduce parental hopelessness and improve coping. These outcomes are crucial for parents of cancer children to be resilient and adaptable, enabling them to support their children during treatment and care. The choice of intervention programs and approaches may vary depending on the needs of the parents. Therefore, the results of this literature review can be the basis for determining the approach used in providing nursing interventions aimed at helping parents of cancer children adapt to difficult situations.

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## 1. INTRODUCTION

Every year, approximately 400,000 children and adolescents between the ages of 0 and 15 are diagnosed with cancer [1], [2]. The incidence is higher in children aged 0-5 years, namely 18 per 100,000 children, while at the age of 5-14 years 10 per 100,000 children [3]–[5]. Cancer in children can have an impact on physical and psychological conditions, not only in children, but also in parents. Children diagnosed with cancer require treatment that incurs considerable cost and attention. Caring for a child with a chronic illness is a challenge and experience that makes parents become stressed, and physical complaints and fear of losing a child become unavoidable stressors. This condition can cause parents to experience psychosocial problems such as stress, depression, anxiety, anger, and despair [6]–[9].

The results of research on the experience of parents in caring for their children with cancer show that the condition of the child's pain is very consuming the energy and thoughts of parents [10], [11]. The prognosis of the disease and uncertainty in the treatment process decrease the quality of life of the parents.

Parents also have difficulty helping children cope with perceived pain and the effects of treatment [12], [13]. This makes parents' lives change drastically; they must spend much time with their sick children, so sometimes they forget to take care of themselves and reduce the social activities they usually do.

Changes in situations that cause parents to panic, sad, angry, and feel guilty can trigger other problems, such as disharmony of relationships between family members due to ineffective communication [14]. Therefore, parents who must continue to care for their children with chronic diseases need the ability to deal with their child's condition and adapt to changes called resilience [15], [16]. Resilience is not only about how a person survives but also how a person can adapt positively and return to the state in which they can live their lives well. Resilience is a process by which a person adapts to difficult situations and can ultimately live their lives well. Parental resilience in childcare is a process that requires knowledge, skills, support, and experience to provide quality care to their children [17], [18]. A person with high resilience will feel strong enough to overcome the problems they face and will always try to increase their sense of optimism and seek social support [19].

To be able to survive and adapt, a person needs several skills to achieve adequate resilience, namely, the skill to understand what prevents him from getting out of the problem at hand, not blaming oneself, recognizing the fear in him, honing the ability to solve problems, looking at problems appropriately, and trying to be calm when facing unpleasant situations. This skill can be improved through activities that teach about how to increase resilience, one of which is proper education, which not only provides information but also helps a person to achieve adequate resilience [20], [21]. Another way to improve resilience is through practicing mindfulness and self-care techniques, which can help individuals better cope with stress and adversity. By developing these skills, a person can build a strong foundation for overcoming challenges and thriving in difficult situations [22].

This review aimed to improve our understanding of resilience as a dynamic and time-consuming process by methodically examining the existing literature to elucidate the processes underlying resilience-based interventions to achieve the desired effects. Additionally, by conducting a systematic review, we intend to identify gaps in the existing literature and provide suggestions for future research, such as the creation of more customized and culturally aware interventions and the incorporation of technologically advanced methods. By synthesizing the current research, we hope to contribute valuable insights that can inform the development of more targeted and impactful resilience programs in the future.

## **2. METHOD**

### **2.1. Design and search method**

This systematic review was conducted in this study. The literature search followed the preferred reporting items for systematic reviews and meta-analyses (PRISMA) guidelines. Article searches were conducted using six electronic databases: PubMed, Scopus, Science Direct, Proquest, WoS, and Clinical Key. Article searches were limited to publication years ranging from 2019 to 2023 using the keywords "resilience" "intervention" and "parents of children with cancer." The combination of keywords used was Boolean operators "AND" and "OR." The search for articles is limited to articles in English, full text, and published in the last five years.

### **2.2. Inclusion and exclusion criteria**

The eligibility criteria for articles to be reviewed were determined based on the objectives. In this case, researchers used a strategy that could make the articles traced more specific, namely, the search for articles using the PICO framework, where the population was parents of children with any type of cancer, interventions focused on resilience-based programs or interventions, and different types of interventions were traced, but still focused on the resilience of parents who had children with cancer. The search was specific to increasing parental resilience and reducing other psychological symptoms related to parental resilience. Study designs were searched for all types of experiments, both quasi-experiments and randomized controlled trials (RCTs).

