

SYSTEMATIC REVIEW OF CHILD LIFE SERVICES IN THERAPEUTIC  
OUTDOOR SPACES IN HOSPITALS

by

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## TABLE OF CONTENTS

|  | Page |
|--|------|
| ACKNOWLEDGEMENTS .....                           | iv   |
| LIST OF TABLES .....                             | vii  |
| CHAPTERS   |      |
| I. INTRODUCTION .....                            | 1    |
| Child Life Program Goals .....                   | 1    |
| Essential Life Experiences .....                 | 3    |
| Play.....  | 4    |
| Family interactions.....                         | 5    |
| Reducing Stress and Anxiety .....                | 6    |
| Promote Self-Esteem and Independence .....       | 7    |
| II. METHOD .....                                 | 10   |
| Step One: Search .....                           | 10   |
| Step Two: Duplicate Removal .....                | 10   |
| Step Three: Screening Titles and Abstracts ..... | 11   |
| Step Four: Eligibility .....                     | 11   |
| Step Five: Quality Assessment.....               | 12   |
| Step Six: Coding.....                            | 12   |
| III. RESULTS.....                                | 13   |
| Goal 1: Quantity of Research .....               | 13   |
| Goal 2: Summary of the Findings .....            | 13   |
| Providing essential life experiences.....        | 13   |
| <i>Increased social interaction.....</i>         | 15   |
| <i>Play areas and equipment.....</i>             | 15   |

|  |    |
|--|----|
| <i>Nature and familiarity</i> .....                                    | 16 |
| Reducing stress and anxiety. ....                                      | 16 |
| <i>Sensory experiences</i> . ....                                      | 17 |
| <i>Animals or animal features</i> . ....                               | 18 |
| Increasing self-esteem and independence. ....                          | 18 |
| <i>Open space</i> .....  | 19 |
| Follow-up analysis: Characteristics of therapeutic outdoor spaces..... | 19 |
| IV. DISCUSSION .....   | 21 |
| Providing Essential Life Experiences.....                              | 22 |
| Increased social interaction. ....                                     | 23 |
| Play areas and equipment. ....   | 24 |
| Nature and familiarity .....   | 24 |
| Reducing Stress and Anxiety .....                                      | 25 |
| Sensory experiences. ....  | 26 |
| Animals or animal features.....  | 27 |
| Facilitating Self-Esteem and Independence .....                        | 27 |
| Open space .....   | 28 |
| Limitations and suggestions for future research.....                   | 29 |
| V. PRACTICAL IMPLICATIONS AND CONCLUSIONS .....                        | 32 |
| APPENDIX SECTION.....  | 39 |
| REFERENCES .....   | 46 |

## LIST OF TABLES

| Table                                      | Page |
|--|------|
| 1. Child Life Goals.....                   | 35   |
| 2. Study Characteristics and Quality ..... | 36   |
| 3. Thematic Analysis .....                 | 37   |

## **I. INTRODUCTION**

In the United States, 15%-18% of children live with a chronic health condition (Boyse, Boujaoude, & Lundy, 2012). Chronic illness requires more frequent or longer hospital stays (Edwards et al., 2012), emphasizing a need for more extensive services. Child life specialists use a wide variety of techniques to ease the transition of hospitalization and prepare patients and families, enhancing feelings of emotional support and encouraging greater cooperation and success with treatments and procedures (Beickert & Mora, 2017). This also requires child life professionals to advocate for less-threatening healthcare environments that children can interact with (Committee on Hospital Care and Child Life Council, 2014). This reduces the anxiety that frequently occurs when pediatric patients are introduced to the unfamiliar schedules and surroundings (Vagnoli, Caprilli, Robiglio, & Messeri, 2005). Child life theory has a strong foundation in patient- and family-centered care (Child Life Council, 2011), which emphasized patient and family members' preferences throughout hospitalization, inspiring changes in care and facility design (Kuo, Sullivan, Coley, & Brunson, 2012). As a result, healing gardens are becoming more prevalent within the hospital setting (Cooper Marcus, 2007), and 42% of hospitals offer an outdoor play space or outdoor healing space program through their child life department (Child Life Programming, 2018), yet little research has been done to evaluate the benefits of utilizing these areas within the child life practice.

### **Child Life Program Goals**

The Association of Child Life Professionals outlines six goals for every child life program: (1) to continually evaluate individual needs regarding patient and family responses to rehabilitation experiences, (2) reduce stress and anxiety, (3) prepare the



patient and their family members for all aspects of hospitalization, (4) facilitate experiences that are essential to each specific patient and family, (5) provide opportunities for the growth of positive self-esteem and independence, and (6) communicate with all members of the healthcare team, advocating for the needs of each patient and family member (Child Life Council, 2011). This is done utilizing a variety of different outdoor play or healing spaces, including art therapy, inpatient and outpatient playrooms, outdoor play or healing spaces and resource libraries (Child Life Programming, 2018).

In order to address these goals, the scope of the field has recently expanded to incorporate a wider variety of environments and disciplines (Hicks, 2008). Expanding the field to include outdoor settings will be important as outdoor settings have shown many positive impacts on children's health (Malone & Tranter, 2005; Reeve, Nieberier-Walker, & Desha, 2016; Turner, Fralic, Newman-Bennett, & Skinner, 2009). In addition, the biophilia hypothesis argues that humans of all ages have an innate need to interact with the environment and living things through a variety of sensory experiences (Kahn, 1997), and these interactions with nature, especially through play, are essential to holistic development (Wilson, 2018).

This need is even reflected in hospital surveys, as the most frequently indicated preference for healthcare settings by families was either access to, or views of, natural settings (Cooper Marcus, 2007). Additionally, child life specialists consider natural lighting and elements of nature to be high priority in design (Weinberger, Butler, Mcgee, Schumacher, & Brown, 2017), and *The Handbook of Child Life: A Guide for Pediatric Psychosocial Care*, a reference text required for all child life professionals, acknowledges

the potential for outdoor spaces in programming for patients and families (Thompson, 2009). Despite this, however, no clear guidelines or suggestions have been included for the child life practice in this domain, and many outdoor spaces in healthcare settings see little usage (Pasha, 2013). The current systematic review aims to determine the amount of research that has been done regarding child life services in therapeutic outdoor spaces in hospitals and how outdoor spaces can be used to meet three child life program goals that are most applicable to existing therapeutic outdoor spaces in hospitals: (1) facilitating experiences that are essential to each specific patient and family, (2) reducing stress and anxiety, and (3) providing opportunities for the growth of positive self-esteem and independence (Child Life Council, 2011).

### **Essential Life Experiences**

Because of the frequent appointments, treatments, and operations involved in hospitalization, children who are ill often miss many of the opportunities that others their age take for granted (Thompson, 2009). Holidays, community events, school, play, and any other familiar family traditions must be recognized, and it is the role of the child life specialist to manage and execute these unique needs for each patient and family they are servicing (Child Life Council, 2011). “Normal” days, with schedules, homework, and opportunities for both structured and unstructured play give children a sense of a reasonable world, instilling feelings of control over their routine (Thompson).

Activities in natural environments can facilitate development of adaptive skills, aesthetic appreciation, cognition, emotional competence, physical abilities, and spirituality, all of which should be available to everyone and are essential to holistic growth during childhood (Wilson, 2018). In addition, therapeutic outdoor spaces can be beneficial for school programs, which child life specialists frequently suggest for patients

who are hospitalized for extended periods of time (Child Life Council, 2011). Children with chronic disease frequently experience deficits in attention, memory, processing speed, and motivation due to the treatments or side effects of the illness (Shaw, McCabe, Walcott, & Chafouleas, 2008). In adult populations, exposure to nature has been found to reduce attention fatigue, restore directed-attention abilities (Berman, 2014), and increase information-process ability (Kaplan, 1995), all of which are beneficial for learning. Furthermore, exposure to nature outside of hospitalized settings also encourages the innate sense of wonder in young children, motivating curiosity, meaning-making, and knowledge throughout development (Wilson).

**Play.** While play is often considered a leisure activity or reward in the United States (Samuelsson & Carlsson, 2008), there are other benefits that make it a crucial aspect of the developmental process (Rubin, 2018). Children who are provided with frequent opportunities for play are more skilled in social interactions, imagination, problem-solving, language, cognition, and empathy (Pistorova & Slutsky, 2018). Because of this, it is becoming more popular as a tool in early education and therapy, facilitating interventions that are more age appropriate to encourage resiliency (Rubin). Child life specialists recognize play as an essential right for every child, and multiple forms of play, both structured and unstructured, are utilized within hospital settings (Child Life Council, 2011).

