



## The effectiveness of play therapy in children with leukemia: A systematic review

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### ABSTRACT

**Problem:** Leukemia is the most common form of childhood cancer worldwide. Children living with leukemia experience various problems because of the disease's progression, harmful effects of treatment, and prolonged hospitalization process. To increase their well-being and alleviate their problems, these children require ongoing support. One solution that both parents and professionals can use is play therapy. This systematic review aimed to identify the type and effectiveness of play therapy in children living with leukemia.

**Eligibility criteria:** We searched PubMed, Scopus, ScienceDirect, and ProQuest databases. Additionally, we performed manual searches on Google Scholar, Google Web, and grey literature. Inclusion criteria comprised: 1) Studies that implemented play therapy on leukemia children, 2) Full-text articles available in English or Indonesian languages from January 2000 to December 2021 and updated until July 2023, and 3) Intervention studies employing quasi-experimental or randomized controlled trial (RCT) designs.

**Sample:** From 1099 articles, 16 studies were selected. Several forms of play therapy were found, including pretend, music, art, and sand play therapy.

**Results:** Of the sixteen studies in this systematic review, fifteen demonstrated beneficial effects on psychological issues, particularly anxiety, despair, stress, and physical problems (fatigue and pain).

**Conclusion:** Play therapy effectively alleviates some physical and psychosocial problems in children living with leukemia.

**Implication:** Nurses can utilize play therapy as an intervention for children living with leukemia. Additionally, comparative research is recommended with a similar research strategy concerning studies with the same design. Systematic review registration: PROSPERO CRD42022318549.

### Introduction

Leukemia is the most common malignancy in childhood and accounts for almost 30% of all childhood cancers (Kaplan, 2019). Global Cancer Observatory (2020) reported that the number of new cases of leukemia in children aged 0–14 years was 67,008, or around 32.5% of all new cases of childhood cancer worldwide (GLOBOCAN, 2020). This disease arises because of the proliferation of hematopoietic cells leading to bone marrow failure (Seth & Singh, 2015). There are four types of leukemia, namely acute myeloblastic leukemia (AML), chronic myeloblastic leukemia (CML), acute lymphoblastic leukemia (ALL), and

chronic lymphoblastic leukemia (CLL), but the highest incidence suffered by children is the ALL type, with an average incidence close to 30 cases per 1 million people (Kaplan, 2019).

Leukemia in children causes various issues due to the disease's progression, adverse effects of treatment, and the drawn-out hospitalization process (Metayer et al., 2016). It is considered one of the chronic diseases in children. A previous review found that children with chronic diseases had more problems than healthy children (Pinquart & Shen, 2011). A study conducted in Mexico on children living with leukemia aged 8–14 years revealed that 43.2% experienced depression, while 10% experienced anxiety (Vasquez et al., 2022). In the general population,

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the prevalence of depression among children aged 3–17 years in America is only about 3.9% (Heo et al., 2022). Myers et al. (2014) found the prevalence of anxiety in children living with leukemia one month after diagnosis reaches 25.2%, which is much higher than anxiety in the normal population of children, which is only around 15% (Myers et al., 2014). Another study reported that all children living with leukemia experienced the highest anxiety related to the procedure one month after diagnosis and decreased over time (Dupuis et al., 2016). These findings provide evidence that children living with leukemia are more prone to psychosocial, emotional, and mental problems compared to their peers of the same age, and if the issue is not resolved, it can have an impact on the quality of life of children (Baytan et al., 2016; Grasaas et al., 2022; Polańska et al., 2020). Besides that, children who exhibit depressive symptoms are more vulnerable to physical and mental health problems, behavioral and social issues into adulthood (Burgin & Ray, 2022).

Play is a primary and essential activity of childhood (Koukourikos et al., 2015; Nabors & Kichler, 2015; Pidgeon et al., 2015), happening universally and constantly across various settings, even in hospitals (Landreth, 2012). Play is critical for the proper development of children because it has numerous developmental benefits, including physical, emotional, cognitive, and social (Nijhof et al., 2018). Play has been characterized as a means by which children explore their social and physical surroundings, interact with others, and develop their social and cognitive abilities (Gariépy & Howe, 2003). Play for sick children in the hospital will promote their overall physical and emotional welfare. It aids in exploring matters of children's hospital experiences and mitigates the intensity of negative emotions commonly associated with admission and hospital stays (Koukourikos et al., 2015).

To reduce the psychological problems induced during their hospitalization, the progress of diseases, and chemotherapy, children with leukemia must receive adequate and atraumatic treatment for their recovery (Hsiao et al., 2019). Hospital play therapies have been broadly applied to prepare children for hospitalization and invasive medical procedures (Godino-Iáñez et al., 2020; Li et al., 2016). Playing can still be done even while a child is hospitalized since it helps them deal with unfamiliar situations, express their emotions, and feel safer and easier coping with medical procedures and treatments (Landreth, 2012).

Play therapy, which therapists use to address various emotional and behavioral issues, may provide an approach to improve the psychosocial outcomes for children with chronic health conditions such as leukemia (Ray et al., 2001). Play therapy is a set of interventions to improve a child's well-being while hospitalized (Godino-Iáñez et al., 2020). Play therapy adheres to the theory of child-centered care, which provides health care, education, or support services that prioritize the child's involvement in decision-making and considers their needs, preferences, and development. According to this approach, play therapy actively incorporates children, making them the central focus of care implementation (Coyne et al., 2018).

Play therapy has been developed for a long time, and several studies concerning its beneficial effects have been done. The initial documented instance of using play and a psychological approach to treat a child was presented in Sigmund Freud's 1909 publication, which detailed the renowned case of "Little Hans," a 5-year-old boy with a phobia. Following this, Ana Freud and Melanie Klein began employing play to foster a bond with the child and establish an alliance. Anna Freud emphasized the significance of nurturing an emotional connection between the child and the therapist before interpreting the hidden motivations underlying the child's drawings and play (Landreth, 2012). They included plays in their psychoanalytic treatment of children (Pidgeon et al., 2015).

Several previous reviews have explained the use of play therapy in children. A systematic review of play therapy showed that play therapy as a form of prevention and treatment is suitable mainly for preschool and school-age children (Koukourikos et al., 2021). Other reviews concluded that play therapy had a significant positive effect on

hospitalized children (Godino-Iáñez et al., 2020; Ibrahim et al., 2020a). This result is also supported by a meta-analysis that showed a small to moderate effect of play therapy (Jensen et al., 2017). However, another systematic review of children with chronic diseases could not conclude the effects of play therapy because of the variety of studies and the small sample sizes (S. Thomas, White, Ryan, & Byrne, 2022). Based on several previous studies, it has been elucidated that play therapy holds significant benefits for sick children. However, to our knowledge, the review of play therapy on children living with leukemia has never been done before. Therefore, conducting this review becomes imperative. This systematic review aimed to identify play therapy effectiveness in leukemic children in hospital settings.

## Methods

### Aims

This review aims to identify the nature, quality, and effectiveness of play therapy in children living with leukemia in hospitals.

The research questions are:

- What type of play therapy is used in children living with leukemia?
- How is play therapy implemented in children living with leukemia?
- What is the effectiveness of play therapy in reducing psychosocial problems and improving the quality of life of children living with leukemia?

### Study design

This systematic review was registered with the International Prospective Register of Systematic Reviews (PROSPERO) (Record #CRD42022318549), and we followed Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) criteria (Page et al., 2021).