### **2.3. Data extraction and synthesis**

Articles were selected by identifying the titles and abstracts based on the inclusion and exclusion criteria. A review of the entire article content is conducted when the information in the title and abstract is not strong enough to decide whether the article can be used. The selection process was completed entirely by the authors. Each article that met the criteria was read in detail by the author, followed by a summary of each article containing the author and country, intervention and study design, sample and setting, implementation strategy, instrument, measurement of the outcomes, and follow-up; the outcome was documented in the form of an extraction table to allow the author to obtain an overview of each study.

## 2.4. Quality appraisal

A critical appraisal of the article was carried out to evaluate whether the article to be used as a reference is feasible in terms of methodology, results, and usefulness. The article quality assessment in this study used the Joanna Briggs Institute (JBI) critical appraisal with a randomized controlled trial design [23] consisting of 13 question items and a quasi-experimental study design consisting of nine question items. Each question item contained in the critical appraisal format has the answer options "Yes" "No" "Unclear" and "Not Applicable" as shown in Table 1. The assessment was performed by all authors, and differences in the results of the assessment were discussed until agreement was reached. One study used a quasi-experimental design, and seven other studies used a randomized controlled trial design. Based on the quality assessment, all studies conducted trials following the design and conducted pre-post measurements, and only one study did not explain how follow-up was conducted [24]. For studies that used a randomized controlled trial design, only one study stated that it used single-blind [25], while other studies did not use a blind system in randomization for both participants and researchers. Two studies did not use an intention-to-treat analysis method [26].

Table 1. Quality appraisal

Study design	Author	Items of quality appraisal												
		1	2	3	4	5	6	7	8	9	10	11	12	13
Quantitative non-randomized	[24]	Y	Y	Y	Y	Y	U	Y	Y	Y				
	[26]	Y	Y	Y	NA	NA	U	Y	Y	Y	Y	Y	Y	Y
Quantitative randomized controlled trials	[25]	Y	Y	Y	NA	Y	Y	Y	Y	Y	Y	Y	Y	Y
	[27]	Y	Y	Y	NA	NA	U	Y	Y	Y	Y	Y	Y	Y
	[28]	Y	Y	Y	U	U	U	Y	Y	Y	Y	Y	Y	Y
	[29]	Y	Y	Y	Y	U	U	Y	U	Y	Y	Y	Y	Y
	[30]	Y	Y	Y	U	Y	U	Y	U	Y	Y	Y	Y	Y
	[31]	Y	Y	Y	U	U	U	Y	Y	Y	Y	Y	Y	Y

Y: yes, N: no, U: unclear, NA: not applicable

Items for quantitative randomized controlled trials: i) used correct randomization for the assignment of participants to treatment groups, ii) allocations to groups were concealed, iii) similar treatment groups at the start of the study, iv) participants blinded to treatment assignment, v) delivering treatment blind to treatment assignment, vi) outcomes assessors blinded to treatment assignment, vii) treatment groups treated identically other than the intervention of interest, viii) differences between groups in terms of their follow-up adequately described and analyzed, ix) participants analyzed in the groups to which they were randomized, x) outcomes measured in the same way for treatment groups, xi) outcomes measured reliably, xii) appropriate statistical analysis used, and xiii) trial design appropriate for the topic, and any deviations from the standard RCT design accounted for in the conduct and analysis. Items for quantitative non-randomized: i) in the study what is the 'cause' and what is the 'effect' is clear, ii) the participants included in any comparisons similar, iii) the participants included in any comparisons receiving similar treatment/care, other than the exposure or intervention of interest, iv) there a control group, v) there are multiple measurements of the outcome both pre and post the intervention/exposure, vi) follow up complete and if not, were differences between groups in terms of their follow up adequately described and analyzed, vii) the outcomes of participants included in any comparisons measured in the same way, viii) outcomes measured in a reliable way, and ix) appropriate statistical analysis used.

