2023

Effectiveness of cognitive behavioral therapy versus therapeutic play for hospitalized children diagnosed with cancer: an integrative systematic review

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EFFECTIVENESS OF COGNITIVE BEHAVIORAL THERAPY VERSUS THERAPEUTIC PLAY FOR HOSPITALIZED CHILDREN DIAGNOSED WITH CANCER: AN INTEGRATIVE SYSTEMATIC REVIEW

A clinical dissertation submitted in partial satisfaction

of the requirements for the degree of

Doctor of Psychology

by

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July, 2023

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This clinical dissertation, written by

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under the guidance of a Faculty Committee and approved by its members, has been submitted to and accepted by the Graduate Faculty in partial fulfillment of the requirements for the degree of

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DEDICATION

To my partner, I know this is not the gift you wanted, but you owe me multiple pieces of jewelry, so Happy 2023 Birthday. Let's call it even.

To my father, thank you for the support, both emotional and financial, but mostly financial. I probably could have done this without you, but it would have been considerably, unbelievably more difficult. Is it too much to hope that this dissertation pays back all the financial contributions you've made for the past 37 years?

To my daughter, I look forward to the day when I force you to read this.

ACKNOWLEDGMENTS

First and foremost, I would like to thank Dr. David A. Levy. You are not only my dissertation chairperson, but you have also been my professor, mentor, and confidant for the past six years. I have had the genuine pleasure to learn from you, work with you, and laugh with you. Your sense of humor, passion, and wit have brightened my days numerous times, and I will forever be grateful to you.

I would also like to thank Dr. Mindia Gabichvadze, my committee member. I am fortunate to share this experience with you, in addition to the countless academic, clinical, and professional experiences, both previous and ongoing. Your support has meant the world to me, and I am so glad I bought that brain lamp six years ago.

Thank you to the amazing and wonderful research assistants that helped me throughout this process. Rebecca Victor – you were the first one to hop on board. Your genuine interest, impressive time management skills, and commitment were truly invaluable. To Rhiannon Walton, Kevin Tan, and Emma Bourroux – while our time together was a little shorter, all of your assistance got me to the finish line. I am very grateful for your interest and willingness to help, especially when I needed it the most.

Finally, thank you to my friends, Stephanie Tuncel and Ferdinand Aliga. You two have kept me sane, motivated, and on-track throughout this doctorate journey. I cannot wait to see what life has in store for us post-doctorate. All I can say for now is… Go Jaguars.

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ABSTRACT

Psychotherapy provides essential coping mechanisms and strategies for children who are diagnosed with cancer, as they experience the extraordinary burden of physical, emotional, and mental strains. While many medical advancements have been made within the past few decades, progress related to psychotherapy for pediatric cancer patients has not been commensurate, evidenced by the limited current literature. Given the sparsity of relevant research, it is presently difficult to compare and evaluate the various psychotherapeutic interventions available for pediatric oncology patients. Additionally, there are significant challenges in providing psychotherapeutic care for patients and their families, including lack of consistency, disruption of care, and unique considerations regarding the medical setting. This systematic review conducted a comprehensive search through four electronic databases to compile a list of studies that examined the effectiveness of CBT-based and therapeutic play-based interventions for children with cancer within the medical setting. Three main research questions were addressed: (1) Which is the more effective psychotherapeutic intervention between cognitive behavioral therapy and therapeutic play for this population? (2) What are the factors to take into consideration when providing psychotherapy for children who are diagnosed with cancer? (3) What are the unique aspects of the inpatient setting to consider for therapeutic interventions? After two screening phases, thirteen studies were included for final selection. Considerable differences among studies made it difficult to make comparisons between the diverse psychotherapeutic interventions. However, seven themes emerged throughout the review: (a) modifications to intervention, (b) developmental stage, (c) health, physical, and cognitive limitations, (d) emphasis on pain, (e) scheduling and space, (f) multidisciplinary team, and (g) social isolation. Therefore, the aim of the study shifted from comparing two psychotherapeutic

interventions to exploring the benefits of a variety of interventions and providing a discussion of the substantial factors when working with this population. Identified features for cost-effective and appropriate psychotherapeutic treatment included shorter timeframe, flexible administration, portability, and comprehensible techniques. However, more research needs to be done for this specialized population and unique setting. Recommendations include conducting more studies that pertain to specific interventions, include larger sample sizes, and utilize the same tool for measuring similar psychological outcomes.

Keywords: pediatric oncology, psychotherapeutic intervention, CBT, therapeutic play

Chapter 1: Introduction

Statement of the Problem

Every year, approximately 300,000 children, aged 0 to 19, are diagnosed with cancer in the world (Steliarova-Foucher et al., 2017). In the United States, there are approximately 3,774 deaths from pediatric cancer each year (Kochanek et al., 2019). Despite improvements in cure rates and survival rates, cancer is still one of the leading causes of death in children between the ages of 5 and 14 (Kochanek et al., 2019). The most common pediatric cancers include leukemia (28%), brain and spinal cord tumors (27%), and lymphoma (9%) (American Cancer Society, 2021). However, commonality does not necessarily correlate with higher survival rates, and there are many factors that influence the outcome of a cancer diagnosis (American Cancer Society, 2021).

In the United States, it is estimated that 10,500 children and 5,090 adolescents will be diagnosed in 2021 (American Cancer Society, 2021). A diagnosis of cancer affects not only the child but also the family members, and the psychosocial effects start with the diagnosis, last throughout treatment, and often for the family, continues beyond the death of a child. Cancer diagnoses are, by nature, difficult for any individual and his/her family, but for children, especially, there are unique considerations. A higher rate of cancer diagnoses occurs in children (ages 0 to 14) than adolescents (ages 15 to 19) (American Cancer Society, 2021). At an age when children are still undergoing emotional, social, and cognitive development, a cancer diagnosis is most likely difficult to comprehend and accept. There are many aspects of a child's cancer diagnosis that can cause strain and disruption within the family (Patterson et al., 2004). These stressors occur in response to the cancer diagnosis, the developmental stage of the client as a child, the strains and possible lack of resources for the family, the rippling effects that may affect

the community, and the necessary coping behaviors that must be learned (Patterson et al., 2004). The lasting psychosocial effects of a pediatric cancer diagnosis may be temporally indefinite and can emanate beyond the client to families and communities.

New research for medical treatments is constantly pursued and produced. As a result, there have been many advancements in medicine in the field of cancer research. In comparison, the research related to psychotherapy in pediatric cancer patients is not as widely pursued; thus, existing literature is limited. *Psycho-oncology* refers to the psychosocial component of cancer care that follow professional clinical practice guidelines (Wiener et al., 2015). However, comprehensive, evidence-based standards for psycho-oncology care within the pediatric population have yet to be published (Wiener et al., 2015). While physical health is often prioritized, it is important to consider the effects of mental and emotional health as well (Shaffer et al., 2016). Studies show that improvements in mental and emotional well-being can contribute to an alleviation in pain-related symptoms or even an increased chance of survival (Spiegel, 2013).

Various studies report the effectiveness of numerous psychotherapy methods, but it is currently difficult to compare and evaluate the results across studies. This lack of consistency among hospital organizations concerning which psychotherapeutic interventions to use presents challenges when transferring patient care, especially when children and their families travel between multiple hospitals in search of alternative treatment options. Psychotherapy treatments can become interrupted, reducing the effects of the intervention. Additionally, there are difficulties and issues to take into consideration when utilizing psychotherapeutic interventions within the hospital setting that do not exist for outpatient therapy. Limits in resources, time, and

space can contribute to reduced effectiveness or adaptations of certain interventions, making it more important to find the most suitable and appropriate psychotherapeutic method for patients.

Current Research

Pediatric Psychology

In 1969, the Society of Pediatric Psychology (SPP) was formed, and, 30 years later, was established as a Division of the APA (Palermo et al., 2014). However, while Clinical Child and Adolescent Psychology was recognized as a specialty in 1998, pediatric psychology is yet to be recognized as a specialty by the Commission for the Recognition of Specialties and Proficiencies in Professional Psychology (American Psychological Association [APA], 2008; Palermo et al., 2014). While one may purport that pediatric psychology is or should be included under the breadth of Clinical Child and Adolescent Psychology, differences between the two suggest that pediatric psychology should be a recognized, independent specialty (Kaufman et al., 1989). First, pediatric psychology places a greater emphasis on medical and biological issues that requires more intensive training in medical care and biological foundations of behavior (Kaufman et al., 1989). With a strong foundation in child emotional, cognitive, social, and behavioral development, pediatric psychologists must further take into consideration the additional factors of a child's medical history, have an acute understanding of pediatric illnesses and their effects, and be knowledgeable about the wide range of medical treatments and regimens that a patient will undergo (Palermo et al., 2014).

Second, the field of pediatric psychology differs from child psychology due to its multidisciplinary format that often involves consultation and interaction with many medical professionals, such as nursing, social work, and other medical specialties (Kaufman et al., 1989; Palermo et al., 2014). Additional training results in a higher level of competency in

professionalism and interdisciplinary skills that are necessary when pediatric psychologists work not only with the children and their families but also with other health-care professionals with varying backgrounds and expertise (Palermo et al., 2014). Finally, pediatric psychology incorporates scientific research and clinical practice to address psychological issues in the context of health behaviors in a health delivery system (Aylward et al., 2009). The unique aspect of working within a hospital setting requires pediatric psychologists to be knowledgeable of the advantages and disadvantages of providing psychotherapy in a hospital setting.

Pediatric Oncology

Within the field of pediatrics, pediatric oncology is a specialty that focuses on the research and treatment of infants, children, and adolescents, diagnosed with cancer. Working with children requires a specialized set of skills, while working with people diagnosed with cancer requires a completely different specialized set of skills. When these two populations are combined, the field of pediatric oncology requires an extremely unique scope of competence to take into consideration the distinct aspects when working with not only the population of children but also the population of children, who are diagnosed with cancer. One important consideration is the developmental stage of the patient, which becomes a crucial factor in interactions with patients and their families. With the diagnosis of cancer, the possibility of death is an inevitable topic. Since a child's understanding of illness and death is primarily determined by the stage of emotional and cognitive development, pediatric oncologists must be knowledgeable regarding the developmental life span of children to understand, communicate, and appropriately support the patients and their families (Kane et al., 2000).