### Data source and search

A literature search was conducted in Scopus, Science Direct, PubMed, and ProQuest on February 19th, 2022, and included articles published from 2000 until December 2021. Then we updated the search to articles published in July 2023. In addition, the search was also done manually by searching Google Scholar, Google Website, and any related dissertations in the grey literature. The researchers used keywords adapted to PICO (Participants, Interventions, Comparison, Outcomes) and considered the available MeSH terms. The keywords used were "play therapy", "therapeutic play", "leukemia", "child" and "children". Furthermore, Boolean operators such as "AND" and "OR" and truncation were used to make the search easier. All obtained articles were exported into End Note 20, and duplicated articles were removed automatically.

### Study selection

Two independent researchers (SR and WL) selected the articles based on the inclusion and exclusion criteria. The inclusion criteria of the studies were as follows: 1) The population: children living with leukemia aged 3–18 years. Although ALL was the most common type of childhood leukemia (Perdana et al., 2020), we included all types of leukemia. 2) All types of play therapy or therapeutic play (such as sand play, puppet play, music, art, toys, pretend play, craft, and role play) performed individually or in groups, and 3) Routine care or standard care as the control of choice in these studies. 4) Main outcomes are psychological and social problems that often occur in children with leukemia, such as anxiety, fear, depression, stress, decreased quality of life, and physical impacts as secondary outcomes. 5) All types of research designs that use interventions such as randomized controlled trials (RCT), Non-RCT, quasi-experiment, pre-experimental studies with the control group, and pre-post studies. We excluded articles written in languages other than English and Indonesian and articles we cannot access for full text. Two

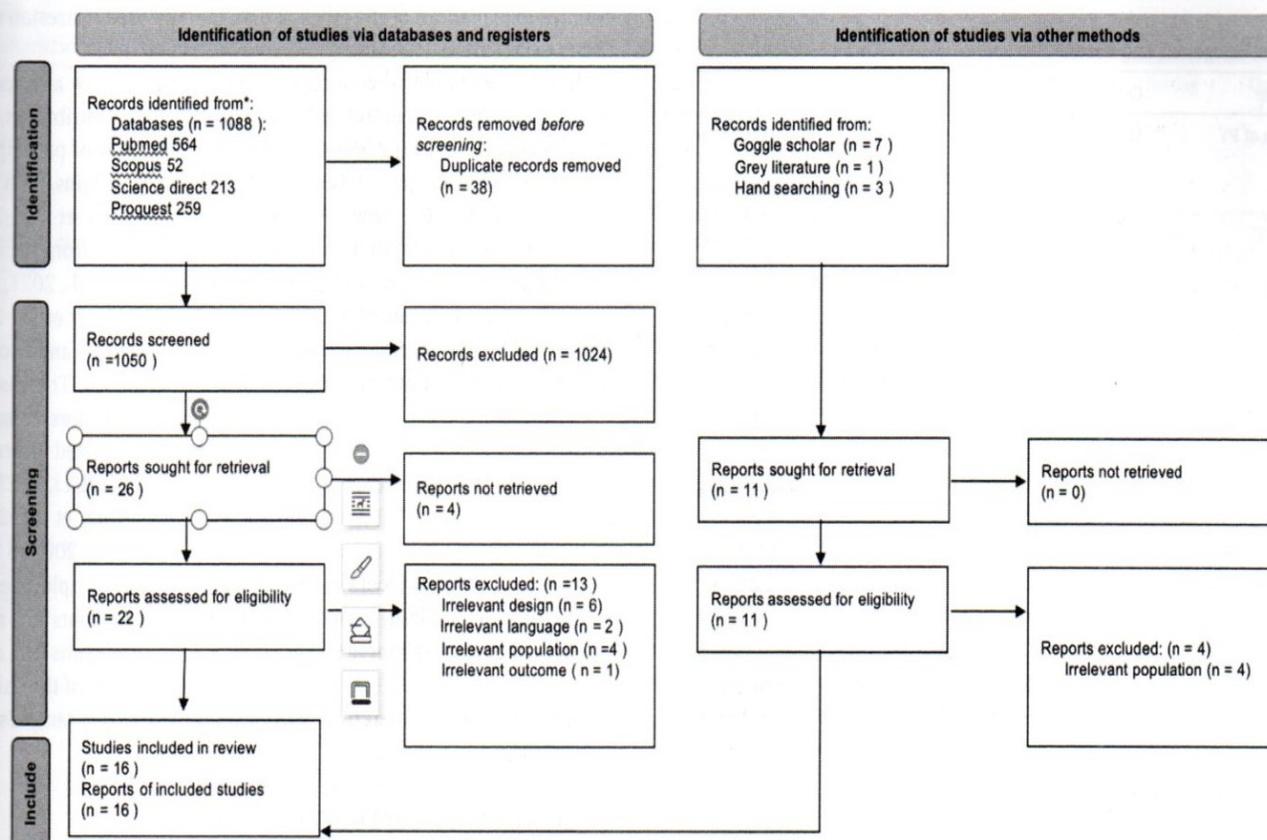


Fig. 1. PRISMA flow chart (Page et al., 2021).

reviewers independently performed the initial selection from the database. The first selection was conducted based on the title and abstract. Based on these criteria, the results were filtered again to see the availability of full-text articles. The full-text article obtained was then re-evaluated to see its suitability with the established eligibility criteria. If there was disagreement, it was resolved by discussion with the 3rd reviewer.

#### Quality appraisal

Each selected article was then independently assessed on its methodology's quality by SR and WL. If there were disagreements in this assessment, a discussion was held with the 3rd researcher (FH) to reach a consensus. The instrument appraisal from Joanna Briggs Institution (JBI) was used to assess the quality of studies, adapted to the research design used in each included study. JBI evaluation for research with a quasi-experimental design consists of nine questions that must be answered with "yes", "no", "unclear", or "not applicable". The RCT studies were reviewed by the JBI evaluation, which has thirteen question items. The mixed-method research was reviewed by the JBI for qualitative research with ten questions (JBI, 2020). The results of this assessment are not the reason to exclude articles from this review but to provide an overview of the quality of the evidence or the results provided for each of these articles.

#### Data extraction

Using a study-specific data extraction form, two authors (SR & WL) independently extracted data for the included studies. All study characteristics included the type and details of play therapy, and outcome measures were extracted. From all of the articles included, the following data were extracted: 1) authors, year, country, study design, sample, and inclusion/exclusion criteria, type of play therapy, and quality of paper; 2) play therapy characteristics, such as session type (individual or group, duration, number, frequency), therapy provider, materials used, and play therapy procedures; and 3) Primary and secondary outcome variables, results, and conclusions.

#### Data synthesis

A narrative synthesis was conducted because the selected articles varied significantly (Rodgers et al., 2009). Narrative synthesis is a methodology used in systematic reviews and synthesis of findings from multiple studies. It primarily relies on using words and text to summarize and elucidate the results of the synthesis (Popay et al., 2006). This method can accommodate many study designs and outcome assessment methods. Meta-analytic approaches were impossible due to study heterogeneity and insufficient inferential statistics reporting.

In addition, this study also involved thematic content analysis of the collected data. Content thematic analysis is used to identify the main patterns and themes that emerge from the data analysed. This approach was chosen because it allows the researcher to explore the qualitative aspects of the research that are relevant to the research question (J. Thomas & Harden, 2008).