## 2.5. Data analysis

The article was analyzed by examining its content, starting from the method of the study, intervention characteristics, results, and suitability of the statistical tests used. The first reviewer recorded the results of the initial analyses. Next, a comprehensive review of the entire article was carried out to ensure that the studies had similar elements. The second reviewer double-checked the first reviewer's work to ensure that it aligned with the study's objectives and covered all relevant items.

Based on Figure 1, as many as 1,515 manuscripts were identified based on keywords, and after going through the screening stage there were 30 remaining manuscripts. At the eligibility stage there were 24 remaining articles. The systematic review process resulted in a final selection of 8 manuscripts for narrative synthesis. This rigorous selection process ensures that only the most relevant and high-quality studies are included in the review. For more detail see Figure 1.

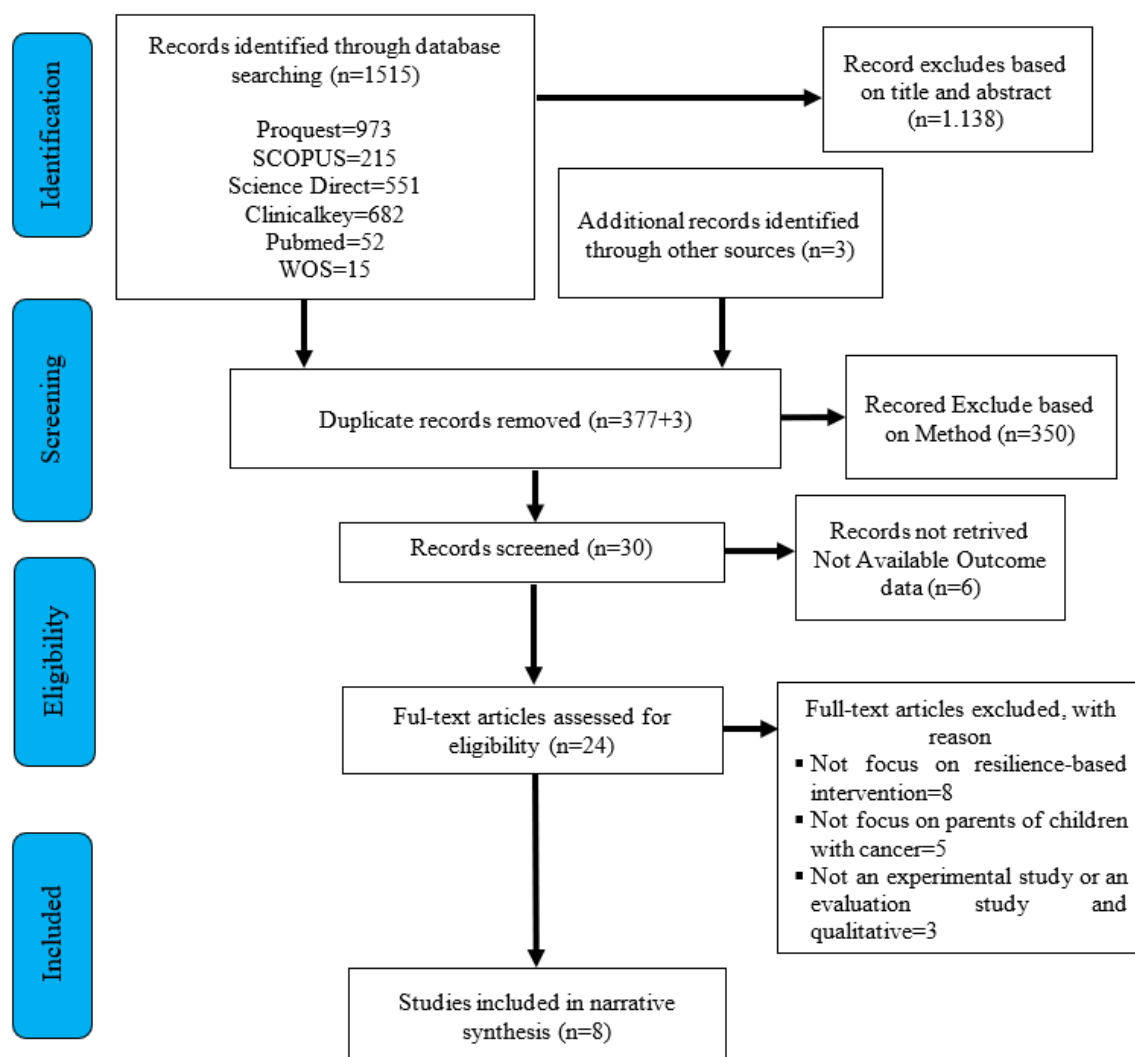


Figure 1. Research flow chart [32]

