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Review

Designing Healing Environments: A Literature Review on the Benefits of Healing Gardens for Children in Healthcare Facilities and the Urgent Need for Policy Implementation

Shereen Khatoon-Jaan Din, Alessio Russo * and Jamie Liversedge

School of Arts, Francis Close Hall Campus, University of Gloucestershire, Cheltenham GL50 4AZ, UK
* Correspondence: arusso@glos.ac.uk

Abstract: Despite the well-known benefits of healing gardens for children in healthcare facilities, policies and guidelines for their implementation are lacking, leading to their undervaluation by policymakers. This literature review investigates the advantages of healing gardens for children's health and wellbeing, with a focus on public-funded healthcare facilities. The review explores the definition of a healing garden, theories, the value of play, the impact on children's development, and the environmental benefits of healing gardens. Additionally, the review presents successful examples of healing gardens in practice, while acknowledging potential arguments against them and associated risks. During the literature review, research gaps were identified, and areas for future research were also examined. Finally, this review calls for evidence-based guidelines for policymakers and designers to incorporate healing gardens into healthcare facilities, providing a comprehensive argument for their adoption and regular access for children.

Keywords: healing space; biophilia; policy; landscape design; play value; theories; salutogenic design; evidence-based design

Citation: Din, S.K.-J.; Russo, A.; Liversedge, J. Designing Healing Environments: A Literature Review on the Benefits of Healing Gardens for Children in Healthcare Facilities and the Urgent Need for Policy Implementation. *Land* **2023**, *12*, 971. https://doi.org/10.3390/land12050971

Academic Editor: Thomas Panagopoulos

Received: 14 March 2023
Revised: 13 April 2023
Accepted: 21 April 2023
Published: 27 April 2023

1. Introduction

Healing gardens can be traced back to the Greeks at the end of the sixth century B.C. when they used "healing centres" in temples [1,2] with the specific usage of natural spring water. This trend was followed by monasteries in Egypt before spreading to Western Europe in the 5th century A.D. [3]. In the Middle Ages, cloisters were used as primary settings for patients to be treated by monks within monasteries [4]. They contained herbaceous planting which was thought to be medicinal. There was an emphasis on provisions of fresh air, accessing areas of sunlight, and daily walks around the gardens. Through plagues, migration, and harvest failure, monasteries were forced to cap their medical resources [5]. As monasticism declined in the 16th century, their methodologies in using healing gardens became a distant memory [6]. In the mid-eighteenth century, industrialisation, migration, and overpopulation accounted for countless deaths due to lack of hygiene and increasing levels of pollution [7]. This triggered a movement of building hospitals within towns rather than in the countryside which, at the time, were seen as more salutary [8]. In the mid-nineteenth century, the concept of pavilion design hospitals in England became popular through John Roberton and George Godwin [9]. The modified style allowed garden views from patient rooms, increased segregation to prevent disease spreading, and enhanced ventilation [9].

This was supported by Florence Nightingale: "quite perceptible in promoting recovery, the being able to see out of a window" [10]. She further demonstrated this through her findings of a lower mortality rate in pavilion-style hospitals than others [9]. Sanitisation, natural sunlight, and clean air became a normality for patients to expect from hospitals [8]. Before pavilion-style hospitals, "open spaces attached to hospitals became accidents of local architectural tradition" [6] (p. 11), but now they were gaining importance.

Healing gardens reached the Victorian period where it became normalised in upper class society to be whisked away to one's country home when sick for a "change of air" [11]. Doctors prescribed patients to be under the warmth of the Sun and to go for country walks—this was known as going "abroad" and it was now not only seen as a health benefit, but a show of wealth and status [11].

From the 1950s to the 1990s, there was a decline in the appreciation of the therapeutic value of gardens across Western countries [5]. This was until the American healthcare industry experienced a movement towards a patient-centred approach in the 1990s [5]. From this movement, the architecture of hospitals changed from a copy and paste of international-style buildings towards a focused response to the regional context. Despite the lack of empirical evidence supporting the theory of gardens inducing healing, gardens in hospitals became a common feature for patient use. Soon after, qualitative data from patients reported improved changes of mood after spending time in the hospital gardens [5]. Consequently, the American Society of Landscape Architects (ASLA) started to sponsor seminars on healing gardens [5]. Schools even began creating courses for healthcare garden design [5]. Overall, this brought back recognition to healing gardens as a healing factor within healthcare.