#### Results

In the data collection phase, a comprehensive search was conducted across four databases, identifying 1088 articles related to play therapy. Eleven papers were also retrieved through manual searches of grey literature and google scholar. Furthermore, we searched for duplicate articles using the reference manager (End Note 20) and also manual search and found 38 articles which we then removed. Next, the screening process involved evaluating titles and abstracts of the initially identified articles, resulting in a total of 37 articles that were further assessed. Of the 37 articles, 33 articles were received in full text format. After a thorough full-text review, These 33 articles underwent a comprehensive qualitative analysis, resulting in the inclusion of 16 articles for the final analysis and 17 articles being excluded for several reasons. To ensure transparency and reproducibility, we followed the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines. Fig. 1 depicts the PRISMA flow chart, providing a clear overview of the article selection process. Additionally, as the result of the thematic content analysis, we represent all the themes, categories and codes in Table 1.

To address the research questions, this review's outcomes are

**Table 1**  
Themes, categories, and codes.

Theme	Categories	Codes
Types of PT	Music therapy	Children given music according to their ages
	PT based an occupational therapy	Each session children can choose 1–2 play activities. When finished, the child is asked to explain what has been done
	Pretend PT	The facilitator plays with the children in the room with various toys. For each session, 3–4 stories based on imagination, medical conditions, or medical games are used followed by playing based on those stories
	Cognitive behavioral therapy	Eight session play therapy), begin with introduction of the therapist until creating creativity and eliminating the fear of chemotherapy by using these devices as toys.
	Art therapy	Sand play, drawing or coloring, or puppets
	PT using various tool	Children play with various toys
	Virtual reality	Children are invited to do various play activities but use virtual reality
Implementation of PT	Duration of intervention	The shortness intervention is two weeks, while the longest is two months
	Number of sessions	One session is the shortness session in play therapy and the longest one is 24 sessions
	Duration of sessions	The duration of each session is about 25–60 min
	Play equipment's	Seven studies (43%) used drawing and coloring tools as play equipment, three research (25%) employed medical dolls and/or toys, while the remaining studies (33%) used sand play, hand puppets, puzzles, virtual reality, and percussion instruments.
	PT providers	Seven studies conducted by researcher, and the other conduct by specific therapist.
Effectiveness of PT	Reducing psychosocial problem	Decrease the level of anxiety Decrease stress Reduce depression and social problem Increase self-esteem Affected children adjustment Increasing quality of life
	Positive response to the physical condition	Reduces pain and fatigue Decreasing pulse rate, respiratory rate, and blood pressure

presented systematically through three tables. Firstly, Table 2 illustrates the various types of play therapy, followed by Table 3, which outlines the specific characteristics of interventions implemented within each type. Lastly, Table 4 provides a comprehensive overview of the outcomes observed in each study.

### Types of play therapy

Regarding the characteristics of the included studies, Table 2 presents the different types of play therapy employed in the 16 studies. These include music therapy (Barrera et al., 2002), play therapy based on occupational therapy (Mohammadi et al., 2021), pretend play therapy (Frygner-Holm et al., 2020), cognitive-behavioral play therapy (Alavi et al., 2021; Mehrara et al., 2018), art therapy (Arief et al., 2019; Favara-Scacco et al., 2001; Ilieová et al., 2015; Rahmawati, 2019; Fitriani et al., 2017; Tan et al., 2021; R. Li, 2023) and play therapy using various tools and virtual reality (Gariépy & Howe, 2003; W. H. Li et al., 2011). However, it should be noted that two articles did not provide

detailed explanations of the types of play therapy used (Gazestan et al., 2021; Gopi, 2012).

In addition to the type of play therapy at tabel 2, we also include other article characteristics such as the geographical distribution, publication years, research designs, sample sizes, and ages of participants. We categorized the studies based on their geographic origins, with three articles from the European continent (Favara-Scacco et al., 2001; Frygner-Holm et al., 2020; Ilieová et al., 2015), eleven from Asia (Tan et al., 2021; W. H. Li et al., 2011; Gopi, 2012; Gazestan et al., 2021; Alavi et al., 2021; Rahmawati, 2019; Fitriani et al., 2017; Arief et al., 2019; Mehrara et al., 2018; Mohammadi et al., 2021; R. Li, 2023) and two from America (Barrera et al., 2002; Gariépy & Howe, 2003). The research designs varied, with twelve articles adopting a quasi-experimental design with a control group, two employing randomized controlled trials (RCTs) (Mohammadi et al., 2017; Tan et al., 2021; R. Li, 2023) and one utilizing a mixed methods approach (Frygner-Holm et al., 2020). The publication years of the selected articles ranged from 2001 to 2023, reflecting a broad range of research in this field. The sample sizes also varied, with the smallest sample consisting of 4 participants in a mixed methods study and the largest consisting of 122 participants in a quasi-experimental study (W. H. Li et al., 2011). The age range of the children included in the studies was from 2 to 18 years, with a total sample size of 627 children.

### The characteristic of play therapy intervention

Table 3 provides an overview of the characteristic of play therapy intervention, namely duration, equipment's used, and educational background of providers. Regarding the number and duration of play therapy sessions, the studies varied widely. The number of sessions ranged from 1 to 24, with each session lasting between 25 and 60 min. The total duration of play therapy intervention was reported in 8 articles, with the longest duration being two months and the shortest duration was two weeks. According to the findings of this review, seven studies (43%) used drawing and coloring tools as play equipment, four research (25%) employed medical dolls and/or toys, while the remaining studies (32%) used sand play (Tan et al., 2021), hand puppets (Ilieová et al., 2015), puzzles (Fitriani et al., 2017), virtual reality (W. H. Li et al., 2011), and percussion instruments (Barrera et al., 2002). The play therapy providers encompassed researchers with diverse educational backgrounds, including nurses, psychologists, art therapists, play therapists, music therapists, occupational therapists, and physical therapists.

### The Outcomes of the included studies

The aims of the studies varied, but most measured psychosocial factors such as anxiety, hospitalization stress, and depression. Other aspects studied were self-esteem, expectations, mood, self-efficacy, play behavior, and quality of life. In three other articles, secondary outcomes related to physical impacts were also found, including fear parameters seen from heart rate, respiratory rate, and blood pressure (Ilieová et al., 2015), pain tolerance, and fatigue (Mehrara et al., 2018; Alavi et al., 2021; Mohammadi et al., 2021; R. Li, 2023). Table 4 explains the outcome summary of the studies. Next, a narrative explanation will be explained about the outcome of each included study.

