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**THE EFFECTIVENESS OF PLAY THERAPY IN MANAGING
ANXIETY IN CHILDREN WITH CANCER: A SYSTEMATIC
REVIEW**

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I dedicate this dissertation to my partner, Charalampos who gave me unconditional emotional and practical support during these years.

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Introduction

Both the diagnosis and treatment of cancer are extremely stressful experiences, especially for children [1]. The contemporary therapies, although they are more effective in curing cancer and they have increased the life expectancy of childhood cancer patients, have several side effects and are painful, affecting children's psychology and well-being. For children, the most stressful factor, however, is not the diagnosis or the treatment per se, rather than daily role functioning effects [2].

Over the years, several studies have focused on examining the stressors for parents whose children face cancer or a chronic illness in general. These studies located the factors that affect parents' stress-e.g., parent's gender, general anxiety, child's age, etc. [3-6] and how stress, in turn, affects parental well-being-e.g., causing post-traumatic stress [7].

On the contrary, there are fewer studies regarding stress or anxiety in children with cancer [8], while many of them focus on post-traumatic stress symptoms [9,10,11]. Even fewer studies focus on non-pharmaceutical treatments and interventions, such as psychosocial intervention, social skills groups, cognitive intervention programmes, creative art therapies etc., that help children cope with cancer -in general, and not only in stress management [12-15].

The current dissertation aims to examine the effectiveness of Play Therapy in managing anxiety in children with cancer, covering a gap in international literature.

Pediatric Cancer

Pediatric or childhood cancer is referred to cancer in children, and adolescents who are younger than 15 years old [16] (these age range includes infants, children and early adolescents, as well as part of middle adolescents). According to the International Classification of Childhood Cancer (ICCC) these are the different types of childhood cancer, categorized in distinct subgroups:

1. leukemias, myeloproliferative and myelodysplastic diseases: a) lymphoid leukemias (precursor cell leukemias, mature b-cell leukemias, mature t-cell and nk cell leukemias, lymphoid leukemia, nos), b) myelodysplastic syndrome and other myeloproliferative diseases, c) chronic myeloproliferative diseases) unspecified and other specified leukemias, and d) acute myeloid leukemias [17].

2. lymphomas and reticuloendothelial neoplasms: a) burkitt lymphoma, b) hodgkin lymphomas, c) non-hodgkin lymphomas (except burkitt lymphoma) (precursor cell lymphomas, mature b-cell

lymphomas (except burkitt lymphoma), mature t-cell and nk-cell lymphomas, non-hodgkin lymphomas, nos), d) miscellaneous lymphoreticular neoplasms, and e) unspecified lymphomas [17].

3. cns and miscellaneous intracranial and intraspinal neoplasms a) astrocytomas, b) ependymomas and choroid plexus tumor (ependymomas, choroid plexus tumor), c) intracranial and intraspinal embryonal tumors (medulloblastomas, primitive neuroectodermal tumor (pnet), medulloepithelioma, atypical teratoid/rhabdoid tumor), d) other gliomas (oligodendrogliomas, mixed and unspecified gliomas, neuroepithelial glial tumors of uncertain origin), e) other specified intracranial and intraspinal neoplasms (pituitary adenomas and carcinomas, pineal parenchymal tumors, neuronal and mixed neuronal-glial tumors, meningiomas), and f) unspecified intracranial and intraspinal neoplasms [17].

4. neuroblastoma and other peripheral nervous cell tumors: a) neuroblastoma and ganglioneuroblastoma, and b) other peripheral nervous cell tumors [17].

5. retinoblastoma [17].

6. renal tumors: a) renal carcinomas, b) nephroblastoma and other non-epithelial renal tumors (nephroblastoma, rhabdoid renal tumor, kidney sarcomas), and c) unspecified malignant renal tumors [17].

7. hepatic tumors: a) hepatoblastoma and mesenchymal tumors of liver (hepatoblastoma, rhabdoid hepatic tumor, embryonal sarcoma of liver), b) hepatic carcinomas, and c) unspecified malignant hepatic tumors [17].

8. malignant bone tumors: a) osteosarcomas, b) chondrosarcomas, c) ewing tumor and related sarcomas of bone (ewing tumor and askin tumor of bone, peripheral neuroectodermal tumor (ppnet) of bone), d) other specified malignant bone tumors and e) unspecified malignant bone tumors [17].

9. soft tissue and other extraosseous sarcomas: a) fibrosarcomas, peripheral nerve sheath tumors and other fibrous neoplasms (fibroblastic and myofibroblastic tumors, nerve sheath tumors, other fibromatous neoplasms), b) rhabdomyosarcomas, c) kaposi sarcoma, d) other specified soft tissue sarcomas, and e) unspecified soft tissue sarcomas [17].

10. germ cell tumors, trophoblastic tumors and neoplasms of gonads: a) intracranial and intraspinal germ cell tumors (intracranial and intraspinal germinomas, intracranial and intraspinal teratomas, intracranial and intraspinal embryonal carcinomas, intracranial and intraspinal yolk

sac tumor, intracranial and intraspinal choriocarcinoma, intracranial and intraspinal tumors of mixed forms, b) malignant extracranial and extragonadal germ cell tumors (malignant germinomas of extracranial and extragonadal sites, malignant teratomas of extracranial and extragonadal sites, embryonal carcinomas of extracranial and extragonadal sites, yolk sac tumor of extracranial and extragonadal sites, choriocarcinomas of extracranial and extragonadal sites, other/unspecific malignant mixed germ cell tumors of extracranial/extragonadal), c) malignant gonadal germ cell tumors (malignant gonadal germinomas, malignant gonadal teratomas, gonadal embryonal carcinomas, gonadal yolk sac tumor, gonadal choriocarcinoma, malignant gonadal tumors of mixed forms, malignant gonadal gonadoblastoma, d) gonadal carcinomas, e) other and unspecified malignant gonadal tumors [17].

11. other malignant epithelial neoplasms and malignant melanomas: a) malignant melanomas, b) thyroid carcinomas, c) adrenocortical carcinomas, d) nasopharyngeal carcinomas, e) skin carcinomas, f) other and unspecified carcinomas (carcinomas of salivary glands, carcinomas of colon and rectum, carcinomas of appendix, carcinomas of lung, carcinomas of thymus , carcinomas of breast, carcinomas of cervix uteri, carcinomas of bladder, carcinomas of eye, carcinomas of other specified sites, carcinomas of unspecified site) [17].

12. other and unspecified malignant neoplasms: a) other specified malignant tumors (pancreatoblastoma, pulmonary blastoma and pleuropulmonary blastoma, malignant gastrointestinal stromal tumor, other complex mixed and stromal neoplasms, mesothelioma, other specified malignant tumors, b) other unspecified malignant tumors [17].

The most frequent diagnoses are acute lymphoblastic leukemia, astrocytoma, nephroblastoma non-Hodgkin lymphoma, and neuroblastoma, although there are differences of prevalence of cancer cases among different countries [16]. Furthermore, there are differences regarding sex, with renal tumours, epithelial tumours, germ cell and gonadal tumours being more common in females [17]. From 2001 to 2010 the incidence rate of cancer in children 0-14 years old was 140.6 per million person-years [17].

Lifestyle Effects of Pediatric Cancer and Pediatric Cancer Therapy

A cancer diagnosis and the vigorous treatment that usually follows this diagnosis is a shocking situation for the child patient and their family. Although in general a life-threatening disease affects not only the patient but also their family and social network, it is considered especially difficult

when the patient is a minor (children are vulnerable, they depend on the adults of their family, it is generally considered that is emotionally heavier for younger people-and especially children-to suffer from illnesses than elders, for example).

Children who undergo cancer treatment have expressed their concerns regarding the pleasures they cannot enjoy during this period as well as the pain they suffer due to cancer treatment, and the use of needle sticks, which makes them feel scared or uncomfortable [18]. They suffer from physical discomfort. They also have difficulty enjoying food and they face restricted social activity [18]. Additionally, pediatric cancer patients not only have difficulty enjoying food, but also worry (both them and their parents) regarding the dietary restrictions they have due to the disease and the treatment [19].

Some types of cancer, as well as chemotherapy, may have an impact in children's cognitive functions, resulting in affecting patients and survivors' lifestyle [20]. For example, a meta-analysis concluded that general IQ, verbal IQ, and performance IQ of children and adolescent survivors of acute lymphoblastic leukemia were significantly lower than their peers with no history of acute lymphoblastic leukemia [20].

Pain, fatigue, nausea and vomiting are the most cited symptoms from which patients of pediatric cancer suffer. Especially, fatigue seems to significantly affect the quality of a child's life not only during the treatment process but also long after the end of it, while the child is at the survival stage, as it affects both the energy levels and the ability to resume previous activities [21]. In general, children who were childhood cancer survivors are more likely to have a poor quality of life and social-emotional outcomes after the treatment, compared to their healthy counterparts. Their quality of life is negatively associated to parental distress, treatment intensity, gender (female), and psychosocial risk [22].

Regarding school attendance children with cancer have poorer school attendance compared not only to their healthy peers but also to their classmates with other chronic conditions, which is likely to impact their academic, behavioural, or social functioning [23]. Moreover, children who had survived acute lymphoblastic leukemia were three to four times more likely to attend classes for special education students or students with learning difficulties compared to their siblings who had no history of cancer [20].

Stress and Anxiety in Childhood Cancer

Definition of stress and anxiety

Although stress and anxiety are often related, there is a fine difference between them [24]. Stress is a human's response to internal or external stressors -either short-term or long-term- and it affects the way we feel and behave, causing not only psychological and emotional changes but physiological changes as well, such as palpitation, dry mouth etc. It can last for a specific period of time or it can lead to chronic stress [25] Anxiety, in contrast, although it has similar symptoms to stress-almost identical, is a situation during which someone worries excessively due to impending danger, catastrophe, or misfortune and the symptoms do not ameliorate when the stressor disappears [24, 26]. When the symptoms of anxiety persist for more than 6 months, a patient meets the criteria for Generalized Anxiety Disorder [27]. The prevalence for generalized anxiety disorder is between 5.7% and 9% [28, 29]

Neurobiologically stress and anxiety share common neural underpinnings [30]. For example, in certain types of both anxiety and stress responses, it has been noticed the participation of bed nucleus of the stria terminalis [31], while stress in early life may affect the hypothalamus-pituitary-adrenocortical axis (HPA axis), which in turn has been associated to anxiety [32].

The common symptoms as well as the shared neural underpinnings might have led many researchers to examine stress, anxiety, stress-related and anxiety-related disorders under a common cluster. For example, in DSM-4 [33], post-traumatic stress disorder (PTSD) is under the cluster of anxiety disorders, while in DSM-5[27] there is a distinction between anxiety disorders and stressor-related disorders.

Anxiety-related Disorders and Stressor-related Disorders

According to the DSM-4 [33] the anxiety-related disorders are the following: panic disorder without agoraphobia, panic disorder with agoraphobia, agoraphobia without history of panic disorder, specific phobia (animal type or blood-injection-injury type or natural environment type or situational type or other type), obsessive-compulsive disorder, social phobia, post-traumatic stress disorder, acute stress disorder, generalized anxiety disorder, anxiety disorder due to [specific medical condition], while there is not a distinct category for stressor-related disorders.

In DSM-5 [27], the anxiety disorders are the following: separation anxiety disorder, selective mutism, specific phobia, social anxiety disorder, generalized anxiety disorder, panic disorder,

panic attack, agoraphobia, substance/medication-induced anxiety disorder, anxiety disorder due to another medical condition, other specified anxiety disorder, unspecified anxiety disorder, while a new category has been created (trauma- and stressor-related disorders) including: post-traumatic stress disorder, disinhibited social engagement disorder, reactive attachment disorder, adjustment disorders, acute stress disorder, other specified trauma- and stressor-related disorder, unspecified trauma- and stressor-related disorder (for more information see Table 1).

It is worth mentioning that in DSM-5 [27] a life-threatening disease (like cancer) is not necessarily considered a traumatic event. Hence, while in DSM-4, a cancer diagnosis was considered an adequate stressor for the patient to meet the criteria for PTSD [33], in DSM-5 such a stressor alone does not qualify for PTSD [27]. This, however, does not mean that a patient with cancer may not suffer from post-traumatic stress or PTSD.

Pediatric Cancer and Stress/Anxiety

Nir, in 1985, was the first researcher to raise the important issue of childhood cancer as a potentially traumatic experience for both patients and their families [34].

And it makes no surprise that pediatric cancer has been connected to stress and anxiety as a life-threatening-many times terminal disease-the patients and their families have to adjust to a new reality, that includes painful invasive treatments, heavy side effects, physical weakness and uncertainty.

Although there are some studies regarding parental stress or anxiety in childhood cancer [35] as well as in survivors of childhood cancer [36], few studies examine the stress children experience as cancer patients [8]. Even in the studies regarding survivors of childhood cancer, the sample is often adults [13]

In general, cancer has been linked to stress, anxiety, anxiety disorders and stressor-related disorders in children, adolescents and adults [36,37]. Especially regarding PTSD, Post-traumatic Stress Symptoms (PTSS), and childhood the review of the literature reveals an overlapping pattern regarding neurobiological changes in children that have been exposed to trauma or with childhood PTSD or PTSS and in childhood cancer survivors. More specifically, a recent review of the literature, carried out by Marusak et al, examined the brain regions that are implicated in childhood cancer survivors and they compared them with neuroimages of noncancer populations with PTSS or PTSD [38]. Neuroimaging showed that both childhood cancer survivors and

children with PTSD showed alterations in the following areas/functions: there was a dysregulation in the HPA axis, there were signs of neuroinflammation, white matter disruptions were located, the hippocampus showed signs of lower volume and altered function, and there was heightened activity in the dorsal anterior cingulate cortex. While noncancer populations with PTSS or PTSD had lower connectivity of the amygdala with the ventral anterior cingulate cortex and/or the ventromedial prefrontal cortex, lower volume of the ventromedial prefrontal cortex, and showed signs of alteration in the amygdala tuning to threat, childhood cancer survivors had no signs of alteration in these areas.