Although play can take place in a variety of settings, nature can serve as a beneficial aspect of the play environment (Wilson, 2018). When children are able to engage in outdoor play, they encounter greater diversity than they would indoors, such as more challenging topography, which encourages creativity and problem-solving (Moore,

2007). A Norwegian study evaluating the outdoor play of kindergarteners in school found that if a space is more diverse and provides a wide variety of opportunities for play, it encourages greater learning and development, especially motor abilities (Fjørtoft, 2001). In addition, some of the elements found in natural play areas, such as slopes, rocks, and vegetation, act as obstacles that kids must cope with (Fjørtoft). This can be especially helpful as limiting play too much can hinder healthy development in children (McGeeney, 2016).

This element of “risk” in outdoor play situations is integral for growth, as it provides a controlled setting to practice behaviors, encouraging greater risk competence (Lavrysen et al., 2015) as children are allowed to test themselves physically, intellectually, and emotionally (Malone & Tranter, 2005). In addition, previous research suggests that simply spending time outdoors or in contact with nature has countless physical and psychological benefits, regardless of the activity or location (Wells & Evans, 2003). Thus, natural spaces can provide a complex physical environment for play and exploration, and therapeutic outdoor spaces in hospitals should be utilized in child life for multiple forms of play.

**Family interactions.** The vision statement created by the Association of Child Life Professionals expresses the need for child life services to be holistic, supported with family systems and developmental theories (Child Life Council, 2011). Along with the individual benefits introduced above, outdoor settings can be therapeutic for the entire family as well. Organized family recreation programs that take place in outdoor settings have been significantly and positively associated with family strength (Freeman & Zabriskie, 2002). In addition, open communication is an essential aspect of family

functioning (Smith & Hamon, 2017), and challenging outdoor activities outside of the hospital have been found to increase communication between parents and adolescents (Huff, Widmer, McCoy, & Hill, 2003). Including therapeutic outdoor spaces in care plans and family resources can give parents the opportunity to take a break from the harsh settings and routines of hospitalization, allowing them to enjoy play, plants, artwork, peer interaction, and much more (Whitehouse et al., 2001), positively impacting their healthcare experience.

### **Reducing Stress and Anxiety**

Another goal of child life services is to minimize the amount of stress or anxiety the patient and their family may be feeling in response to hospitalization (Child Life Council, 2011). Many aspects of healthcare settings can cause anxiety in children, including fears of pain or separation during procedures, loss of control, and unfamiliar schedules or surroundings (Vagnoli et al., 2005). Symptoms of post-traumatic stress disorder are developed in 25%-30% of ill children as a result of the healthcare process, and the rates for parents are even higher (Rubin, 2018). Child life specialists use a myriad of strategies to try and minimize this anxiety, including creative play that encourages understanding of medical procedures and emotional expression, unrestricted visiting, frequent communication, and by supporting patient-family relationships by actively involving parents in every step of the care plan (Child Life Council). This leads to positive outcomes (Lerwick, 2016) and helps determine the amount of anxiety the child will have for future procedures (McCann & Kain, 2001).

Therapeutic outdoor spaces can serve as valuable tools throughout the entire process of hospitalization to reduce stress and anxiety in both patients and family members. Ulrich (1984) explained the healing aspect of nature with his Stress Recovery

Theory, finding quicker physiological recovery from stress in participants when they were exposed to natural settings. Even small doses of outdoor time can have immediate health benefits for individuals of many ages (Barton & Pretty, 2010). Exposure to green spaces has the potential to serve as a buffer for children in low-income areas from stress or adversity as well (Wells & Evans, 2003). Horticulture therapy has also been utilized with both children and adults in a variety of programs, and working with the plants or gardening has been found to reduce stress in children living with cancer (Kim, Mattson, Park, Lunday, Knigge & Taft, 2004). Because of these potential benefits, the current review aims to review how child life programs have used therapeutic outdoor spaces to reduce stress and anxiety in patients.

### **Promote Self-Esteem and Independence**

Another priority in child life practice is to provide frequent opportunities supporting self-esteem and independence (Child Life Council, 2011). Children living with a chronic physical illness report lower self-esteem levels than their peers without chronic illness (Pinquart, 2012). This diagnosis can also force them into a new reality (Thompson, 2009), which may cause distress if it contradicts their ideal self, especially in adolescence (Santrock, 2011). Child life specialists work to enhance this by treating the patient as a unique individual, including the patient in decisions regarding their care, establishing a sense of responsibility, creating opportunities that maximize their independence, increase feelings of competency, and advising the patient and family through the process of leaving the hospital so they are prepared to go back to their home, school, and peer groups (Child Life Council).

In addition, when children are in the hospital, they are suddenly more dependent on their parents and caregivers, and are often times limited further by authority figures

and practitioners due to safety concerns, making them feel as though they have no control in their lives (Thompson, 2009). Child life specialists can promote independence by advocating for their patients' privacy, encouraging developmentally appropriate participation in decisions involving their care, and emphasizing a personal responsibility for their own self-care and well-being (Thompson). Also, by establishing opportunities for multiple forms of play, children can express their emotions and gain control through imagination and the recreation of their experiences, especially medical play (Burns-Nader & Hernandez-Reif, 2016), easing the transition back into their previous routines (Child Life Council, 2011).

Outdoor spaces can be used to promote the development of self-esteem and independence in many ways. These environments expose children to physical and psychological diversity, and previous research assessing new forms of outdoor play spaces outside of the hospital has found that these natural challenges can instill a sense of control and mastery as they develop greater safety competence through freedom and practice (Little & Wyver, 2008). According to Erikson, as children progress through the industry versus inferiority developmental stage, competence is a key goal, and identity is constructed based off of these inner conflicts (Scheck, 2005), which can occur more frequently in outdoor environments. In addition, opportunities for physical and mental challenges are more prevalent in natural spaces, and previous organizations have utilized outdoor therapy in children with behavioral or mental health challenges to facilitate feelings of greater autonomy and self-concept (Taylor & Kuo, 2009).

While previous research has indicated a positive link between therapeutic outdoor spaces, self-esteem, and independence, few studies evaluate this effect on hospitalized

children with chronic illness. The current review aims to evaluate the ways in which the child life profession has utilized nature and outdoor play spaces to facilitate feelings of autonomy, responsibility, and inclusion within their family and peer groups, all contributing to greater self-esteem and independence for children in hospitals

Although previous research encompasses the multiple benefits of nature for children and families (Berman, 2014; Kaplan, 1995; Kondo, Jacoby & South, 2018; Louv, 2005), design recommendations for hospital gardens (Cooper Marcus, 2007; Whitehouse et al., 2001), and applicability to child life practices (Thompson, 2009; Kaddoura, Cormier, & Leduc, 2013), little has been done to analyze how outdoor play and hospital green spaces could be utilized to meet child life program goals. The current systematic review aims to (a) determine how many studies have been conducted regarding therapeutic outdoor spaces in hospitals and (b) summarize how child life programs have utilized these spaces to meet three goals: support essential life experiences for patients and their family members, promote greater self-esteem and independence, and reduce stress and anxiety.



## II. METHOD

The current review was structured using The PRISMA method (Liberati et al., 2009) as a guide to (1) determine the amount of research published and (2) summarize research findings regarding the use of therapeutic outdoor spaces in hospitals and the three goals of child life practice delineated above. The search strategy was constructed in a series of steps, utilizing MedLine, PsychInfo, PubMed, the Cumulative Index of Nursing and Allied Health Literature (CINAHL), and the Education Resources Information Center (ERIC) databases.

### **Step One: Search**

The initial search was conducted by the first author and five trained reviewers on a series of search combination tracking sheets (see Appendix A), each with search terms focused on one of the child life goals described in the codebook of included and excluded criteria (see Appendix B). Each reviewer was assigned one or two of the five included databases to search for each goal, completing the coordinating tracking sheet and comparing each search with the first author, who searched all of the databases for each goal. All articles identified with these searches were transferred into a shared folder on Refworks for further review. Weekly meetings were held with the first author and all five reviewers to discuss and resolve any issues with search strategy or article extraction. After all search combination tracking sheets were completed and all search terms were exhausted, 82,274 articles were saved in the Refworks shared folder (see Figure 1).

### **Step Two: Duplicate Removal**

The articles that were saved in the Refworks shared folder were examined and all duplicates were identified and removed by three reviewers, and 22,574 articles remained after this step.

### **Step Three: Screening Titles and Abstracts**

These remaining articles were screened for relevance using their titles and abstracts, and those that were (1) not empirical, (2) did not take place in a hospital setting, (3) did not involve a therapeutic outdoor space (listed in codebook in Appendix B), (4) did not study children, (5) were not written in English, (6) were published before 1960, or (7) were published after September, 2018, were excluded from the current review. Each reviewer ( $n=5$ ) was assigned approximately 4,000 articles to screen, consensus coding at weekly meeting with the first author to determine exclusion.