### The effect of play therapy on anxiety

Most of the articles in this review mention that play therapy positively affects children's anxiety. Various research results reported that the use of play therapy using sand (Tan et al., 2021), a pilot study using play based on daily work (Mohammadi et al., 2021), and playing using puzzles (Fitriani et al., 2017) could decrease the level of anxiety in children living with leukemia. In addition, two other articles also explain that play therapy using dolls, toys, and drawing tools can reduce anxiety (Gazestan et al., 2021; Mehrara et al., 2018; R. Li, 2023). One article found no significant difference between playing traditional

**Table 2**  
Characteristics of the included studies.

(Author, Year) Country	Participants Total Number Age Group or Average Age	Aim	Types of Study Design	Inclusion(I) and Exclusion (E) Criteria	Technique for Sampling	Type of Play Therapy	Setting	Quality of the Paper
Ilievová et al. (2015) Slovakia	20 3.7 years	To investigate whether a psychological preparation through drama therapy and the therapeutic puppet may reduce the anxiety and fear related to diagnostic and therapeutic procedures	Quasi-experimental design with a control group	I: (1) Diagnosis of oncological diseases requiring hospitalization, (2) preschool or early school age, and (3) patient & parent agreement to participate in the study. E: Not mentioned	Consecutive sampling	Drama/puppet therapy	Hospital	JBI <sub>1</sub> : 7/9
Favara-Scacco et al. (2001) Italia	49 2–14 years	To prevent an increase in children's fear and anxiety in the face of painful and repetitive actions, to help children to cooperate better, and improve the quality of life during treatment, help children and parents during the adaptation process to traumatic actions, and to explore their coping abilities, and to prevent developmental disorders in children	Quasi-experimental design with a control group	I: (1) Children aged 2–14 years, (2) patients with leukemia, and (3) candidates for lumbar puncture or BMA (bone marrow aspiration).	NM	Art therapy	Hospital	JBI <sub>1</sub> : 7/9
Frygner-Holm et al. (2020) Germany	4 5–8 years	To develop and evaluate the feasibility and acceptance of "pretend play therapy" in children with cancer	Feasibility study (mixed methods)	I: (1) Children aged 4–10 years, (2) have a diagnosis of cancer, and (3) are interested in active play. E: (1) children who are too tired to play, and (2) cannot speak Swedish fluently.	NM	Pretend play therapy	Hospital	JBI <sub>3</sub> : 7/10 JBI <sub>4</sub> : 8/8
Tan et al. (2021) China	60 6–12 years	To assess the clinical effectiveness of playing with sand in school-age children with chronic diseases who have behavioral and emotional problems	RCT	I: (1) Children aged 6–12 years with a diagnosis of leukemia or chronic kidney disease, (2) the total CBCL score exceeds the score in normal Chinese, (3) children and caregivers speak Chinese and can fill out the questionnaire. E: Children and caregivers could not communicate well with the researcher, (2) the patient was in critical condition, (3) refused to participate in the research	Random sampling	Sand play	Hospital	JBI <sub>2</sub> : 9/13
Mohammadi et al. (2021) Iran	25 7–12 years	To identify the effect of play-based occupational therapy on the symptoms and daily activities of children with cancer who are treated and undergoing chemotherapy	RCT	I: (1) Aged 7–12 years, (2) diagnosed with one type of childhood cancer, (3) had a history of chemotherapy in the hospital, (4) returned to the oncology room for chemotherapy, (5) had a minimum score of 4 for pain and fatigue and 3 for anxiety, (6) fluent in reading and writing and in Persian. E: (1) Changes in chemotherapy protocol, (2) unwillingness to	Random sampling	Play-based occupational-therapy	Hospital	JBI <sub>2</sub> : 11/13

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Table 2 (continued)

(Author, Year) Country	Participants Total Number Age Group or Average Age	Aim	Types of Study Design	Inclusion(I) and Exclusion (E) Criteria	Technique for Sampling	Type of Play Therapy	Setting	Quality of the Paper
W. H. Li et al. (2011) China	122 8–16 years	To examine the effectiveness of the use of therapeutic play using virtual reality on reducing symptoms of anxiety and depression in children with cancer being treated in Hong Kong	Non-equivalent control group pre-test–post-test	cooperate in studies of >2 treatment sessions. I: (1) Aged 8–16 years, (2) able to speak Cantonese and read Chinese writing, and (3) diagnosed with cancer at least 2 months and currently undergoing treatment. E: Patients with learning and cognitive problems	NM	Play therapy with virtual reality	Hospital	JB1 <sub>1</sub> : 8/9
Gariépy and Howe (2003) Canada	22 3.1–5.5 years;	To determine the therapeutic effect of playing on leukemia children aged 3–5 years compared to healthy children.	Observational design with control group	I: (1) children aged 3–5 years, and (2) diagnosed with leukemia for 1 year for the intervention group	Nonrandom (matching age & gender)	Play therapy	Hospital and day care	JB1 <sub>1</sub> : 6/9
Barrera et al. (2002) Canada	65 6 month–17 years	(1) To examine the general benefits of music therapy in cancer children who are hospitalized, (2) to determine the effect of music therapy on reducing anxiety and increasing positive mood in cancer children who are hospitalized.	Pilot study, pre-post intervention with control	NM	NM	Music therapy	Hospital	JB1 <sub>1</sub> : 6/9
Gopi (2012) India	60	(1) To assess the level of stress among the children before and after giving play therapy between the age group of 8–18 years with leukemia, (2) to evaluate the effectiveness of play therapy on reduction of stress among the leukemic children, (3) to find out the interrelationship between physical, psychological, social and spiritual level of stress, and (4) To find out the association between the level of stress and selected demographic variables such as age of the client, gender, educational status of the children, religion, type of family, family monthly income (in rupees), number of children in the family, type of leukemia, duration of illness, frequency of hospitalization, place of residence, method of food preparation, family history of cancer and habit of consuming Jung foods.	Pre experimental one group pretest and posttest design	I:(1) Children in the age group of 8–18 years, (2) Children those who were willing to participate in this study, (3) Both male and female children were included, (4) Children who were residing in Nagercoil. E: (1) Children who were not willing to participate in this study, (2) Children in the age group of below 8 years and above 18 years, and (3) Children with newly diagnosed leukemia.	Purposive sampling	Play therapy	Hospital	JB1 <sub>1</sub> : 6/9
Gazestan et al. (2021) Iran	30 8–12 years	To evaluate effectiveness of group play therapy on anxiety in children with leukemia	Quasi experiment approach with pre-test-post-test design and a control group	I:(1) Age range 8–12 years, (2) hospitalization in the blood and oncology ward of Afzalipour hospital, (3) evidence of leukemia diagnosis in the medical record, (4)	Convenient sampling methods were randomly assigned to the two experimental and control groups	Play therapy (based on Hajjari educational package, 2010)	Hospital	JB1 <sub>1</sub> : 7/9

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Table 2 (continued)

(Author, Year) Country	Participants Total Number Age Group or Average Age	Aim	Types of Study Design	Inclusion(I) and Exclusion (E) Criteria	Technique for Sampling	Type of Play Therapy	Setting	Quality of the Paper
Arief et al. (2019) Indonesia	14 3–4 years	To reduce stress of hospitalization that occurs in children with leukemia	Quasi-experimental with pre-test-post-test design which consists of treatment and control group	symptom of anxiety according to the clinical interview criteria, and (5) parent and child satisfaction regarding the child's participation in the study. E: (1) the presence of physical problems preventing the child from participating in play therapy session and obtaining written consent from the participant's parent. I: (1) school age children (7–12) with leukemia, (2) get hospitalization over 2× in the pediatric ward, (3) not in a critical condition. E: not mentioned	Purposive sampling (children with score of adaptive response >50% will included)	Drawing play activities	Hospital	JB1: 7/9
Alavi et al. (2021) Iran	30 8–12 years	To evaluate the effectiveness of individual play therapy on hope, adjustment and pain response of children with leukemia	Quasi-experiment approach with pre-test-post-test design and a control group	I: (1) Being 8 to 12 years old, (2) having leukemia, (3) living with both parents, (4) no acute psychological illness and (5) no psychological treatment (based on medical files). E: (1) divorce of parents during study, (2) non-cooperation in completing the questionnaire and participation in the research, (3) absence of >2 session in play therapy.	Convenience sampling methods	Individual cognitive-behavioral play therapy	Hospital	JB1: 8/9
Mehrara et al. (2018) Iran	30 9–12 years	To determine the effectiveness of cognitive-behavioral play therapy on pain	Quasi-experiment approach with pre-test-post-test design and a control group	I: (1) Willingness to participate, (2) not having specific psychological problems or disorder at least one year of diagnosis, (3) hospitalization >3 times, and (4) high score in the questionnaire. E: Reluctance to attend the sessions.	Purposive sampling	Cognitive behavioral play therapy	Clinic	JB1: 7/9
Fitriani et al. (2017) Indonesia	14 3–6 years	To find out the effect of play therapy with puzzles to reduce anxiety level in pre-school age children undergoing chemotherapy	Pre-experiment one group pre-test-post-test design.	I: (1) Preschool age children with mild, moderate, or severe anxiety, (2) undergoing chemotherapy in consolidation phase. E: not mentioned	Consecutive sampling	Play therapy	Hospital	JB1: 6/9
Rahmawati (2019) Indonesia	30 4–11 years	To determine the effect of Art therapy on children's self-esteem with leukemia	Pre-experiment one group pre-test-post-test design.	I: (1) <b>Children with leukemia, (2) ages 4–12 years, and (3) at least 3 days hospitalized.</b> I: (1) aged between 8 and 14 years; (2) diagnosed with AL; (3) receiving chemotherapy; and (4) able to speak and understand Chinese. E: (1) were associated with	NM	Art therapy (drawing, coloring & story telling)	Hospital	JB1: 6/9
R. Li (2023) China	48 11 years	Aimed to explore the effects of Child Life intervention on the pain, anxiety, fatigue, and sleep disorder (PAFS) cluster in this population.	A prospective, parallel, single-blinded pilot RCT		Random sampling	Child life intervention (art therapy: role play & picture)	Hospital	JB1: 12/13