A cancer diagnosis also brings about the likelihood of severe and intense treatments and potentially lengthy hospitalizations. The commonly used medical treatments include

chemotherapy, surgery, and radiation. Each of these treatments have distinct side effects, concerns, and challenges that can have lasting effects on a child's cognitive, psychosocial, and physical development. Additionally, hospitalizations can last from a few days to months to years, which have a significant impact on the lives of not only patients but also their families and support systems. Lengthy hospitalizations can result in increased school absences, which can ultimately result in grade retention or decreased academic performance. High rates of school absences also impact patients' social skills development and can contribute to the difficulty of re-integration into school (Apter et al., 2003). Even after treatment is completed, a cancer diagnosis frequently comes with the possibility of a long-lasting uncertainty of disease recurrence or second malignancies that can impact psychosocial adjustment (Apter et al., 2003).

Finally, the after-effects of pediatric cancer should be taken seriously. Many, if not all, pediatric cancer diagnoses result in some cognitive, psychological, or physical side effects of the diagnosis or treatment, which may be seen immediately or not until years after treatment completion (Apter et al., 2003). The age of disease onset is highly correlated with prognosis outcome and risk factors. Younger children, in particular, are in critical stages of their development in cognitive, physical, and social functioning, so even a slight impact on their functioning can cause severe impairments. For example, depending on where a brain tumor is located, children can have drastic changes to their personalities, executive functioning that impacts daily life, or academic performance. While brain tumors directly impact cognitive functioning, indirect effects exist with other cancer diagnoses and more often with treatments, such as central nervous system irradiation and intrathecal injections (Apter et al., 2003). The effects of certain kinds of chemotherapy are well-researched. Methotrexate is a commonly used

chemotherapy drug that impacts executive functioning; vincristine can result in peripheral neuropathy; and doxorubicin affects heart functioning.

Psychotherapy in Pediatric Oncology

Psychologists have collaborated with pediatric oncologists for decades, and they contribute in a variety of ways. One study by Kazak and Noll (2015) lists seven major areas of contribution: managing symptoms, understanding and reducing neuropsychological effects, addressing context of family, applying a developmental perspective, identifying competence and vulnerability, applying psychological knowledge to decision making and other clinical care issues, and facilitating the transition to palliative care and bereavement. Children diagnosed with cancer are faced with a unique combination of handling an extraordinary amount of physical pain along with the heavy burden of emotional and mental strains. Psychotherapy can provide coping mechanisms and strategies for these kinds of situations. Psychotherapy also helps with the various stages of the process with the handling of the diagnosis, going through the treatment by creating a dyadic trust between patient and health care professionals, and, if it comes to it, acceptance of death and after-death support for the family.

There are specific challenges to administering psychotherapy in the pediatric oncology population. Scheduling often revolves around the patient's medical appointments and state of well-being. Sessions may be unable to be planned consistently, and therapeutic interventions may constantly get interrupted. This leads to the frequent use and preference for brief-intervention strategies. Topics that do not usually arise in outpatient clinical child psychology will be frequently discussed with this population, such as death, loss, and meaning of life. These topics can be heavily influenced by culture, so psychologists must be aware and open-minded to discuss these topics in a culturally sensitive way. Furthermore, as people naturally have differing

coping strategies, individuals can differ in their approach and acceptance of a cancer diagnosis and treatment (Apter et al., 2003). Psychologists should adapt their therapeutic interventions to fit the patient's participation and communication style, which may vary from a passive approach (i.e., little to no involvement in decision-making) to active engagement and complete involvement (Brown et al., 2002). Another factor that will significantly influence the psychotherapeutic approach is the developmental stage of the patient, which may direct the psychotherapeutic interventions on either working with the caregivers or more with the patients, if they are older and more developmentally mature (Apter et al., 2003). With certain diagnoses, psychotherapeutic treatment may need to involve the family, and clinicians will work with the family even after a child's passing.

Types of Psychotherapeutic Intervention

There have been various studies on types of interventions (see, for example Coughtrey et al., 2018; Kazak & Noll, 2015; Muglia-Wechsler et al., 2014) that have been used as psychosocial support for children in hospital settings. Most of these interventions are aimed at reducing stress, anxiety, and emotional distress in patients and their families (Muglia-Wechsler et al., 2014). Treatments frequently include psychotherapeutic techniques, such as cognitive restructuring and development of coping strategies, that are based on cognitive behavioral therapy (CBT; Coughtrey et al., 2018). CBT is particularly useful in specialty medical settings because it tends to be brief, solution-focused, and short-term, which is beneficial for pediatric patients who cannot commit to lengthy sessions (Magidson & Weisberg, 2014). Additionally, CBT is a preferred intervention for health-care systems because it is cost-effective (Sabariego et al., 2011).

Therapeutic play, also referred to as play therapy, is defined as "the systematic use of a theoretical model to establish an interpersonal process wherein trained play therapists use the therapeutic powers of play to help clients prevent or resolve psychological difficulties to achieve optimal growth and development" (Association for Play Therapy, 1997, para. 3). Most often used with children, therapeutic play is another option that is utilized for the pediatric population to help children become familiar with the medical environment and cope with stressful situations (Burns-Nader & Hernandez-Reif, 2016). Specifically, art therapy can be particularly helpful for children and the family during multiple phases from diagnosis to end of life support, assisting in a variety of situations that may be frustrating or providing the need for stabilization and control (Councill & Ramsey, 2019). It has also been shown to improve the child's subjective quality of life (Madden et al., 2010). Music therapy has also been used, and while a systematic review reveals that music therapy lacks sufficient evidence as a psychotherapy intervention for end-of-life care, this may be due to a limited number of studies (Bradt & Dileo, 2010). Along the same lines, storytelling has been used a therapeutic intervention for children who were critically ill, especially in addressing the concept of death with younger children. Communication between children and health care professionals or between children and their families are influenced by the developmental stages of the child, and storytelling can assist in talking about the topic of death and dying with children (Freeman, 1991).

Types of Setting

While this review mostly focused on the inpatient population, it is still important to briefly cover the various settings that apply to the pediatric cancer population. First, outpatient refers to patients who do not stay overnight at the hospital and do not need to be hospitalized. Inpatient refers to patients who are admitted to the hospital for a minimum period of 24 hours.

Hospice and palliative care are similar terms, in that they both refer to the medical, psychological, and spiritual support of patients and their families (Connor & Cecilia, 2014). However, while palliative care can cooccur with treatment, hospice care begins after treatment options are exhausted and is also referred to as end-of-life care (World Health Organization, 2007). Patients in hospice care are not undergoing treatment, and care is mostly focused on pain management and alleviation (Nakhoda, 2010).

This review investigated the psychotherapeutic interventions that were administered for children who were considered inpatient or, at least, psychotherapeutic interventions that were administered within the hospital setting. There are unique considerations and challenges for administering psychotherapy within this setting. Psychologists often do not have a dedicated space to conduct therapy and frequently travel to the patient's room to conduct sessions with patients who are often unable to leave their hospital bed or room. Thus, clinicians are limited to the number of materials, books, or tools that they are physically able to carry. Sessions are rarely longer than 30 minutes due to the barrage of visits and testing that other members of the medical team must conduct. Furthermore, scheduling is rarely consistent because patients may be undergoing medical treatments or are often unable to participate in sessions due to mental or physical exhaustion.

Despite these challenges, there are benefits to administering psychotherapy within the hospital setting. Access to patients is less restrictive because they are in one location. The frequency of meetings can be increased, and progress is easier to measure and observe. Family members are available for intake purposes and can act as great resources for necessary information. The multidisciplinary aspect allows improved communication between health care professionals, who also serve as valuable resources and consultants.

Family Context

A diagnosis of cancer at any age typically affects not only the patient but also the patient's family. This is especially relevant and significant for children diagnosed with cancer, as relationships among all family members are impacted by the diagnosis. In fact, depending on the age of the patient, caregivers may be more psychosocially impacted by the medical diagnosis than the patient and may show more distress, experience greater adjustment problems, and require more support (Apter et al., 2003). As minors, children need their parents' consent for virtually anything related to their health. The financial strains put upon the family due to medical bills add to the stresses that family members may be feeling. Siblings of the patient may feel a variety of emotions, ranging from guilt to sadness to loneliness to resentment to anger (Apter et al. 2003). With certain pediatric cancers, there is a strong genetic component, so that there may be more than one child within a family that is medically or psychosocially diagnosed. Parents often report feeling a great sense of helplessness during the process and may need encouragement to rely on additional support systems (Apter et al., 2003).

Rationale, Primary Aims, and Research Questions. Currently, the literature regarding psychotherapy within the pediatric oncology population is either overly general or too specific. For example, there are studies that look at a variety of psychotherapeutic interventions and their effects (Muglia-Wechsler et al., 2014; Coughtrey et al., 2018; Pai et al., 2006) or studies that look at only a singular psychotherapeutic intervention and its effects (Adamo & De Falco, 2012; Varni et al., 1993). Furthermore, this is the first study to analyze, compare, and evaluate the effectiveness between cognitive behavioral therapy and therapeutic play for children diagnosed with cancer. This systematic review aims to examine these issues by answering these three key questions:

1. Which is the more effective psychotherapeutic intervention between cognitive behavioral therapy and therapeutic play for this population?
2. What are the factors to take into consideration when providing psychotherapy for children who are diagnosed with cancer?
3. What are the unique aspects of the inpatient setting to consider for therapeutic interventions?

Chapter 2: Methods

Systematic Review Approach

A systematic review approach was utilized to examine existing literature to address the effectiveness of two psychotherapeutic techniques of cognitive behavioral therapy and therapeutic play provided in the hospital setting for children diagnosed with cancer. While there were distinct advantages to including both quantitative data and qualitative data, there were also several advantages to focusing on quantitative research. One of the goals for this systematic review was to propose an effective psychotherapeutic intervention for the pediatric oncology population. Findings from quantitative research are typically more generalizable to larger populations. Additionally, quantitative studies are more subjective in their results and interpretations. Since systematic reviews already include a risk of bias via selection of studies, choosing quantitative studies reduced the bias related to the results and findings from each study. The design and methods of this protocol followed the guidelines presented in the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA-P; Page et al., 2021).

Eligibility Criteria

Inclusion Criteria

Publication sources were eligible for inclusion once they met five inclusion criteria.

Source Eligibility. Studies published in peer-reviewed journals, books, and chapters with references were included. Following the PRISMA guidelines, grey literature was also included to prevent publication bias. All studies were written in English or provided available translations to English. Studies were published after 1970. This publication date was chosen because the 1970s is when psychologists began to conduct research in pediatric cancer settings (Kazak & Noll,

2015). Additionally, the Society of Pediatric Psychology (SPP) was created in 1969 (Palermo et al., 2014).