Risk Factors

Survivors of childhood cancer seem to have less positive health beliefs, while those who had higher level of treatment intensity had greater anxiety than those with less intense treatments [39]. Age of the onset of cancer may also be correlated to psychological distress, although the data are ambiguous. There is evidence supporting that survivors who were diagnosed as adolescents had significantly greater changes of PTSD than those who were diagnosed earlier [39], while other studies concluded that there is no specific pattern regarding the age of diagnosis and any kind of psychological distress [40].

The data regarding stress and anxiety in childhood cancer patients and survivors compared to their peers with no medical history are dubious. The findings of a study support that there are no statistically significant differences between survivors and people with no history of cancer regarding psychological distress levels [39], while other studies concluded that childhood cancer survivors had increased risk (four times) of exhibiting PTSD symptoms than their healthy siblings [41].

Regarding distress-in adult survivors of childhood cancer- research has found various risk factors, including gender (female-as in overall quality of life), marital status (being unmarried), being an only-child, diagnosis during adolescence, and receiving more treatment that is more intense(again as in the overall quality of life) [42,43].

Patients who faced comorbidity, physical late effects or disability were more like to face PTSD, as well [41, 44, 45]. Gender (female-as in distress), race (non-white), educational level (less education) and recentness of the diagnosis were also correlated to PTSD in childhood cancer populations [45]. A salient factor in the prevalence of anxiety and PTSD for survivors is also

family functioning [46, 47], In a relevant study of adolescent survivors in the USA, it has been reported that 75% of adolescent survivors with PTSD came from families which had poor family functioning. The family functioning was measured by assessing the following subareas: problem-solving, communication, roles, affective involvement and responsiveness, behavioural control, and general functioning [46]. In a similar vein, a study on Japanese adolescent survivors concluded that the families who had the poorest family functioning reported the highest levels of anxiety, PTSS, and depression. In this case, the family functioning was measured by assessing cohesiveness, conflict, and expressiveness (thoughts and feelings) [47]. PTSD was also negatively correlated to time since the termination of the treatment.

A meta-analysis also revealed a statistically significant association between child distress and overall parent distress ($r = .32$, $p < .001$) since increased parental distress was correlated to elevated distress in their children. Different types of parental distress (i.e., anxiety, depression, post-traumatic stress, and global distress) were associated with each other ($r_s = .31-.51$, $p_s < .001$), as well as with overall child distress. There was a stronger association to parental proxy-report of child symptoms and both child and parent distress than child reporting of their own distress [48].

Coping Mechanisms

Research has identified several coping mechanisms that help children alleviate their discomfort, stress or anxiety that are caused by cancer itself or the procedure of hospitalization and cancer treatments.

For example, a study conducted on 147 patients that were undergoing treatment for childhood cancer conveys that attention control was associated with ego-resilience, well as lower levels of distress. These variables accounted for indirect associations between attention control and anxiety related to the treatment procedure. There were significant differences in ego-resilience regarding sex (the associations were stronger for male than female participants) [49].

In another research, with 61 participants, patients with pediatric cancer were measured regarding the relationship between anxiety, depression, hope, depression, and quality of life within 4 weeks of their diagnosis and every 3 months for the first year after the diagnosis. As expected, time worked comfortingly, as during its course the patients exhibited lower levels of both depression and anxiety while they had higher levels of Quality of life and hope. Hope was a significant

predictor of improved Quality of life, while it partially mediated the effects of anxiety and depression on Quality-of-Life [50].

Hildenbrand et colleagues detected additional coping strategies for stress and anxiety that included the following: relaxation, cognitive restructuring strategies, practical seeking social support, and emotional expression. In the same study, distraction was identified as the only avoidant coping strategy [51].

Interventions in Stress/Anxiety in Pediatric Cancer

Psycho-oncology

Stress, anxiety and other psychoemotional difficulties that rise after the diagnosis of cancer or the problems that patients face due to the effects of the medical treatment have arisen the need of psychosocial interventions. The science that researches and implements these interventions aiming to ameliorate cancer patients and cancer survivors' quality of life is called psycho-oncology [52].

Psycho-oncologic interventions aim to a broad aspect of cancer patients and survivors' problems including emotional problems (such as psychiatric comorbidities, fear of recurrence of cancer, or other psychological conditions), physical difficulties (such as pain, fatigue, insomnia, sex/reproduction difficulties), practical/social problems (such as work-related problems, financial problems, household managing), spiritual aspects (such as religious concerns, death/grief), optimizing treatment (that include treatment decisions, alternative medicine as support, pain relief), improvement of general lifestyle (such as stress management, daily routines including nutrition and exercise) and finally support to the caregiver/members of the patient's family.

Regarding pediatric psycho-oncology, there is still need to develop evidence-based practices and guidelines. Wiener et colleagues, in their systematic review, located 27 articles, published 1980 and 2013, guidelines, consensus-based reports, or standards for psychosocial care of pediatric cancer patients and their families [53]. None of them offered adequate data to serve as a current standard for psycho-oncological interventions in underaged patients with cancer and their families. Since children differ from adults regarding the way they experience health issues, illness and medical treatment/hospitalization, regarding the fact that they depend on their caregivers to help them cope with the emotions that arose due to their illness (fears, desires etc.), as well as

regarding their needs of socialization and their personal-identity development [54], further research focused on children's psycho-oncology is an essential requirement of our times.

Psychotherapy in Pediatric Cancer

Psychotherapy in patients with pediatric cancer is not a well-documented area. Again, most studies focus on the psychotherapy or counselling of parents of patients with pediatric cancer or in survivors of pediatric cancer (often adolescents or adults). Central themes in psychotherapy with critically ill children (including children with cancer) are those related to loss, as loss of control is a predominant fear of them [55].

There are several techniques that are used in psychotherapy with ill children. Some of them are art techniques, play with a therapeutic stuffed animal, the creation of a book, letter writing, as well as several self-support tools, such as relaxation, guided imagery, and hypnosis [56]. Cognitive behavioural therapy-CBT (different types of it) is also a popular therapeutic approach among therapists that work with pediatric cancer patients, as well as creative art therapies (art, music, drama and/or Play Therapy) [57].

Melesse et colleagues, in their systematic review and meta-analysis regarding the efficiency of CBT in children with cancer, assessed 8 studies (RCTs and quasi-experimental). The results suggested that CBT in patients with childhood cancer or childhood cancer survivors decreases anxiety (SMD = -0.89, 95% CI (-1.45, -0.32), $p < 0.002$), pain (SMD = -0.56, 95% CI (-1.04, -0.08), $p < 0.002$), and depression (SMD = -0.90, 95% CI (-1.40, -0.39), $p < 0.0005$). One of the included studies also suggested that it helps with stress, anger and self-efficacy [58].

Regarding art therapy, Aguilar conducted an integrative literature review, which included 7 studies. The results of the studies suggest that the children who attended art therapy sessions were able to enhance communication with their family members and the medical staff. Moreover, children were facilitated to express better their emotions, develop more effective coping skills, and alleviate the negative feelings of adverse side effects [59].

Although the available data are limited, they are robust: psychotherapy (as well as psychosocial interventions, as mentioned in the previous section) work complimentary with the pharmacological intervention, improving patients' mental and emotional health and their quality of life.

Play Therapy

What is Play?

There is not a universal definition of what play is. Several specialists over the years have tried to reach a definition. Eberle identifies the differences between play and nonplay to make clearer what play is: In play, people feel pleasure, while in nonplay excess. Play is understanding, while nonplay is indifference. Play is strength, while nonplay is heedlessness. Play is about poise while nonplay is about abstraction. In play key elements are surprise and anticipation, while in nonplay they are shock/terror and obsession [60].

According to Bettelheim play should not be confused with game, although these two terms are used often as synonyms: play refers to an earlier developmental stage of development, and it is characterized by freedom, by personally imposed and changeable rules, by fantasy and by the absence of goals -children's goal in play is playing-while game refers to a child's later developmental stage, it is usually competitive, it is regulated by rules and it often has a purpose-winning [61].

Play (in both children and animals) has the following characteristics, according to Burghardt: 1) It is a repeated performance: play does not occur once. It is a repeated performance and it usually has different variations of the same theme. 2) It is an incompletely functional behaviour. Play does not serve specific purpose regarding survival or some other specific result. 3) It is different structurally, contextually, or ontogenetically [62].

According to Parten, developmentally play can be categorized into six stages: a) unoccupied play: in this developmental stage children do not play but rather occupy themselves while they tend to watch anything that seems exciting to them. Otherwise, they will use their own body to play, they prefer to follow their caregiver or their teacher, or they just stand around. In this stage their play appears scattered.; b) solitary play: in this stage children play on their own and may not notice or acknowledge other children even if they are close to them; b) onlooker play: children in this stage begin to engagingly watch other children's play, without participating in it; (d) parallel play: children in this stage play next to each other without interacting with each other, and without playing together, sharing toys or activities; (e) associative play: children engage in similar or even identical activity, without having, however, organization of the activity, while the children focus mainly on associations and not in his activity.; and (f) cooperative play or organized supplementary: children that have reached the cooperative play stage are able to play

with their friends while learning social skills. The group of children is organized with the purpose of creating material product, or of trying to succeed in some competitive goal, or of the dramatization of situations of adult life, or of playing formal games [62].

Another division of play is the one that was proposed by Sue Jennings, and that is strongly connected to Play Therapy. Jennings suggested that play can be divided into two main categories, each of which includes three stages: the first category is neurodramatic play (NDP) which includes dramatic play (such as interactive stories and masks), sensory play (which uses different textures and smells) and rhythmic play (such as drumming, singing, clapping and dancing). The second category is that of embodiment, projection, and role play, which is also known as EPR. Embodiment is prominent at the age of 0–13 months and it includes activities that are experienced through the body and the senses (such as messy play, hopping, and jumping). Embodiment activities also include activities of the early stages of NPD. In projection, which is characteristic of children's play at the age of 13 months–3 years, the child uses different means to express themselves (such as play dough, sand, dollhouses, and puppets.). In role-play stage, which is usually dominant between the age of 3 and 7 years old, the child develops characters and stories, both verbally and non-verbally (such as improvising dramas, creating or creatively playing with fairy stories, myths and legends) [64].

In general, play has many definitions regarding its use, the means it uses or its purpose. All definitions, however, have something in common: play is a pivotal aspect of a child's development and life.

The Importance of Children's Play

The importance of children's play was prominent since ancient times. In Ancient Greece, children's play was encouraged while in recent years famous pedagogists such as Heinrich Pestalozzi and Maria Montessori underlined the importance of play, especially during the early years of a child's life [65].

According to the psychologist and pioneer in Play Therapy Virginia Axline play is children's natural medium for self-expression, thus the child through play is given the opportunity to accumulate their feelings (frustration, tension, insecurity, aggression, bewilderment, confusion, fear). So, by playing out these feelings the child can bring them to the surface, they can face them, learn how to control these feelings, or to abandon them if they do not need them[66].

On the other hand, Winnicott (1971) stated that: “It is by playing and only in playing that the individual child is able to be creative and to use the whole personality and it is only in being creative that the individual discovers the self” [67]/

It is obvious that play is a pivotal factor in children’s self-expression and the development of their personality and many mental health specialists across the world acknowledge its importance.

In fact, several studies have concluded that play allows children to delve into their world, enhance their skills and develop resilience, while through play they can learn how to face their fears and embrace adult behaviours as they grow older [68-70]

In a psychoanalytic point of view, play is important since, according to Sigmund Freud is the mean through which a child accomplishes his first great cultural and psychological achievements [61], while Erik Erikson considers play as the “royal road” to understanding a child’s ego (paraphrasing Freud, who supported that dreams are the royal road to the unconscious) [71]. This opinion was endorsed by Bettelheim, who states it in an article he wrote for the Atlantic: “Play is [...] a "royal road" to the child's conscious and unconscious inner world; if we want to understand his inner world and help him with it, we must learn to walk this road” [61].

Play Therapy: Definition of Play Therapy

There are different definitions of Play Therapy, but a simple definition of Play Therapy could be that it is a psychotherapeutic approach that uses play to help children [72].

According to the Association of Play Therapy, Play Therapy is “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 psychosocial difficulties and achieve optimal growth and development” [73], while the British Association of Play Therapy points out that Play Therapy is not a static situation rather than a dynamic process between the child and and the therapist. During this process the child explores at their own pace and whatever they need from their past and current, their conscious and unconscious, that are affecting their life in the present. The therapist is not a leader but a mean to enable the child’s inner, which lead to growth and change. The primary medium in play therapy is play while and speech is the secondary medium, thus play therapy is child-centered, as the child leads through their natural mean of expression: play [74].

Landreth, on the other hand, describes Play Therapy as “a dynamic interpersonal relationship between a child (or a person of any age) and a therapist trained in Play Therapy procedures who provides selected play materials and facilitates the development of a safe relationship for the child (or person of any age) to fully express and explore self (feelings, thoughts, experiences and behaviors) through play, the child’s natural medium of communications, for optimal growth and development” [75].

Kottman and Meany define Play Therapy as “a therapeutic modality that uses a wide variety of methodologies to communicate with clients, including adventure therapy, storytelling and therapeutic metaphors, movement/dance/music experiences, sand tray activities, art techniques, and structured play experiences in addition to free, unstructured play [...] Play Therapy is a relationship in which a trained therapist creates a safe space for clients to explore and express themselves through telling stories, having adventures, dancing, hearing stories, making up songs, messing around in the sand, doing art, and playing” [72].

Seeing the above definitions of Play Therapy, it becomes clear Ann Cattanach’s statement that the definition of Play Therapy depends on the perspectives of the person that describes it. Different definitions emerge through one’s experience, professional background and cultural representations [76].