Therapeutic outdoor spaces outside of the hospitals, such as camps, non-profits, hospice settings, or outdoor educations school programs, were not included in this study. While some information regarding new settings for child life practice has been provided by the Association of Child Life Professionals, it has yet to be addressed in a full-length study or publication (Hicks, 2008), and these settings were therefore determined to be excluded from the current review.

### **Step Four: Eligibility**

The sixteen articles included following the screening were recorded into the data extraction sheet (see Appendix C) for further review. This sheet was pilot tested with the first author and five reviewers on ten randomly selected studies prior to this screening step, and each reviewer was given one to two articles to consensus code with the first author. These full-text documents were verified to be empirical, take place in a hospital, involve a therapeutic outdoor space, and study children, all of which were recorded on the data extraction sheet, excluding seven that did not meet the inclusion criteria following the full-text review. In addition, reviewers recorded which aspects of the three child life goals each article addressed (see Table 1).

### **Step Five: Quality Assessment**

The remaining nine articles included in the data extraction sheet (see Appendix C) were then reviewed using the Effective Public Health Practice Project (EPHPP) Quality Assessment Tool (Evans, Lasen & Tsey, 2015). This assessment for quantitative studies rates selection bias, study design, confounders, blinding, data collection methods, withdrawals and drop-outs, intervention integrity, and analysis to provide a global rating of strong, moderate, or weak for each article (Evans et al.). The first author and five reviewers were trained to use this tool, and one study was pilot tested before continuing. Consensus coding was also utilized at this step, and ratings were discussed by the first author and reviewers until a final rating was determined.

### **Step Six: Coding**

The final set of nine articles were included in the qualitative synthesis and reviewed for common themes. Common themes were coded using a thematic network analysis (Attride-Stirling, 2001) and are described further in the results section to address the second research question (Table 1). This analysis included (1) coding material, (2) identifying themes, (3) constructing thematic networks, (4) describing and exploring the networks, (5) summarizing thematic networks, and (6) interpreting the patterns (Attride-Stirling). Consensus coding was utilized to reduce risk of bias, and weekly meetings were held with all reviewers and the first author to discuss issues with coding and address questions. Five researchers were each assigned one to two articles to code in between each meeting, and results were compared with the first author until an agreement was reached.

### III. RESULTS

A total of nine studies met the inclusion criteria (see Figure 1) and were analyzed to determine the amount of research that has been done regarding therapeutic outdoor spaces in hospitals. All studies assessed pediatric patients in hospitals and the impact of therapeutic outdoor spaces associated with the three child life goals (i.e., providing essential life experiences, reducing stress and anxiety, and facilitating self-esteem and independence) and were recorded in Table 1. Further, a thematic analysis was conducted for each child life goal.

#### **Goal 1: Quantity of Research**

Overall, of the nine studies evaluating therapeutic outdoor spaces, 100% ( $n = 9$ ) examined essential life experiences, 100% ( $n = 9$ ) discussed positive impacts on stress and anxiety, and 66.67% ( $n = 6$ ) assessed self-esteem or independence.

The characteristics of each study were recorded in Table 2 along with the study quality rating assigned using the EPHPP Quality Assessment Tool (Evans et al., 2015). One study received a strong rating, two moderate, and six weak. The studies were published between 2003 and 2018 and were conducted mostly in United States ( $n = 3$ ) and Malaysian hospitals ( $n = 4$ ), as well as Australia ( $n = 1$ ) and Taiwan ( $n = 1$ ). Six of the studies utilized mixed-method designs involving a combination of surveys, interviews, and behavioral mapping, two involved only interviews and one was a case study. All of the studies included both male and female patients with ages ranging from 10 months to 18 years old.

#### **Goal 2: Summary of the Findings**

**Providing essential life experiences.** All of the studies suggested that therapeutic outdoor spaces provide essential life experiences for pediatric patients (See Table 1). Five

of the studies mentioned that these spaces encouraged both patients and their family members to come to the garden together, promoting parental presence. In addition, studies reported that therapeutic outdoor spaces provide more opportunities for social interaction, as patient users engaged in more social play with both their siblings ( $n = 5$ ) as well as other patients ( $n = 7$ ).

All of the studies found that therapeutic outdoor spaces encouraged a wide variety of play and exploration. Children sought out more active or explorative play in the therapeutic outdoor spaces (Whitehouse et al., 2001), including climbing (Whitehouse et al., 2001; Said, Zaleha Salleh, & Abu Bakar, 2005; Said, Zaleha Salleh, Abu Bakar & Mohamad, 2005) and running (Whitehouse et al., 2001; Said, Zaleha Salleh, & Abu Bakar, 2005; Said, Zaleha Salleh, Abu Bakar & Mohamad, 2005). In addition, children favored toys and equipment they could manipulate (Said & Abu Bakar, 2007-2008; Said, Zaleha Salleh, & Abu Bakar, 2005), such as structural elements or sculptures (Said, 2003; Sherman et al., 2005; Said, Zaleha Salleh, & Abu Bakar, 2005; Said, Zaleha Salleh, Abu Bakar & Mohamad, 2005; Said & Abu Bakar, 2007-2008), toys to dig with (Said, 2003; Said, Zaleha Salleh, & Abu Bakar, 2005; Said, Zaleha Salleh, Abu Bakar & Mohamad, 2005; Said & Abu Bakar, 2007-2008), and playgrounds (Said, 2003; Sherman et al., 2005; Said, Zaleha Salleh, & Abu Bakar, 2005; Said, Zaleha Salleh, Abu Bakar & Mohamad, 2005; Said & Abu Bakar, 2007-2008; Ibrahim Momtaz & Shaban, 2018).

Five articles found that therapeutic outdoor spaces instill a feeling of familiarity in pediatric patients, as described by the biophilia hypothesis (Kahn, 1997). Four studies explained that spending time in the garden reminded patients of activities they engaged in

at home (Said, 2003; Said, Zaleha Salleh, Abu Bakar & Mohamad, 2005; Said & Abu Bakar, 2007-2008; Reeve et al., 2017).

A thematic analysis was conducted, evaluating patterns in design characteristics, user preferences, and natural elements that led to access essential life experiences. Three themes were found across all nine articles regarding aspects of the therapeutic outdoor space that contributed to these experiences; increased social interaction, abundance of play areas and equipment, and natural features encouraging feelings of familiarity.

***Increased social interaction.*** Five of the included studies found that time in the therapeutic outdoor space encouraged patients to engage with their parents (see Table 3). In addition, studies mentioned that therapeutic outdoor spaces increased social interactions with siblings (Whitehouse et al., 2001; Said, Zaleha Salleh & Abu Bakar, 2005; Said & Abu Bakar, 2007-2008; van der Riet et al., 2017) and other patients (Said, 2003; Sherman et al., 2005; Said, Zaleha Salleh & Abu Bakar, 2005; Said, Zaleha Salleh, Abu Bakar & Mohamad, 2005; Said & Abu Bakar, 2007-2008; van der Riet et al., 2017; Ibrahim Momtaz & Shaban, 2018), and increased patients participation in social play without introduction (Said, Zaleha Salleh, & Abu Bakar, 2005).

***Play areas and equipment.*** All of the articles found that patients enjoyed the opportunity to play or actively participated with garden features, including a wide variety of equipment and design elements. Children sought out more active or explorative play in the therapeutic outdoor spaces (Whitehouse et al., 2001), including climbing (Whitehouse et al., 2001; Said, Zaleha Salleh, & Abu Bakar, 2005; Said, Zaleha Salleh, Abu Bakar & Mohamad, 2005) and running (Whitehouse et al., 2001; Said, Zaleha Salleh, & Abu Bakar, 2005; Said, Zaleha Salleh, Abu Bakar & Mohamad, 2005). In addition, children

avored toys and equipment they could manipulate (Said & Abu Bakar, 2007-2008; Said, Zaleha Salleh, & Abu Bakar, 2005), such as structural elements or sculptures (Said, 2003; Sherman et al., 2005; Said, Zaleha Salleh, & Abu Bakar, 2005; Said, Zaleha Salleh, Abu Bakar & Mohamad, 2005; Said & Abu Bakar, 2007-2008), toys to dig with (Said, 2003; Said, Zaleha Salleh, & Abu Bakar, 2005; Said, Zaleha Salleh, Abu Bakar & Mohamad, 2005; Said & Abu Bakar, 2007-2008), and playgrounds (Said, 2003; Sherman et al., 2005; Said, Zaleha Salleh, & Abu Bakar, 2005; Said, Zaleha Salleh, Abu Bakar & Mohamad, 2005; Said & Abu Bakar, 2007-2008; Ibrahim Momtaz & Shaban, 2018).