Therefore, since Ulrich's groundbreaking study in 1984, researchers have studied the effects of viewing nature in healthcare settings [12,13].

Over the past 20 years, there has been an increase in research on gardens in children's hospitals as it has become clear that these gardens need special design features to draw in visitors and offer a healing environment for children [2,12]. As children are psychologically more vulnerable than other social groups, the design of healthcare settings, especially for children, is definitely more critical than the design of other spaces [14].

The advantages of healing gardens in children's hospitals have been examined in several important studies [12]. In addition, there has been an increase in the use of salutogenic and biophilic design approaches in healthcare environments over the last decade [15].

However, Paraskevopoulou et al. (2018) [16] identified in a literature review only four publications on healing gardens in paediatric hospitals. In addition, the majority of research studies on healing gardens are indeed focused on elderly populations [17–20].

Therefore, more recent research on healing gardens for children is required. While some recent publications have discussed the benefits and empirical evidence supporting the effectiveness of healing gardens, more research is needed to investigate healing garden policies in the UK and abroad.

Thus, the purpose of this paper is to explore and provide evidence for the potential benefits of healing gardens for children's health and wellbeing in healthcare facilities. Specifically, the paper addresses the research question: Why should it be a policy for all healthcare facilities to have healing gardens for children? Through a literature review and analysis of successful healing garden precedents, this paper aims to demonstrate the importance of healing gardens for children's physical, mental, and emotional health, and make a case for their incorporation in all healthcare facilities as a standard policy recommendation for policymakers and healthcare facility designers to improve the quality of life.

2. Materials and Methods

The objective of this literature review was to investigate the benefits of healing gardens for children in healthcare facilities and to make a case for enacting policies to encourage their inclusion. A thematic approach was used to identify and select relevant literature [21], which included academic articles, books, reports, and policy documents. Searches were carried out using a variety of electronic databases, including Google Scholar, Google, ScienceDirect, Scopus, and the Search Library Discovery at the University of Gloucestershire.

Specifically, a deductive approach was adopted to gather evidence from previous research [22] and to categorise the findings from the selected publications based on the

following predetermined themes: (1) the definition of a healing garden, (2) theories, (3) the value of play and its impact on children's development, and (4) policies (Figure 1).

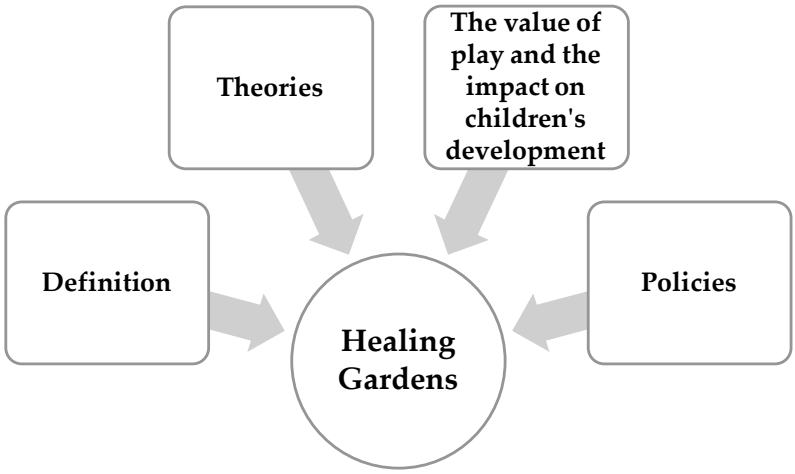

Figure 1. Predetermined themes for the literature review.