One of the reasons of the unspecificity in the definition of Play Therapy, maybe the heterogeneity of Play Therapy. Over the years different approaches of Play Therapy have been developed. Some of the have been based on major psychotherapeutic and counselling approaches for adults, including Child-Centered Play Therapy, Narrative Play Therapy, Object Relations and Attachment-Based Play Therapy, Existential Play Therapy, Adlerian Play Therapy, Jungian Analytical Play Therapy, Psychodynamic Play Therapy, Cognitive-Behavioral Play Therapy, Experiential Play Therapy, Relationship Play Therapy, Prescriptive/Integrative Play Therapy, while others developed as autonomous Play Therapy approaches for children, e.g.: Dynamic Play Therapy, Experiential Play Therapy, Synergetic Play Therapy, Release Play Therapy, Ecosystemic Play Therapy. There are also approaches that were developed for specific groups of children (e.g., autistic children), like Theraplay, Autplay and Lego-based Therapy.

Play therapy can be used in different cases, helping children that face various difficulties such as: homelessness, disaster, attachment problems, sexual abuse; difficulties in self-regulation [77-82].

In 1982, the foundation of the Association for Play Therapy (APT), established Play Therapy as a distinct psychotherapeutic approach [83].

History of Play Therapy

As already mentions, Play Therapy was developed through the years, using different therapeutic approaches and integrating various psychotherapeutic theories. At first, play was used in psychotherapy for children without, however, being the base of the therapeutic approach, but rather a tool that facilitated the therapeutic process [75, 85, 86]. In this chapter, the history of Play Therapy as well as a brief description and history of different Play Therapy approaches (including the ones that were used in the studies included in this systematic review) will be presented.

The Bases of Play Therapy

Long before Play Therapy was established as a distinguished psychotherapeutic approach for children, mental health specialists were integrating play in their therapeutic sessions. The first report describing the therapeutic use of play and a psychological approach was published in 1909 by Sigmund Freud (the case of “Little Hans”) [75]. It was Hermine Hug-Hellmuth, however, who was the first psychoanalyst to develop techniques for child psychoanalysis that were distinct from adult methods [84].

Psychoanalytic Play Therapy

After Freud and Hermine Hug-Hellmuth, Anna Freud, as well as Melanie Klein, used play in their therapeutic sessions with children, setting the bases for psychoanalytic Play Therapy [85, 86]. Melanie Klein named her approach “psychoanalytic play technique or play analysis”, and key factor in it was the interpretation of the child’s play and the symbolic level of the toys [85].

Although both Anna Freud and Melanie Klein were pioneers in psychotherapy for children, their approaches had major differences, since for Anna Freud play was a mean to establish a therapeutic relationship with the child, a tool of observation so the therapist could understand better the child and as a mean of re-enactment real-life events. Klein, on the other hand, made profound interpretations of child’s unconsciousness through their play, as she believed play to be

symbolic. For her play was equivalent to free association of adult psychoanalysis: a way to reach unconsciousness and reveal its phantasies and anxieties [87].

Release Play Therapy

In the 1930s, David Levy developed Release Therapy. His therapeutic approach was a structured model of psychotherapy that used play, in children with anxiety. In this approach, the therapist was creating or was helping the child to create situations so the child could express their anxiety through play. Levy [88], in paper his “Release Therapy” in Young Children” illustrated in detail his approach, which was categorized in two forms: “specific release therapy” (which is addressed to children who face a specific situation out of which the anxiety and its accompanying symptoms arose), and “general release therapy” (which is addressed to children that have symptoms of anxiety due to excessive demands or prohibitions at an early age of their life).

The work of Levy was extended by Gove Hambidge [89], who introduced the term “Structured Play Therapy” and attempted to critically evaluate this approach and offer evidence-based data.

Release Play Therapy focuses on re-enacting the traumatic experience that is the source of anxiety for the children. For that purpose, according to Levy [88], three different forms of activities occur in the playroom:

1. The child releases their aggressive behaviour by throwing objects, or through infantile pleasures such as sucking water out of a baby bottle, then spilling the water on the ground, sitting on it and slapping it.
2. The child releases their feelings by recreating standard situations, as in those depicting, parents alone or together, sibling rivalry, boy and girl doll nude, etc.
3. The child releases their feelings through playing with a specific play situation set up that resembles a real-life experience.

Relationship Play Therapy

Relationship Play Therapy was based on Jesse Taft (1933) and Frederick Allen’s (1934) work [75]. Later, Clark Moustakas (1953), developed a non-directive therapeutic approach and called his model Relationship Play Therapy [83].

Taft considered that the core of child psychotherapy was the examination of the authentic relationship between the psychotherapist and the child and how the child functioned in the here

and now. For Taft it was very important the building of the therapeutic relationship between the therapist and the child as well as the use of time in therapy. He considered that the closure of each therapy session and the end of the therapy was an analogous process to the process of birth, thus he believed that the successful resolution of the trauma, and consequently, the successful separation from the therapist was related to the original separation from the child's mother. In fact, he believed that the trauma experienced in therapy and birth was similar. Taft set the date of the end of the therapeutic process at the beginning of therapy [90].

Allen, like Taft, focused on the relationship between the therapist and the child, emphasizing the enhancement of autonomy and self-actualization of the child. For Allen, the main purpose of therapy was the facilitate the child learn how to act in relationships and in everyday life [90].

Moustakas was the one who shaped relationship Play Therapy in its current form, developing the underpinnings of both the theory and techniques. His main focus was the use of the secure relationship between the child and the therapist as the basis for the child to explore interactions between them and others that will help them move toward individuation. He pinpointed that the growth process includes both the therapist and the child and that these two together will move through the therapy towards self-awareness and awareness of others. Key factor of this therapeutic approach is the play therapist's unconditional acceptance and faith that the child is capable of moving towards a positive direction without any guidance or interference on behalf of the therapist. The therapist must interact with the child's feelings without trying to interpret them. Furthermore, the therapist must participate actively in the child's play if the child invites them to do so [90].

Child-Centered Play Therapy (CCPT)

In 1964, Virginia Axline [91] published "Dibs in Search of Self: The Renowned, Deeply Moving Story of an Emotionally Lost Child Who Found His Way Back", setting the foundations of non-directive Play Therapy. In her book, Axline describes one-year Play Therapy sessions with a boy named Dibs. Axline was based on Roger's person-centered theory for the development of non-directive Play Therapy [86].

Rogers supported that a therapist must ensure that the following conditions are present in order to help their client have a successful therapeutic trajectory. The therapist must establish rapport with the client; the client must feel comfortable to express their thoughts and feelings, the therapist

must recognize and accept his spontaneous, authentic self, the therapist must allow their client to bear the responsibility of making their own choices, (5) the therapist must try gain of client's feelings and attitudes and accept them, and the therapist must bear in mind that the client can grow of independence, using their own power [92].

Axline [66], based on Rogers' theory of successful therapy, developed eight principles as guides to CCPT. These principles are fundamental for CCPT, and every therapist that follows the specific approach must espouse them. These principles, as stated by Axline are the following:

1. The therapist must develop a friendly relationship with the child, and attempt to establish a good rapport as soon as possible.
2. The therapist accepts the child exactly as they are.
3. The therapist establishes a feeling of permissiveness in the relationship so that the child can be free to express their feelings completely.
4. The therapist must keep alert so they can recognize the feelings the child is expressing and to reflect those feelings back to the child in such a manner that they can gain insight into their behaviour.
5. The therapist must maintain a deep respect for the child's ability to solve their own problems if given an opportunity to do so. The child has the responsibility to make choices and to institute changes, and not the therapist.
6. The therapist must be non-directive and must not attempt to direct the child's actions or conversation in any way. It is the child that leads the way; the therapist follows.
7. The therapist must respect the child's pace and should not try to hurry the therapy. Play therapy is a gradual process.
8. The therapist must establish only the limitations that are needed to anchor the therapy to the world of reality and to make the child aware of their responsibility in the relationship, and not to intervene in any other way.

Landreth [75], another pioneer of CCPT, gives the definition of Play Therapy in his book "Play therapy: The art of the relationship: "child-centered Play Therapy is a complete therapeutic system, not just the application of a few rapport-building techniques, and is based on a deep and abiding belief in the capacity and resiliency of children to be constructively self-directing".

From all the above, it becomes obvious that CCPT, is not driven by the therapist, but by the child themselves who leads the therapeutic sessions, makes choices for themselves, and works through play their issues. The therapist, although essential, is a facilitator rather than an interventionist.

Jungian Play Therapy (JPT)

Another popular approach in Play Therapy is Jungian Play Therapy. It is based on Carl Jung's theory. JPT is a dynamic, creative therapeutic approach for children whose base is the symbolic meaning. Jung believed that the children's psyches contain a transcendent function, which occurs through symbolic identification [93]. Jung believed that people are neutral-neither bad nor good. It is their psyche (the conscious and the unconscious structures of one's personality), which was developed as a survival mechanism, that is responsible for both good and bad behaviour [72]. John Allan was the one who developed JPT, after integrating Carl Jung's therapeutic approach in school counselling [85]. As Allan has stated JPT is "playing, making, doing, enacting fantasies in the safety of the therapeutic container" [94].

Psychotherapists who work with children, facilitate their psychic healing by focusing on the positive therapeutic dyad (therapist-child) and helping them find the self-healing archetype (an innate symbol that facilitates healing by helping the child recognize and achieve a balanced communication between the ego and the Self) that is embedded within children's psyches [93].

JPT is considered non-directive, although some Jungian play therapists can be more directive, using semi-directive techniques [72].

Adlerian Play Therapy

Terry Kottman [95], after being inspired by Alfred Adler, developed a four-phase model for Adlerian Play Therapy. A brief description of these phases is the following:

First Phase: The first phase involves building an egalitarian relationship (a therapeutic relationship that the power is equally shared between the client and the therapist). During this relationship, the therapist will follow the child's lead in the playroom but is also engaged in playing with the child and making questions.

Second Phase: In the second phase, the therapist begins to explore the child's lifestyle so they (the therapist) can identify patterns of thinking, behaviour, and feelings, that the child uses and

that they make the child feel a sense of importance and belonging. Based on their observations the therapist creates a treatment plan.

Third Phase: In the third phase, through the use of drawings and metaphors, the therapist begins to help the child gain insight into their lifestyle.

Forth Phase: In the fourth phase the child is re-educated in order to obtain the skills to practice new positive attitudes and behaviours. This will help them form a constructive lifestyle.

Cognitive Behavioural Play Therapy (CBPT)

Cognitive Behavioral Play Therapy (CBPT) was specifically designed for young children by Suzan Knell, who was based on the work of cognitive-behavioural therapists, such as Aaron Beck [90]. CBPT is based on Cognitive Therapy, a structured, focused approach that helps individuals alterate their behaviour by changing these perceptions that underlie their behaviour. CBPT is used in various situations including children with anxiety and phobias, selective mutism, encopresis, or children who have experienced adverse experiences, such as sexual abuse [96, 97].

CBPT use techniques both cognitive and behavioural techniques [97, 98] including:

Cognitive: psychoeducation (that teaches the child about their condition, how CBPT works and help them obtain new skills or alternate their behaviours), cognitive restructuring (the therapist help the child change their negative thinking by learning how to identify, modify, and/or build cognitive distortions), and positive self-statements (positive, self-affirming statements that are taught during therapy).

Behavioural: somatic management/relaxation (usually through the use of a puppet or a book the child learns muscle relaxation and breathing techniques), exposure (the gradual and systematic confrontation of stimuli that cause anxiety, either in real life or in both imaginal and in vivo situations), and systematic desensitization (the process of reducing anxiety or fear by adopting adaptive responses).

In CBPT both structured and unstructured play is used. Parents or caregivers usually have an active role in CBPT [97].

NDP and EPR application

As mentioned before NDP and EPR are certain stages of play. These stages of play can be used in a therapeutic manner and are the base of Sue Jennings' therapeutic approach. In fact, however, if

these stages (and especially NDP) have not developed smoothly due to rejection, abandonment, neglect or abuse, it is essential that Play Therapy rework them, as compensation. So, EPR and NDP are not Play Therapy (or psychotherapy) per se, but they can be integrated into any Play Therapy -or other child psychotherapy- approach [64].

Through NDP and EPR the child is able to enter the imaginative and symbolic world, the world of ritualistic and dramatic play, and drama. NDP is developed before even the child is born, in their mother's womb, creating a bond between the mother and the child [64].

Through NDP and EPR essential competences for child development are acquired: attachment between mother and infant, problem-solving and conflict resolution, imagination and creativity, growth of identity and independence, everyday reality and dramatic reality, empathy and resilience [64].

Toys in Play Therapy

Landreth [75] suggested three types of toys for a fully equipped playroom: acting-out aggressive-release toys, real-life toys, and toys for creative expression and emotional release. In his book "Play Therapy: The Art of the Relationship" noted a full list of suggested toys that included the following:

dishes (plastic or tin), tinker toys, play camera, balls (large and small), band-aids, chalkboard, chalk, hand puppets (doctor, nurse, police officer, family members, different animals), tongue depressors, popsicle sticks, empty fruit and vegetable cans, crayons, pencils, paper, paints, easel, newsprint, brushes, pacifier, pitcher, play money and cash register, , hats (fireman, policeman, tiara, crown,) gumby, handcuffs, soap, brush, comb, rubber snake, alligator, school bus, sandbox with large spoon, funnel, sieve, and pail, different vehicles (truck, car, airplane, tractor, boat, ambulance), toy watch, toy soldiers and army equipment, telephone, sponge, towel, insects, rags or old towels, rope, kitchen equipment, instruments (drum, cymbals ,xylophone), dart gun, barbie doll, bendable doll family, doll furniture, dollhouse, flashlight, utensils (pots, pans, dishes, silverware, empty food containers), pounding bench and hammer, puppet theater, purse and jewelry, building blocks, tissues, stuffed animals, toy noise-making gun, rubber knife, dress-up clothes, nursing bottle.