***Nature and familiarity.*** Five of the studies mentioned that many aspects of the therapeutic outdoor space reminded patients of familiar routines, activities, or experiences. For example, Said and Abu Bakar (2007-2008) and Reeve, Nieberler-Walker, and Desha (2017) found that climatic forces in the garden provided this sense of familiarity for patients and families, consisting of feeling the breeze (Said, 2003; Said, Zaleha Salleh & Abu Bakar, 2005; Said & Abu Bakar, 2007-2008), watching the rain (Said & Abu Bakar, 2007-2008), and enjoying the scenic views (Said, 2003; Said, Zaleha Salleh, Abu Bakar & Mohamad, 2005; Ibrahim Momtaz & Shaban, 2018).

***Reducing stress and anxiety.*** Five of the articles found that pediatric patient exploration of the therapeutic outdoor space was associated with reduced feelings of stress, and four found that these spaces contributed to a more positive hospital experience overall for children who participated (See Table 1). In addition, two articles indicated that patients showed a preference for the therapeutic outdoor space over hospital environment, leading children to associate their visits with positive experiences in the garden rather than medical procedures. Sherman et al. (2005) found lower distress scores on the

Pediatric Quality of Life Inventory Present Functioning Module (PedsQL PFM) across all six domains (anxiety, anger, sadness, and worry) in patients using the garden compared to those in the hospital.

Of the included studies, two found that therapeutic outdoor spaces provide opportunities for patients to manipulate objects (Said, Zaleha Salleh & Abu Bakar, 2005; Said & Abu Bakar, 2007-2008), four found that therapeutic outdoor spaces provide opportunities to practice physical skills (Said, 2003; Said, Zaleha Salleh & Abu Bakar, 2005; Said & Abu Bakar, 2007-2008; van der Riet et al., 2015), and two found that therapeutic outdoor spaces provide opportunities to practice cognitive skills (Said, Zaleha Salleh & Abu Bakar, 2005; Said & Abu Bakar, 2007-2008), all contributing to feelings of mastery. Overall, the thematic analysis suggested that therapeutic outdoor spaces contributed to the child life program goal of reducing stress and anxiety in two key ways: providing sensory experiences and animals or animal features.

***Sensory experiences.*** Types of sensory stimulation included pleasant sounds and quiet areas (Whitehouse et al., 2001; Said, 2003; Sherman et al., 2005; Said, Zaleha Salleh, Abu Bakar & Mohamad, 2005) variety of shapes, colors, and textures (Whitehouse et al., 2001; Said, 2003; Sherman et al., 2005; Said, Zaleha Salleh, & Abu Bakar, 2005; Said, Zaleha Salleh, Abu Bakar & Mohamad, 2005; Said & Abu Bakar, 2007-2008; van der Riet, 2017; Reeve et al., 2017; Ibrahim Momtaz & Shaban, 2018), scenic views (Said, 2003; Said, Zaleha Salleh, Abu Bakar & Mohamad, 2005; Ibrahim Momtaz & Shaban, 2018), and refreshing smells (Said, 2003; Said, Zaleha Salleh, Abu Bakar & Mohamad, 2005).



All of the studies also mentioned patient's preference for climatic factors that contrasted the sterile environment of the ward, including fresh air (Said, 2003; Said, Zaleha Salleh, Abu Bakar & Mohamad, 2005; van der Riet et al., 2017; Reeve et al., 2017), sunlight (Said 2003; Said, Zaleha Salleh, & Abu Bakar, 2005; Said, Zaleha Salleh, Abu Bakar & Mohamad, 2005; van der Riet et al., 2017; Reeve et al., 2017; Ibrahim Momtaz & Shaban, 2018), wind/breeze (Said, 2003; Said, Zaleha Salleh, & Abu Bakar, 2005; Said & Abu Bakar, 2007-2006), and refreshing smell (Said, 2003; Said, Zaleha Salleh, Abu Bakar & Mohamad, 2005).

***Animals or animal features.*** Interaction with animals or animal features was also mentioned in many of the included articles. Studies found that patients enjoyed observing (Said, Zaleha Salleh, Abu Bakar & Mohamad, 2005; Said & Abu Bakar, 2007-2008) and interacting with (Said, Zaleha Salleh, Abu Bakar & Mohamad, 2005; Said & Abu Bakar, 2007-2008, Ibrahim Momtaz & Shaban, 2018) animals or wildlife, such as birds or insects. Furthermore, animal artwork or structures (Whitehouse et al., 2001; Sherman et al., 2005), such as topiary animals (Whitehouse et al., 2001) engaged children and eased their stress in the therapeutic outdoor space.

**Increasing self-esteem and independence.** Three of the studies found that these areas also provided a diverse landscape and play opportunities that allowed patients to practice skills, heightening feelings of competency and contributing to greater self-esteem. (Said, Zaleha Salleh, Abu Bakar & Mohamad, 2005; Said & Abu Bakar, 2007-2008; van der Riet, Jitascorn, Junlapeeya & Thursby, 2015). Four of the included studies reported these spaces reminded patients of their home or community during their time at the hospital, supporting more successful reintegration when they return (Said, 2003; Said,

Zaleha Salleh, Abu Bakar & Mohamad, 2005; Said & Abu Bakar, 2007-2008; Reeve et al., 2017). One theme was identified in contributing to greater self-esteem and independence; open space.

***Open space.*** Studies reported that children preferred the garden over the ward because it is a larger, more open space, which provides room for wide variety of activities. The therapeutic outdoor space provided more space to run and play freely (Said, 2003; Said, Zaleha Salleh, Abu Bakar & Mohamad, 2005; Said & Abu Bakar, 2007-2008; van der Riet et al., 2007; Reeve et al., 2017; Ibrahim Momtaz & Shaban, 2018), wide paths for walking or wheelchair use (Sherman et al., 2005; Ibrahim Momtaz & Shaban, 2018), and secluded areas for privacy when desired (Said, 2003).

**Follow-up analysis: Characteristics of therapeutic outdoor spaces.** Each study assessed therapeutic outdoor spaces in children's hospitals, however, locations differed in their design, amount of foliage, active play areas, and sensory characteristics. The elements of each space were recorded in Table 2 to evaluate similarities and differences as well as their relevance to outcome measures. All of the gardens included varying amounts of vegetation for patients to observe and interact with, such as trees, shrubs, flowers, and grassy areas, described as V\* in Table 2. Studies indicated that these features provided shade ( $n = 2$ ), privacy ( $n = 1$ ), and sensory stimulation ( $n = 7$ ) for users, also attracting wildlife including birds and insects (Said, Zaleha Salleh, Abu Bakar, & Mohamad, 2005; Said, Zaleha Salleh, & Abu Bakar, 2005; Said & Abu Bakar, 2007-2008; Momtaz & Shaban, 2018). Eight of the studies also referenced children's preference for spacious areas to run or walk freely and six discussed play areas for activities. Water themes including fountains, ponds, and blue colored areas were common

features, mentioned colored areas were common features, mentioned in four of the studies. Other design characteristics frequently mentioned in patient preferences were animal statues, benches to sit, toys or objects to manipulate, and bright colors.

#### **IV. DISCUSSION**

Hospitals are becoming increasingly aware of the need for patient-friendly design characteristics, including the benefits of natural features on stress (Ulrich, 2002). While child life specialists reported that natural lighting and natural elements should be high priority in design (Weinberger et al., 2017) and child life theory has a strong foundation in patient- and family-centered care (Child Life Council, 2011) and child-friendly facility design (Kuo et al., 2012), little has been done to assess how child life program goals have been met utilizing these spaces. In addition, child life theory recognizes therapeutic outdoor spaces for potential programming (Thompson, 2009), yet provides no further direction for possible uses or benefits. The current review aimed to (1) determine the amount of research that has been done regarding therapeutic outdoor spaces in hospitals and (2) summarize how these areas can be used to meet three child life program goals; support essential life experiences for patients and their family members, promote greater self-esteem and independence, and reduce stress and anxiety.

Findings indicated that there is little research in the field that evaluate pediatric patient usage of therapeutic outdoor spaces in hospitals, as only nine studies were included for analysis. However, the studies discussed positive impacts on stress and anxiety, examined essential life experiences, and assessed self-esteem or independence, which shows significant potential for these spaces to be utilized in child life program. Some factors of each goal were not addressed, however, including the promotion of parental presence and opportunities for caregivers to actively continue their parenting role, activities encouraging the expression of feelings and greater understanding of healthcare experiences to reduce stress, and opportunities to recognize the child as a

unique individual and foster responsibility for self and others, facilitating positive self-esteem and independence.

To assess the second research question, a thematic analysis was conducted for each child life goal, evaluating patterns in design characteristics, user preferences, and natural elements that led to a reduction in stress and anxiety, access essential life experiences, and greater self-esteem and independence. Six major themes were identified across the nine articles regarding the fulfilment of the three child life goals: two in reducing stress and anxiety (i.e., sensory experiences and animals or animal features), three for providing essential life experiences (i.e., increased social interaction, play areas and equipment, and nature and familiarity) and one in facilitating self-esteem and independence (i.e., open space).