### 3. RESULTS AND DISCUSSION

Articles that met the inclusion criteria of focusing on resilience-based interventions for parents of children with cancer were selected. Previous studies have been conducted in several countries. Five studies were conducted in Iran [24], [28]–[31], one in China [25], one in Korea, and one in Washington [27]. More detail can be seen in Table 2 (see in Appendix).

#### 3.1. Study characteristics

All the studies were experimental. Four studies used a RCT design [25]–[28], two studies used an experimental design [29], [30], one study used a quasi-experimental design [24], and one study used a clinical trial design [31]. All studies were on parents of children with cancer, with four studies involving mothers only [26], [28], [30], [31] and four other studies involving both fathers and mothers, although most respondents were mothers as well [24], [25], [27], [29]. The total number of respondents across all the studies was 480. The number of respondents across studies ranged from 30 to 103. The number of respondents in the range of 60 to 103 was found in four studies [25], [27], [30], [31] and the number of respondents in the range of 30 to 48 was found in the other four studies [24], [26], [28], [29]. Based on the number of sessions that respondents received in each intervention, one study had nine sessions [30], three studies had eight sessions [24], [25], [29], one study had six sessions [28], one study had five sessions [31], and two studies had four sessions [26], [27]. For the duration of each session, there were six studies with each session lasting 60 to 90 minutes [26]–[31] and one study per session for 15 minutes [25]. Another study did not specify the duration of each session took [24]. Six studies measured outcomes immediately after completion of the intervention and conducted follow-ups after two and six weeks [25] one month [26], [30], two months [31], and three

months after the intervention [27], [28]. One study measured outcomes one week after the intervention with no follow-up [29]. Another study did not explain when the outcomes were measured [24].

### 3.2. Intervention type and description

There are two studies whose intervention design is technology-based [25], [26], where the provision of interventions uses electronic media, such as telephones and laptops connected to the internet. One study reported that the intervention was delivered both face-to-face and over the phone, depending on the parents' availability [27]. The other five studies provided face-to-face interventions either individually or in groups [28]–[31]. The use of technology-based interventions in these studies allowed for flexibility in delivery methods, catering to the diverse needs and schedules of participants. This approach demonstrates the potential for technology to enhance accessibility and effectiveness of interventions in various settings.

The study conducted by Carlsson *et al.* [24] provides a reality therapy intervention for parents of children with cancer, which emphasizes that everyone must accept reality, accept responsibility, and recognize the good and bad things that have to do with everyday life. The eight-session intervention involved building communication with others, identifying needs and their fulfillment, evaluating perceptions and understanding of the disease, making choices based on correct perceptions, and finding creative ways to overcome the gap between what one wants and what one has. Another study conducted by Khosrobeigi *et al.* [29] provided an intervention in the form of self-compassion training, which emphasizes how a person fosters feelings of compassion for others who could be themselves and the desire to help alleviate the problems faced by others. This eight-session intervention provided activities such as understanding self-compassion, building self-compassion behavior, expressing it, applying it, role-playing about self-compassion, and finding and overcoming limitations in applying self-compassion behavior.

Another intervention made by Jamali *et al.* [31] is peer education, the empowered peers, in this case mothers of children with cancer who had successfully undergone the treatment process. The peer mothers were first trained by the researcher on what they should do as educators, and then the peers interacted with all respondents in four sessions where they taught and shared experiences on how to use internal and external support, how to build resilience, and how to reduce stress. This approach proved to be effective in providing practical and emotional support to families facing similar challenges. The peer education model also helped create a sense of community and solidarity among the families.

A study conducted by Kaboudi *et al.* [30] provided a resilience training intervention consisting of nine sessions. All respondents were given training on how to become resilient, where they were given material on the concept of resilience, how to become resilient, and how to recognize the supporting factors to become resilient. Another intervention with a similar set of resilience materials conducted by Hoseinzadeh *et al.* [28] was resilience-based group therapy, in which the intervention program was tailored to resilience described in three dimensions, namely an understanding of the concept of resilience and the characteristics of resilient people, internal and external supporting factors, and an understanding of ways to achieve resilience. The activity was performed in six sessions.