Kottman [72, 90] suggested that toys can be divided in five categories:

Family/nurturing toys. The purpose of these toys is to work as mediators for children to build a relationship with the therapist, explore the relationships between the family members, and as media to represent situations that happen outside the playroom.

Pretend/fantasy toys. Through pretend/fantasy toys the children manage to express their feelings, while they explore a variety of different roles and experiment with different attitudes and behaviours.

Aggressive toys. Through play with aggressive toys, the children have the opportunity to symbolically express anger and aggression. They can also find a way to symbolically protect themselves from their fears while exploring control issues.

Scary toys. The purpose of these toys is to provide opportunities for children to deal with their fears. Through this process, they can work on their traumas.

Expressive toys. The purpose of these toys is to help the children express their feelings while enhancing a sense of mastery and practising problem-solving skills. They also help them express their creativity.

Especially regarding Play Therapy in hospital settings, therapists use toys that represent different kinds of hospital equipment, stethoscopes syringes, and masks, with the combination of dolls or puppets [75].

Play Therapy in Children with Stress/Anxiety

Play therapy is considered a therapeutic approach that can help children with stress and/or anxiety. A large meta-analytic review by Bratton et al [99] concluded that 7 studies regarding anxiety and/or fear (there were no separate categories in the meta-analysis) accounted for Effect Size = 0.69 9 ($p < .05$) indicating a moderate correlation between the implementation of Play Therapy and reduction in anxiety. It is worth mentioning, however, that the eligible studies regarding stress in this meta-analysis were very few compared to the studies that examined other factors.

Another meta-analysis, by Ray and colleagues [100], examined, among other factors, the effectiveness of school-based child-centered Play Therapy in internalizing problems, which included problems within the self (anxiety, withdrawal, depression, and somatic symptoms). Of the 9 studies, that were included, 2 showed data regarding anxiety and one regarding stress. The mean effect for internal processes across the nine studies was $d = .21$, 95% CI [.03, .39], meaning

that there was a small effect for children who received a Play Therapy intervention. There was, however, a statistically significant difference between children who received a Play Therapy intervention compared to those who received no therapeutic intervention ($z = 2.24, p < .05$). Still, the number of studies compared to the overall number of studies that included in this meta-analysis, as well as the number of studies regarding stress and anxiety within the cluster of internalizing problems was small.

A more recent systematic review, located 9 studies that examined the efficiency of Play Therapy in stress and anxiety, with three of them being included in Ray's aforementioned meta-analysis. The data suggest that individual Play Therapy for anxiety had effect sizes ranging from $d = 0.18$ to 2.73 (with an effect size of $.20$ being small, $.50$ medium, and $.80$ or greater large). More specifically, the effect sizes of the including researches were the following: $0.18, 0.20, 0.21, 0.35, 0.50, 0.55, 0.56, 1.87,$ and 2.73 , with the majority of the studies having medium or large size effect [101].

Another study, with 4 participants, that was not included in the above systematic reviews, also indicated that children who receive Play Therapy may benefit from it regarding anxiety (Swan), while a study regarding the effect of non-directive Play Therapy on the reduction of anxiety disorders, also concluded that anxiety reduced from 90.7 to 36.9 in the Spence Children & Anxiety Scale after the children received 10 sessions of non-directive Play Therapy, while there was no significant reduction in the control group [102]

Cognitive Play Therapy, also, seems to also have positive effects on children with anxiety, and in fact, be more effective than other interventions such as audiovisual distraction, and the tell-show-do technique. In a relevant study in children 6 to 10 years old, not only it was noted a significant reduction ($p = .001$) in objective anxiety and subjective anxiety, but also 80% of the children that received CBT indicated feeling very happy after the completion of the sessions, and 20% feeling happy. Additionally, in the CBT group, it was observed a greater reduction of both objective and subjective anxiety compared to the audiovisual distraction group, and tell-show-do technique group ($p = .002$, and $p = .001$ respectively) [103].

Play Therapy in Chronically Ill and/or Hospitalized Children

Hospitalized kids and especially chronically ill children are a very sensitive group of patients. Play therapy has been used as palliative intervention for these children. Several studies have

examined how can Play Therapy help children who are chronically ill or hospitalized. A recent systematic review indicated that Play Therapy has been used in children that have undergone surgery, in children with acute or chronic pathologies, as well as in children with a cancer diagnosis. It was found that Play Therapy is beneficiary for hospitalized children since it improves behaviour and attitude, decreases postoperative pain, and reduces anxiety [104].

For example, the findings of a study conducted on hospitalized children in India revealed that there was a significant difference in both the mean and standard deviation of the anxiety level ($M=49, 42.76$ & $SD = 8.40, 8.29$) before and after the implementation of the therapeutic sessions ($p<.01$), while such difference was not noted in the control group [105].

One systematic review examined the effectiveness of Play Therapy in decreasing negative behaviours, perioperative anxiety, and postoperative pain in children undergoing surgery. The results, however, are contradictory: Of the studies that were included in this systematic review, two suggested that there was a significant difference ($p < .05$) in anxiety levels after the implementation of the therapeutic play, two found no significant difference and one although it found that there was a significant difference in anxiety during the day of the surgery, when two tools were combined to measure anxiety there was no significant difference [106].

The results of another systematic review regarding the effectiveness of play therapy in psychosocial outcomes in children with chronic diseases are contradictory, as two of the included studies concluded that Play Therapy may have a positive impact on depression, and one in improving self-concept, while the three studies found no effect [107].

Play Therapy in Pediatric Cancer

Different approaches of Play Therapy may benefit patients with pediatric cancer in several aspects. In a relevant systematic review, the following types of Play Therapy have been identified: drawing Play Therapy, painting Play Therapy, puzzle Play Therapy, storytelling Play Therapy, cognitive behavioural Play Therapy, and therapeutic Play Therapy. The data, however, regarding the characteristics of each approach and where each approach was based are limited so it is unclear if the approach was indeed Play Therapy or a play-based intervention [108].

Play Therapy can be used in children with cancer to help them reduce their pain [109, 110], stress or anxiety [109, 111, 112, 113], to help them improve their functional mobility [110], improve

children's behavioural problems [114] or to be prepared for surgery or other medical procedure [109].

The Current Study

As mentioned in previous parts of this paper both the diagnosis and treatment of pediatric cancer are stressful experiences for children and their families [1, 34-36].

However, there are a few studies that examine the stress or the anxiety children with cancer experience [8-11], while although there are several studies that examine different psychological and psychosocial interventions (including Play Therapy and creative arts therapies in general) in hospitalized children or children with chronic diseases, there are even fewer studies that focus on psycho-oncological interventions, such as psychosocial intervention, cognitive intervention programmes, social skills groups, creative art therapies etc. in children with cancer [12-15].

Furthermore, there are some systematic reviews as well as meta-analyses regarding Play Therapy in general [99], regarding specific Play Therapy approaches, e.g., CCPT [115] in specific settings [100], or with children with specific difficulties, such as children who had suffered traumatic events [116], hospitalized children [104], children who were undergoing elective surgery [106], or even children with cancer [108]. None of them, however, has focused on the effect of Play Therapy on stress and anxiety in children with cancer. Moreover, most of the aforementioned systematic reviews do not include qualitative studies although they can offer valuable data.

This systematic review seeks to combine evidence from both qualitative and quantitative studies, published in peer-reviewed journals, adding valuable data to the field of Play Therapy in paediatric oncology.

Aims

The current systematic review aims to identify how different approaches of Play Therapy can contribute to the reduction of stress and/or anxiety that face children while suffering from cancer and during their hospitalization, and/or as childhood cancer survivors.

Further aim of the study is to summarize which Play Therapy approaches are most popular among therapists who work with patients with pediatric cancer. Another objective of this systematic review is to examine the age of pediatric cancer patients that may benefit more from Play Therapy.

Methods

Study Design

This systematic review was performed under the PRISMA guidelines [117].

A PICOS approach was used to define the inclusion criteria (Table 2).

Two independent researchers (A K and A K) conducted research in the following databases: ERIC, Google Scholar, ProQuest, PubMed, Embase, PsychInfo and SCOPUS, up to 30 May 2022. The research was based on the following algorithm: ("Play Therapy" OR play-based OR play-therapy OR "play intervention" or filial OR "therapeutic play") AND (child OR pediatric OR childhood) AND (cancer OR oncology OR oncological OR leukemia OR cancerous OR lymphoma OR Retinoblastoma OR Rhabdomyosarcoma OR tumor OR Hodgkin OR osteosarcoma OR sarcoma OR melanoma) AND (anxiety OR anxious OR stress OR stressful OR distress).

Although play intervention or play-based (intervention) are not Play Therapy, these terms were also included in the search terms, as some researchers include some Play Therapy approaches under the play-based intervention umbrella (e.g., filial play).

Only peer-reviewed articles were included, written in English, Greek and Spanish. Abstracts were also included (e.g., from conferences or English abstracts from articles written in a language other than English, Greek or Spanish), as long as they have been published in peer-reviewed journals. The studies that were included in the current systematic review mentioned explicitly that pediatric cancer patients followed a Play Therapy intervention in order to reduce anxiety and/or stress. Studies that included additional areas of intervention (e.g., depression) were included in this systematic review. The results regarding the other areas of intervention were not, however, included in this study.

Due to the subject of the research (intervention) cohort studies, RCTs, experimental studies, phenomenological studies, case series and case reports were included. Studies of quantitative study design, qualitative study design, and mixed methods design were eligible. Systematic reviews were used as referrals for the snowball assessment for additional relevant studies. There was no language, gender or other demographic restrictions. All studies that indicated that they use Play Therapy were included, even though some of them did not follow the protocols of known Play Therapy approaches.

Data extraction

Data from eligible studies were extracted (Table 3, Table 4, Table 5 and Table 6), including the name of the first author, the country where the survey was conducted, study design, selection of the sample, number of participants and percentage of girls, age range, settings where the sessions took place, tools that were used to assess anxiety and/or stress, therapeutic approach, statistical analysis, main findings, and comparison to the control group where applicable.

Quality Assessment

Different critical appraisal tools were used, that addressed better to each type of study included in this systematic review.

Qualitative studies (case reports, case series, phenomenological studies) were screened with the Critical Appraisal Skills Programme (CASP) for Qualitative Studies. CASP for Qualitative Studies consists of 10 questions that are answered with “Yes”, “No” or “Can’t tell”, included in three sections/subquestions: a) Are the results valid? b) What are the results? c) Will the results help locally? Included qualitative studies were divided into three categories of poor, medium, and good for scoring the quality of them [118].

The Joanna Briggs Institute Critical Appraisal tool for use in JBI Systematic Reviews Checklist for Case Reports was used to critically appraise the quantitative case reports. JBI Checklist for Case Report consists of 8 questions that are answered “Yes”, “No”, “Unclear”, or “Not Applicable” [119].

The Joanna Briggs Institute Critical Appraisal tools for use in JBI Systematic Reviews Checklist for Quasi-Experimental Studies (non-randomized experimental studies) was used for the quality assessment of quasi-experimental studies. JBI Checklist for Quasi-Experimental Studies consists of 9 questions that are answered “Yes”, “No”, “Unclear”, or “Not Applicable” [120].

The one RCT study that was included in this systematic review was assessed through the Cochrane Collaboration’s tool for assessing risk of bias in randomized trials, consisting of 7 in total that can be characterized as “low risk”, “high risk”, or “unclear” [121].

Quality assessment was independently performed by the primary author and by the second author. Any disagreements between the two reviewers regarding critical appraisal were resolved

by discussion between the two researchers. In cases that the two researchers could not come to an agreement, consultation was sought by a third, independent, reviewer.

Results

Selection of Studies

Figure 1 summarizes the selection of studies for this systematic review. The publications retrieved from research in databases were 2.241. After the duplicates were removed the remaining studies were 1.366. 236 were screened by title and abstract and 27 studies were assessed full-text. Fourteen of them were excluded with reasons (Table 7). After careful screening, 13 studies remained as eligible. One study was added through snowball, raising the number of selected studies to 14 (flowchart). The eligible studies were published between 1985 and 2021.

Description of the included studies

Methods of the included studies

The eligible studies were both quantitative (10) [109, 111, 112, 113, 122, 123, 124, 125, 126, 127], and qualitative (4) [128, 129, 130, 131]. There was no mixed-methods study. Two of the quantitative studies were case reports [112, 122], one RCT [113] and the rest were quasi-experimental studies [109, 111, 122-127]. Regarding the qualitative studies, three of them were case reports [129-131] and the remaining one was Phenomenological research [128].

Regarding the categorization of each eligible study, if the study design was explicitly mentioned in the study, the researchers considered the studies as so. If there was no mention of the study design in the published paper, the study was characterized as RCT if both the sampling and the allocation of the sample were randomized, and as Quasi-Experimental if only the allocation was randomized. Case studies with four or fewer participants were considered case reports while those with over four participants were considered case series according to the suggestions of Abu-Zidan et colleagues [132].

Participants

349 children and adolescents (including those in control groups), aged 2,5 to 16 years old, participated in the studies. In all studies, the participants were cancer patients, except in one case report, where the participant was a cancer survivor [131].

295 of the participants had known gender, while, in two studies (54 participants), where only the abstracts were available in English there were no data regarding their gender. Out of the 294 participants, 119 of them were females (40%) and 176 were males (60%). Tables 3 and 4 present more information.

The patients suffered different types of cancer. The majority of the patients had different kinds of leukemia (n=168)-including acute lymphoblastic leukemia (acute lymphoid leukemia) and myeloblastic leukemia (acute myeloid leukemia or acute nonlymphocytic leukemia)- [109, 111-113, 123, 125, 128-130] followed by patients who suffered from lymphoma (32) [109, 111], brain tumour (n=25) [111, 124, 131], germ-cell tumour (n=23) [111], osteosarcomas (n=14) [111]. One patient had malignant tumour in the spinal column [128], one adrenal gland tumour [128], one and myosarcoma [128], one rhabdomyosarcoma [130], and one blood cancer [122]. In one study it was noted that 21 participants suffered from tumour, without further clarifications [109]. In two studies there was no additional information of the type of cancer the participants suffered from [126, 127].