### **Providing Essential Life Experiences**

The Association of Child Life Professionals (2011) recognizes the importance of providing pediatric patients with essential life experiences, including ample opportunity for both structured and unstructured play, support of familiar experiences, and interaction with family members and peers. All of the studies found that the therapeutic outdoor space encouraged a wide variety of play opportunities for patients that the ward did not, especially free play, which benefits social interactions, affect, and attention (Burdette & Whitaker, 2005). In addition, therapeutic outdoor spaces provided patients with a sense of familiarity, supporting the biophilia hypothesis that children have an innate need for interaction with nature (Kahn, 1997). Results from the thematic analyses indicated that therapeutic outdoor spaces related to increased social interaction, abundance of play areas and equipment, and natural features encouraging feelings of familiarity.

**Increased social interaction.** Child life specialists aim to support patients' relationships with their families by promoting parental presence and encouraging interaction with siblings and peers (Child Life Council, 2011). Therapeutic outdoor spaces provide a central location for social interaction (Momtaz & Shaban, 2018) and access to social spaces for activities or interactive leisure within the hospital, which can create a more positive experience overall for patients and families (Lambert, Coad, Hicks, & Glacken, 2012). For example, the therapeutic outdoor space encouraged patients to engage with their family members, especially when there were private seating areas for small or large groups. This is important as parental presence during healthcare experiences leads to better physical and psychological outcomes (Cleary, Gray, Hall, Rowlandson, Sainsbury & Davies, 1986) and is an integral aspect of patient- and family-centered care, a foundation in child life practice (Thompson, 2009). In addition, therapeutic outdoor spaces increased social interactions with other patients and increased patients' participation in social play. This socialization can reduce feelings of isolation that are frequent for children in hospital settings (Lambert et al., 2013).

Furthermore, specific types of social play were observed to contribute to the development of positive social skills. Said, Zaleha Salleh and Abu Bakar (2005) found that the garden encouraged cooperative, associative, and parallel plays with siblings and other patients, leading to better communication, sharing, cooperation, and turn-taking. Additionally, Said, Zaleha Salleh, Abu Bakar, and Mohamad (2005) explained that social play in therapeutic outdoor spaces also allows patients to assimilate their peer's actions, encouraging patients to observe and practice new abilities as supported by the social learning theory (Bandura, 1997). Thus, findings from the current study mirror work by

Wilson (2018), Berman (2014), and Kaplan (1995) who found therapeutic outdoor spaces to be beneficial for physical and cognitive development with adult populations or children outside of hospitals, all of which lead to greater social interaction skills (Santrock, 2011).

**Play areas and equipment.** Play impacts all areas of child development, providing a fun and safe way for children to test new skills, form friendships, think abstractly, and normalize hospitalization experiences (Hubbock, 2009). The fact that therapeutic outdoor spaces provide patients with an opportunity to play is notable given that play has been found to provide a wide variety of benefits for children, giving them a way to express feelings, regulate stimuli, practice roles, and more developmental competencies (Rollins, Bolig & Mahan, 2005). Thus, therapeutic outdoor spaces should be integrated into care plans because they allow child life specialists to facilitate normative, medical, and therapeutic play, depending on the developmental age and specific needs of each patient (Burns-Nader & Hernandez-Reif, 2015).

**Nature and familiarity.** The unfamiliar people, schedules, equipment, and environment of the hospital is overwhelming for pediatric patients, and supporting familiar activities or traditions give children a reasonable sense of the world (Thompson, 2009). As 15-18% of children live with a chronic illness requiring extended hospital stays (Boyse et al., 2012), it is integral that child life programs provide “normal” routines or interactions for each patient, especially if they are hospitalized for a long period of time (Thompson).

The biophilia hypothesis (Kahn, 1997) describes the integral role that nature plays in mental and physical health, emphasizing an innate need for all individuals to

interact with the natural environment (Grinde & Grindal Patil, 2009). The articles included in this review support this hypothesis, finding that many aspects of the therapeutic outdoor space facilitated feelings of familiarity. For example, Said and Abu Bakar (2007-2008) and Reeve, Nieberler-Walker, and Desha (2017) found that climatic forces in the garden provided this sense of familiarity for patients and families, reminding children of similar sensations to those they felt outside at home (Reeve et al., 2017). According to Lazarus and Folkman's (1987) stress and coping theory, stress results when the demands of an environment exceed the resources of an individual, and therapeutic outdoor spaces can be a resource that children can draw on to help cope with stress as therapeutic outdoor spaces provide a sense of familiarity and control (Said & Abu Bakar, 2007-2008).

Thus, therapeutic outdoor spaces provide place for patients to balance between familiarity and change (Ibrahim Momtaz & Shaban, 2018), including climatic elements and opportunities for unstructured activities that were previously part of their normal routines. Taken together, these findings suggest that access to social interaction, play, and feelings of familiarity are all integral components of healthy development in children, and therapeutic outdoor spaces provide unique opportunities for child life programs to meet these goals.

### **Reducing Stress and Anxiety**

The Child Life Council (2011) describes various techniques to reduce stress and anxiety in pediatric patients; encouraging opportunities for emotional expression, promoting a sense of mastery, and providing developmentally appropriate information regarding healthcare experiences, all of which were evaluated in the review. While none found the therapeutic outdoor space to encourage emotional expression or understanding



of healthcare experiences, Said, Zaleha Salleh, Abu Bakar and Mohamad (2005) and Said and Abu Bakar (2007-2008) mentioned that following participation in garden activities, patients were more cooperative towards their treatments plans, indicating a beneficial effect. The stress and coping theory describes a stressful experience in two parts: appraisal and secondary appraisal (Lazarus & Folkman, 1984). Children first determine if a particular interaction is stressful, and if children determine that it is stressful, they search for resources to address it (Rollins et al., 2005). The unfamiliar schedules, design, sensory stimulation, and procedures associated with healthcare settings can be incredibly overwhelming for children (Vagnoli et al., 2005), and child life specialists work to mitigate this stress by providing patients with positive coping strategies centered around their unique needs (Child Life Council, 2011). Therapeutic outdoor spaces provide a secure place for patients to get away from the harsh environment of the ward (Reeve et al., 2017), facilitating quicker physiological recovery from stress (Kaplan, 1995).

**Sensory experiences.** When discussing how therapeutic outdoor spaces reduced stress and anxiety, researchers reported that the sensory stimulation children experience while in the therapeutic outdoor spaces contribute to a positive shift in mood or reduction in stress, such as pleasant sounds and quiet areas, variety of shapes, colors, and textures, scenic views, refreshing smells. Said and Abu Bakar (2007-2008) specifically mentioned the benefits of bird songs, which have been associated with attention restoration and stress reduction (Ratcliffe, Gatersleben, & Sowden, 2013). In addition, outdoor sensory play and interaction involves the use of the senses and manipulation of materials, encouraging positive development (Woolley & Lowe, 2013) and attention restoration (Kaplan, 1995). Thus, outdoor sensory play and interaction involves the use of the senses

and manipulation of materials, encouraging positive development (Woolley & Lowe, 2013) and attention restoration (Kaplan, 1995).

All of the studies also mentioned patient's preference for climatic factors that contrasted the sterile environment of the ward, supporting previous research regarding the benefits of outdoor gardens for children, especially those with disabilities, as they encourage children to explore sensory experiences within their own control (Hussein, 2010). Therapeutic outdoor spaces facilitate three-dimensional interactions with nature (Reeve et al., 2017), giving patients the opportunity to spend time away from the manmade features in the hospital setting (Said, Zaleha Salleh, Abu Bakar & Mohamad, 2005).

**Animals or animal features.** Many studies also reported that patients enjoyed observing and interacting with animals, such as birds and spiders, in the therapeutic outdoor space. In addition, animal artwork or structures within these spaces engaged children and eased their stress. This supports the previous research finding that interaction with animals during healthcare experiences reduced stress levels in children (Nagengast, Baun, Megel, & Leibowitz, 1997). The presence of wildlife, animal features, sensory stimulation, and opportunities to promote mastery in therapeutic outdoor spaces in hospitals all contribute to lower levels of stress and anxiety in pediatric patients.

### **Facilitating Self-Esteem and Independence**

Due to the restrictive nature of the hospital environment, another goal for child life programs is to increase self-esteem and independence for patients. This can be encouraged by recognizing each child as a unique individual, fostering a sense of responsibility for self and others, providing access to facilities that promote maximum independence, heightening feelings of competency, and supporting successful

reintegration into the community following discharge (Child Life Council, 2011). Many of the studies suggested that therapeutic outdoor spaces encourage patients to develop and build on skills necessary for their growth, and by giving them access to these facilities, hospitals are reinforcing the importance of independence.