Population. Studies contained participants who were children that had been diagnosed with cancer. While the age ranges that are used to identify "children" differ across studies, this review included studies that abided by the age range that was determined by the definition of "pediatric cancer" provided by the National Cancer Institute (2020), which refers to cancer in children ages 0 to 14 years. Although some studies refer to pediatric cancer as cancer in individuals 0 to 19 years, for the purposes of this review, ages 15 to 20 were considered a separate category of teens/adolescents.

Setting. Studies that administered therapeutic techniques within the hospital setting were included in this review.

Design. Given the inherent risk of bias within systematic reviews, only designs and approaches for quantitative studies were included to reduce as much bias as possible and present focused, objective data. This included, but was not limited to, mixed-methods design, randomized controlled trials (RCTs), clinical trials, and quasi-experimental studies.

Intervention. Studies that administered cognitive behavioral therapy or therapeutic play to the target population for the purposes of psychotherapy, defined as "involving communication between patients and therapists that is intended to help people" by the American Psychological Association were included in this review (American Psychological Association, 2017, para. 1). For purposes of this study, therapeutic play was defined as "the systematic use of a theoretical model to establish an interpersonal process wherein trained play therapists use the therapeutic powers of play to help clients prevent or resolve psychological difficulties to achieve optimal growth and development" (Association for Play Therapy, 1997, p. 7).

Exclusion Criteria

Studies that involved participants with a history of medical, psychiatric, or psychological diagnoses prior to their cancer diagnosis were excluded due to the possibility of confounding variables. In other words, a cancer diagnosis was the first and primary diagnosis for participants. Studies that also involved participants undergoing pharmacological therapy that was not related to the treatment of their primary cancer diagnosis were excluded. Studies, in which the psychotherapeutic intervention was not administered in-person and mostly individually, were excluded to reduce the confounding variables related to differences between in-person therapy versus telehealth, as well as individual therapy versus group therapy. Finally, studies that administered psychotherapeutic interventions within the setting of a specific medical procedure (e.g., bone marrow aspiration, magnetic resonance imaging) were excluded.

Search, Screening and Selection Process

Information Source

Studies were gathered through a comprehensive literature search utilizing electronic databases, including PsycINFO, PubMed/MedLine, Scopus, and EBSCOhost. Additionally, references of each eligible study were reviewed to identify further relevant studies to include. The primary author also manually searched through *Journal of Pediatric Psychology* for relevant articles.

Search Terms

Search terms that were used for the comprehensive literature search to identify relevant studies fell under one of three major themes or a combination: pediatric cancer, psychotherapy, and inpatient setting. To address the general theme of pediatric cancer, search terms included *pediatric cancer, pediatric oncology, childhood cancer,* and *children with cancer*. To include

studies that specify the type of pediatric cancer, search terms related to types of pediatric cancer that have the highest incident rates also included *leukemia, brain tumor,* and *lymphoma.* For the general theme of psychotherapy, search terms included *psychology, psychosocial, psychotherapy, therapy, counseling, therapeutic technique, therapeutic intervention,* and *mental health*. To address the two specific psychotherapeutic interventions that this study evaluated, search terms also included *cognitive behavioral therapy, CBT, play therapy,* and *therapeutic play.* Spelling variations were considered and applied to include studies using standard British or American English spellings. Finally, search terms for the theme of inpatient setting included *in hospital, inpatient,* and *hospitalized*. All of the search terms were used in the search fields for titles, keywords, abstracts, and references of articles. Appendix A displays a list of variations of applied search terms.

Screening and Selection of Studies

The selection of studies consisted of two screening phases and a final decision phase. The first screening phase consisted of scanning the abstracts, titles, and keywords of search results to identify the first batch of potentially relevant articles. This phase was conducted and completed by the primary author and research assistants. Articles were included in the first batch if they answered "yes" to any of the following three questions:

1. Population: Does the study include participants that are 0 to 14 years of age AND diagnosed with cancer?
2. Intervention: Does the study examine the effectiveness of one or both psychotherapeutic interventions of cognitive behavioral therapy and therapeutic play?
3. Setting: Were psychotherapeutic techniques or interventions conducted in the hospital setting?

Every step of the first screening phase was recorded and organized in a Microsoft Word document (See Appendix B). After the first screening phase, the second screening phase included a full-text analysis that was recorded and organized in a Microsoft Excel spreadsheet (See Appendix C), in which the primary author and one research assistant identified studies to include or exclude based on eligibility and exclusion criteria. When a verdict differed, a third research assistant was asked to be the tiebreaker. In the last phase, a final decision was made by the primary author, with approval from the chairperson if necessary. A flow chart based off the PRISMA 2020 Flow Diagram (Page et al., 2021) was used to illustrate the process of identifying and including studies.

Data Collection and Extraction

A data collection and extraction document, created in Microsoft Word, was used for each study that met inclusion criteria (See Appendix D). This form was used to organize the information that was gathered from included studies. Extracted data included:

1. General information
    a. Assigned ID #
    b. Article Title
    c. Author(s)
    d. Journal
2. Purpose
3. Sample characteristics
4. Study design
5. Description of interventions
6. Outcome measured

   a. Tool used

7. Results

Quality Appraisal

During the quality appraisal phase, articles were examined using multiple types of quality appraisal tools, depending on the specific study design. The Joanna Briggs Institute is an international research organization that develops and provides tools to evaluate the quality of a variety of study designs. The JBI website includes free downloadable critical appraisal tools that were used as a checklist for quasi-experimental studies and RCTs (See Appendix E). Other critical appraisal tools included the Mixed Methods Appraisal Tool (MMAT) for mixed-methods design and tools from the National Heart, Lung, and Blood Institute (NHLBI) for the remaining study designs. If there was any uncertainty at any point of the quality appraisal phase, the primary author consulted with the dissertation chair, who provided the final decision if necessary.

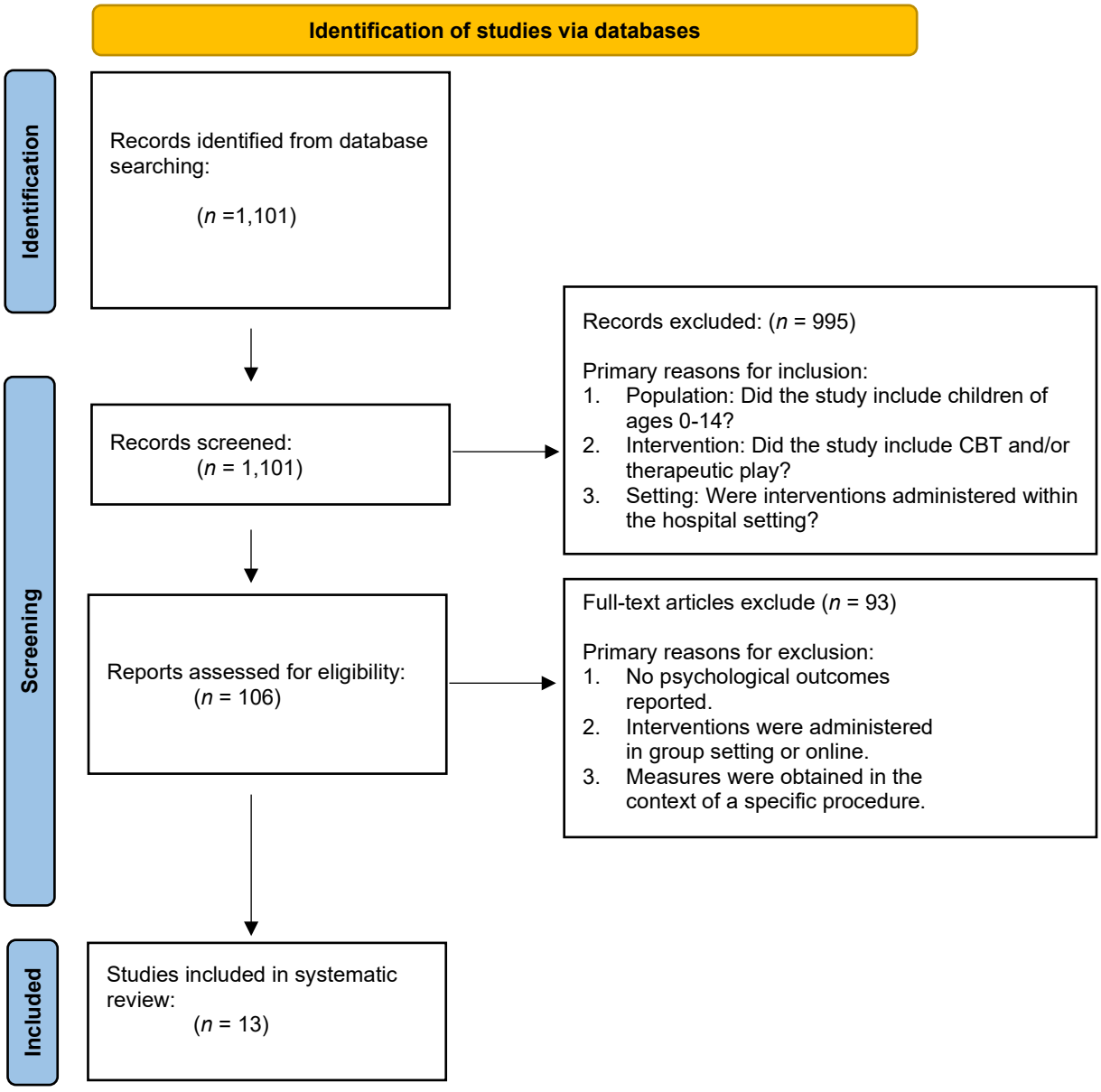
Reporting of Results

Results were reported in two literature tables of included studies that presented general characteristics, as well as a summary of relevant extracted data (See Appendices F and G).

Chapter 3: Results

The initial search consisted of a variety of combinations of predetermined search terms, conducted through multiple databases, and yielded 1,101 results. Search was performed by three individuals to increase the number of combinations of search terms to produce a comprehensive search. All 1,101 results went through a first screening phase that consisted of a title and abstract review. 995 records were excluded based on three primary inclusion criteria: population, intervention, and setting. During the second screening phase, the full text of 106 articles was scanned to assess for further eligibility. Ninety articles were excluded based on exclusion criteria: not individual treatment, outcomes limited to specific procedure, and no measures of psychological outcomes. Additionally, the references of applicable systematic reviews were also searched for relevant studies. The second screening phase resulted in 13 articles for inclusion. Please, see Figure 1 for more details.

Figure 1
PRISMA Flow Diagram of Studies Identified



Characteristics of Included Studies

General characteristics of each of the 13 studies are listed in Appendix G. The table includes the article title, author(s), publication year, study design, description of participants, and intervention.