Countries

The majority of the studies were conducted in Asia. Out of the 14 studies, 5 were carried out in Iran [113, 125-128], 3 in USA [129-131], 2 in India [123, 124], 1 in Turkey [109], 1 in Hong Kong [111], 1 in Brazil [112], and 1 in Taiwan [123]. Surprisingly, there were no studies from Europe and all the studies from the USA were case studies conducted more than two decades ago (from 1985 to 1996).

Age of the Participants Receiving Intervention

The youngest participants who received intervention were 3 years old [124, 128] while the oldest were 16 [11]. It was challenging to determine the mean age or the mode regarding age in the included studies, as most of them do not present so detailed data. It is noticed, however, that the majority of the studies included children between 8 and 12 years old in the intervention group,

while in Li et colleagues' study [111], which included the most participants that received Play Therapy, the mean age was 11.6 years. Only one study examined if there is any significant difference in the age of the patients that were receiving Play Therapy [125]. The results indicated that there was a significant difference ($p=.001$) among the three subgroups (6-8, 9-10, and 11-12 years old), but no further information is provided. For more information, Table 8 provides the available data.

Measuring Stress and Anxiety

Out of the fourteen studies, nine assessed anxiety, while five assessed both stress and anxiety. There was no study that measured only stress. Ten validated tools were used to assess anxiety, plus an adaptation of the Child State-trait anxiety inventory in Chinese and an adaptation of the same scale in Turkish. In one case, only one subscale of the tool was used (the one that measured anxiety) [126]. One study used a validated tool to measure stress [112]. Three studies used observation for both stress and anxiety, while one study used measures of physiological responses to anxiety. One study used the framework of analysis of the structure of the phenomenon for both stress and anxiety. Six studies included a detailed description of the measures they used. The tools that were used to measure anxiety and stress included 7 to 40 questions. Table 9 provides a list of the measures, as well as a brief description of them.

Play Therapy Approaches

The Play Therapy sessions were conducted in hospital settings, with the exception of one case that was implemented in support home, and two studies that there was no data regarding the settings the Play Therapy was implemented.

In most studies, the approach was either CBPT (including Cognitive-behavioral art-Play Therapy) [113, 126, 127] CCPT [112, 122] or some kind of Directive Play Therapy [123, 130] - without explaining firmly which of the directive Play Therapy approaches it was. One study was regarding Focal Play Therapy [131], one Dramatic Therapeutic Play [112], one therapeutic play using virtual reality computer games [111], one Therapeutic Play using the Chemoduck toy [109], one puppet therapy [125], one play group that integrated Play Therapy techniques [124], and one used Play Cabinet [129].

The number of the sessions ranged from one to twenty, with a duration from 15 minutes to 2 hours, and a frequency of once a week, twice a week, or five times a week. In some studies, the frequency of the therapeutic sessions was not stated.

It was mentioned for none of the providers if they were registered play therapists or the training they had received. In three of the studies the providers were mentioned as “therapists” [111, 112, 123], without any further information, in two they were nurses [111, 129], and in one he/she was a social worker [131]. In one study there was a social worker and a nurse as coordinators [130]. In one study the term researcher was used [109], without providing any further information. In two studies only the abstract was in English, where no further information was provided regarding the therapists [126, 127]. The remaining four studies had no information regarding the therapists.

Table 10 provides the available data regarding each therapeutic approach, as well as the profile of the therapist.

Toys Used in Therapeutic Sessions

Various toys were used during the therapeutic sessions, including different kind of puppets: hand-made hand puppets (made with gloves, socks, buttons, string, cotton ball, and plastic eyes), hand-made stick puppets (made with art paper, colourful paper cotton), and readymade finger puppets [125], puppets that represented, patients, family, staff members, or animals [128, 130, 131], dolls [112, 113, 131], medical equipment such as blood and urine collection bottles, syringes and hypodermic needles, adhesive tape, catheters, gauze, tourniquet, giving set [112, 113, 128, 130], paper and crayons [123, 129-131], board games [129, 131], cars [123], domestic utensils [128], stuffed toys, such as Chemo Duck Toy, or other [109, 129], balloons [123], music box, music tapes, music instruments [129], masks [123, 130], puzzles [123, 129], books [13], video games [111, 129].

The Efficiency of Play Therapy in Anxiety and Stress

All studies concluded that Play Therapy can help children with cancer relieve their stress and anxiety. More specifically, in all studies, it was noted a reduction in anxiety and/or stress after the Play Therapy sessions [109, 111-13, 122-131], with one study examining the role of sociodemographic characteristics in the effectiveness of Play Therapy and concluding that the

success of the intervention was associated to the age, sex, history of the previous hospitalization, days of hospitalization of the participants ($p=.001$) [125].

Qualitative research gave valuable information, not only for the efficacy of the Play Therapy but also regarding the specific issues that were worked through the therapeutic process and how the therapists handled them. In Antoneli Fonseca et al's phenomenological research [128], the children seemed to re-enact scenes of their stay at the hospital, but they also had the need to relive situations of family routine through their play. Furthermore, the study suggested that Play Therapy has helped the children recognize their distress and thus try to overcome their stress and anxiety. The fact that play offered the children the opportunity to make choices helped them control their stress. Play also helped the children gain self-confidence, which in turn helped them handle stressful situations, regarding their disease and treatment. The use of medical toys has helped the children have a compensative experience.

Cooper and Blitz [130] describe in their paper the cases of 4 children with cancer and their therapeutic sessions. All four children used puppets to re-enact stressful situations from their hospitalization and all of them worked on their feelings (anger, anxiety etc.). It is also described how the coordinators of the therapeutic group worked with the children and how they reflect the children's feelings, thoughts and worries (e.g., how they responded to children's specific statements, how much directive they were during the sessions etc.). In the same case study, as well as in Davies' case study [131], it is illustrated vividly, the image that many children patients have regarding their doctors and nurses-especially the very young children-as someone who does hurtful things to them. In both studies, Play Therapy helped pediatric cancer patients use coping mechanisms to handle stress. Children could express their anxiety (e.g., anxiety about death through play) [130, 131].

The last of the included qualitative studies it was indicated Play Therapy facilitated children who received it to verbalize their thoughts and feelings to the medical staff [129]

Comparison of Pre- and Post-intervention

All measurements, as well as observations (in qualitative studies), suggested the efficacy of Play Therapy regarding different types of anxiety and stress.

Only in one study, it was noticed that anxiety was reduced and relapsed during the sessions. Still, the majority of the stressor related to illness (being sick, examined by doctors, receiving

medicines being hospitalized, receiving injections, bone marrow aspiration,) were reported to be non-upsetting, or at least it felt that they were less upsetting after the children attended the Play Therapy sessions [112].

In Heydari and colleagues quasi-experimental research [123] it was found that social anxiety ($p < 0.001$) and separation anxiety ($p < 0.001$), harm avoidance ($p < 0.001$), and physical symptoms related to anxiety ($p < 0.001$) decrease after the Play Therapy sessions. In a similar vein, Li et al [111] concluded that there was a statistically significant reduction in anxiety after the pass of one week hospitalization-time when the intervention was implemented as well state anxiety on admission 21.04, SD=4.90, after 7 days 19.48, SD=4.73). The only RCT in this systematic review also concluded that there was a decrease in children's anxiety (both trait and state anxiety) after the intervention (trait anxiety score pre-test=54.73, SD=0.79, post-test=52.13, SD=3.18, state anxiety pre-test=56.20, SD=2.70, post-test=52.00, SD=4.19) [113]. In line with the above evidence, Behera et colleagues [125] also suggest a significant difference in anxiety before and after the implementation of Play Therapy (mean score of anxiety in pre-test=14±4.94, in post-test=8.95±2.87, t-test= 4.355, df=18, and p-value=0.0004).

The remaining studies also concluded that there was a decrease in anxiety or stress before and after the therapeutic intervention, regardless of the Play Therapy approach each study examined, children seem to benefit from it [109, 124, 126-131].

Comparison of Intervention and Control Group

Of the 14 studies, eight were design to include a comparison group and seven of them concluded that there was a significant different between the intervention and the control group.

More specifically, in Behera et colleagues' study [125] among 40 children with leukemia, equally allocated to the intervention and the control group, it was found that there was statistically significant difference between the intervention group and the control group regarding anxiety after the implementation of the intervention (by t-test= 3.14 at df=38, and p-value =0.001).

In another study from 30 children in Iranian hospital, again equally allocated to the control and the experimental group it was indicated that there was a statistically significant difference between the intervention group and the control group in all the anxiety components (social anxiety: $F=117.01$, partial $\eta^2=0.83$, $p=0.0001$, separation anxiety: $F=129.65$, partial $\eta^2=0.84$, $p=0.0001$, harm avoidance: $F=228.11$, partial $\eta^2=0.90$, $p=0.0001$, physical symptoms: $F=48.58$,

partial $\eta^2=0.66$, $p=0.0001$) [123]. In Nekah et al's research [126], the results are also similar: anxiety significantly decreased in the intervention group (6.7 ± 2.1), compared to the control group (10 ± 3.1) after the intervention ($P<0.04$).

The only RCT of this systematic review also concluded that there is significant difference in effectiveness of Play Therapy in anxiety (both trait and state anxiety $p<0.05$) [113]. The results of Orhan et al's quasi-experimental study [109] in Turkey also suggest the same, but only regarding state anxiety as the mean state anxiety score of the intervention group was lower than that of the control group (intervention group: 31.50 ± 4.73 , control group: 43.40 ± 5.42 , $p<0.001$), while there was no difference in the trait anxiety score between the two groups.

Tsai et al's research [124], the only study that used two different measures to measure anxiety as well as measure of physiological responses, concluded also that the intervention group had significantly lower anxiety scores than the control group. A statistically significant difference was noted in both the Beck Youth Anxiety Inventory Score and in Faces Anxiety Scale between the two groups ($p=0.01$, $p=0.05$ respectively), as well as in the heart rate variability and salivary cortisol concentration ($p=0.05$, $p=0.02$ respectively)

A comparison between cognitive-behavioural art-Play Therapy and cognitive-behavioural story therapy suggested that the former had a significant difference with the control group in anxiety ($F=29.98$, $P<0.001$), and stronger effects than cognitive-behavioural story therapy in reducing anxiety ($p<0.001$) [127]

Only one study, that of Li and colleagues [111], found no statistical difference between the intervention and the control group, although the mean score of state anxiety in the intervention group was lower after the intervention compared to the control group. The effect size on anxiety and intervention, however, was between small and moderate ($\eta^2 = 0.05$), suggesting that Play Therapy can be effective.

Risk of Bias

Most of the qualitative studies, assessed via CASP checklist, have poor quality. Only Antoneli Fonseca et al's study [128] scored positively in most questions (7/9: clear statement of the aims of the research, appropriate methodology, appropriate research design, appropriate recruitment strategy, appropriate data collection, ethical issues into taken into consideration, and sufficiently

rigorous data analysis). The remaining 3 studies were of poor-quality scoring 1/9 [129-131] (for more information see Table 11).

All quasi-experimental studies scored in JBI Checklist Criteria for Quasi-Experimental Studies as having moderate quality (two scored 6/9 and four scored 7/9) [123, 126, and 109, 111, 124, 125 respectively], except one that was characterized as having high quality [127] (for more information see Table 12).

Regarding the quantitative case studies, one scored 7/8 in the JBI Checklist Criteria for Case Reports [122] and one 2/8 [112] (for more information see Table 13).

Finally, the only RCT included in this systematic review was considered as of low bias (high quality) in the Cochrane tool for RCT [113] (for more information see Table 14).

Overall, the majority of the studies were of moderate quality.

Discussion

The aim of this systematic review was to understand the impact of Play Therapy as well as to summarize which are the most popular Play Therapy approaches for patients with pediatric cancer and at what age is Play Therapy more effective.

This is the first systematic review regarding Play Therapy and pediatric cancer that is so thorough and includes this number of studies. It is also the first systematic review that focuses solely on dealing with stress and anxiety in pediatric cancer with the help of Play Therapy. Furthermore, the previous relevant systematic review [108] had methodological deficits (i.e., in Ibrahim et al's systematic review there was no quality assessment).

Overall, the quality of the quantitative studies was moderate, with most qualitative studies had poor quality, while only one study met the criteria of randomized control trials. In addition to these, the majority of the qualitative studies were conducted before 2000 and they do not seem to follow any protocol for qualitative research, such as the contemporary CARE or an equivalent tool. They rather seem to be a recording of the sessions and the therapists' conclusions, thus the data they provide, although they may contribute by offering valuable information regarding the development of Play Therapy (and qualitative research), they are not very reliable. Surprisingly there were no recent studies from the USA (only qualitative studies before 2000), and no studies from Australia, New Zealand, the UK, or even any other country in Europe where the framework for Play Therapy is well-established.

The evidence, however, from the quasi-experimental studies, the RCT, the phenomenological study, as well as the quantitative case studies, although they may be limited (9 studies in total), are robust. All studies concluded that, when comparing the pre- and post-intervention scores of stress and/or anxiety, Play Therapy helped children with cancer with their anxiety and stress. The majority of the studies also suggest that play therapy is more effective than no treatment (i.e. (i.e. in Tsai et al's research, 2013; Orhan et al, 2017; Mehrara et al's research, 2018; Heyadari et al's research, 2021; Behara et al's research, 2021) or other therapeutic approach (i.e., compared to cognitive-behavioral story therapy in Shojaei et al's research). Only Li et al' study [111] did not find any statistical difference between the intervention and the control group, although it was found that there was a significant difference in anxiety levels before and after the intervention within the intervention group. This, however, can be explained as the result of the power analysis was 0.68, indicating a 32% chance of type II error. As the researchers state the limited sample size might have affected the state anxiety scores.