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Table 2 (continued)

(Author, Year) Country	Participants Total Number Age Group or Average Age	Aim	Types of Study Design	Inclusion(I) and Exclusion (E) Criteria	Technique for Sampling	Type of Play Therapy	Setting	Quality of the Paper
				other malignant tumors, severe organic craniocerebral syndrome, or psychiatric diseases; (2) had critical or unstable conditions that required special care from caregivers; (3) were enrolled in other clinical trials; and (4) had intellectual disabilities or other conditions that prevented them from participating.				

NM: Not mention, JBI: Joanna Briggs Institution, RCT: Randomized controlled Trial, JBI<sub>1</sub>: JBI for quasi-experiment, JBI<sub>2</sub>: JBI for RCT, JBI<sub>3</sub>: JBI for qualitative research, JBI<sub>4</sub>: JBI for quantitative studies.

games and virtual reality on children's anxiety with  $p > 0.05$  (W. H. Li et al., 2011).

#### Effect of play therapy on stress

Play therapy using picture books such as "My Activity Book" significantly reduce hospitalization stress with  $p = 0.0001$  (Arief et al., 2019). Another study also found that playing therapy in 60 children decreased stress, measured using a modified perceived stress assessment (Gopi, 2012). Social and cognitive games performed with 22 children with leukemia could also reduce stress compared to healthy children (Gariépy & Howe, 2003).

#### Effects of play therapy on depression

The effect of play therapy on depression was identified in two articles. Research using sand as play therapy for two months in children with leukemia reduce depression and social problems (Tan et al., 2021). An RCT using virtual reality among children living with leukemia found a significant difference between the level of depression in the intervention group and the control group (W. H. Li et al., 2011).

#### Effects of play therapy on other psychosocial responses

One study showed a more positive change in children's behavior in children living with leukemia who underwent bone marrow aspiration procedures after playing therapy using art therapy (Favara-Scacco et al., 2001). Another study that used art therapy showed a significant increase in the value of children's self-esteem scores between pre-intervention and post-intervention (Rahmawati, 2019). A study using cognitive-behavioral play therapy significantly affected children's adjustment (Alavi et al., 2021).

Quality of life is one of the outcomes that one of the studies in this review aimed to measure. The study that aimed to determine the quality of life of children conducted a feasibility design using a mixed-method approach on four children living with leukemia. This study used pretend play therapy, namely playing based on a predetermined story. After eight sessions, there was a slight increase in children's self-efficacy. However, the effect of quality of life varied, some remained the same, and some increased. In addition, none experienced an increase in worry about the side effects of this game (Frygner-Holm et al., 2020).

#### The effects of play therapy on the physical responses (vital signs, pain, fatigue, and physical mobility)

Six studies that aim to determine the physical response of children with leukemia to play therapy have shown a positive response. For

example, research on 20 preschool-aged children living with leukemia explained that play therapy with hand puppets/drama resulted in a significant decrease in pulse rate, respiratory rate, and blood pressure in the intervention group compared to the control group. These parameters indicate decreased children's fear and anxiety (Ilievová et al., 2015). Occupational play-based therapy and child life intervention were the form of play used in this review's research. The results show that these therapy effectively reduces pain and fatigue in children with leukemia (Mohammadi et al., 2021; R. Li, 2023). Other studies also explain that play therapy using drawing tools, puzzles, and balls (Alavi et al., 2021), musical instruments (Barrera et al., 2002), dolls and toys (Mehrara et al., 2018) can reduce pain in children with leukemia.

#### Discussion

This review provides evidence that all forms of play therapy can successfully address psychological and physical issues in children with leukemia, making it a useful intervention for healthcare professionals, particularly nurses. These findings reinforce previous studies showing the benefits of play therapy in patients with chronic diseases or hospitalized children. S. Thomas, White, Ryan, & Byrne, 2022 included some types of play therapy, such as medical play, pretend play, directive play, and non-directive play, and stated that children with chronic diseases such as diabetes mellitus and thalassemia may experience a variety of psychosocial problems, such as stress, depression, anxiety, and fear, which can be alleviated through play therapy. Previous systematic reviews by Godino-Iáñez et al. (2020) and Ibrahim et al. (2020) found that play therapy benefits children receiving hospital care by reducing anxiety, pain, fear, and insecurity during hospital procedures, improving relationships with healthcare workers, and improving children's behavior and attitudes toward diseases. Koukourikos et al. (2021) supported these findings by describing how physical therapy is an effective solution for children who face various physical and psychological issues. In general, children with leukemia can benefit from numerous types of play therapy, but during the implementation process, it is critical to consider each child's individual aims, developmental stage, and unique needs.

This review focuses on how play therapy affected psychosocial outcomes and found that it significantly decreased anxiety, depression, fear, and stress during hospitalization. All studies aimed at reducing anxiety showed that play therapy effectively reduced anxiety in children with leukemia, except for Li's study using virtual reality, which showed no significant effect on anxiety (W. H. Li et al., 2011). These findings align