Of the 13 studies included in this review, six used CBT-based interventions (46%), and seven used therapeutic play-based interventions (54%). The publication date for the included studies ranged from 2002 to 2020, with six published within the last five years (2019-2023; 46%), two published between 2014-2018 (15%), and five published more than 10 years ago (2002-2013; 39%). Studies were conducted internationally, with a majority in Iran (*n* = 4; 31%). Others were conducted in Turkey (*n* = 2; 15%), America (*n* = 2; 15%), China (*n* = 2; 15%), Canada (*n* = 1; 8%), Sweden, (*n* = 1; 8%), and Spain (*n* = 1; 8%). Regarding study design, most of the studies were quantitative (*n* = 10; 77%), with only three mixed methods studies (*n* = 3; 23%). Sample sizes from the 13 studies ranged from five to 122. Three studies had sample sizes greater than 50 (23%); six studies had sample sizes between 10 and 50 (46%); and four studies had sample sizes less than 10 (31%). More than half of the included studies included participants older than 14 years (*n* = 8; 62%). However, the mean/median age was younger than 14 years for all 13 studies.

Research Questions

Appendix H presents the main findings from each of the studies, by listing intervention details, outcome measured, tools used, and major results. Upon data extraction and analysis, recurring themes emerged among studies that pertained to the research questions of this systematic review. These themes and the relevant studies are addressed below.

Research Question #1: Which is the More Effective Psychotherapeutic Intervention Between Cognitive Behavioral Therapy and Therapeutic Play for This Population?

All 13 studies were evaluated in terms of quality and effectiveness of psychotherapeutic interventions. Key differences among all 13 studies occurred (e.g., type of intervention, measured psychological outcome, and tools used) and made it difficult to choose one psychotherapeutic intervention as "more effective." Thus, the focus of this research question was shifted from a direct comparison between two (CBT and therapeutic play) interventions to an evaluation and exploration of all the psychotherapeutic interventions and their effectiveness for children with cancer. Within the 13 studies, two themes seemed to be associated with increased effectiveness: modifications to intervention and consideration of the developmental stage.

Modifications to Intervention. Five studies made modifications to interventions. Abedini et al. (2021) conducted a study to evaluate the efficacy of a modified Mindfulness-based Cognitive Therapy for Children (MBCT-C). Based on a needs assessment pilot study, four modifications were made to the MBCT-C protocol. First, the duration of hospitalization resulted in reducing the length of the program from 12 weeks to 4 weeks. Second, due to physical fatigue and deteriorating levels of attention and motivation within participants, session times were reduced from 90 minutes to 45 minutes. Third, in response to the medical conditions of the participants, several activities (e.g., mindful eating, yoga movements, and moving mindfully) were eliminated. Finally, group sizes were smaller than usual due to medical treatment schedules and the participants' limited available free time. Results of the study showed significant clinical changes before and after the intervention ($p < .05$).

Barrera et al. (2002) made similar modifications to interventions based on the duration of the child's hospitalization. Children received one to three music therapy sessions, and the

duration of the session ranged from 15 minutes to 45 minutes. Burns (2012) modified a Trauma-Focused Cognitive Behavioral Therapy (TF-CBT) intervention program and condensed material that is typically covered in two sessions into one session due to logistical difficulties. Research specific to TF-CBT supported the shorter timeframe and suggested that as few as eight sessions of TF-CBT can be effective in reducing posttraumatic stress symptoms (Burns, 2012; Ehlers et al., 2010).

Hamedi et al. (2020) compared the effectiveness of conventional CBT and its computerized version (cCBT) on the reduction of pain, depression, anger, and anxiety. The interventions within the cCBT group included a guidebook and a compact disk containing contents of six CBT sessions. This RCT showed that both CBT and cCBT had statistically significant differences pre- and post- intervention ($p < .01$). The findings of Hamedi et al.'s (2020) study supported the use of cCBT, which authors concluded can address the lack of access to psychological services not only for the pediatric oncology population but also to other populations who may be in need of psychological interventions. Authors stated that the ease of administration and accessibility of cCBT makes it a viable option for effective reduction in pain and negative emotions for many people.

The final study to make modifications to intervention was Purrezaian et al. (2020), which implemented a new integrated family-based psychotherapy called psycho-art-drama (PAD). PAD was created to incorporate the presence of family due to the medical condition of patients, and it also provided the flexibility to switch between art therapy and psychodrama depending on the patient's state. Results of the study showed PAD to have high effectiveness in reducing bio-

psycho-social expressions of incompatibility (ES[1] = 12.42), and that the RCI[2] was statistically significant (0.69 < 7.08). Authors concluded that the study supported the need for clinicians to modify psychotherapeutic interventions, depending on the individual patient's physical and psychological condition that can change from day to day.

Developmental Stage. Six studies addressed the potential impact of the developmental stage of participants. Barrera et al. (2002) applied music therapy interventions that were appropriate to the child's developmental level. Since the ages of participants ranged from six months to 17 years, the sample was divided into three age groups: preschool age between 0 and five years (n = 33), school age between 6 and 10 years (n = 16), and teenage between 11 and 17 years (n = 16). For the preschool age group, participants engaged in animated play songs, rhymes, lullabies, and playing instruments. Participants within the school age group engaged in camp songs and listened to music of their choice. The teenage group participated in song writing and instrumental improvisation. Outcome measures also differed, depending on the developmental stage of the participant. For children under the age of three, feedback from parents and staff was obtained. For all other participants, the Faces Pain Scale was used (Bieri et al., 1990). Results suggested a significant improvement in children's feelings from pre- to post-music therapy (p < 0.01).

Similarly, Becerra et al. (2020) used different techniques of psychological treatment with cognitive-behavioral foundation, depending on the developmental stage of the participants. The ages of participants ranged from seven to 18 years. The treatment consisted of seven sessions, each focusing on a specific technique (viz., breathing techniques, relaxation techniques,

[1] ES = effect size
[2] RCI = reliable change index

emotional education, imagination techniques, distraction techniques). For younger children, techniques involved more games and play components, while the techniques for adolescents included more verbal and cognitive aspects. Results revealed statistically significant differences in self-reported measures of both anxiety and pain ($p < 0.05$; $p < 0.05$).

One study used developmental stage as an exclusion criterion. Li et al. (2011) stated that children younger than eight may have limited verbal and cognitive capacities in expressing themselves and understanding the questionnaires used for the study. Thus, only children between the ages of eight and 16 were invited to participate. Another study by Madden et al. (2010) placed patients within groups according to their developmental stage to receive psychotherapeutic intervention. However, authors did not provide a reason for this decision, and the results did not address the possible varying effects of the different groups. Likewise, Polat et al. (2015) also divided participants into two groups. One group consisted of children aged five to 10. The second group included children between the ages of 11 and 15. Again, the reason for dividing the participants into these two groups was not expressed. Results indicated that the difference between the mean scores of the pre-test and post-test was slightly higher for the 11-15 age group ($1.17 \pm 0.75 > 0.68 \pm 0.64$).

A study by Zhang et al. (2019) explored the effect of CBT on improving psychological adjustment (PA) in Chinese pediatric cancer patients. In order to compare the effects of intervention strategies in children and adolescents, 106 participants were split into two age groups: 8-12 years old and 13-18 years old. Results of the study demonstrated that CBT was effective in improving PA in both groups ($p < 0.05$), but there were no differences between the two groups ($p > 0.05$).

Research Question #2: What are the Factors to Take Into Consideration When Providing Psychotherapy for Children who are Diagnosed With Cancer?

Health, Physical, and Cognitive Limitations. Of the 13 studies, five acknowledged significant effects from health, physical, and/or cognitive limitations of participants, related to their cancer diagnoses. Based on research that suggested brain cancers affect attention, the study by Abedini et al. (2021) excluded children diagnosed with brain cancers, since attention was one of the key outcome variables of the study. Additionally, authors needed to shorten the length of sessions due to observed physical fatigue and deteriorating levels of attention in patients. Furthermore, one participant ultimately had to withdraw from the study because of worsening health.

A similar instance occurred in a quasi-experimental study by Altay et al. (2017). In this study, authors examined the effect of drawing and writing interventions on anxiety in children undergoing cancer treatment in the hospital. The 5-day therapeutic program produced statistically significant results ($p < 0.05$). However, authors stated that their initial sample size was affected by two participants who were excluded from the study due to physical limitations that affected their abilities to draw or write. While Becerra et al. (2020) did not lose any participants from their study, authors experienced difficulties in implementing their interventions in a timely manner. Specifically, the patient's physical health was always prioritized and resulted in frequent postponement of sessions due to the effects of medical procedures that would often produce cognitive and physical side effects (e.g., dizziness, nausea, fatigue).

Frygner-Holm et al. (2020) used a mixed methods design to assess the feasibility of using pretend play as an intervention for pediatric cancer, between the ages of four and 10. Authors excluded child participants if they were "too ill" to engage in play activities. The study ended up

with four participants. Quantitative analysis demonstrated that the intervention did not have any negative or harmful effects on participants. Additional qualitative measures of parents' reports were incorporated to further support the positive effects of the intervention on the child participants' moods.

In contrast, Li et al. (2011) incorporated the health and physical limitations of pediatric oncology patients into their rationale for using virtual reality technology. This study examined the effectiveness of virtual reality (VR) computer games in minimizing anxiety and reducing depressive symptoms in Hong Kong Chinese children hospitalized with cancer. Results showed that children who received the intervention reported statistically significant fewer depressive symptoms ($p < .02$) than the children who did not receive intervention. Authors stated that the virtual reality platform allows flexibility in the way it can be utilized by patients. Depending on their physical capabilities and type of disease, children have the choice to sit or stand while still engaging in the virtual environment.

Emphasis on Pain. Five studies discussed the role of pain in working with the pediatric oncology population and its impact on the effectiveness of psychotherapeutic interventions. A study by Farrokhnia et al. (2013) aimed to assess the efficacy of combined cognitive interventions on pain, distress, and quality of life in children with cancer. Results of the study showed that the cognitive interventions had a significant positive effect on the trial group at $p < 0.001$. Interventions were effective in reducing reported intensity of pain and level of distress and improving quality of life of children with cancer. An additional finding was the significant relationship between variables of reported pain, distress level, relationship between child and parent, and the situation-related quality of life. Specifically, the reduction in distress and improvement in quality of life seemed to stem from the reduction in reported pain levels. The

authors concluded that the management of pain or the perception of pain may be an appropriate priority to address before attempting to target any other psychosocial goals with pediatric oncology patients, as pain level will interfere with the effectiveness of psychotherapeutic interventions.