The results are in line with the current literature. Godino and colleagues' [104] systematic review in hospitalized children also suggests that Play Therapy can benefit them, while Bratton et al's [99] meta-analysis in 93 studies regarding play therapy also indicates the efficacy of Play Therapy.

One issue that emerged was that of who can implement Play Therapy and how they can affect the results of the studies. In none of the studies it was stated clearly if the individuals that implemented the therapeutic sessions were trained play therapists or not, jeopardizing the correct implementation of the intervention, and subsequently the efficacy of it. Furthermore, some interventions were called "Play Therapy" but they did not follow the protocol of any Play Therapy approach, or, in some studies, the intervention was not described in detail, thus it was not easy to identify if the therapists/researchers followed the appropriate protocol regarding the therapeutic approach they were implementing.

One of the limitations of this systematic review was that in some studies only the abstract was available in English, thus important information about the research procedure was not assessed. Additionally, due to the heterogeneity of the study designs, different appraisal tools were used. Although this decision helped the researchers have a clearer overview of each study, it made it difficult to compare each study with the others.

One additional limitation of this study is that there was little or no data regarding how the demographic characteristics of the participants are related to the efficacy of the Play Therapy. Unfortunately, regarding the age that play therapy is more effective, there were no sufficient data in the eligible studies. Only one study examined age as a factor, but the data are limited. If and how the ethnicity of the participants was correlated to the success of the intervention was also unclear. Lin and Bratton in their meta-analytic review [115] concluded that the mean effect of CCPT for non-Caucasian populations was statistically significantly higher than the mean effect size for Caucasian participants. In the studies included in this systematic review, it was not mentioned in any of the studies the ethnicity of the participants, which might have given light to cultural issues in Play Therapy.

Implications for Pediatric Cancer Population

Play Therapy seems to be an effective intervention in reducing stress and anxiety in children with cancer. Hospitals should equip rooms, especially for play therapy sessions and hire appropriately trained professionals (play therapists). Health care staff can also integrate play therapy techniques that seem to benefit children in their sessions, not only regarding stress and anxiety management but in enhancing their psychoemotional health in general.

Conclusions

This systematic review illustrates the need for more systematic, organized research and design. Further research is required, as well as specific protocols and guidelines that will specify the toys and children's books that are more appropriate for hospitalized children, especially children with cancer, the optimal number of sessions, etc. Moreover, it is essential to investigate which play therapy approach might be more effective (directive, non-directive, CCPT, CBPT etc.) and which is most beneficial for children with cancer: individual or group Play Therapy. Further demographic characteristics of the participants (such as age, ethnicity etc) should be taken into consideration. The studies should also include in their description the exact protocol that was used during the therapeutic sessions, so it will be clear which therapeutic approach was used, and if it was indeed Play Therapy or some kind of play-based intervention. The implementation of Play Therapy should be done by appropriately trained professionals (play therapists) that will assure the credibility of the procedure.

Tables

Table 1	
Trauma- And Stressor-Related Disorders (DSM-5)	Classification DSM-4
Reactive Attachment Disorder	Other Disorders of Infancy, Childhood, or Adolescence
Disinhibited Social Engagement Disorder	Other Disorders of Infancy, Childhood, or Adolescence
Posttraumatic Stress Disorder	Anxiety Disorders
Acute Stress Disorder	Anxiety Disorders
Adjustment Disorders	Adjustment Disorders
Other Specified Trauma- And Stressor-Related Disorder	-
Unspecified Trauma- And Stressor-Related Disorder	-

Table 2
PICOS definitions of inclusion criteria.

PICOS	Inclusion Criteria
Population	Children with Pediatric Cancer
Intervention/Exposure	Play Therapy
Comparison (where applicable)	Children with Pediatric Cancer who do not follow a Play Therapy intervention programme (no programme at all, or different programme)
Outcome	Reduction of Stress/Anxiety
Study Design	Cohort, Quasi-Experimental, Randomized Clinical Trial, Case Series, Case Report, Phenomenological

Table 3: Characteristics of Quantitative Studies

First author (year)	Country	Study design	Sample	Sample size (% girls)	Age range	Setting	Number of sessions	Therapeutic approach	Ways/tools anxiety or stress were measured	Statistical analysis
Behara (2020)	India	Quasi-Experimental	Children hospitalized with leukemia	40-20 in intervention group (25% girls) and 20 in the control group (25% girls)	6 to 12 year olds	Hospital	5	Puppet Therapy	Hamilton Anxiety: Children's Play Therapy Instrument (CPTI) Stress: Illness-specific Adjustment Scale (IsAS)	Paired t test, unpaired t test, chi-square value
Chari (2013)	India	Case Report	Child hospitalized with cancer children hospitalized with leukemia, with no presence of physical problems preventing the child from participating in play therapy sessions	1 (girl)	4 year olds	Hospital	20	Child-Centered Play Therapy		Descriptive
Heydari (2021)	Iran	Quasi-Experimental		30 15 in intervention group and (46% girls) 15 in control group (46% girls)	8 to 12 year olds	Hospital	10	Group Play Therapy (MASC).	Anxiety: Multidimension al Anxiety Scale for Children	Multivariate analysis of covariance, ANCOVA test in MANCOVA text

Table 3: Characteristics of Quantitative Studies (continued)

First Author (year)	Country	Study Design	Sample	Sample size (% girls)	Age range	Setting	Number of sessions	Therapeutic approach	Ways/tools anxiety or stress were measured	Statistical analysis
				122-52 in the interventio					Anxiety: The short form of the Chinese Version of the State Anxiety Scale for Children (CSAS-C).	Independent t-test and v2 for homogeneity of the control and intervention
Li (2011)	Hong Kong	Quasi-Experimental	Children hospitalized with cancer Children with cancer with no specific psychological problems or disorders and, at least one year of diagnosis, hospitalization more than 3 times, and a high score in the Child State-trait anxiety questionnaire	n group and (46% girls) 70 in the control group (47% girls)	8 to 16 years old	Hospital	5	Directive therapeutic play, using virtual reality computer games	Anxiety: Child State-trait anxiety questionnaire (CSTA) Anxiety: Hospital Anxiety and Depression Scale (HADS)	Levin's test and Kolmogorov-Smirnov for homogeneity, covariance analysis for the efficiency of the intervention
Mehrara (2018)	Iran	RCT		30-15 in the interventio n group and (40% girls) 15 in the control group (46% girls)	9 to 12 years old	Hospital	8	Cognitive-Behavioural Play Therapy		
Nekah (2015)-abstract only	Iran	Quasi-Experimental	Children hospitalized with cancer	18 old	8 to 14 years old	Hospital	10	Cognitive-Behavioral Group Play Therapy		Covariance analysis, paired t-test and Independent t-test

Table 3: Characteristics of Quantitative Studies (continued)

First Author (year)	Country	Study Design	Sample	Sample size (% girls)	Age range	Setting	Number of sessions	Therapeutic approach	Ways/tools anxiety or stress were measured	Statistical analysis
Orhan (2017)	Turkey	Quasi-Experimental	Hospitalize children that receive treatment through peripheral vascular access, and at a mental development level to be able to answer the questions.	40-20 in the intervention group (30% girls) and 20 in the control group (25% girls)	8 to 12 years old	Hospital	1	Therapeutic Play using the Chemoduck toy	Anxiety: State-Trait Anxiety Inventory for Children (STAIC) Anxiety: Revised Children Manifest Anxiety Scale (RCMAS)	Chi-square and Fisher's exact probability tests for comparing the frequencies and percentages between the two groups, t-test for the efficiency of the intervention.
Sefat (2012)-abstract only	Iran	Case Report	Child with cancer	1 girl	9 years old	-	12	Child-Centered Play Therapy	Anxiety Scale (RCMAS)	Visual analysis of data
Shojaei (2019)	Iran	Quasi-Experimental	Children hospitalized with cancer	36- 12 in intervention group 1, 12 in intervention group 2, and 12 in the control group	8 to 12 years old	Hospital	12	Cognitive-behavioural art-play therapy	Children Anxiety Scale (SCAS)	Repeated-measures analysis of variance

Table 3: Characteristics of Quantitative Studies (continued)

First Author (year)	Country	Study Design	Sample	Sample size (% girls)	Age range	Setting	Number of sessions	Therapeutic approach	Ways/tools anxiety or stress were measured	Statistical analysis
Tsai (2013)	Taiwan	Quasi-Experimental	Young brain tumor patients, that were receiving external beam radiotherapy for the first time	19-9 in the intervention group (55.56% girls), 10 in the control group (0% girls)	3 to 14 years old	Hospital	Approximately 64 sessions (5 days a week sessions for 3 months)	Therapeutic Play	Anxiety: Beck Youth Anxiety Inventory, Faces Anxiety Scale, Evaluation of physiological responses of anxiety (heart rate variability, salivary cortisol concentration)	Independent t tests

Table 4: Characteristics of Qualitative Studies

First author (year)	Country	Study design	Sample	Sample size (% girls)	Age range	Setting	Number of sessions	Therapeutic approach	Ways/tools anxiety or stress were measured
Antoneli Fonseca (2015)	Brazil	Phenomenological research	Preschool children with cancer, undergoing oncological, clinical and/or surgical treatment, temporarily living in support house	5 (80% girls)	3 to 6 years old	Support House	2 to 9 (not explicitly mentioned)	Dramatic Therapeutic Play	analysis of the structure of the phenomenon
Cooper (1985)	USA	Case Series	Children hospitalized with cancer	4 (25% girls)	2,5 to 12 years old	Hospital	Directive group play therapy		Observation
Davies (1992)	USA	Case Report	Brain tumour survivor	1 (girl)	4 years and 8 months old	-	Not mentioned	Focal play therapy	Observation
Kuntz (1996)	USA	Case Report	Children hospitalized with cancer	2 (1 girl)	one was 7 years old and one was not mentioned	Hospital	Not mentioned	Play Therapy in a Play Cabinet	Observation

Table 5: Findings in Quantitative Studies

First author (year)	Main findings	Differences between group with and without intervention (where applicable)
Behara (2020)	<p>There was a statistical difference in the efficiency of the intervention regarding age, sex, history of the previous hospitalization, days of hospitalization. There was reduction in anxiety (mean score of anxiety in pre-test=14±4.94, in post-test=8.95±2.87, t-test= 4.355, df=18, and p- value=0.0004).</p> <p>Anxiety was reduced and relapsed during the sessions. The majority of the stressor related to illness (being sick, being hospitalized, being examined by doctors, receiving injections, bone marrow aspiration, receiving medicines) were reported to be non-upsetting, or at least less upsetting after the intervention.</p>	<p>There was a statistically significant difference between the intervention group and the control group regarding anxiety after the implementation of the intervention (by t-test= 3.14 at df=38, and p-value =0.001).</p>
Chari (2013)		N/A
Heydari (2021)	<p>Reduction of social anxiety (p<0.001) and separation anxiety (p<0.001), harm avoidance (p<0.001), and physical symptoms related to anxiety (p<0.001) after the play therapy sessions</p> <p>There was a statistically significant reduction in anxiety after the pass of one week hospitalization (time when the intervention happened as well) (state anxiety on admission 21.04, sd=4.90, after 7 days 19.48, sd=4.73).</p> <p>There was a decrease in trait anxiety and state anxiety after the intervention (trait anxiety score pre-test=54.73, sd=0.79, post-test=52.13, sd=3.18, state anxiety pre-test=56.20, sd=2.70, post-test=52.00, sd=4.19).</p>	<p>There was a statistically significant difference between the intervention group and the control group of minimum play therapy and control in all anxiety components (p=0.0001).</p> <p>No significant differences between the two groups were found.</p> <p>The mean score of trait anxiety and state anxiety in the experimental group decreased compared to the control group after the intervention (both p <0.05).</p>
Li (2011)		
Mehrara (2018)		

Table 5: Findings in Quantitative Studies (continued)

First author (year)	Main findings	Differences between group with and without intervention (where applicable)
Nekah (2015)- abstract only	Structured cognitive-behavioural group play therapy could be effective in the reduction of anxiety in children with cancer (decrease of 8.1±1.2 points).	Anxiety significantly decreased in the intervention group (6.7±2.1), compared to the control group (10±3.1) after the intervention (p<0.04).
Orhan (2017)	All children that received intervention showed reduced levels of state anxiety. Anxiety and worry were reduced after the implementation of the therapy. The most reduction has been observed in worry.	The mean state anxiety score of the intervention group was lower than that of the control group (intervention group: 31.50 ± 4.73, control group: 43.40 ± 5.42, p<0.001). There was no difference in the trait anxiety score between the two groups.
Sefat (2012)-abstract only		N/A
Shojaei (2019)	Cognitive-behavioural art-play therapy can benefit children hospitalized with cancer.	Cognitive-behavioural art-play therapy had a significant difference with the control group in anxiety (f=29.98, p<0.001), and stronger effects than cognitive-behavioural story therapy in reducing anxiety (p<0.001).
Tsai (2013)	Anxiety was reduced after the intervention.	The intervention group had significantly lower anxiety scores than the control group. A statistically significant difference in the Beck Youth Anxiety Inventory score and in the Faces Anxiety Scale between the two groups (p=0.01, p=0.05 respectively). The a statistically significant difference in the heart rate variability and salivary cortisol concentration (p=0.05, p=0.02 respectively).

Table 6: Findings in Qualitative Studies

First author (year)	Main findings
Antoneli Fonseca (2015)	Play therapy has helped the children recognize their distress and tried to overcome their stress and anxiety. Stress was controlled through play, which offered the children the opportunity to make choices. It also helped them gain self-confidence, which in turn helped them handle stressful situations, regarding their disease and treatment. The use of medical toys has helped the children have a compensative experience.
Cooper (1985)	Overall stress and anxiety were reduced. Play therapy helped the children use coping mechanisms to handle stress. Children were able to express their anxiety (e.g., anxiety about death through their play).
Davies (1992)	The play therapy sessions helped the child reduce her stress and anxiety. During the sessions, different stressful topics emerged (e.g., fear of death) and were worked through.
Kuntz (1996)	Play therapy seemed to benefit children handle their stress and anxiety by verbalizing their thoughts to the medical staff.