**Table 3**  
Characteristics of play therapy intervention.

(Author, Year)	Total Week of Play Therapy	Number of Sessions, Duration Each Session Frequency	Material Used	Theoretical Framework	Play Therapy Provider	Detail Procedure of Play Therapy
Ilievová et al. (2015) Slovakia	NM	Unclear	Puppets	NM	Nurse	Children play puppets individually in groups. Simulate 4 actions with the doll, included infusion, port installation, SC injection, and lumbar puncture
Favara-Scacco et al. (2001) Italia	NM	2 sessions NM NM	Drawing book, crayon, story book, picture & medical toy	Psychotherapy-Art children theory (Malchiodi, 1999)	Psychologist-Art therapies	First phase is clinical dialogue, the therapies asked specific questions about coping methods to find out the type of play. After that, the therapies will give some play which suitable with the children's coping like medical play, structured drawing, redundant reading, free drawing, or dramatization.
Frygner-Holm et al. (2020) Germany	NM	6–8 sessions 25–35 Minutes NM	Variety of medical play toys and non-medical play toys	Research from a variety of sources on play therapy by Moore and Russ (2006), Russ (2004), Fehr et al. (2016), Pearson (2008)	Play facilitator	The facilitator plays with the children in the room with various toys. For each session, 3–4 stories based on imagination, medical conditions, or medical games are used followed by playing based on those stories. In the last session the child makes up a story by himself.
Tan et al. (2021) China	2 months	6 sessions 60–90 min 1–2 times/week	Sand table, plant miniature, flower, vehicles, and building	Sand play theory by Dora Kalff	The therapies	This sand game adopts the model from Lowenfeld which has 6 sessions with 6 goals. Children play individually on the sand table that has been provided according to the purpose of playing. The therapist records the child's behavior as well as the miniatures used. At the end of the intervention, the children were asked to explain the results of their sand creations.
Mohammadi et al. (2021) Iran	2 weeks	8 sessions 1 h 4 times/week	Doctor's kit, blocks, make-up clothes, sandbox, candles/night, balls, weapons, vehicles, crayons, colored pencils, markers, whiteboard, family dolls, dollhouse, and hand puppets	The term "play-based occupational therapy" refers to the use of play to achieve treatment goals (facilitating playful activities) and to develop skills and capacities needed to complete daily activities (Parham, 2008).	Occupational therapies	The game was carried out for 4 days in the hospital in a special room with various toys. Each session children can choose 1–2 play activities. When finished, the child is asked to explain what has been done
W. H. Li et al. (2011) China	NM	NM 30 min 5 times/week	Virtual reality	Unclear	Researcher	Children are invited to do various play activities but use virtual reality modified by PlayMotion.
Gariépy and Howe (2003) Canada	6 weeks	24 NM 4 times/week	Variety of toys	Play allows the child a sense of control over his/her life (Erikson, 1993).	Author/researcher	Children play using various tools that are designed differently every week according to the Rubin Play Scale
Barrera et al. (2002) Canada	NM	1–3 sessions 15–45 min NM	Percussion instruments (drums, bells), classical guitars, electric keyboards, tape recorders and songbooks	The potential benefits of music therapy for children have been illustrated in some descriptive (Marley, 1984) or case studies (Edwards, 1995; Fagen, 1982)	Music therapist	Children are grouped into various age groups, then given music according to their age. Then observe their behavior
Gopi (2012) India	6 weeks	30 min daily (2nd-5th day in each week) 1st day for pre-assessment and 6th day for post assessment	Dolls, toys, puzzle, chess, charm, drawing book, crayon, coloring book, pencil	Roy's Adaptation Model	Researcher	Every week 10 samples were selected basis on the inclusion criteria and intervention was given for 30 min for each sample to supervise them for performance of their play activity. They play with doll, toys, puzzle, chess, charm, drawing or coloring.
Gazestan et al. (2021) Iran	NM	10 sessions 2 h NM	Balloons, cans, puzzles, coloring book, drawing book	Hajjari educational package for play session (2010)	Therapist	Play therapy conducted in playroom by teaching the rules n principles of play under supervision of therapist (based on Hajjari educational package, 2010)

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Table 3 (continued)

(Author, Year)	Total Week of Play Therapy	Number of Sessions, Duration Each Session Frequency	Material Used	Theoretical Framework	Play Therapy Provider	Detail Procedure of Play Therapy
Arief et al. (2019) Indonesia	2 weeks	NM	drawing paper, pencils, and crayons	NM	Researcher	Researchers and teams carry out interventions at the first meeting to deliver a game program to children with the help of parents. The researchers provide each respondent "activity books" to continue coloring on "My Activities Book" after the initial visit. For two weeks, the children participated in independent activities while being accompanied by their parents. Researchers observed the child's stress response at the end of the second week
Alavi et al. (2021) Iran	2 months	10 sessions NM	Paper, pencils, crayon, puzzles, ball	Cognitive-behavioral play therapy protocol (Nekah et al., 2013)	Unclear	Play therapy based on Asghari Nekah protocol (2013)
Mehrara et al. (2018) Iran	NM	8 sessions 60 min NM	Doll & Toys	Cognitive-behavioral play therapy is the correction of maladaptive cognitions (Scarponi & Pession, 2016)	Therapist	Eight session play therapy based on (Darooz, 2017), begin with introduction of the therapist until creating creativity and eliminating the fear of chemotherapy by using these devices as toys.
Fitriani et al. (2017) Indonesia	NM	NM	Jigsaw puzzles	Playing has a therapeutic value. It can provide a release from the stress and tension that is being felt by children, besides that playing in the hospital is useful as a transition (distraction) and relaxation (Wong, 2004)	Researcher	The researchers used jigsaw puzzle as the chosen game to be played with preschool-aged children undergoing chemotherapy
Rahmawati (2019) Indonesia	NM	NM	Drawing and coloring book	The impact of the disruption of daily activities in children with leukemia is feared that there will be a decrease in self-confidence in interacting with other people (Oswalt, 2010).	Researcher	Encourages children to actively participate in activities such as drawing, coloring, and telling stories.
R. Li (2023) China	8 weeks/ 2 months	Twice a week (16 sessions) 30–40 min per session	Dolls, medical toys, picture	The concept of Child Life was originated in the 1950s. The theory of children's stress and coping, cognitive development, family support systems, and games forms the basis for games to be used to carry out dynamic, continuous, and diversified psychological interventions to meet the social and healthy development needs of hospitalized children and their family members (Yang, 2017)	Researcher	The intervention consisted of three phases included developmental play phase, medical stimulation game stage and supportive play phase. In the first phase, the children would establish the relationship and cognitive preparation. At second phase, program support dan role simulation. In the last phase: active response, information support and emotional support

NM: Not mention.

with the results of previous meta-analysis, indicating that play therapy has demonstrated effectiveness in addressing behavioral problems, improving children's self-esteem, and reducing caregiver-child relationship stress regardless of the presenting concerns (Lin & Bratton, 2015). The results of this review are further supported by a meta-analysis of 22 studies on play therapy, indicating its effectiveness in alleviating behavioral disorders among children, especially when they engage in more play sessions (Niknezhad, 2022). Play therapy utilizes tangible objects such as toys and play-based activities, providing a safe and accessible avenue for children to express difficult and distressing experiences, as abstract language may restrict effective communication. Consequently, play therapy proves to be a highly effective intervention that can address various challenges faced by children, regardless of their age, gender, or environment (Esfandiari, 2017).

Another study also showed the significant effect of play therapy on

anxiety and fear. The mean pre-test and post-test STAIC-level scores were  $49.1 \pm 8.5$  and  $31.5 \pm 4.9$ , respectively. The mean trait anxiety levels significantly decreased; this difference was statistically significant ( $p = 001$ ). The mean pre-test and post-test fear scale scores were  $69.7 \pm 13.5$  and  $38.9 \pm 7.1$ , respectively). The mean post-test score decreased after the program; this change was statistically significant ( $p = 001$ ) (Zengin et al., 2021). Recent research also showed that parents and professionals mentioned that young patients with leukemia could benefit from the pretend play intervention. The children could obtain professional support to deal with the diagnosis, treatment, and many negative experiences, including pain, fear, and isolation from cancer (Witt et al., 2019). One study also shows the significant effect of sand play therapy in increasing pediatric patients' quality of life and decreasing their anxiety and depression (J. Li et al., 2022). The findings of this review align with the conclusions drawn from other studies.