The study conducted by Rosenberg *et al.* [27] is the promoting resilience in stress management intervention for parents of children with cancer (PRISM-P) intervention, a preventative, skills-based training program that focuses on improving four components as key resilience resources, including stress management, goal-setting skills with "SMART" criteria (specific, measurable, actionable, realistic, and time-dependent), cognitive reframing, and benefit discovery, including exercises to identify gratitude, meaning, and purpose despite adversity. Another study used technology-based intervention. Internet-based family resilience-promoting program is an intervention provided to parents of children with cancer conducted by Novrianda *et al.* [26] where the intervention consisting of four sessions is carried out to improve family functioning by increasing their resilience by providing a tree of life activities to express their thoughts and feelings when having a child with cancer and also to share about their difficulties, then providing ecological map activities to describe what resources they have and I-message strategies as a communication booster to train each respondent to express their thoughts and feelings. Another intervention is the mobile device-based resilience training program conducted by Luo *et al.* [25] where this intervention uses the WeChat application installed on the respondent's mobile phone and then sends tweets eight times (once a week) containing the Introduction, problem-solving skills, character strength training, cognitive strategy, parent-child communication, gratitude practice, and summary.

### 3.3. Effectiveness of the intervention on outcomes

All studies showed that the interventions were effective on the variables measured, namely, resilience, psychological distress, depressive symptoms, stress, hopelessness, and parents' quality of life. Interventions conducted in studies [24]–[27], [29], [31] have proven effective in improving parental resilience. It can also reduce psychological distress [24], improve family functioning, increase family

adaptability to stress [26], improve quality of life, reduce parental hopelessness [25], [27], [29], and improve parental coping [28], [30]. Outcomes contained in all studies are that parents of children with cancer need to be resilient and able to adapt to changing situations so that each parent can accompany their children during cancer treatment and care.

Various interventions have been developed and conducted to help increase the resilience of parents of children with cancer and provide support to parents. The interventions designed generally aim to provide emotional support, teach coping skills, foster social relationships, and empower parents to advocate for their children's needs. This study systematically reviewed studies that conducted resilience-based interventions in the parents of children with cancer. Resilience is the interaction between problems that arise with individual strengths that can produce positive adaptations where a person can adjust to changes, free themselves from negative pressures, and avoid long-term trauma. In the process of achieving resilience, there is pain experienced by a person and efforts to avoid existing stressors [33]–[35]. Resilient individuals tend to see everything as a useful experience, have good self-qualities, focus on strength, make constructive criticisms, develop close relationships with others, develop social skills, and have emotional awareness. Everyone can strengthen their resilience, and having good research can make a person healthier and live a more productive life [36], [37]. Everything we experience remains a part of our life journey. Resilient people can integrate their bitter experiences with themselves. Resilience is the ability of a person to generate great power by fighting a great problem with extraordinary spirit [21], [38], [39].

There are five factors that most often make a person's self-resilience low: the imbalance between work and personal life, too often experiencing stress, having no place to express negative feelings, having experienced embarrassing things, and social isolation [40]. Building resilience can be achieved by increasing the ability to recognize stressors, reducing stressors, and increasing emotional intelligence [41]–[43]. Therefore, programs and interventions designed to increase adaptability or resilience should focus on factors that can increase resilience. Based on a review of existing studies, the average intervention consisted of more than one session, and in each session, all studies focused on how parents can become resilient individuals who can get through the process they face. Although two studies [28], [30] did not make the resilience variable an outcome but focused more on measuring parental coping, these results also had an impact on parental resilience because the intervention design in both studies also provided programs on how to increase parental resilience.

Another study, although not specific to increasing resilience, also focused on how to make parents of children with cancer more resilient. The intervention conducted in study Agbaria and Mokh [44] focused on developing problem-solving skills and increasing the mothers' sense of optimism. The study conducted by Paley and Hajal [45] had similar intervention content, wherein each parent was taught about stress management, providing information, emotion regulation, and problem solving. The intervention in the study of Tol *et al.* [46] added to how to build effective communication and empower social support. Other interventions Cousineau *et al.* [47] included mindfulness and compassion to improve parental adaptability. Another similar intervention was conducted by Marchetti *et al.* [48] which provided interventions in the form of problem-solving skills and cognitive restructuring. All of these studies aim to equip parents with skills to deal with the psychological changes they feel when their children are diagnosed with cancer, where with the skills they have, parents are expected to be able to adapt to the conditions experienced and become resilient [49], [50].