The literature search process was conducted using a combination of relevant keywords to ensure a comprehensive search of the available literature. The keywords used included "healing gardens", "children", "healthcare facilities", "policy", "biophilic", "hospital setting", and "design", as well as other related terms such as "therapeutic gardens", "paediatric healthcare", "exemplars of healing gardens in hospitals", "therapeutic effects", and "restorative environment". The search terms were used with Boolean operators such as "AND" and "OR" to join sets of concepts together and narrow or broaden the search results, respectively [23]. As Atkinson and Cipriani (2018) noted, "AND" was used to retrieve articles that contained all the search terms within a concept, while "OR" was used to expand the search and find articles that contained at least one of the search terms within a concept [23]. The inclusion criteria for the literature review were: (1) English-language publications, (2) academic articles, books, reports, and policy documents and grey literature, (3) publications focusing on the benefits of healing gardens for children's health and wellbeing, (4) publications discussing healing gardens in the context of healthcare facilities, and (5) publications discussing policies and guidelines related to healing gardens.

Existing or proposed projects were also examined to highlight successful examples of healing gardens in healthcare facilities.

The findings of this review were used to create design recommendations for healing gardens in healthcare facilities, as well as to debate the need for policies and guidelines to encourage their inclusion.

3. Results and Discussion

3.1. Definition of a Healing Garden

There are many discrepancies in the definition of a "healing garden". Marcus states that "it is important to recognise that 'healing' is not synonymous with 'cure'" [5]. To elaborate, the purpose of a healing garden in her opinion is to "facilitate stress reduction" [5], which is agreed by Vapaa (2002) [24]. In further support of this, Tyson says "the healing environment is based on . . . the body, mind and spirit working together" [25]. However, an issue with these definitions is they cannot explain how one can set out to design a healing garden as its effects cannot be proven until the end of the design process. Thus, it cannot be identified as a healing garden until it is used.

Tyson (1998) [25], alongside Marcus and Barnes (1999) [6], uses "healing garden", "therapeutic garden", and "restorative garden" interchangeably, which are aimed to enhance people's health and wellbeing [25]. This is not justified as there is a critical difference between a healing and a therapeutic garden. Therapeutic gardens are personal and de-

signed for a target population whereas healing gardens benefit a wider population with various needs. Healing gardens also have more flexible usage with elements such as restoration and passive involvement or more active aspects such as productive gardens.

A more practical definition of a healing garden from Ulrich is that a garden should have "green vegetation, flowers and water" (Ulrich, quoted in Marcus and Barnes, 1999 [6] (p. 30), cited by Vapaa, 2002 [24] (p. 5)) which leaves a very open interpretation. Arguably, the interpretation should be left open to allow for greater flexibility in the design and use of a healing garden so long as it does not confuse how to design a healing garden. It is in general agreed by field experts such as Marcus, Barnes, Tyson, and Vapaa that a healing garden should offer stress relief and is not expected to cure any illness. In alliance to this, one of the more universal definitions refers "to a variety of garden features that have in common a consistent tendency to foster restoration from stress and have other positive influences on patients, visitors and staff" [6] (p. 30), including water features, shaded seating, and a varied planting mix.

The current definition of a healing garden set out by Marcus and Barnes (1999) states what a healing garden aims to do rather than what it is [6]. This is because there is a limited amount of quantifiable evidence to show the direct correlation between healing gardens and direct therapeutic or restorative effects [26]. Much of the existing research uses qualitative data from patient experiences and correlations are assumed from this [5,27]. Another approach to the definition is through the assumed physical composition of a healing garden, such as vegetation, seating, and water, as stated by Ulrich (quoted in Marcus and Barnes, 1999 [6] (p. 30)). These definitions may apply to healing gardens in a variety of settings but in the case of a healthcare facility for children it is proposed that the term "healing garden" is inaccurate terminology. This is because the term misrepresents the garden as having a direct therapeutic effect which can be misleading.

For example, Hartig and Marcus (2006) argue that "Healing garden is perhaps an unfortunate name, since in popular parlance healing is perceived as synonymous with cure. No one would argue that a garden of itself can cure a person of cancer or mend a broken leg, and many would argue that gardens can serve healthcare even in settings in which unavoidable deterioration in health will continue" [28] (p. S36).