**Table 4**  
Outcomes and results of the included studies.

(Author, Year) Country	Outcome	Outcome Measure	Timing of Assessment	Result
Ilievová et al. (2015) Slovakia	The parameter of fear (i.e., heart rate, blood pressure and frequency of breath).	Stopwatch	At rest, before, and after a diagnostic or therapeutic procedure.	The result shows that the experimental group had a lower pulse, respiratory rate, and blood pressure after implementing diagnostic and therapeutic procedures. Therefore, that psychological preparation using drama and therapeutic puppets reduced the fear and anxiety related to diagnostic or therapeutic procedures in pediatric oncological children.
Favara-Scacco et al. (2001) Italy	Positive behavior	Fifteen criteria for positive behavior in children in the face of painful procedures. Divided into 2 categories, good responders (8 or more positive behavior) and poor responders (< 8 positive behaviors).	Before, during and after the procedures of LP/BMA.	From the experimental group, 23 show good responder among 32 (72%). This condition better than in comparison group, only 3 children that show good responder among 17 children (18%). In conclusion, art therapy can provide strong support for children who have difficulty in spontaneous adaptive coping.
Frygner-Holm et al. (2020) Germany	Self-efficacy of communication, quality of life and Feasibility (acceptance, security, and satisfaction)	<b>Self-Efficacy in communicating in care situations questionnaire, Generic Health-Related quality of life with DisabKids version 6, PedSQL cancer module version 3</b> and parent notes	Before play intervention, and immediately after play intervention	Information from parents obtained through open-ended questions obtained 3 categories of pretend play, namely communication, emotion and feeling comfortable and playing as a break. In general, play intervention is a fun thing for children. There was a slight increase in the child's self-efficacy, and a similar and improved quality of life in the child. Apart from that there are no increased concerns or side effects from this game. Therefore, this game is feasible, safe, and acceptable for both children and their parents/caregivers.
Tan et al. (2021) China	Anxiety, depression, and personality	Child behavioral checklist (CBCL), Zung Self-rating Depression scale (SDS), Zung self-rating anxiety scale (SAS) and Eysenck Personality Questionnaire (EPQ).	Before and after sand play procedures	Sand play therapy can reduce anxiety, withdrawal and social problems in children as well as reduce levels of anxiety and depression in caregivers.
Mohammadi et al. (2021) Iran	Therapy-related symptoms, level of participation in daily activities, pain, fatigue, and anxiety	Therapy-related symptoms checklist (TRSC), Children participation assessment scale (CPAS), Wong Baker faces pain rating scale (FPS), The Visual Analog Scale-Fatigue (VAS-F), and Faces anxiety scale (FAS)	Unclear	(1) Play-based occupational therapy is effective in increasing the level of participation in daily life activities of children hospitalized with cancer, and (2) effective in reducing therapy-related symptoms, pain, anxiety and fatigue in children with cancer.
W. H. Li et al. (2011) China	Anxiety & Depression	Chinese version of State anxiety scale for children (CSAS-C) and the Centre for Epidemiologic Studies Depression Scale for Children (CES-DC).	At the first of the weeks for baseline and 7th day for the post test.	Therapeutic play using VR had no statistically significant effect on children's anxiety (p 0.07), but still had an "effect size" between small and moderate. As for depression, it has a significant effect compared to the control group.
Gariépy and Howe (2003) Canada	The quality of the environmental setting where the child is cared for and distress	Early Childhood Environment Rating Scale – Revised Edition ECERS-R (Harms et al., 1998) with 7 scale (1–7) & self-distress measures, stress inventory & play scale	Before and after the intervention	In the control group in day care, there was no significant relationship between stress and the type of play, but there was a significant relationship in the intervention group who was in the hospital. In the control group play behavior (play behavior) 60% and 40% for non-play behavior (non-play behavior), while in the intervention group, play behavior is 45% and non-play behavior is 55%. The conclusion is that leukemia children (1) play less than healthy children, (2) play characteristics are repetitive play (repeated), (3) there is a relationship between anxiety and cognitive type of play, (4) play more alone (solitary play). compared to other games, (5) more playing alone than healthy children.
Barrera et al. (2002) Canada	Anxiety, mood, and pain	Faces pain scale (FPS), play performance scale (PPS), children satisfaction questionnaire (CSQ) and parent satisfaction questionnaire (PSQ)	Before the intervention and after each the session of play	There is a significant effect between music therapy and pain in children. Playing performance in adolescent and pre-school children tends to increase after music therapy but is not significant in school age children. In general, children and parents have a positive response to music therapy.
Gopi (2012) India	Level of stress	Modified Perceived Stress assessment scale with 25 items. The maximum score was 100 and minimum score 25. The stress of patient was graded into mild (<56), moderate (57–66), and severe categories (≥ 67).	The first day in each week for pretest and the sixth day of the week for the post test.	Level of stress showed that in the pre-test, among the subjects 5 [8.3%] were in mild stress, 43 [71.7%] were in moderate stress and 12 [20%] were in severe stress. In post-test among the subjects, 15 [25.0%] were in

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Table 4 (continued)

(Author, Year) Country	Outcome	Outcome Measure	Timing of Assessment	Result
Gazestan et al. (2021) Iran	Anxiety	Multidimensional anxiety scale for children (MASC) with 39 items. Its measures four dimensions including social anxiety, separation anxiety, harm avoidance, and physical symptoms.	Pre and post the intervention	mild stress, 42 [70.0%] were in moderate stress and 3 [5.0%] had severe stress. The mean for stress on pre intervention was 63.133, and post intervention was 58.833. The computed value of 't' was 7.962 is more than the table value [2.000] at DF [59] which was statistically significant at 0.05 levels. This data showed that play therapy was effective in reduction of level stress. Mean of total anxiety score at pre-test were 63.86 at group therapy and 62.80 at control group, meanwhile at post-test were 59.60 at group therapy and 62.60 at control group. The result of Pillai trace test showed that the effect of the group on the linear composition of dependent variables was significant, in other word there was a statistically significant differences between the two group of minimum play therapy and control in one of the anxiety components. Next, the result of ANCOVA test showed that group play therapy led to reduced social anxiety, separation anxiety, harm avoidance and physical symptoms with <i>p</i> value 0.0001. The result of pre-test shows that 8 children (57.14%) have a maladaptive response and 6 children (42.8%) has an adaptive response. While the post-test shows that 12 children (85.71%) have adaptive response and 2 children (14.28%) has maladaptive response. The statistical test with Wilcoxon signed rank test explains that <i>p</i> value was 0.001, its means that child life program with "my activities book" have significant influence of hospitalization stress children. Bonferroni test result explain that all the variable has significance level < 0.001 except for hope, therefore it showed the effect of play therapy intervention on the adjustment and pain response (active pain response, passive pain response & adaptive pain response), but after 2 month and in the follow up stage, there were no significant changes in the hope variable. As the results of the study, <i>F</i> value is significant in the variables of pain intolerance, trait anxiety and state anxiety at the significant level ( <i>p</i> < 0.05); in other words, training play therapy has been effective on increasing pain tolerance and reducing the trait and state anxiety of children
Arief et al. (2019) Indonesia	Stress hospitalization	Observation sheet that contains 10 item positive respond modified from Wong (2009) and questions in interview to validating the result of observations.	Before and after the play therapy "My Activity Book"	There is an effect of playing using puzzles on decreasing the anxiety level of children who are undergoing chemotherapy with <i>p</i> < 0.05. In the pre-intervention, the average self-esteem score was 35.2 and the average in the post intervention was 35.83. The results of statistical tests with t pair test showed that there was a significant difference between pre and post intervention ( <i>p</i> = 0.0001). In the post intervention at control group, the average score of pain, anxiety, fatigue, and sleep disturbance syndrome are 15,29; 17,98; 21,19 and 35,0 while at the intervention group are 10,83; 10,48; 14,33 and 30,5 respectively. The intervention group showed a significant reduction in pain, anxiety, fatigue, and sleep disturbance ( <i>P</i> < 0,001)
Alavi et al. (2021) Iran	Hope, adjustment, and pain	Snyder Hope scale, this scale has six items, and each sub scale has 3 items. Dokhanchi's Children's Adjustment Questionnaire has 37 four choice questions and Pain response inventory. This scale has 60 items to measure adaptive responses to recurrent pain.	Before and after the intervention and follow up after 2 months.	
Mehrara et al. (2018) Iran	Pain tolerance and trait-state anxiety	The Oucher's pain intensity was develop by Beyer and Knott (1998) and Child Trait-State Anxiety Questionnaire (CTSA), this CTSA scale has 40 items.	Before and after the intervention	
Fitriani et al. (2017) Indonesia	stress hospitalization	Anxiety instrument for pre-school age children	Before and after the intervention	
Rahmawati (2019) Indonesia	Self esteem	Self-esteem Questionnaire from Rosenberg	Before and after the intervention	
R. Li (2023) China	Score of pain, anxiety, fatigue and sleep disturbance syndrome	The Chinese version of Ped-PROMIS (C-Ped-PROMIS) Pain Interference (8 items), Anxiety (8 items), and Fatigue (10 items) Sleep disturbance scale for children (SDSC) comprises 26 items.	Before and after the intervention	