In line with a systematic review conducted by Ogez *et al.* [51] on 11 studies of manual intervention programs designed to support parents of children with cancer, it was concluded that most of the designed intervention models already contained a good theoretical framework, set targeted outcomes, and explained the implementation strategy. However, further development is needed, such as modifying existing programs with other components deemed necessary and applicable. In addition, it is also necessary to consider cultural differences, so it is hoped that future program development will focus on how the program can be applied according to the cultural background of the parents who need it.

Based on a systematic review of these eight studies, within each intervention consisting of multiple sessions, all studies used psychoeducation as part of their intervention to reduce psychological symptoms in parents. Providing education can increase resilience because, by providing adequate information, a person's anxiety will be more manageable, and they are more likely to make decisions [52]. However, out of eight studies, only two [24], [25] provided information related to cancer and its treatment; the other studies focused more on providing information on how to build resilience. Providing information about cancer and its treatment will make parents more confident through the process of accompanying and caring for their child. One of the cornerstones of the cancer-supportive care framework is information support [53], [54]. Research conducted by Tan *et al.* [55] shows that parents of children with cancer have a variety of information needs, including information about the disease, the treatment process, how to care for their child, practical resource information, and coping mechanisms.

The interventions designed in all of the studies included in this systematic review also used cognitive behavioral therapy (CBT)-based programs, where the content of each intervention focused on how to make parents recognize the conditions they are facing, then parents are taught to build positive mindsets and respond to their problems by maximizing the resources they have. Interventions using a CBT approach can help a person build resilience by identifying the strengths to look for, building a personal resilience model, and applying personal resilience to every difficult situation faced. Subsequently, a person must continue to practice self-resilience.

The time it takes for an individual to become resilient varies widely and is influenced by several variables such as the level of adversity, individual traits, accessible resources, and the efficiency of support networks. Resilience is not a static quality, but a dynamic process that changes over time. Resilience may emerge quickly in some people in response to a particular adversity, whereas in others, it may take longer or require continuous hard work and support. Various events, coping mechanisms, and treatments can foster and strengthen resilience [35]. Based on the number of sessions provided in the intervention, all studies reviewed had more than three sessions with an average duration of 60-90 minutes per session and up to three months of follow-up. However, one study measured only once, namely, one week after the intervention, so the outcomes obtained could not describe the actual decrease or increase. In terms of delivery methods, most studies provided face-to-face interventions and two studies provided them using the internet. Despite the use of different methods, all studies showed positive results. This confirms that both face-to-face and internet-based delivery methods are equally effective. The advantages of using internet-based interventions are time efficiency and flexibility in uncovering the problems faced by participants [56], while the advantages of face-to-face interventions are that both the person providing the intervention and the person receiving the intervention can be more interactive and minimize the presence of unclear information. Although each of these methods has advantages, both internet-based and face-to-face interventions are equally effective [56].

Resilience-based interventions provide significant and wide-ranging benefits, which benefit not only parents but also children and their families [57]. These interventions improve mental health, enhance family functioning, and ultimately improve outcomes for children receiving cancer treatment by offering support, resources, and coping mechanisms [58]. For families facing pediatric cancer, investing in therapies that help parents become more resilient is an important part of providing complete psychosocial care [59].

#### 4. CONCLUSION

Most studies have increased resilience as a primary outcome. However, secondary outcomes are symptoms that must be reduced or abilities that must be built so that parents have a resilient personality. In general, all interventions designed provide positive results, but future research needs to consider interventions that are appropriate to the cultural context so that parents who have children with cancer can benefit from any intervention aimed at helping them become resilient people. Therefore, more research is needed to increase resilience and psychological well-being using face-to-face, internet-based, and mixed interventions.