Zhang et al. (2019) suggested CBT as an effective strategy in dealing with physiological effects of cancer diagnoses and related treatments. Authors implemented a CBT intervention that lasted for five weeks and consisted of cognitive therapy, relaxation training, and effect evaluation. Authors noted that behavioral relaxation training was especially effective in reducing physiological symptoms during bone marrow punctures. Based on research that CBT is already one of the most well-known methods in treating chronic pain, Hamedi et al. (2020) suggested cCBT as an effective pain management program that can target the different dimensions of pain experiences (i.e., both psychological and physiological aspects) when working with children diagnosed with cancer.

A mixed-methods study by Madden et al. (2010) evaluated the effect of Creative Arts Therapy (CAT) on the Quality of Life (QOL) of pediatric oncology patients. Based on research, authors suggest that pain and emotional distress are important targets for interventions to directly enhance QOL in children with cancer. Results of the study revealed statistically significant improvements in parent-reports of perceived pain and nausea in participants ($p = .03$; $p = .0061$). In another study, Polat et al. (2015) showed that music therapy had a statistically significant effect on anxiety in children, ages 5-15 ($p < 0.05$). Authors proposed that the convenience of providing music therapy to patients should be considered as adjunctive therapy, especially with children undergoing painful procedures to relieve their anxiety before and during procedures.

Research Question #3: What are the Unique Aspects of the Inpatient Setting to Consider for Therapeutic Interventions?

Scheduling and Space. Four studies referenced scheduling and space as limitations or obstacles that may have affected the outcomes. Abedini et al. (2021) noted that group sizes were smaller than expected due to medical treatment schedules and the participants' limited available free time. In the study by Becerra et al. (2020), one participant was eventually excluded from the study due to the saturation of professionals that intervened with him. Authors also acknowledged the methodological limitation of taking baseline measurements over a short period of time, which was inevitable due to challenges in accessing the patient for consistent sessions.

The study by Burns (2012) was significantly impacted when two out of the five recruited families withdrew due to scheduling conflicts between the rigid medical treatment schedules and the required time commitment to participate in the study. Burns also had difficulties regarding room availability that affected session attendance. Therefore, the study acknowledged that statistical analyses were limited, given the study design and sample size, and the author utilized visual inspection of the data as the method for primary analyses. Results indicated no significant reduction in the children's posttraumatic stress symptoms, and the author concluded that further research is needed to determine the efficacy of a trauma-informed CBT intervention for pediatric oncology patients.

Madden et al. (2010) needed to change the instruments used to measure psychological outcomes due to time limitations for assessing participants' QOL. The initial tool took too long, and authors needed instruments that would more quickly assess the participants. Thus, a stated limitation of the study was the use of disparate instruments between the randomized and nonrandomized phases.

In contrast, two studies were able to account for the challenges regarding scheduling and space and managed to avoid potential negative effects on findings. Li et al. (2011) worked around the scheduling demands by ensuring that the available times that children could engage with the virtual reality computer games were flexible, and sessions were repeated multiple times throughout the day. Polat et al. (2015) chose an intervention (listening to music through earphones from an iPod) that was portable, easy to administer, and did not require much space. Given the intervention's statistically significant effect on anxiety in participants ($p < 0.05$), the authors suggested a wider application of the intervention to hospital wards and waiting areas for not only children but also their family members.

Multidisciplinary Team. Out of all the explored themes in this review, the aspects of a multidisciplinary team were discussed the most and were mentioned in eight out of the 13 studies. In the study by Abedini et al. (2021), participants received additional psychosocial support from members of the multidisciplinary team that were accounted for in the interpretation of the study's data. In addition to the MBCT-C intervention, hospital staff provided psychosocial support; a team of social workers helped children and their families understand their diagnoses; and hospital staff also supervised a playroom that was stocked with games and toys for therapeutic play. Zhang et al. (2019) also included additional hospital staff in their implementation of the CBT interventions. Authors created a collaborative group, consisting of the children, their families, psychotherapists, doctors, and nurses. All staff received the same professional training and obtained a qualification certificate for CBT.

Both Barrera et al. (2002) and Madden et al. (2010) took advantage of the multidisciplinary team in a different way and utilized hospital staff as additional sources in obtaining data. This was listed as a strength in both studies since consistent findings across

informants provided stronger evidence for the study's results, and feedback from staff could be incorporated for future research.

Frygner-Holm et al. (2020) consulted with physicians and nurses from the oncology ward for their input on story stems for the pretend play intervention. Authors stated that this was extremely helpful in developing play scenarios that were relevant and meaningful for the children. Li et al. (2011) demonstrated another example of collaboration with the multidisciplinary team. Due to the ease of administration, the virtual reality-based intervention was administered by research nurses, allowing more flexibility in scheduling and gathering of data.

After demonstrating that drawing, writing, and mutual storytelling techniques reduced the anxiety level of children undergoing cancer treatment in the hospital, Altay et al. (2017) proposed that nurses and other health professionals should be offered support and training to enable them to use these techniques as early as possible in a child's hospitalization period. Similarly, Polat et al. (2015) also made implications for the integration of music intervention in nursing and health policies. Authors claimed that the utilized intervention is easy to learn and within the scope of nursing practice, so that techniques can be used more frequently during painful procedures and cancer treatment.

Social Isolation. Three studies discussed concerns regarding social isolation for the specific population of hospitalized children diagnosed with cancer. Abedini et al. (2021) divided participants (n = 20) into six groups. Authors stated that they intentionally limited the group size to increase intimacy and comfortability. Within these small groups, MBCT-C was used to teach children how to describe their internal experiences among a small group of nonjudgmental peers. Authors proposed that sharing similar experiences with other hospitalized children provides

protection against social isolation and depression (Abedini et al., 2021; Merrell & Gimpel, 2014). Li et al. (2011) stated that virtual reality-based interventions offered children valuable opportunities to interact with their peers because it created a safe and comfortable atmosphere for children to express their concerns and fears. Additionally, Li et al. (2011) suggested that virtual reality could compensate for the disruptions in children's natural play and socialization due to hospitalization.

The third study by Purrezaian et al. (2020) specifically focused on the impact of social isolation within hospitalized children with cancer. The tool used within the study was a checklist that measured bio-psycho-social expressions of incompatibility in the hospital (BPSEIH). Authors attributed children's incompatibility to the feeling of rejection from the community due to their illness. Consideration of children's desire for social connections resulted in the creation of specific intervention used by Purrezaian et al. (2020) that combined art therapy with psychodrama. Authors proposed that psychodrama allowed children to bring others into session via empty chair technique, tele principles, or encounter, which resulted in an increase in the perception of social support.

Summary of Results

Of the 13 studies included in this systematic review, six used CBT-based interventions, and seven used therapeutic play-based interventions. Six studies were published within the last 5 years, and seven were published before 2019. Only two studies were conducted in the United States, and 11 studies were conducted outside of the United States. The majority of the studies were quantitative, and all studies included participants with the mean age $\leq$ 14 years.

Regarding the first research question related to the effectiveness of psychotherapeutic interventions, five studies made modifications to interventions (e.g., increasing/decreasing non-

verbal components, eliminating techniques that required physical exertion), and six studies addressed the potential impact of developmental stage of the patients. Regarding the second research question related to psychotherapeutic considerations for children diagnosed with cancer, five studies acknowledged significant effects from limitations of participants, related to their cancer diagnoses, and five studies discussed the prevalence of pain among participants and the significant impacts on psychotherapeutic outcomes and even the applicability of interventions. Finally, the third research question explored the unique aspects of inpatient settings. Six studies acknowledged the challenges related to scheduling and space, and eight studies discussed the benefits of working within a multidisciplinary team. Three studies discussed concerns regarding social isolation for the specific population of hospitalized children diagnosed with cancer.

Quality Appraisal

Due to the variance in study designs among all 13 studies, several quality appraisal tools were utilized. Each study underwent a quality appraisal by three individuals, who used the appropriate critical appraisal tool from a list of provided options. The list included two critical appraisal tools from Joanna Briggs Institute (JBI) for quasi-experimental studies and RCTs; the Mixed Methods Appraisal Tool (MMAT) for mixed-methods design; and quality assessment tools from the National Heart, Lung, and Blood Institute (NHLBI) for controlled intervention studies and pre-post studies with no control group (Hong et al., 2018; NHLBI, 2013; Tufanaru et al., 2020). Appropriate checklists, depending on the study design, were applied to make the decision to include or exclude a study in the final selection for the systematic review.

Chapter 4: Discussion

The initial aim of this study was to compare the effectiveness of two psychotherapeutic interventions: CBT and therapeutic play. After comprehensive evaluation of 13 studies that included multiple variations of CBT and therapeutic play interventions, several recurring themes surfaced that required further attention. Additionally, key differences from study to study made it virtually impossible not only in comparing the effectiveness of CBT versus therapeutic play, but even within the same group of CBT-based interventions and therapeutic play-based interventions, comparisons could not be made fairly. Thus, the aim of the study shifted to exploring the benefits of different psychotherapeutic interventions, as well as bringing to the forefront the significant factors to consider when working with the pediatric oncology patient within the hospital setting.

Theme #1: Modifications to Intervention

Among the five studies that made modifications to interventions, three studies shortened the treatment, one study used a computerized version, and one study included family members to increase access to patients. Making changes to interventions can be challenging, especially once interventions have started. However, existing literature and the results from this study indicate that one of the easiest modifications to interventions is shortening the length of treatment or sessions. It seems to be standard practice for psychotherapy sessions to be 45 minutes to one hour. However, this does not necessarily mean that effectiveness is decreased when sessions are shorter than 45 minutes. There is research that shows that the duration of a psychotherapeutic session has little association with outcome (King, 2015; Stiles et al., 2015). Therefore, shorter sessions and treatments may actually be more effective and appropriate for children with cancer and should be considered as a viable option before any kind of treatment implementation.

Theme #2: Developmental Stage

The choice between CBT and therapeutic play can depend on the developmental stage of a child, which becomes a crucial factor to consider when working with children diagnosed with cancer. Research shows that developmental delays are common in children diagnosed with cancer, and there is strong correlation between age of diagnosis and severity of the delay (Institute of Medicine and National Research Council, 2003). Thus, when working with pediatric cancer patients, therapists must look beyond the chronological age of the patients and choose appropriate interventions for the individual child and his/her developmental stage. Six studies considered the developmental stage of participants in various ways, but only one study (Zhang et al., 2019) actually compared the effectiveness of interventions between different groups of children. While it is important to consider the developmental stage and discuss the potential impacts, it would be even more helpful for future research to study the similarities or differences in effectiveness of interventions on different developmental stages.