indicating the effectiveness of play therapy in alleviating anxiety disorders among children (Nursanaa & Ady, 2020; Salmi & Hanson, 2021).

The reviewed studies indicate that all play therapy was conducted individually, except for the music therapy (Barrera et al., 2002) in a

group setting. However, this difference did not affect the children's problems (Ray et al., 2001). Other studies (Thomas, White, Ryan, & Byrne, 2022) describe that both individual-based and group-based play therapy have shown similar significant effects. Effective play therapy is

defined by various characteristics, such as session length, frequency, and the number of sessions (Kool & Lawver, 2010). The number of sessions, duration, and length of the intervention period varied among the play therapy therapies examined in this review. On average, children received 12.8 sessions lasting approximately 43 to 53 min. According to another systematic review, the time for play in the intervention group was between 20 and 60 min (Ibrahim et al., 2020), while VanFleet et al. (2010) suggested play therapy sessions for hospitalized children should last between 15 and 20 min, allowing for a bonding experience between parents and children without causing fatigue in the children during play. The shortest and longest play therapy sessions lasted two weeks and eight weeks, respectively, with an average of 5.5 weeks. The average number of sessions in the studies examined is lower than the numbers reported in earlier meta-analyses of play therapy, which ranged from 30 to 35 for play therapy (Leblanc & Ritchie, 2001) to 16.5 for combined play therapy-familial therapy and 16.6 for play therapy (Ray et al., 2001) and 22.4 for clinic settings (Lin & Bratton, 2015), but higher than another review which found 8,71 sessions and the duration of each session is 30 min (Thomas, White, Ryan, & Byrne, 2022). A statistically significant predictor of the effectiveness of play therapy was the number of sessions. The effect size increased with the number of sessions in the play therapy category, reaching a peak effect at 35 to 45 sessions (Ray et al., 2001). The results of this review indicate that a small number of therapy sessions may have good efficacy.

The play therapy area is typically a specific room arranged in a particular and predetermined way. There are many different toys and tools for expression in the space. It is important for the therapist to use in selecting toys and materials that will serve as a medium for children to express feelings, explore relationships, and understand themselves (Landreth, 2012). Examples of possible materials include a home corner/kitchen, musical instruments, puppets, figurines, toy animals, toy weapons, military figures, a toy medical kit, superheroes, books, vehicles, building blocks, a dollhouse and dolls, balloons and balls, a sand tray, toys for dance and movement, and a table with clay (Pidgeon et al., 2015). Several toys were employed, including both medical play and non-medical play. They affect the psychosocial problem in children living with leukemia. Medical play involves explaining and using medical tools and equipment through play to allay worries, anxieties, and preconceptions regarding procedures, treatments, medical devices, and hospital procedures (Burns-Nader & Hernandez-Reif, 2016). It was demonstrated to lessen stress, foster positive coping, and reduce anxiety in hospitalized pediatric patients (Burns-Nader & Hernandez-Reif, 2016). Additionally, explaining procedures or treatments in a developmentally appropriate way improves adherence and lessens discomfort for the current and upcoming interventions (Flowers & Birnie, 2015). Dolls or stuffed animals are often used in medical play, allowing kids to take an active role by acting out medical operations (Burns-Nader & Hernandez-Reif, 2016). Patients and their families benefit greatly from creative play in the pediatric context (Schleisman & Mahon, 2018). Play therapy facilitates the emotional growth and development of children with chronic illnesses, helping them express their feelings while dealing with their illnesses (Koukourikos et al., 2021). Play therapy sessions address various medical issues, including fears associated with procedures and needle sticks and the significance of adhering to prescribed medical regimens. Play therapy also provides an opportunity for patients to cope with the distress and grief associated with living with a medical condition (Nabors & Kichler, 2015).

#### Limitations

This review has some limitations. First, several studies have small sample sizes, so it isn't easy to generalize. Second, there are only two forms of RCT research that have limited methodologies, especially in the aspect of sample selection and determination. Third, the researchers cannot perform a meta-analysis due to the diversity of outcomes and types of research. In addition, several studies do not include quantitative

data such as mean, median, or *p*-values. Fourth, some studies do not include details about the play therapy procedures, including the number of sessions conducted and the duration of play therapy, making it difficult for us to interpret the data further. The final limitation is that we could not access CINAHL and Psych Info databases, which could potentially include studies meeting our inclusion criteria. Due to the lack of institutional access, obtaining data from these sources posed a challenge.

#### Implications for practice

Children with leukemia experience various physical and psychosocial health problems caused by the course of the disease, the side effects of treatment, and the impact of hospitalization. According to his systematic review, play therapy reduces physical and psychosocial problems in children with leukemia. Therefore, health workers must try to understand these challenges and plan actions to overcome them. In addition, as health workers who interact the most with patients, pediatric nurses can use play therapy as part of independent nursing interventions.

#### Conclusions

This systematic review demonstrates that play therapy can be performed in children with leukemia. All types of play therapy have benefits in reducing psychosocial problems in children with leukemia and physical issues such as pain and fatigue. Nurses can work with a play therapist or psychologist to help design the ideal type of play therapy according to the child's characteristics. The number of sessions, duration of therapy, and the kind of equipment used can be adapted to the health facility's situation, condition, and resources. Furthermore, conducting a systematic review using the same population but with the same type of study is recommended so that the analysis can be conducted further to enable the implementation of the meta-analysis.

#### Author contribution

Contributions to concept and design: SR & WL; Data analysis and interpretation: SR, WL, FH, and MNS; article draft: SR & WL, and article revision: SR, WL, FH, and MNS.

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There is no conflict of interest in writing this review.

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