#### APPENDIX

Table 2. Results summary

Author, country	Intervention, study design	Sample, setting	Implementation strategy	Instrument	Measurement of the outcomes and follow-up	Outcomes
[26] Indonesia	The internet-based family resilience promoting-program, RCT.	Parents of children with cancer N=41 (20 people for the intervention group and 21 people for the control group, conducted at Yonsei Cancer Center.	The intervention was conducted to increase parents' resilience by providing activities to express their thoughts and feelings, identifying the relationships they have, and improving the communication process. The intervention group was given treatment for 4 sessions in 4 weeks, while the control group was given the same program after the study ended.	<ul style="list-style-type: none"> <li>▪ Family resilience scale to measure resilience.</li> <li>▪ The beck depression inventory to measure the level of depression.</li> <li>▪ The partnership, growth, affection, and resolve (APGAR) scale to measure family function.</li> </ul>	After the intervention and 4 weeks after the intervention	<ul style="list-style-type: none"> <li>▪ Positive changes in family resilience (p=0.003).</li> <li>▪ Positive changes in family functioning (p=0.018).</li> <li>▪ There was no significant difference between the intervention and control groups for depression level (p=0.187).</li> </ul>

Table 2. Results summary (continued)

Author, country	Intervention, study design	Sample, setting	Implementation strategy	Instrument	Measurement of the outcomes and follow-up	Outcomes
[29] Iran	Self-compassion training. Experimental study.	Parents of children with cancer N=30 (15 people for each group, intervention, and control). Conducted at Amirkabir Hospital in Arak.	Interventions are carried out by increasing the sense of understanding the suffering of others and oneself. The intervention was given one session per week for 8 weeks. Each session lasted 90 minutes, while the control group was not given any intervention, but at the end of the study, respondents were given a self-compassion training program.	<ul style="list-style-type: none"> <li>▪ The Connor-Davidson resilience scale (CD-RISC) to measure resilience.</li> <li>▪ The Beck Hopelessness scale (BHS) to measure hopelessness.</li> </ul>	One week after the intervention. No explanation for follow-up.	<ul style="list-style-type: none"> <li>▪ Increasing resilience (p=0.0001).</li> <li>▪ Decrease in parental hopelessness (p=0.0001).</li> </ul>
[24] Iran	Reality therapy, quasi experiment.	Parents of children with cancer N=30 (15 people for each group, intervention, and control), conducted at Amirkabir Hospital in Arak.	Reality therapy is done by getting parents to accept reality and respond to it with appropriate behavior such as making choices about what to do. The experimental group was given a Reality Therapy intervention for 8 sessions, while the control group was given reality therapy after both groups were measured pre and post.	<ul style="list-style-type: none"> <li>▪ The Connor-Davidson resilience scale (CD-RISC) to measure resilience.</li> <li>▪ The Kessler psychological distress scale (KD 10) to measure psychological distress.</li> </ul>	After the intervention. No explanation for follow-up.	<ul style="list-style-type: none"> <li>▪ Increased resilience and decreased psychological distress (P&lt;0.01).</li> </ul>
[25] China	The mobile device-based resilience training program, RCT.	Parents of children with cancer N=103 (52 people for the intervention group and 51 people for the control group), conducted in pediatric oncology wards of 3 tertiary hospitals in China.	The intervention was carried out by focusing on resilience skills including problem-solving activities, character strengthening, cognitive strategies, building communication, and increasing gratitude. Both groups received the intervention for 8 weeks. The intervention group received a resilience enhancement program in the form of 8 tweets sent every Saturday at 8 p.m., while the control group received a placebo information program.	<ul style="list-style-type: none"> <li>▪ The Connor Davidson resilience scale to measure resilience.</li> <li>▪ The self-rating depression scale to measure depressive symptoms.</li> <li>▪ The short form of the 6-dimension health survey, respectively to measure the quality of life.</li> </ul>	After the intervention and followed up at weeks two and six after the intervention.	<ul style="list-style-type: none"> <li>▪ Increased level of resilience (p=0.01).</li> <li>▪ Decrease in depression symptoms (p=0.04).</li> <li>▪ Parents' quality of life in the intervention group was also higher than in the control group at week 6 after the intervention.</li> </ul>
[27] Washington	The promoting resilience in stress management (PRISM-P), RCT	Parents of children with cancer N=94 people who were divided into 3 groups (32 people for one-on-one session group, 32 people for group session, and 30 people for usual care group), conducted at Seattle Children's Hospital.	The PRISM-P intervention consists of 4 target skills which include stress management, goal setting, cognitive reframing, and meaning-making. In the one-on-one session group, each respondent was given an intervention once every 2 weeks with the duration of 1 session for 30-60 minutes. In group sessions, the intervention is given in one day with at least 2 respondents per group. The intervention was conducted every Saturday until all respondents received the intervention. The usual care group was not given any intervention.	<ul style="list-style-type: none"> <li>▪ The 10-item Connor-Davidson resilience scale.</li> <li>▪ The 14-item benefit finding scale.</li> <li>▪ The 12-item hope scale.</li> <li>▪ The 19-item medical outcomes study social support survey.</li> <li>▪ The medical outcomes study 36-item short-form healthy survey.</li> <li>▪ The 10-item perceived stress scale.</li> <li>▪ The 6-item Kessler psychological distress scale.</li> </ul>	After the intervention and 3 months after the intervention	<ul style="list-style-type: none"> <li>▪ Primary outcomes: resilience improvement.</li> <li>▪ Secondary outcomes: benefit finding, social support, health-related quality of life, stress, and distress.</li> <li>▪ Respondents who were given the PRISM-P intervention in the One-on-one session showed an increase in resilience (p=0.04) and benefit finding (p=0.001).</li> </ul>