Theme #3: Health, Physical, and Cognitive Limitations

Almost all diagnoses of pediatric cancer are associated with physical symptoms (e.g., fatigue, pain) that significantly affect a child's health. Additionally, cancer-related medications and many medical treatments for pediatric cancer (e.g., chemotherapy, radiation) come with their own side effects that compromise a child's health and result in further physical and cognitive limitations to participation in psychotherapy. Five studies were significantly affected by the health, physical, and cognitive limitations of participants, mostly related to sample size. Specifically, participants dropped out of studies or were purposely excluded from studies due to physical or cognitive demands of interventions. Given the significant effects, the best psychotherapeutic intervention seemed to be the virtual reality-based intervention (Li et al.,

2011) that allowed the most flexibility in method of administration. Children were able to remain stationary or move around according to their capabilities, and the intervention also had less cognitive demands. The intervention also seemed to appeal to children the most due to its novelty and entertaining features. These results suggest that more research related to the applicability and effectiveness of virtual reality-based interventions will be important to further support the viability of virtual reality-based interventions.

Theme #4: Emphasis on Pain

An estimated 25-50% of children with cancer experience pain, which is often accompanied by negative emotions (Langeveld et al., 1997). Thus, the question of whether treatment of pain should be prioritized or treatment of negative emotions should be prioritized often arises when working with the pediatric oncology population. Additional research shows that effective pain control is associated with faster and more complete recoveries, resulting in cost reductions to the health system (Turner et al., 2007). Among the five studies that discussed the role of pain, there was no consensus regarding the type of psychotherapeutic intervention that would be most effective. Instead, results suggested that both CBT-based and therapeutic play-based interventions were effective in decreasing pain-related anxiety and physiological symptoms through relaxation or distraction. Given the strong correlation between pain and distress, the management of pain should be prioritized before attempting psychotherapy. Reducing pain not only contributes to the effectiveness of psychotherapeutic interventions, but it can also reduce the chance that the pain is interfering with treatment. Furthermore, children with cancer often have to endure many painful procedures related to their medical treatment. Thus, it is important to consider interventions that can be administered during procedures that can result in efficiency regarding both financial costs and time.

Theme #5: Scheduling and Space

Four studies illustrated the limitations associated with scheduling and space when working within a hospital setting. Therapeutic interventions that require strict schedules, numerous materials, or a spacious area do not seem likely to succeed within the inpatient setting, where children are restricted to their assigned room, as numerous providers go in and out for a variety of medically related procedures and check-ins. Therefore, psychologists and therapists often rely on luck or well-established communication among providers to "catch" the patient at an opportune time to administer therapeutic interventions. Additionally, in outpatient settings, therapists often have access to multiple areas to conduct sessions. However, in the hospital setting, they are limited to the designated patient's room, and patients are often unable to ambulate to other areas.

Theme #6: Support from Multidisciplinary Team

A significantly advantageous aspect of the hospital setting is the multidisciplinary framework that exists for most patients. For one pediatric oncology patient, there are typically at least 10 people on the multidisciplinary team, consisting of a pediatric hematologist/oncologist, pathologist, nurse(s), social worker, and a psychologist/psychiatrist (Cantrell & Ruble, 2011). While each provider has a main role that he/she fulfills, fluid communication and teamwork often lead to increased efficiency and cost-effectiveness. Choosing therapeutic interventions that can be implemented or administered by other members of the multidisciplinary team can contribute to increased consistency and efficiency, especially for hospitals or organizations that have fewer financial resources or members on staff. In all eight studies that addressed this theme, the aspects of working within a multidisciplinary team were discussed positively and contributed

to increased effectiveness. Given the overwhelming support for this feature, it seems crucial that the aspects of a multidisciplinary team are incorporated into psychotherapeutic interventions.

Theme #7: Social Isolation

While only three studies addressed the theme of social isolation, it is a unique feature that not only applies to the pediatric oncology population, but it is also compounded by the fact that patients are often confined to the hospital setting. The diagnosis of cancer is very isolating for children. In the United States, one in 285 children are diagnosed with cancer. So, it is very unlikely that more than one child from the same peer group will have a diagnosis of cancer. In other words, children with cancer may not feel comfortable revealing or talking about their cancer diagnosis with peers. Additionally, when within the inpatient setting, the children are physically separated from their peers and social groups. All of these factors contribute to feelings of social isolation that should be an integral part of psychotherapeutic treatment.

Differences

There were a surprising number of differences that the author encountered when reviewing the 13 studies that resulted in shifting the aim of this review. First, many studies used a variation of psychotherapeutic interventions that made it difficult to compare even within CBT or therapeutic play. For example, within the CBT group, one study looked at a computerized version of CBT, while another study looked at trauma focused CBT. Within the therapeutic play group, several studies examined the effectiveness of music therapy, while another study applied a virtual reality-based intervention. Second, each study looked at different psychological outcomes, ranging from anxiety to depression to perception of pain. Finally, studies used dissimilar tools to measure the psychological outcomes. Since different tools vary in their population norms, validity scales, and effect sizes, it would be difficult to interpret the data

consistently across all studies. However, despite the differences among studies, most studies showed statistically significant changes that provide valuable information regarding the effectiveness of several psychotherapeutic interventions.

Cross Cultural Considerations

This study included articles that were published globally. Out of the final 13 studies, four were conducted in Iran, which was the greatest number of studies found in any one country. The reason for this outcome is unclear, but according to Alebouyeh (2017), the pediatric hematology and oncology services in Iran have been steadily improving since 2007. The number of Iranian annual publications in MEDLINE increased from 273 to 14,511 from 2000 to 2014 (Akhondzadeh et al., 2017). Additionally, improving socioeconomic conditions and public health services in Iran may be correlated to the increasing number of board-certified providers and training programs for pediatric hematology-oncology. This trend can actually be seen in other countries as well. In fact, Conte et al. (2017) noted that China has steadily increased its number of publications and went from 14th to 4th in ranking for article output from 2000 to 2015. Given the fact that the 13 studies included in this review ultimately came from seven different countries, it is essential that cross-cultural implications are considered.

Pediatric cancer does not discriminate, and neither should clinicians when it comes to treatment or research that can benefit pediatric patients and their families. Clinicians should be open to results and data that come from studies all over the world, especially when research with the pediatric oncology population proves challenging. The results from this review illustrate that there are many obstacles when it comes to conducting research with this population and within the medical setting. Sharing research globally is one way that clinicians can compensate for these challenges.

Implications for Clinical Practice and Future Research

Results of this review suggest that determining a singular psychotherapeutic intervention as more effective than another was less important than the emphasis on a clinician's ability to be flexible when working with the pediatric oncology population within the hospital setting. Overall, the adaptability of both interventions and clinicians resulted in increased effectiveness across all studies. This will be an important skill set to prioritize and develop in clinicians who are interested in working with this population. Taking into consideration all the findings and results from the 13 studies, the qualities that will contribute to the most cost-effective and appropriate psychotherapeutic treatment for pediatric oncology patients include short timeframe, flexible administration, portability, and comprehensible techniques.

Regarding future research, the lack of consistency among studies was surprising, and it would be beneficial for more studies to be conducted pertaining to a particular intervention and utilizing the same tool for measuring similar psychological outcomes. While one study is better than none for illustrating the effectiveness of specific interventions, larger sample sizes and the use of control groups would strengthen the results and make a stronger case for the application of new or modified interventions. Additionally, given that this review ended up with only 13 studies, the current literature still seems sparse when it comes to the pediatric oncology population. There are still many avenues to pursue regarding research involving children with cancer and the numerous psychotherapeutic interventions that currently exist, as well as the potential for innovative interventions for the future.

Limitations

As a systematic review, this review was susceptible to the inherent limitations of conducting a systematic review. An article by Doleman et al. (2021) offers a detailed description

of these limitations. Limitations that were particularly relevant to this review include selection bias and publication bias. While the author recruited assistance from multiple research assistants to reduce selection bias as much as possible, selection bias should still be considered. Also, in order to compensate for publication bias, the author included gray literature. However, publication bias inevitably occurred in the author's decision to mostly look at peer-reviewed articles, as well as the selective publication of studies within journals. Another limitation specific to the topic of this review is the focus on only two psychotherapeutic interventions (CBT and therapeutic play).

The inclusion and exclusion criteria can also be considered as limiting factors. Since the author chose to examine articles that were either written in English or had English translations, excluding international studies written in other languages limited the scope of the review regarding both data and cultural considerations. Furthermore, this study only included articles that produced quantitative data, which excluded studies that may have only used qualitative data. For this study, the author used qualitative analysis to interpret the data from the studies, which is more prone to bias. Given the differences between studies, accurate statistical analysis was difficult to apply. Finally, search terms and combinations of terms were chosen by the author and research assistants, and while attempts were made to be thorough, there are still combinations of terms and additional search terms that have not been utilized.

Despite these limitations, this systematic review surveyed the most relevant and current literature related to the proposed research questions via diverse databases. Assistance from multiple research assistants provided inter-rater reliability and reduced researcher bias. Detailed search records and documentation assure that this dissertation is replicable for other researchers and can be considered in becoming a peer-reviewed manuscript.

Closing Remarks

In conducting this systematic review and reviewing numerous articles related to psychotherapeutic interventions for the pediatric oncology population, it became less and less important to designate one intervention as more effective than the other. With so many factors to consider in working with a specialized population, the overarching theme that consistently emerged was the capacity of therapists, providers, and psychologists to be flexible. Whether the therapist was constantly changing the scheduled times for therapy or adapting the interventions to accommodate for the day-to-day differences in patient's status, the outcomes of many studies were noticeably impacted by changes that were beyond the therapist's control. Instead, increasing knowledge and awareness of the unique features of the pediatric oncology population and the unique aspects in working within the medical setting will guide clinicians in creating and/or choosing the most appropriate psychotherapeutic intervention for the child. Working in any specialized field or with specialized populations comes with distinct challenges, but it is my hope that these unique challenges pertaining to the pediatric oncology population are perceived positively and actually appeal to clinicians who are motivated to work with these children and their families with compassion, empathy, and respect.