Another integral aspect of promoting self-esteem and independence is supporting ties to home, school, and the community, encouraging more successful reintegration following discharge (Child Life Council, 2011). Therapeutic outdoor spaces reminded patients of their home or community during their time at the hospital. Given that child life programs work to provide patients with access to facilities or equipment that encourage maximum independence (Child Life Council), the open space and “home feeling” afforded by therapeutic outdoor spaces promote free exploration, movement, and play (Said, 2003).

In addition, two articles mentioned educational benefits within the therapeutic outdoor space, where patients enjoyed learning about the plants, animals, and art within it. Previous research has found that providing young children with educational opportunities throughout gaps within the school year, such as summer break, can improve learning outcomes, especially in those that are considered economically disadvantaged (Terzian, Moore, & Hamilton, 2009). This suggests that therapeutic outdoor spaces can provide patients with unique learning opportunities throughout their hospital stay, supporting continuing education and more successful reintegration into school following hospitalization.

**Open space.** While healthcare settings can seem incredibly foreign and unfamiliar for children, there are many services that can incorporate pediatric patients’

needs for movement, making the facility feel less restrictive (Gaynard et al., 1990). The findings suggested that children preferred the garden over the ward because it has more open space, providing room for patients to run and play freely while also having the opportunity for privacy when desired.

The balance between safety and independence can be difficult to manage within the hospital setting, as the equipment, medications side-effects, and other aspects of treatment plans discourage many pediatric patients from participating in activities (Whitehouse et al., 2001). Erikson's stage theory, however, supports that children from school-age to adolescents require ample opportunity to express their feelings, practice new skills, and find their unique identity (Rollins et al., 2005). Therapeutic outdoor spaces provide an expansive and diverse space for patients to engage in a variety of activities, facilitating greater risk competence (Lavrysen et al., 2015), instilling a sense of control (Little & Wyver, 2008), and encouraging children to freely interact with the natural environment (Ibrahim Momtaz & Shaban, 2018). This accessibility can possibly reduce feelings of confinement and leads patients to behave more independently both while in the therapeutic outdoor space, and upon returning to the ward (Said, Zaleha Salleh, Abu Bakar & Mohamad, 2005), promoting more successful reintegration following discharge.

**Limitations and suggestions for future research.** Due to the limited research evaluating the role of child life services in therapeutic outdoor spaces in hospitals, the current review provides insight into the impact of these areas on the physical, social, and emotional responses of pediatric patients throughout hospitalization. However, there are some limitations impacting generalizability that should be noted. While the sample

consisted of studies conducted in four different countries and assessing several age ranges, there were a relatively small number included for quantitative synthesis. In addition, there was little variation in study design; the majority of the findings were based on qualitative interviews, encouraging detailed, practical responses and allowing researchers to develop a relationship with participants.

Furthermore, a majority of the studies received a weak rating using the EPHPP Quality Assessment Tool (Evans et al., 2015), however this assessment tool ranked quantitative studies higher than qualitative or mixed-methods students. However, many of the qualitative studies reported the use of multiple validity procedures including triangulation, prolonged engagement in the field, and thick, rich, description, suggesting adequate trustworthiness of findings (Creswell & Miller, 2010). Therefore, other tools are needed to address qualitative methodology, such as the Joanna Briggs Institute (JBI) tool, the critical appraisal skills program (CASP) tool, and the evaluation tool for qualitative studies (ETQS), which have been recommended for health research (Hannes, Lockwood, & Pearson, 2010).

Additionally, future research on this subject would benefit from further exploration into specific activities within each therapeutic outdoor space, as these were not always clearly defined. Documenting whether activities were structured or unstructured, part of planned activities or other therapeutic activities will be important, as these settings may impact how therapeutic outdoor spaces related to the three goals of child life programs. It would also be helpful to understand how frequently the therapeutic outdoor space is used and promoted in each hospital, possibly impacting accessibility and participation rates.

Additional research is also needed to help overcome limitations associated with the reviewed articles. For example, data from the reviewed articles were only collected in six hospitals throughout the world, indicating a need for further research in the field. All of the studies reported that their findings were preliminary or exploratory, suggesting a need for further quantitative methodology to measure physical and physiological changes following use of the therapeutic outdoor space and how they contribute to clinical outcomes. Finally, many of the studies recruited participants through convenience sampling within the therapeutic outdoor space, meaning the sample may not be representative of all hospital users.

## **V. PRACTICAL IMPLICATIONS AND CONCLUSIONS**

The scope of child life practice is constantly evolving, growing to include camps, nonprofits, schools and many other settings. As the patient- and family-centered care movement continues to motivate more child-friendly hospital design, child life programs must also recognize these advancements and adapt care plans to utilize these resources. This review found that pediatric patient participation in therapeutic outdoor spaces is beneficial for holistic development, meeting three of the child life programming goals; to support essential life experiences for patients and their family members, reduce stress and anxiety, and promote greater self-esteem and independence.

Therapeutic outdoor spaces provide children with opportunities for social interaction, free play, and restoration throughout hospitalization, providing patients with appropriate choices and a sense of control over their environment. All of the studies in this review, however, evaluated unstructured participation in the therapeutic outdoor space; therefore, child life specialists should encourage further implementation of structured activities or events in future practice. For example, activities such as crafts, games, walking tours, planting areas, scavenger hunts, and other nature-based programming that would increase awareness and motivate patients to go to the garden can be utilized as structured activities (Whitehouse et al., 2001; Ibrahim Momtaz & Shaban, 2018). This is important because structured leisure activities have been found to encourage greater psychosocial development in young children (Fletcher, Nickerson & Wright, 2003), contributing to more positive coping (Carson & Swanson, 1991).

While previous research has addressed the numerous benefits of hospital gardens and outdoor play for patients throughout healthcare experiences, there is no research evaluating structured programming that could enhance positive development in pediatric

users. The child life profession must grow and adapt with advancements within the healthcare field, and the current systematic review emphasizes the need for more research regarding therapeutic outdoor spaces and their role within programming.