Table 7: Excluded with reasons

Title	First author (year)	Assessment
Effectiveness of Individual Play therapy on Hope, Adjustment and Pain Response of Children with Leukemia Hospitalized in Shahrivar Hospital, Rasht, Iran	Alavi, B. (2021)	Only pain was assessed. Anxiety was mentioned as connected to pain.
The effect of playing games with toys made with medical materials in children with cancer on pain during intravenous treatment	Hakime (2021)	Although play therapy is mentioned in the article, only playing games with toys made with medical materials was used as an intervention strategy.
The Effects of a Therapeutic Play/Play Therapy Program on the Fear and Anxiety Levels of Hospitalized Children After Liver Transplantation	Zengin (2021)	It is not mentioned whether the liver transplant is due to cancer or not.
Effectiveness and Appropriateness of Therapeutic Play Intervention in Preparing Children for Surgery: A Randomized Controlled Trial Study	Ho (2008)	It is not mentioned whether the surgery is due to cancer or not.
Play-based procedural preparation and support intervention for cranial radiation	Grissom (2016)	It was a generic play-based intervention that was not based on a play therapy approach.
Therapeutic play as a pain relief strategy for children with cancer	Mello Sabino (2006)	Only pain was assessed. Anxiety was mentioned as connected to pain.
Comparison Study of Art Therapy and Play Therapy in Reducing Anxiety on Pre-School Children Who Experience Hospitalization	Ramdaniati (2016)	It is not mentioned whether the hospitalization is due to cancer or not.
Use of Art and Play Therapy in Pediatric Oncology	Walker (1989)	It is an article that includes a presentation of play and art psychotherapy in pediatric cancer.

Table 7: Excluded with reasons (continued)

Title	First author (year)	Assessment
The therapeutic power of play: examining the play of young children with leukaemia	Gariépy (2003)	Play as a therapeutic tool not play therapy.
Influence of Therapeutic Play on the anxiety of hospitalized school-age children: Clinical trial	Tobias da Silva (2017)	The participants are not pediatric cancer patients.
Play interventions to reduce anxiety and negative emotions in hospitalized children	Li (2016)	The participants are not pediatric cancer patients. The intervention was play-based and not play therapy.
Exploring the Potential of a Pretend Play Intervention in Young Patients with Leukemia	Witt (2019)	Parents and Professional thoughts regarding pretend play as intervention.
Play model for "evaluation of self-concept of children with cancer"	Manav (2016)	No result on how the intervention helped in reducing anxiety or stress.
Pretend Play as an Intervention for Children With Cancer: A Feasibility Study	Frygner-Holm (2020)	Although the article refer that the pretend play intervention is based on play therapy, after seeking the original article of the intervention, no connection with play therapy was made by the creators.

Table 8: age of participants receiving intervention

First Author (Year)	Number of participants receiving intervention	Age range of participants receiving intervention	Mean age of participants receiving intervention
Antoneli Fonseca (2015)	5	3-6 years old	4
Behera (2020)	20	15 participants 6-8 years old, 1 participant 9-10 years old, and 4 participants 11-12 years old	6.5
Chari (2013)	1	4	4
Cooper (1985)	4	2.5-12	5.75
Davies (1992)	1	4.75	4.75
Kuntz (1996)	1 (missing data for the other)	7	7
Heydari (2021)	15	8-12	10.7
Li (2011)	52	8-16	11.6
Mehrara (2018)	15	9-12	10.7
Nekah (2015)	18 in both intervention and control group	8-14	10.5
Orhan (2017)	20	8 participants 8-10 years old, and 12 participants 10-12 years old	no data for mean age
Sefat (2012)	1	9	9
Shojaei (2019)	12	8-12	no data for mean age
Tsai (2013)	9	3-12	median= 8.12 years no data for mean age

Table 9: Description of tools used for measuring anxiety and stress

First Author (Year)	Title of Paper	Description of tool used for measuring anxiety	Description of tool used for measuring stress
Antoneli	Revealing The World of	Analysis of the structure of the phenomenon	Analysis of the structure of the phenomenon
Fonseca (2015)	Oncological Treatment Through Dramatic Therapeutic Play		
Behara (2020)	Effect of Puppet Therapy on Reduction of Anxiety Among Children (6-12 Years) Suffering from Leukemia in Selected Hospitals of Odisha.	Hamilton Anxiety Scale, a self-report scale of anxiety which consists of 14 items	-
Chari (2013)	Exploring Play Therapy in Pediatric Oncology: A Preliminary Endeavour	The Children's Play Therapy Instrument (CPTI), that assesses the changes in child's play behaviours over the course of play sessions, that located-among other- anxiety defences such as constriction (persistent and rigid repetition of play activities) and autistic encapsulation (self-absorbed play)	The Illness-specific Adjustment Scale (IsAS) measures child's level of distress in respect to 10 leukemia-related stressors. The distress is rated on a visual scale using five faces ranging from smiling face labelled not at all upset (score of 1) to a frowning face labelled very, very upset (score of 5)
Cooper (1985)	A Therapeutic Play Group for Hospitalized Children with Cancer	Observation	Observation

Table 9: Description of tools used for measuring anxiety and stress (continued)

First Author (Year)	Title of Paper	Description of tool used for measuring anxiety	Description of tool used for measuring stress
Davies (1992)	Psychotherapy of a Preschool Cancer Survivor: Promoting Mastery and Understanding	Observation	Observation
Heydari (2021)	The Effect of Group Play Therapy on Anxiety in Children Diagnosed with Leukemia	Multidimensional Anxiety Scale for Children (MASC), which consists of 39 items that assess the symptoms of anxiety in children and adolescents. It measures four dimensions: social anxiety, separation anxiety, harm avoidance, and physical symptoms.	-
Kuntz (1996)	Therapeutic Play and Bone Marrow Transplantation	Observation	Observation
Li (2011)	The effectiveness of therapeutic play, using virtual reality computer games, in promoting the psychological well-being of children hospitalised with cancer	The short form of the Chinese Version of the State Anxiety Scale for Children (CSAS-C), consisting of 10 items, scored from 1–3, with total possible scores ranging from 10–30. The higher the score, the greater the anxiety	-

Table 9: Description of tools used for measuring anxiety and stress (continued)

First Author (Year)	Title of Paper	Description of tool used for measuring anxiety	Description of tool used for measuring stress
Mehrara (2018)	The Effectiveness of Cognitive-Behavioral Play Therapy on Pain Tolerance and Trait-State Anxiety Among Children with leukemia cancer in Isfahan City	Child State-trait anxiety inventory for children aged 9 to 14 years. This questionnaire consists of 40 items and measures two dimensions of state anxiety and trait anxiety, in Likert scale form with a range from 1 (never) to 4 (always).	-
Nekah (2015)	The Effects of Structured Cognitive-Behavioral Group Play Therapy on Anxiety and Depression in Children with Cancer: A Pilot Study	The 7-item subscale of the Hospital Anxiety and Depression Scale (HADS)	-
Orhan (2017)	The Effects of Pre-Intervention Training Provided Through Therapeutic Play on the Anxiety of Pediatric Oncology Patients During Peripheral Catheterization	The Turkish version of State-Trait Anxiety Inventory for Children (STAIC), including the State Anxiety Subscale (20 items assessing feelings about state anxiety, with minimum score of 1 and maximum score of 3) and the Trait Anxiety Subscale where the child chooses among “almost never,” “sometimes,” and “often,” where “often” as an answer to each item (minimum score 1 and maximum score 3)	-

Table 9: Description of tools used for measuring anxiety and stress (continued)

First Author (Year)	Title of Paper	Description of tool used for measuring anxiety	Description of tool used for measuring stress
Sefat (2012)	Effectiveness of play therapy in reduction of anxiety in children with cancer	The Revised Children Manifest Anxiety Scale (RCMAS), a relatively brief scale, addressed to children and adolescents 6 to 19 years old.	-
Shojaei (2019)	Comparing the Effectiveness of Group Story Therapy and the Art-Play Therapy on Anxiety and Depression in Children with Cancer: Based on the Framework, Principles and Rules of Cognitive-Behavioral Approach	The Spence Children Anxiety Scale (SCAS).	-

Table 9: Description of tools used for measuring anxiety and stress (continued)

First Author (Year)	Title of Paper	Description of tool used for measuring anxiety	Description of tool used for measuring stress
Tsai (2013)	Efficacy of therapeutic play for pediatric brain tumour patients during external beam radiotherapy	The Faces Anxiety Scale, for children and adolescents 3 to 18 years old, a visual analogue scale consisting of five faces, ranging from a very happy face to a very unhappy face (score 1 to 5, with 5 representing the highest level of anxiety). The Beck Youth Anxiety Inventory, a 20-question scale about behaviors associated with emotional impairment in children and adolescents. Participants choose how frequently the statement has been true for them during the past 2 weeks, including the test day. Evaluation of physiological responses of anxiety, which included heart rate variability, and salivary cortisol concentration.	-

Table 10: Description of Play Therapy Approach

First Author (Year)	Title of Paper	Description of Play Therapy Approach	Who carried out the intervention
Antoneli Fonseca (2015)	Revealing The World of Oncological Treatment Through Dramatic Therapeutic Play	2 to 9 sessions of individual Dramatic Therapeutic Play. The following toys were offered: toy cars, games, a family of dolls, and domestic utensils. Toy versions of hospital materials: giving set, syringes, adhesive tape, catheters, hypodermic needles, gauze, tourniquet, blood and urine collection bottles, and bottles of normal saline	Not mentioned
Behara (2020)	Effect of Puppet Therapy on Reduction of Anxiety Among Children (6-12 Years) Suffering from Leukemia in Selected Hospitals of Odisha.	Five 15-minute sessions of puppet therapy. Each session had the following structure: 2 minutes hand puppet for introduction 8 minutes finger puppets for a conversation with children regarding themselves, likes and dislikes, their daily activities, general knowledge and about their family members 5 minutes stick puppets for different interesting rhymes	Not mentioned, only puppet therapy is implemented by medical staff such as psychiatrist, psychologist, pediatrician and nurses
Chari (2013)	Exploring Play Therapy in Pediatric Oncology: A Preliminary Endeavour	20 sessions of 30-minute individual non-directive play therapy (Child Centered Play Therapy) (2 cycles of 10 sessions each), under the framework established by Axline for CCPT	Therapist (no further information)
Cooper (1985)	A Therapeutic Play Group for Hospitalized Children with Cancer	A twice-a-week directive group play therapy programme. The approach was interdisciplinary. The group consisted of 2 to 10 children (average 4 to 6 in session). The materials that were used were mainly hospital supplies. Also, puppets were used. Paper and crayons were also available.	A social worker and a nurse with a master's degree in child psychology (coordinators) A Social Work Specialist
Davies (1992)	Psychotherapy of a Preschool Cancer Survivor: Promoting Mastery and Understanding	Focal Play Therapy, based on Chethik's model for focal psychotherapy (psychodynamic approach),	
Kuntz (1996)	Therapeutic Play and Bone Marrow Transplantation	Development of the Play Cabinet that included toys appropriate for each of the following age groups: infant, toddler, preschool, school-age, and adolescent	Nurses

Table 10: Description of Play Therapy Approach (continued)

First Author (Year)	Title of Paper	Description of Play Therapy Approach	Who carried out the intervention
Heydari (2021)	The Effect of Group Play Therapy on Anxiety in Children Diagnosed with Leukemia	Ten 2-hour sessions of Group Play Therapy. The approach was directive as each session had a specific form and specific materials were used in each session. First session: Building relationship, and getting to know the therapist. Second session: Relaxation and emotional catharsis. Third session: Discovering children's concern and cognitively reconstruct them. Fourth session: Handling frustration and isolation, improvement of social ties. Fifth session: Working with emotions and experiencing shared group activity Sixth session: Expressing conflicts, developing coping mechanisms. Seventh session: Handling anxiety. Eighth session: Dealing with anxiety, experiencing positive emotions, adjusting to medical equipment. Ninth session: Externalizing and objectifying the disease, coping with anxiety. Tenth session: perceptions and generalizing them to everyday life.	Therapist (no further information)
Li (2011)	The effectiveness of therapeutic play, using virtual reality computer games, in promoting the psychological well-being of children hospitalised with cancer	5 days a week for the first week of hospitalization, 30-minute therapeutic play intervention using virtual reality computer games in groups (maximum 4 children). Group playing activities included virtual reality through interactive simulations that present children with opportunities to engage in environments similar to real-work objects and events.	Nurse (Researcher)

Table 10: Description of Play Therapy Approach (continued)

First Author (Year)	Title of Paper	Description of Play Therapy Approach	Who carried out the intervention
Mehrara (2018)	The Effectiveness of Cognitive-Behavioral Play Therapy on Pain Tolerance and Trait-State Anxiety Among Children with leukemia cancer in Isfahan City	<p>Eight 60-minute sessions of Cognitive-Behavioral Play Therapy.</p> <p>First session: introduction of a therapist and rapport</p> <p>Second session: the relaxation training through sleeping play.</p> <p>Third session: identification of the children's emotions through the smiley play, support of self-identify the positive and negative emotions and the conditions for creating it.</p> <p>Fourth session: introduction on how to express negative emotions and ways to create positive emotions, using doll emotions, completing sentences deleted from the story.</p> <p>Fifth session: identifying the child's strengths, creating positive self-image through play and poetry.</p> <p>Sixth session: making awareness of the concept of the locus of control.</p> <p>Practice in reducing feelings of guilty in events beyond the control of the child through play and show.</p> <p>Seventh session: training positive emotions.</p> <p>Eighth session: developing creativity and eliminating the fear of chemotherapy by using these devices as toys.</p>	Therapist (no further information)
Nekah (2015)	The Effects of Structured Cognitive-Behavioral Group Play Therapy on Anxiety and Depression in Children with Cancer: A Pilot Study	Ten 60-minute sessions of structured cognitive-behavioral group play therapy. No more information was available as only the abstract was available in English	No information was available as only the abstract was available in English
Orhan (2017)	The Effects of Pre-Intervention Training Provided Through Therapeutic Play on the Anxiety of Pediatric Oncology Patients During Peripheral Catheterization	One 20 to 30-minute Therapeutic Play using the Chemoduck toy. Before the catheterization was applied to the children, they were informed regarding peripheral vascular access. After the explanation, the children with the help of the researcher performed vascular access on the Chemo Duck toy using adequate materials (intravenous catheter without needle, injectors without needles, cotton and bandage).	Researcher (not mentioned their professional training)