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APPENDIX A

List of Search Terms

SEARCH TERMS
"Cancer"
Variations: oncology, leukemia, leukaemia, brain cancer, brain tumor, malignancy, lymphoma
"Child"
Variations: pediatric, paediatric, children, infant, in children, childhood, children with
"Psychology"
Variations: psychosocial, psychotherapy, therapy, counseling, therapeutic technique, therapeutic intervention, mental health, psychological
"Cognitive behavioral therapy"
Variations: CBT, cognitive behavioural therapy, cognitive behavior treatment, cognitive behavioral treatment, cognitive behavioural treatment, cognitive-behavioral, cognitive-behavioural
"Therapeutic play"
Variations: play therapy, child-centered play therapy, play-based
"In hospital"
Variations: inpatient, in-patient, hospitalized, hospitalised, hospitalization, medical setting

APPENDIX B

Example of Search Documentation Record

For all searches:

Field(s) Searched: ALL
Specifier - Years: 1970-2022
Specifier - Publication Type: ALL
Additional Specifiers: Peer-reviewed, English

Search ID#	Search Date	Initials	Database	Search Terms	# of Results	# of Relevant Articles
1	1/09/2023	DK	EBSCOhost	pediatric cancer OR childhood cancer OR children with cancer & cognitive behavioral therapy OR cbt OR cognitive behavioural therapy	54	8
2	1/11/2023	RV	PubMed	pediatric cancer & psychotherapy & play therapy	37	8
3	1/11/2023	DK	EBSCOhost	pediatric cancer OR childhood cancer OR children with cancer & play therapy OR therapeutic play OR child-centered play therapy	62	17
4	1/12/2023	RV	Scopus	(Search 1): childhood & cancer OR children with cancer & cbt OR cognitive behavioral therapy & psychotherapy OR therapy (Search 2): pediatric cancer OR childhood cancer & psychotherapy OR therapy	46 + 78	14
5	1/18/2023	RV	APA PsycInfo	childhood cancer OR children with cancer OR pediatric oncology & inpatient OR hospitalization OR hospitalized patients & play therapy OR therapeutic play OR child-centered play therapy	65	7
6	1/18/2023	DK	EBSCOhost	cbt OR cognitive behavioral therapy OR cognitive behavioural treatment & leukemia OR pediatric oncology	183	8
7	1/22/2023	DK	Journal of Pediatric Psychology	(Search 1): play therapy & cancer (Search 2): psychotherapy & cancer	16	1

APPENDIX C

Example of Screening and Selection Record

Inclusion Criteria: 0-14 years, quantitative study, includes CBT and/or therapeutic play, outcome measured has psychological component

Exclusion Criteria: other main medical diagnosis, pharmacological intervention, intervention is specific to medical procedure, group therapy, remote therapy

Decision Date	Article ID#	Inclusion Criteria Met?		Exclusion Criteria Met?		Reviewer #1 Decision	Reviewer #2 Decision	Tiebreaker Reviewer
2/1/2023	1	#1: **N**	#2: **N**	#1: **Y**	#2: **Y**	Exclude	Exclude	NA
2/1/2023	2	#1: **N**	#2: **N**	#1: **Y**	#2: **Y**	Exclude	Exclude	NA
2/1/2023	3	#1: **Y**	#2: **Y**	#1: **Y**	#2: **Y**	Include	Include	NA
2/1/2023	4	#1: **Y**	#2: **Y**	#1: **Y**	#2: **Y**	Include	Include	NA
2/1/2023	5	#1: **N**	#2: **N**	#1: **Y**	#2: **Y**	Exclude	Exclude	NA
2/1/2023	6	#1: **N**	#2: **N**	#1: **Y**	#2: **Y**	Exclude	Exclude	NA
2/1/2023	7	#1: **N**	#2: **N**	#1: **Y**	#2: **Y**	Exclude	Exclude	NA
2/1/2023	8	#1: **Y**	#2: **Y**	#1: **Y**	#2: **Y**	Include	Include	NA
2/1/2023	9	#1: **N**	#2: **N**	#1: **Y**	#2: **Y**	Exclude	Exclude	NA
2/2/2023	10	#1: **N**	#2: **N**	#1: **N**	#2: **N**	Exclude	Exclude	NA
2/2/2023	11	#1: **N**	#2: **N**	#1: **Y**	#2: **Y**	Exclude	Exclude	NA
2/2/2023	12	#1: **N**	#2: **N**	#1: **N**	#2: **N**	Exclude	Exclude	NA
2/2/2023	13	#1: **N**	#2: **N**	#1: **Y**	#2: **Y**	Exclude	Unsure	Exclude
2/2/2023	14	#1: **N**	#2: **Y**	#1: **Y**	#2: **Y**	Exclude	Include	Include
2/2/2023	15	#1: **N**	#2: **Y**	#1: **Y**	#2: **Y**	Exclude	Include	Exclude
2/2/2023	16	#1: **Y**	#2: **N**	#1: **N**	#2: **N**	Exclude	Exclude	NA

2/2/2023	17	#1: **N**	#2: **N**	#1: **Y**	#2: **Y**	Exclude	Unsure	Exclude
2/5/2023	18	#1: **N**	#2: **N**	#1: **Y**	#2: **Y**	Exclude	Exclude	NA
2/5/2023	19	#1: **N**	#2: **N**	#1: **Y**	#2: **Y**	Exclude	Unsure	
2/5/2023	20	#1: **N**	#2: **N**	#1: **Y**	#2: **N**	Exclude	Exclude	NA
2/5/2023	21	#1: **N**	#2: **N**	#1: **N**	#2: **N**	Exclude	Exclude	NA
2/5/2023	22	#1: **N**	#2: **N**	#1: **N**	#2: **Y**	Exclude	Exclude	NA
2/5/2023	23	#1: **Y**	#2: **?**	#1: **Y**	#2: **Y**	Include	Unsure	Include

APPENDIX D

Example of Data Collection and Extraction Form

- **ID#:** 3
- **Article title:** The effect of drawing and writing technique on the anxiety level of children undergoing cancer treatment.
- **Author(s):** Naime N. Altay
- **Journal:** European Journal of Oncology Nursing
- **Purpose:** To determine the effect of the drawing and writing technique on the anxiety level of children undergoing cancer treatment in hospital.
- **Sample (e.g., # of participants, ages, diagnoses):** n = 30, children aged 9-16, diagnoses: childhood cancer & leukemia
- **Study Design:** quasi-experimental
- **Description of Interventions:** "Drawing, writing and mutual story-telling techniques were used as part of a five-day programme. Children were asked to draw a picture of a hospitalised child and write a story about this drawing. After drawing and writing, mutual storytelling were used to more constructive story with positive feelings. The drawing, writing techniques was implemented on the first and third days of the programme and mutual storytelling was implemented on the second and fourth days."
- **Outcome measured (e.g., pain, anxiety):** anxiety
    - **Tools used:** State Anxiety Inventory
- **Results:** anxiety scores lowered after intervention showing that the intervention decreases anxiety levels in the sample population.

- **ID#:** 4
- **Article title:** The Effects of Interactive Music Therapy on Hospitalized Children with Cancer: A Pilot Study
- **Author(s):** Barrera, M. E., Rykov, M. H., & Doyle, S. L.
- **Journal:** Psycho-Oncology
- **Purpose:** "This pilot study is a preliminary exploration of the effectiveness of interactive music therapy in reducing anxiety and increasing the comfort of hospitalized children with cancer."
- **Sample (e.g., # of participants, ages, diagnoses):** n = 65, children aged 6 months - 17 years, diagnoses: leukemia, brain tumors, lymphoma, osteogenic sarcoma, Ewing's sarcoma, and neuroblastoma
- **Study Design:** pre- and post-intervention evaluation
- **Description of Interventions:** "Music therapy involved live, interactive and developmentally appropriate music-making…aimed at facilitating expression of feelings, reducing distress and promoting well being."
- **Outcome measured (e.g., pain, anxiety):** mood/feelings,
    - **Tools used:** faces pain scale (Bieri et al., 1990)
    - "The Satisfaction Scale"
- **Results:** music therapy may possess benefits for pediatric oncology patients.

APPENDIX E

Quality Appraisal Tool

JBI CRITICAL APPRAISAL CHECKLIST FOR QUASI-EXPERIMENTAL STUDIES

Reviewer_____Date_____

Author _____Year_____ Record Number_____

	Yes	No	Unclear	Not applicable
1. Is it clear in the study what is the 'cause' and what is the 'effect' (i.e., there is no confusion about which variable comes first)?	□	□	□	□
2. Were the participants included in any comparisons similar?	□	□	□	□
3. Were the participants included in any comparisons receiving similar treatment/care, other than the exposure or intervention of interest?	□	□	□	□
4. Was there a control group?	□	□	□	□
5. Were there multiple measurements of the outcome both pre and post the intervention/exposure?	□	□	□	□
6. Was follow up complete and if not, were differences between groups in terms of their follow up adequately described and analyzed?	□	□	□	□
7. Were the outcomes of participants included in any comparisons measured in the same way?	□	□	□	□
8. Were outcomes measured in a reliable way?	□	□	□	□
9. Was appropriate statistical analysis used?	□	□	□	□

Overall appraisal: Include □ Exclude □ Seek further info □

Comments (Including reason for exclusion)

_____

_____

_____

_____

APPENDIX F

General Characteristics of Studies

Article	Country of Study	Publication Year	Study Design	Participants	Intervention Used
A randomized clinical trial of a modified mindfulness-based cognitive therapy for children hospitalized with cancer. Abedini et al.	Iran	2021	Randomized controlled trial (RCT)	*n* = 40, children ages 11 to 13, diagnosed with cancer and hospitalized; 21 boys and 19 girls; mean age was 12.12 years (*SD* = 0.93); 27.3% received chemotherapy, 66.7% received radiation treatment, and 6.1% received both	CBT: Mindfulness-based cognitive therapy for children (MBCT-C)
The effect of drawing and writing technique on the anxiety level of children undergoing cancer treatment. Altay et al.	Turkey	2017	Quasi-experimental design (pre- and post-intervention evaluations of a single group)	*n* = 30, hospitalized children aged 9-16 years; average age of children was 12.56 years ± 2.67 and 76.7% were girls. Most of the children (50%) had leukemia and were receiving chemotherapy (66.7%)	Therapeutic play: Drawing, writing and mutual story-telling
The effects of interactive music therapy on hospitalized children with cancer: A pilot study. Barrera et al.	Canada	2002	Pilot study (pre- and post-intervention evaluation), mixed methods	*n* = 65, admitted pediatric oncology patient; 33 girls and 32 boys, ranging in age from 6 months to 17 years (*M* = 7 years, *SD* = 4.8 years); pre-school age between 0 and 5 years (*n* = 33), school age 6-10 years (*n* = 16), and teenage 11-17 years (*n* = 16); newly diagnosed (40%), receiving chemotherapy treatment (25%), palliative care (10%), and other treatment complications (25%); diagnoses included leukemias (*n* = 45) and other malignancies (*n* = 20)	Therapeutic play: Music therapy
Cognitive behavioral treatment for improving distress in pediatric oncology: A pilot study. Becerra et al.	Spain	2020	Controlled A-B-A-type clinical experiment with intra-subject replication	*n* = 9, pediatric oncology patients, ages 9-15, mean age was 13 (*SD* = 1.4) years, 58% boys, 42% girls	CBT