Table 2. Results summary (*continued*)

Author, country	Intervention, study design	Sample, setting	Implementation strategy	Instrument	Measurement of the outcomes and follow-up	Outcomes
[31] Iran	Peer education, clinical trial	Mother of children with Leukemia N=74 (36 people for the intervention group and 38 people for the control group), conducted at the hematology ward of Ali ibn Talib in Zahedan	The intervention was conducted every Saturday until all respondents received the intervention. The usual care group was not given any intervention.  The intervention was conducted by empowering peers who had been trained beforehand to share experiences and information on how to be resilient. The intervention group was given education by peers for 5 days. Each session lasted for 1.5 hours, while in the control group, training and conventional care were provided.	<ul style="list-style-type: none"> <li>▪ The 10-item perceived stress scale.</li> <li>▪ The 6-item Kessler psychological distress scale.</li> <li>▪ The Connor-Davidson resilience scale-25 items (CD-RISC).</li> </ul>	After the intervention and two months after the intervention	<ul style="list-style-type: none"> <li>▪ resilience (p=0.04) and benefit finding (p=0.001).</li> <li>▪ Increasing resilience (p&lt;0.001).</li> </ul>
[28] Iran	Resilience-based group therapy, RCT.	Mother of children with cancer N=48 (24 people for each intervention and control group), conducted at Shahid Motahhari Hospital of Urmia.	The intervention was carried out by providing resilience training which contained the concept of resilience, how to become resilient, and recognizing the supporting factors of resilience. The intervention consisted of 6 sessions given weekly with a duration of 60-90 minutes per session. Respondents for the intervention group were divided into 3 groups (8 people per mother). The control group was given the resilience-based training after the intervention group finished.	<ul style="list-style-type: none"> <li>▪ General health questionnaire (GHQ-28).</li> <li>▪ Coping health inventory for parents (CHIP).</li> </ul>	After the intervention and 3 months after the intervention.	<ul style="list-style-type: none"> <li>▪ Improved parental coping in three subscales: family integration, social support, and understanding the medical situation (p=0.001).</li> </ul>
[30] Iran	Resilience training, experimental study.	Mother of children with leukemia N=60 (30 people for each intervention and control group), conducted at Mohammad Kermanshahi Hospital in Kermanshah City, Iran.	The intervention is carried out by providing resilience training which contains how to become a resilient person by understanding unpleasant life situations, recognizing supporting factors, and building resilience. Respondents in the intervention group were given 9 sessions over 9 weeks and each session were conducted within 1 hour, while respondents in the control group did not receive any training.	<ul style="list-style-type: none"> <li>▪ Connor_Davidson resiliency questionnaire.</li> <li>▪ Styles of coping questionnaire.</li> <li>▪ Parental stress scale short form questionnaire.</li> </ul>	One month after the intervention	<ul style="list-style-type: none"> <li>▪ Improved coping styles and decreased parental stress scores (p &lt;0.05).</li> </ul>

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