Table 10: Description of Play Therapy Approach (continued)

First Author (Year)	Title of Paper	Description of Play Therapy Approach	Who carried out the intervention
Sefat (2012)	Effectiveness of play therapy in reduction of anxiety in children with cancer	12 sessions of child-centered play therapy	Not mentioned
Shojaei (2019)	Comparing the Effectiveness of Group Story Therapy and the Art-Play Therapy on Anxiety and Depression in Children with Cancer: Based on the Framework, Principles and Rules of Cognitive-Behavioral Approach	12 sessions of cognitive-behavioral art-play therapy. No more information was available as only the abstract was available in English	No information was available as only the abstract was available in English
Tsai (2013)	Efficacy of therapeutic play for pediatric brain tumor patients during external beam radiotherapy	15-to-20-minute therapeutic play sessions, 5 days a week for 3 months. The therapeutic play included the following strategies: Cognition change strategies, including story-telling and role-playing as well as using children’s coloring books. Desensitization strategy: during the radiation treatment sessions, children were allowed to bring a favorite doll into the treatment room. Children could also paint their own radiation treatment headfixing masks. Token strategy: Children were issued a cartoon sticker at the end of each radiation session. When they had an adequate number of stickers, they could exchange them for toy stickers. Recreational strategies, including activities with foldable colored paper, molding clay, painting, video games, or watching cartoons that were projected on the treatment room ceiling during radiation sessions. Reinforcement strategy: In order to encourage the children to complete the treatment praise was given. Also, promises were made to provide toys and allow children to draw lots for presents to Peer imitation strategies: children and their families were introduced to other children with the same experiences in order to have a support group.	Not mentioned

Table 11: CASP Checklist for Qualitative Studies

Study	Section A: Are the results valid?			Section B: What are the results?			Section C: Will the results help locally?			
First author (year)	1	2	3	4	5	6	7	8	9	10
Antoneli Fonseca (2015)	Yes	Yes	Yes	Yes	Yes	Can't tell	Yes	Yes	No	This research contributes to the current literature for therapeutic play as an approach that can help children who undergo cancer treatment.
Cooper (1985)	Yes	No	No	No	No	Can't tell	Can't tell	No	No	This research has historical value since it is one of the first researches regarding play therapy in cancer. Key information of the sessions are provided as paradigm for future therapists.
Davies (1992)	Yes	No	No	No	No	Can't tell	Can't tell	No	No	This research has historical value since it is one of the first researches regarding play therapy in cancer. Key information of the sessions are provided as paradigm for future therapists.
Kuntz (1996)	Yes	No	No	No	No	Can't tell	Can't tell	No	No	This research has historical value since it is one of the first researches regarding play therapy in cancer. Key information of the sessions are provided as paradigm for future therapists.

1 Was there a clear statement of the aims of the research?

2 Is a qualitative methodology appropriate?

3 Was the research design appropriate to address the aims of the research?

4 Was the recruitment strategy appropriate to the aims of the research?

5 Was the data collected in a way that addressed the research issue?

6 Has the relationship between researcher and participants been adequately considered?

7 Have ethical issues been taken into consideration?

8 Was the data analysis sufficiently rigorous?

9 Is there a clear statement of findings?

10 How valuable is the research?

Table 12: JBI Checklist Criteria for Quasi-Experimental Studies

Questions	Studies						
	Behera (2020)	Heydari (2021)	Li (2011)	Nekah (2015)	Orhan (2017)	Shojaei (2019)	Tsai (2013)
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)?	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Were the participants included in any comparisons similar?	Yes	No	Yes	Yes	Yes	Yes	Unclear
Were the participants included in any comparisons receiving similar treatment/care, other than the exposure or intervention of interest?	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Was there a control group?	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Were there multiple measurements of the outcome both pre and post the intervention/exposure?	No	No	No	No	No	No	Yes
Was follow up complete and if not, were differences between groups in terms of their follow up adequately described and analyzed?	No	No	No	Unclear	No	Yes	No
Were the outcomes of participants included in any comparisons measured in the same way?	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Were outcomes measured in a reliable way?	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Was appropriate statistical analysis used?	Yes	Yes	Yes	Unclear	Yes	Yes	Yes
Total Quality Rating	7/9	6/9	7/9	6/9	7/9	8/9	7/9

Table 13: JBI Checklist Criteria for Case Reports

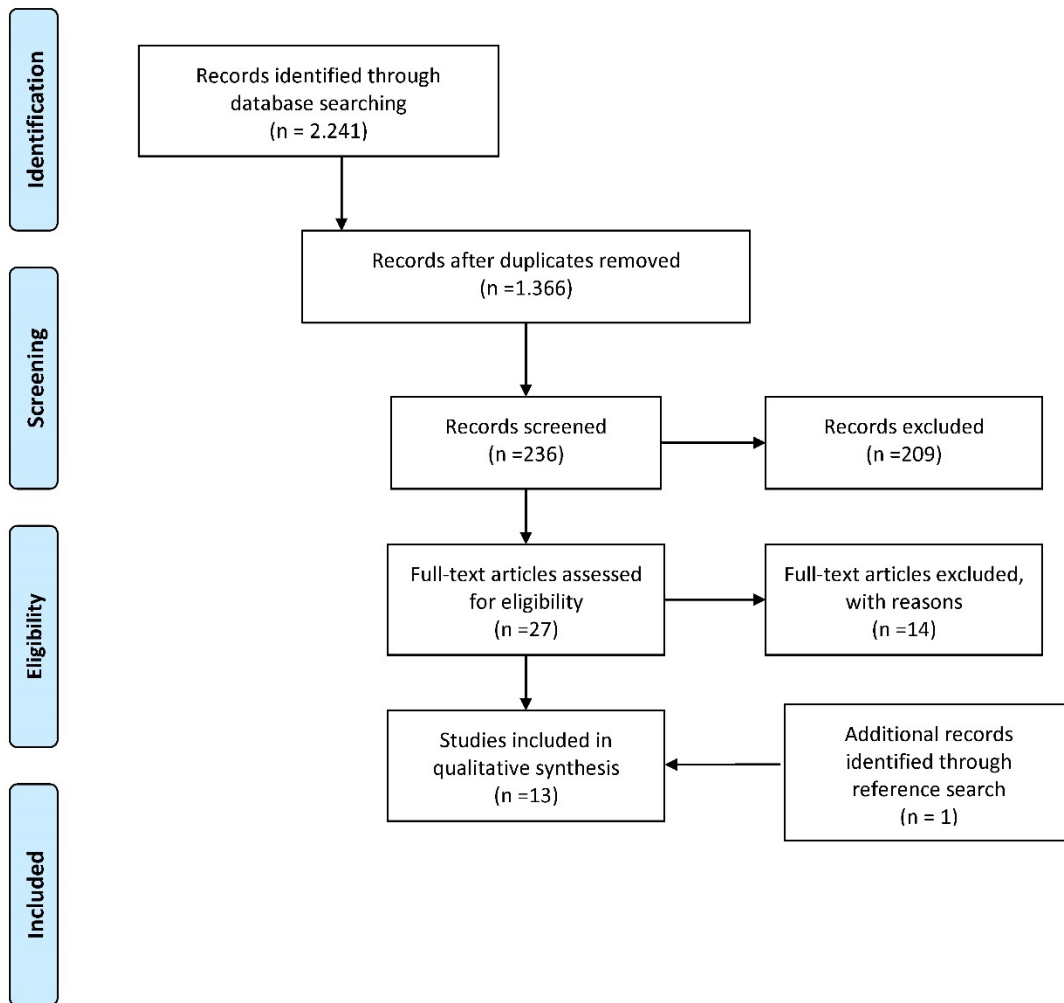
Questions	Studies	
	Chari (2013)	Sefat (2012)
Were patient's demographic characteristics clearly described?	Yes	Unclear
Was the patient's history clearly described and presented as a timeline?	Yes	Unclear
Was the current clinical condition of the patient on presentation clearly described?	Yes	Unclear
Were diagnostic tests or assessment methods and the results clearly described?	Yes	Yes
Was the intervention(s) or treatment procedure(s) clearly described?	Yes	Yes
Was the post-intervention clinical condition clearly described?	Yes	Unclear
Were adverse events (harms) or unanticipated events identified and described?	Not Applicable	Not Applicable
Does the case report provide takeaway lessons?	Yes	Unclear
Overall appraisal	7/8	2/8

Table 14: Cochrane Collaboration's tool for RCTs

Study	Selection bias	Performance bias	Detection bias	Attrition bias	Reporting bias	Other bias	Overall
Mehrara (2018)	Random sequence generation Unclear	Allocation concealment Unclear	Blinding of participants and personnel Low	Blinding of outcome assessment Low	Incomplete outcome data Low	Selective reporting Low	Anything else, ideally prespecified Unclear
							high quality-low bias

Figures

PRISMA Flow Diagram



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Περίληψη

Περίληψη: Η παιγνιοθεραπεία χρησιμοποιείται για ένα εύρος θεμάτων που μπορεί να αντιμετωπίζει ένα παιδί. Δεν υπάρχει, εντούτοις, αρκετή έρευνα σχετικά με την αποτελεσματικότητά της σε παιδιά με καρκίνο. Η παρούσα συστηματική ανασκόπηση εξετάζει την αποτελεσματικότητα της παιγνιοθεραπείας στο άγχος/στρες που αντιμετωπίζουν τα παιδιά με καρκίνο.

Μέθοδος: Έγινε αναζήτηση στις ακόλουθες βάσεις έως 30 Μαΐου 2023: ERIC, Google Scholar, ProQuest, PubMed, Embase, PsychInfo και SCOPUS, εξετάζοντας διαφορετικά είδη ερευνών που ενδεχομένως να βοηθήσουν στο να δημιουργηθούν τεκμηριωμένες πρακτικές παιγνιοθεραπείας σε παιδιά με καρκίνο..

Αποτελέσματα: 14 έρευνες (Ημι-πειραματικές, Τυχαιοποιημένες Κλινικές Μελέτες, Μελέτες Περίπτωσης, Φαινομενολογικές Μελέτες) κρίθηκαν επιλέξιμες. Οι περισσότερες ποσοτικές έρευνες αξιολογήθηκαν με τη χρήση των κατάλληλων εργαλείων ως μέτριες σε ποιότητα, ενώ οι περισσότερες ποιοτικές έρευνες κρίθηκαν ως χαμηλές σε ποιότητα. Όλες οι έρευνες κατέληξαν στον ότι η παιγνιοθεραπεία μπορεί να ωφελήσει παιδιά με καρκίνο, μειώνοντας το στρες και ο άγχος τους. Μόνο μία έρευνα έλαβε υπ' όψιν της τον ρόλο της ηλικίας των ασθενών για την αποτελεσματικότητα της παιγνιοθεραπείας.

Συμπεράσματα: Η έρευνα σχετικά με την παιγνιοθεραπεία στη διαχείριση άγχους/στρες στον παιδικό καρκίνο είναι προς το παρόν περιορισμένη και συχνά δεν γίνεται σαφές ποια ακριβώς θεραπευτική προσέγγιση χρησιμοποιήθηκε. Είναι αναγκαία περισσότερη έρευνα στο συγκεκριμένο πεδίο.

Λέξεις Κλειδιά: Παιγνιοθεραπεία, Παιδικός καρκίνος, Στρες, Άγχος

Abstract

Abstract: Play Therapy is used in a range of issues that children face. There is, however, little research regarding its effectiveness in stress/anxiety that children with cancer face. The present systematic review examines the effectiveness of Play Therapy in anxiety/stress reduction in pediatric cancer.

Method: The following databases were accessed until 30 May 2023: ERIC, Google Scholar, ProQuest, PubMed, Embase, PsychInfo and SCOPUS, assessing studies with various study designs that might contribute to the formation of evidence-based practice of Play Therapy in pediatric cancer.

Results: 14 studies of different designs (Quasi-Experimental, Randomized Clinical Trials, Case Series, Case Reports, Phenomenological Studies) were deemed eligible. Most quantitative studies were evaluated as having moderate quality, using the appropriate critical appraisal tools, while most qualitative studies were evaluated as having poor quality. All studies concluded that Play Therapy can benefit children with cancer, reducing their anxiety and stress. Only one of the studies examined the role of patients' age in the effectiveness of the therapeutic procedure.

Conclusion: Current research of Play Therapy in pediatric cancer stress/anxiety management, is limited and sometimes unclear regarding the therapeutic approach it was followed. Further study is needed.

Key words: Play Therapy, Childhood Cancer, Stress, Anxiety

Appendix

Abbreviations

PTSD-Post-Traumatic Stress Disorder

PTSS- Posttraumatic Stress Symptoms

HPA Axis-Hypothalamus-Pituitary-Adrenocortical Axis

CCPT-Child-Centered Play Therapy

JPT-Jungian Play Therapy

NDP- Neurodramatic play

CBPT-Cognitive Behavioural Play Therapy

CBT- Cognitive Behavioural Therapy

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