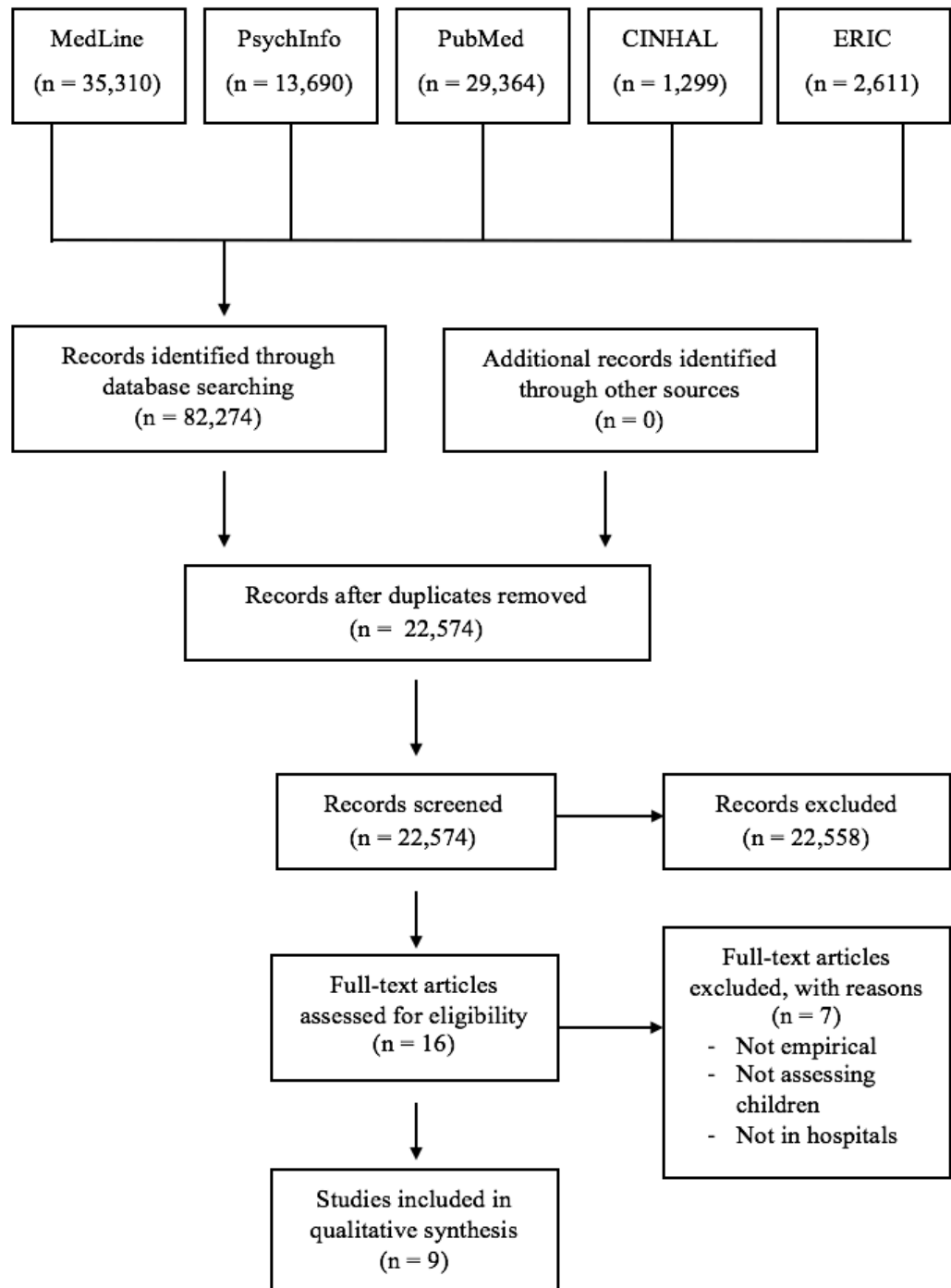


Figure 1. *Search Strategy*

Table 1: Child Life Program Goals

|  | Whitehouse, Varni,<br>Seid, Cooper-<br>Marcus, Ensberg,<br>Jacobs, &<br>Mehlenbeck, 2001 | Said, 2003 | Sherman, Varni,<br>Ulrich, &<br>Malcarne, 2005 | Said, Zaleha<br>Salleh, & Abu<br>Bakar 2005 | Said, Zaleha<br>Salleh, Abu Bakar,<br>& Mohamad, 2005 | Said & Bakar,<br>2007-2008 | van der Riet,<br>Jitsacorn,<br>Junlapeeya, &<br>Thursby, 2015 | Reeve, Nieberler-<br>Walker, & Desha,<br>2017 | Ibrahim Momtaz &<br>Shaban, 2018 |
|--|--|------------|--|---|---|----------------------------|---|---|----------------------------------|
| <b>Essential Life Experiences</b>  |  |            |  |   |   |                            |   |   |                                  |
| Promote parental presence  |  | X          | X  |   | X   | X                          | X   |   |                                  |
| Providing opportunities for parents to actively<br>continue parenting role |  |            |  |   |   |                            |   |   |                                  |
| Support communication with parents   |  |            |  |   |   |                            |   |   |                                  |
| Support interaction with siblings  | X  | X          |  | X   | X   | X                          |   |   |                                  |
| Support interaction with peers   | X  | X          |  | X   | X   | X                          | X   | X   |                                  |
| Provide play opportunities   | X  | X          | X  | X   | X   | X                          | X   | X   | X                                |
| Support recognition of familiar experiences                                |  | X          |  |   | X   | X                          | X   | X   |                                  |
| <b>Stress and Anxiety</b>  |  |            |  |   |   |                            |   |   |                                  |
| Reduce feelings of stress, anxiety, or fear<br>(shift in mood)             | X  | X          | X  | X   | X   | X                          | X   | X   | X                                |
| Activities encouraging expression of feelings                              |  |            |  |   |   |                            |   |   |                                  |
| Promote a sense of mastery   |  |            |  |   |   | X                          | X   |   |                                  |
| Understanding of healthcare experiences                                    |  |            |  |   |   |                            |   |   |                                  |
| <b>Self-Esteem and Independence</b>  |  |            |  |   |   |                            |   |   |                                  |
| Recognize child as unique individual                                       |  |            |  |   |   |                            |   |   |                                  |
| Foster responsibility for self and others                                  |  |            |  |   |   |                            |   |   |                                  |
| Provide access to facilities encouraging<br>maximum independence           |  | X          |  |   | X   | X                          | X   |   | X                                |
| Heighten feelings of competency  |  |            |  |   | X   | X                          | X   |   |                                  |
| Support ties to home, school and community                                 |  | X          |  |   | X   | X                          |   | X   |                                  |

Table 2: Study Characteristics and Quality

| Author, Year  | Country   | Methodology            | Age Range                | Study Group  | Therapeutic Outdoor Spaces   | Quality Rating |
|---|-----------|------------------------|--------------------------|--|--|----------------|
| Whitehouse, Varni, Seid, Cooper-Marcus, Ensberg, Jacobs, & Mehlenbeck, 2001 | U.S.A.    | Mixed-Method           | Unknown                  | 12 in garden, 10 in hospital   | Animal sculptures, windmill, V*, shade, seating rocks, benches, lawns, "ocean", splash fountain  | 2 (moderate)   |
| Said, 2003,   | Malaysia  | Survey                 | 2-5 years and 6-12 years | 360 Patients (parents for those who could not participate)                       | 4-7 play zones, 13 species of trees & 20 species of foliage, pavilions, benches, rope canopy   | 3 (weak)       |
| Sherman, Varni, Ulrich, & Malcarne, 2005                                    | U.S.A.    | Mixed-Method           | 2-18 yo                  | Behavior Mapping: 148 patients, Visual Analog Scales: 1 outpatient & 3 inpatient | Garden of Dreams: colored cloth butterflies, shade, V*, benches, water, animal features<br>Friendship Garden: life-size playhouse, V*, fountain pool, gazebo, animal structures<br>Buggy Garden: caterpillar bench, fountain, tables | 2 (moderate)   |
| Said, Zaleha Salleh, & Abu Bakar, 2005                                      | Malaysia  | Mixed-Method           | 6-12 yo                  | 31 patients; Mean LOS 3.1 days   | V*, open space to play & move in wheelchairs, lawns, sand pits, wildlife (birds & bugs), rope play areas   | 3 (weak)       |
| Said, Zaleha Salleh, Abu Bakar, & Mohamad, 2005                             | Malaysia  | Mixed-Method           | 2-12 yo                  | 360 mothers; 43 Nurses-survey about patients                                     | V*, Sensorimotor, rope, lawn, pretend play, and seating areas  | 3 (weak)       |
| Said & Bakar, 2007-2008   | Malaysia  | Mixed-Method           | 6-12 yo                  | 31 patients; Mean LOS 3.1 days   | V*, open space to play & move in wheelchairs, lawns, sand pits, wildlife (birds & bugs), rope play areas   | 1 (strong)     |
| van der Riet, Jitsacorn, Junlapeeya, & Thursby, 2015                        | U.S.A.    | Interviews             | 10 mos - 14 years        | 8 family members interviewed about patients over 5-weeks                         | V*, water, animal features, courtyard lawn, play areas, swings, "sit on toys"  | 3 (weak)       |
| Reeve, Nieberler-Walker, & Desha, 2017                                      | Australia | Survey (bench diaries) | Unknown                  | 102 comments   | Secret garden: V*, secluded areas & seating<br>Adventure garden: V*, therapy equipment & seating<br>Staff garden: V*, lawn, & paved areas<br>Babies garden: V*, sheltered seating & paved areas                                      | 3 (weak)       |
| Ibrahim Momtaz & Shaban, 2018   | Egypt     | Interview              | Unknown                  | 25 children  | Multiple playing areas (shapes & colors)<br>Shadow patterns of structures/plants<br>Foliage, Flowers<br>V* Water features  | 3 (weak)       |

V\* = vegetation, shrubs, flowers, trees, and other foliage; \*Studies arranged chronologically

Table 3: Thematic Analysis

| Global Theme                         | Organizing Theme             | Basic Theme                           | Examples  |
|--------------------------------------|------------------------------|---------------------------------------|---|
| Providing Essential Life Experiences | Increased Social Interaction | Social Interaction w/ Siblings        | "Patients played with peers: either siblings or fellow patients"  |
|                                      |                              | Social Interaction w/ Other Patients  | "Patients played in a group with peers...that they had met in the ward"   |
|                                      |                              | Social Interaction w/out Introduction | "...joined in the social play without introduction"   |
|                                      | Play Areas and Equipment     | Climbing                              | "...rope play equipment affords the patients to grasp, climb..."  |
|                                      |                              | Running                               | "I run on the grass and wiggled it through my toes"   |
|                                      |                              | Manipulables                          | "patients mentioned they played with manipulating equipment, namely shovel, swing, ..."   |
|                                      | Nature and Familiarity       | Reminder of Home                      | "children discovered plant species...in the garden similar to the ones found at their home"                                       |
|                                      |                              | Climactic Factors                     | "feeling the breeze, seeing the movement of leaves, watching rain, wishing to play in the rain, seeing shadows, and feeling warm" |