Article	Country of Study	Publication Year	Study Design	Participants	Intervention Used
A trauma-informed cognitive-behavioral intervention for pediatric oncology patients. Burns, K. D.	United States of America (USA)	2012	Prospective longitudinal study that utilized a single-subject, non-concurrent multiple baseline design	*n* = 5, children ages 9 to 15, previously diagnosed with cancer and have recently completed medical treatment for that diagnosis, mean age is 12.2 years	CBT: TF-CBT
The impact of cognitive interventions in reducing intensity of pain and distress, and improving quality of life of children with cancer. Farrokhnia et al.	Iran	2013	Clinical trial using pretest-posttest method and a control group	*n* = 41, children with a variety of cancers, ages 5 to 8; 21 (51.2%) were girls and 20 (48.8%) were boys; mean age of children was 78.2 ± 15.884 months (equivalent to 6.5 years)	CBT: Combined cognitive interventions
Pretend play as an intervention for children with cancer: A feasibility study. Frygner-Holm et al.	Sweden	2020	Mixed method design	*n* = 5, children between the ages of 4 and 10 years, with a cancer diagnosis	Therapeutic play: Pretend play intervention
Effectiveness of conventional cognitive-behavioral therapy and its computerized version on reduction in pain intensity, depression, anger, and anxiety in children with cancer: A randomized, controlled trial. Hamedi et al.	Iran	2020	RCT	*n* = 15, children aged 9-12 years, with cancer	CBT: Conventional CBT and computerized version
The effectiveness of therapeutic play, using virtual reality computer games, in promoting the psychological well-being of children hospitalised with cancer. Li et al.	China	2011	Non-equivalent control group pretest-post-test, between subject design	*n* = 122, Hong Kong Chinese children, 8-16 years of age, admitted to a pediatric oncology ward for the treatment of cancer, mean age of experimental group is 11.6 years and 12.1 years for control group	Therapeutic play: Virtual reality computer games

Article	Country of Study	Publication Year	Study Design	Participants	Intervention Used
Creative arts therapy improves quality of life for pediatric brain tumor patients receiving outpatient chemotherapy. Madden et al.	USA	2010	Mixed methods pilot study	*n* = 16, children between 2 and 18 years of age, diagnosed with a brain tumor; 14 males and 4 females; diagnoses of low-grade astrocytoma (69%), primitive neuroectodermal tumor (19%), high grade glioma (12%)	Therapeutic play: Creative arts therapy (CAT)
The effect of therapeutic music on anxiety in children with acute lymphoblastic leukaemia. Polat et al.	Turkey	2014	Single-grouped pre-test, post-test quasi-experimental design	*n* = 28, children diagnosed with ALL, ages between 5 and 15; mean age of 8.67 ± 2.63; 10 females and 18 males	Therapeutic play: Therapeutic music
Psycho-art-drama: development and testing a new integrated complementary method of psychiatric treatments for hospitalised children with cancer (a case study). Purrezaian et al.	Iran	2020	Single-subject study (A-B type) design	*n* = 5, children aged 9-14 years with cancer	Therapeutic play: Psycho-art-drama (PAD)
Effects of cognitive behavioral therapy on psychological adjustment in Chinese pediatric cancer patients receiving chemotherapy. Zhang et al.	China	2019	RCT	*n* = 104, Chinese pediatric cancer patients receiving chemotherapy, aged 8 to 18 years	CBT

APPENDIX G

Findings/Results of Studies

Article	Intervention Details	Outcome Measured	Tools Used	Findings/Results
A randomized clinical trial of a modified mindfulness-based cognitive therapy for children hospitalized with cancer. Abedini et al.	Manualized MBCT-C, consisting of 20 sessions, each lasting 45 minutes. Sessions were conducted 5 times weekly for 4 weeks.	Internalizing problems (anxious/depressed, withdrawn/depressed, somatic complaints) and attention problems	Kiddie Schedule for Affective Disorders and Schizophrenia-Present and Life-time Persian version (K-SADS-PL-P), Child Behavior Checklist (CBCL), Parent Report, and Youth Self-Report (YSR)	MBCT-C group achieved significant reductions in internalizing and attention problems. Those gains were maintained at the 2-month follow-up.
The effect of drawing and writing technique on the anxiety level of children undergoing cancer treatment. Altay et al.	Five-day therapeutic program consisted of drawing, writing, and mutual storytelling techniques.	Anxiety	State Anxiety Inventory	The State Anxiety Inventory mean score (38.63 ± 4.38) of children after the program were decreased when compared to the mean score at the beginning (42.63 ± 4.64) ($Z = -4.57$, $p < 0.05$)
The effects of interactive music therapy on hospitalized children with cancer: A pilot study. Barrera et al.	1-3 music therapy sessions, each lasting 15-45 minutes. Music therapy involved live, interactive and developmentally appropriate music-making	Feelings	Children's ratings of their feelings, FACES pain scale	Patients' ratings suggested a general improvement in the child's play activity after music therapy
Cognitive behavioral treatment for improving distress in pediatric oncology: A pilot study. Becerra et al.	Individual psychological treatment with cognitive-behavioral foundation. Components and techniques include breathing, relaxation, emotional education, imagination, distraction, and test of techniques learned.	Coping with pain and anxiety	Eysenck Personality Questionnaire-Junior (EPQ-J), Child Behavior Check List (CBCL), Youth Self Report (YSR), State-Trait Anxiety Inventory for Children (STAIC), Positive and Negative Affective Scale (PANAS)	Results clearly show effectiveness of treatment for significantly lowering anxiety.

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A trauma-informed cognitive-behavioral intervention for pediatric oncology patients. Burns, K. D.	6 sessions of TF-CBT, each lasting approximately 2 hours, with one session per week	Mental health sequelae	Child PTSD Symptom Scale (CPSS), Children's Depression Inventory (CDI), Multidimensional Anxiety Scale for Children (MASC), Children's Somatization Inventory (CSI-24)	Given the study design and sample size, statistical analyses examining change as a result of the intervention are limited. Positive treatment effects were established for some, but not all participants.
The impact of cognitive interventions in reducing intensity of pain and distress, and improving quality of life of children with cancer. Farrokhnia et al.	Cognitive interventions (including parent information booklet, and child's distraction through cartoons, maze and painting short story pictures)	Pain, distress, quality of life	Oucher pain intensity scale, Children's Hospital of Eastern Ontario Pain Scale (CHEOP) scale, and Peds QLTM VAS	Cognitive interventions had a significant effect on the trial group at $P<0.001$. Interventions had been effective in reducing reported intensity of pain and level of distress, and improving quality of life of children with cancer.
Pretend play as an intervention for children with cancer: A feasibility study. Frygner-Holm et al.	Six to eight sessions, each approximately 25 to 35 minutes of pretend play intervention.	Self-efficacy, quality of life	Self-efficacy questionnaire, Health-Related Quality of Life (HRQOL), Pediatric Quality of Life Inventory (PedsQL)	Results suggest that the play intervention was enjoyable. Measures indicate small improvements regarding self-efficacy and equal or increased quality of life for participants.
Effectiveness of conventional cognitive-behavioral therapy and its computerized version on reduction in pain intensity, depression, anger, and anxiety in children with cancer: A randomized, controlled trial. Hamedi et al.	CBT: six 45 minute psychological sessions cCBT: guidebook, compact disk with contents of all six CBT sessions, psychoeducation and training	Pain, depression, anxiety	Wong-Baker Faces Pain Rating Scale, Children's Depression Inventory, State-Trait Anger Expression Inventory (STAXI), State-Trait Anxiety Inventory (STAI)	Both CBT and its computerized version could reduce depression, anxiety, anger, and pain. CBT was more effective in the reduction of anger.

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The effectiveness of therapeutic play, using virtual reality computer games, in promoting the psychological well-being of children hospitalised with cancer. Li et al.	30-minute therapeutic play intervention using virtual reality computer games daily (five days a week).	Anxiety, depressive symptoms	Chinese Version of the State Anxiety Scale for Children (CSAS-C), Center for Epidemiologic Studies Depression Scale for Children (CES-DC)	Results showed that children that received intervention reported statistically significant fewer depressive symptoms than the children that did not receive intervention. The results, however, find no differences in children's anxiety scores.
Creative arts therapy improves quality of life for pediatric brain tumor patients receiving outpatient chemotherapy. Madden et al.	Six sessions, 2 sessions of each modality of CAT. Each session lasted for 1 hour and occurred weekly.	Quality of life, mood, emotional reactions	Pediatric Oncology Quality of Life Inventory (PedsQL), Faces scale, Emotional Reactions Checklist	Results indicate that children undergoing chemotherapy may benefit therapeutically from CAT during infusions.
The effect of therapeutic music on anxiety in children with acute lymphoblastic leukaemia. Polat et al.	Therapeutic music session, consisting of 15-30 minutes of the Four Seasons.	Anxiety	Visual Analog scale (VAS)	Anxiety of post-test measures decreased from pre-test measures for all age groups, and the difference was found to be statistically significant. Results showed that therapeutic music helped the children to endure the amount of perceived anxiety.
Psycho-art-drama: development and testing a new integrated complementary method of psychiatric treatments for hospitalised children with cancer (a case study). Purrezaia et al.	Family-based PAD in eight sessions, duration of each session varied from 40 to o60 minutes.	Biological, psychological, and social expressions of incompatibility	Bio-psycho-social expressions of incompatibility in hospital (BPSEIH)	Results showed that PAD was significantly effective in reducing the bio-psycho-social expressions of incompatibility in the hospital (BPSEIH)

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Effects of cognitive behavioral therapy on psychological adjustment in Chinese pediatric cancer patients receiving chemotherapy. Zhang et al.	CBT consisted of cognitive therapy, relaxation training, and effect evaluation. Lasted for 5 weeks.	Psychological adjustment	Conner-Davidson resilience scale (CD-RISC), Depression anxiety stress scale (DASS)	Study demonstrated that the family-children centered CBT model improved the PA of children with cancer more effectively than routine psychological care. CBT lowered scores of depression, anxiety, and stress.