Table 3: Continued

|                                    |  |                                       |  |
|------------------------------------|--|---------------------------------------|--|
| <b>Reducing Stress and Anxiety</b> | Sensory Experiences                              | Pleasant Sounds & Quiet Areas         | "... and hear pleasant sounds such as bird songs"  |
|                                    |  | Scenic Views                          | "... outward view towards the surrounding landscape that affords a feeling of spaciousness"                                  |
|                                    |  | Refreshing Smells                     | "...could cheerfully play in a space with fresh air, sunlight, and refreshing smell"   |
|                                    |  | Variety of Shapes, Colors, & Textures | "plants provide screens...produce fragrance and colored flowers, and arrays of green foliage in many shapes and textures..." |
|                                    |  | Bird Songs                            | "positive affordances...hearing birds"   |
|                                    | Animals or Animal Features                       | Interaction                           | "...a familiar response of the patients was the activity of searching for and catching spiders"                              |
|                                    |  | Observation                           | "...afforded positive affordances such as watching birds and insects"  |
|                                    |  | Artwork                               | "She brightens up coming here because there are [topiary] animals..."  |
|                                    | <b>Facilitating Self-Esteem and Independence</b> | Open Space                            |  |
|                                    |  | More Space to Play Freely             | "...prefer the garden, where they can move around more freely to play..."  |
|                                    |  | Wide Paths for Walking/Wheelchairs    | "...with wide passageways for wheelchairs or rolling IV posts"   |
|                                    |  | Secluded Areas for Privacy            | "patients could rest in pavilion with more privacy"  |
|                                    |  | Reduce Feelings of Confinement        | "open space and not confined"  |

## **APPENDIX SECTION**

|   |    |
|---|----|
| A. SEARCH COMBINATION TRACKING SHEET..... | 40 |
| B. CODEBOOK.....                          | 41 |
| C. DATA EXTRACTION SHEET.....             | 45 |

# APPENDIX A: SEARCH COMBINATION TRACKING SHEET

| #   | Level One<br>(Empirical?) | Level Two Terms (1 & 2) |           | Level Three<br>Term | Level Four Letter<br>and Term | # of<br>Articles |
|-----|---------------------------|-------------------------|-----------|---------------------|-------------------------------|------------------|
| Ex. | Yes                       | Nature                  | Hospitals | Children            | a. Stress                     | 4                |
|     |                           |                         |           |                     |                               |                  |
|     |                           |                         |           |                     |                               |                  |
|     |                           |                         |           |                     |                               |                  |
|     |                           |                         |           |                     |                               |                  |
|     |                           |                         |           |                     |                               |                  |
|     |                           |                         |           |                     |                               |                  |
|     |                           |                         |           |                     |                               |                  |

## APPENDIX B: CODEBOOK

\*\*\*IF AT ANY POINT AN ARTICLE IS EXCLUDED, STOP AND CONTINUE TO EXCLUDED TAB\*\*\* (Put an X under the “Excluded” column and continue to EXCLUDED tab in Excel document)

| Level 1: Type of Article                |   |  |
|---|---|--|
| Empirical                               |   | X = Empirical<br><br>Blank = Other (This should then be excluded)  |
| Excluded                                | Systematic Reviews<br>Meta-Analyses<br>Book Reviews<br>Theses/Dissertations   |  |
| Level 2: Setting                        |   |  |
| Therapeutic Outdoor Spaces in Hospitals | 1. “Nature” or “Natural elements” or “Nature elements” or “Natural” “Green spaces” or “Healing gardens” or “Outdoor spaces” or “Natural areas” or “Natural Spaces” or “Therapeutic gardens” or “Adventure Gardens” or “Restorative Gardens” or “Rehabilitative gardens” or “Outdoor Play Spaces” or “Horticulture Therapy” or “Healing Spaces” or “Therapeutic Landscapes” or “Garden Environment”<br><b>AND</b><br>2. “Hospitals” or “Children’s Hospitals” or “Healthcare” or “Chronic illness” or “Hospitalization” or “Healthcare settings” | X = Article mentioned one or more of the listed terms from section 1 AND 2<br><br>Blank = Was not included |
| Excluded                                | *** Exclude any therapeutic outdoor spaces that are not within hospitals ***<br>(Ex: camp settings)   |  |



| <b>Level 3: Population</b>            |  |   |
|---------------------------------------|--|---|
| <b>Children</b>                       | “Children” or “Youth” or “Adolescents”   | X = Article mentioned one or more of the listed terms<br><br>Blank = Was not included |
| Excluded                              |  |   |
| <b>Level 4: Child Life Goals</b>      |  |   |
| <b>a. Reducing Stress and Anxiety</b> | “Stress” or “Anxiety” or “Fear” or “Worry” or “Adverse Reactions” “Familiar” or “Non-Threatening” or “Parental Involvement” or “Active Parenting” or “Communication” “Support” or “Supportive Relationship” or “Warmth” or “Empathy” or “Respect”  | X = Article mentioned one or more of the listed terms<br><br>Blank = Was not included |
| Excluded                              |  |   |
| <b>b. Essential Life Experiences</b>  | “Essential Experiences” or “Normative development” or “Meaningful Events” or “Education” or “School” or “School Program” or “Hospital Classroom” “Special events” or “Events” “Prom” or “Camps” or “Birthdays” or “Holidays” or “Play” or “Therapeutic play” or “Outdoor play” or “Wild play” “Risky play” or “Adventure play” or “Rough and tumble play” or “Unstructured play” | X = Article mentioned one or more of the listed terms<br><br>Blank = Was not included |
| Excluded                              |  |   |
|                                       | “Self-esteem” or “Self-concept” or “Ideal self” or “Unique” or “Confidence” or “Self-Expression” or  | X = Article mentioned one or more of the listed terms                                 |

|   |   |   |
|---|---|---|
| <b>c. Facilitating Self-Esteem and Independence</b> | “Emotional Expression”<br>“Responsibility” or<br>“Access” or “Facility<br>Access” or “Equipment<br>Access” “Independence” or<br>“Choice” or “Free choice”<br>or “Control” or “Privacy”<br>or “Free play” or “Sense of<br>Mastery” or “Competency”<br>“Peer Interaction” or<br>“Interaction” or “Social<br>behavior” or “Prosocial<br>behavior” or “Social<br>Interaction” or “Peer<br>Group” or “Inclusion” | Blank = Was not included  |
| Excluded  |   |   |
| <b>Level 3: Population</b>                          |   |   |
| <b>Children</b>                                     | “Children” or “Youth” or<br>“Adolescents”   | X = Article mentioned<br>one or more of the listed<br>terms<br><br>Blank = Was not included |
| Excluded  |   |   |
| <b>Level 4: Child Life Goals</b>                    |   |   |
| <b>a. Reducing Stress and Anxiety</b>               | “Stress” or “Anxiety” or<br>“Fear” or “Worry” or<br>“Adverse Reactions”<br>“Familiar” or “Non-<br>Threatening” or “Parental<br>Involvement” or “Active<br>Parenting” or<br>“Communication”<br>“Support” or “Supportive<br>Relationship” or “Warmth”<br>or “Empathy” or “Respect”  | X = Article mentioned<br>one or more of the listed<br>terms<br><br>Blank = Was not included |
| Excluded  |   |   |
|   | “Essential Experiences” or<br>“Normative development”<br>or “Meaningful Events” or<br>“Education” or “School” or<br>“School Program” or<br>“Hospital Classroom”   | X = Article mentioned<br>one or more of the listed  |

|   |  |   |
|---|--|---|
| <b>b. Essential Life Experiences</b>                | “Special events” or<br>“Events” “Prom” or<br>“Camps” or “Birthdays” or<br>“Holidays” or “Play” or<br>“Therapeutic play” or<br>“Outdoor play” or “Wild<br>play” “Risky play” or<br>“Adventure play” or<br>“Rough and tumble play”<br>or “Unstructured play”   | terms<br><br>Blank = Was not included   |
| Excluded  |  |   |
| <b>c. Facilitating Self-Esteem and Independence</b> | “Self-esteem” or “Self-<br>concept” or “Ideal self” or<br>“Unique” or “Confidence”<br>or “Self-Expression” or<br>“Emotional Expression”<br>“Responsibility” or<br>“Access” or “Facility<br>Access” or “Equipment<br>Access” “Independence” or<br>“Choice” or “Free choice”<br>or “Control” or “Privacy”<br>or “Free play” or “Sense of<br>Mastery” or “Competency”<br>“Peer Interaction” or<br>“Interaction” or “Social<br>behavior” or “Prosocial<br>behavior” or “Social<br>Interaction” or “Peer<br>Group” or “Inclusion” | X = Article mentioned<br>one or more of the listed<br>terms<br><br>Blank = Was not included |
| Excluded  |  |   |

## APPENDIX C: DATA EXTRACTION SHEET

| Title | Excluded | Design     | Setting                    | Population |     |
|-------|----------|------------|----------------------------|------------|-----|
|       |          | Empirical? | Therapeutic Outdoor Space? | Hospital   | Age |
|       |          |            |                            |            |     |
|       |          |            |                            |            |     |
|       |          |            |                            |            |     |

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