Ergo, it is proposed that the current term "healing garden" for healthcare facilities with children be replaced with "freedom garden". Unlike previous definitions, freedom gardens would only be used in the context of children in healthcare facilities. The use of the garden would permit children to use it flexibly for play, expression, restoration, and socialising [29–31].

It is agreed with current research that healing gardens do benefit children's mental health and wellbeing from the evidence shown [27,32,33]. In reference to the literature review, regarding definitions of a healing garden, the term healing garden has not been substituted with freedom garden to ensure there is clarity in the research and avoid limiting the scope of secondary research. However, the above definitions of healing gardens were sourced from Western countries.

Therefore, we found that Jiang (2014) [34] conducted a review of Chinese literature and compared it to studies conducted in Western countries.

The study found that "healing garden", as defined by Eckerling (1996), is "...a garden in a healing setting aimed to make people feel better" [35] and is the term most frequently used by Chinese scholars [34,36,37]. On the other hand, Wang and Li (2012) [38] state that healing gardens are typically where horticulture therapy activities take place [34,38]. Table 1 summarises the definitions of healing gardens identified in our literature review, incorporating both Western and Chinese literature.

Table 1. Healing garden definitions from the literature.

Definition	Key Points	Reference
"the healing environment is based on . . . the body, mind and spirit working together"	Aimed to enhance people's health and wellbeing	Tyson, 1998 [25]
"it is important to recognise that 'healing' is not synonymous with 'cure'" instead it "facilitates stress reduction"	Focuses on stress reduction	Marcus, 2007 [5]
A garden should have "green vegetation, flowers and water"	Healing gardens should be reduced down to physical design aspects	Ulrich, quoted in Marcus and Barnes, 1999 [6] (p. 30)
"to a variety of garden features that have in common a consistent tendency to foster restoration from stress and have other positive influences on patients, visitors and staff"	There should be restoration and benefit the health and wellbeing of users	Marcus and Barnes, 1999 [6] (p. 30)
"a garden in a healing setting aimed to make people feel better"	Feeling better	Eckerling, 1996 [34,35]
"the places where horticultural therapy activities happen"	Horticulture therapy activities	Wang and Li, 2012 [34,38]

3.2. Theories

Our literature review shows that there were many arguments and theories that debated humankind's innate connection to nature. Some were quantifiable whereas others were not. This section explores proposed theories that relate humankind to a biophilic sense and the feeling of restoration. It also looks at how our innate need to be in nature coincides with technology and how this affects children.

Bio translates to "life" and philia is "love", deriving from the Latin language [2] and thus forming "biophilia". This was first coined by Erin Fromm in 1973 [39] which he described to be "the passionate love of life and of all that is alive" [40]. This was later refined by Wilson to "The concept that our instinctual affinity for nature is the very essence of humanity and binds us to all other living things" [41–44].

Within biophilia, there are sub-theories of colour and shape. Biophilia is a key idea that can aid designs in replicating the sense of restoration nature offers in healing gardens. The current thinking behind colour theory is that humans are predisposed to be attracted to natural colours such as green, and this links to humans' innate survival instinct to locate food [45]. This is said to be through "motivating desired cognitive control" [46]. Dankner found that "some colors and visual distractions reduce stress on emotional and physiological levels" [47] with warmer tones creating a calmer environment [48].

Applying colour theory to a healthcare setting, Park (2009) [49] found that preferred colours of both healthy children and children in paediatric care were blue and green. The only difference was found in a control group of healthy children who preferred yellow, whereas paediatric patients did not [32,49]. The evidence suggests that "natural colours" such as green/blue can offer children a more comforting hospital setting, therefore this colour palette should be extended to healing gardens.

Shape is another significant attribute to biophilia as it can create a feeling of restoration by contributing "to our capacities for emotional and intellectual growth and wellbeing" [50]. It can also create an indirect experience with nature using "biomimicry" and "biomorphism" [45]. Biomimicry imitates systems nature uses to solve human issues [51] and biomorphism is the copy of natural forms [52]. There is evidence for biophilia creating a "restorative environmental design" [45]. One study found that children showed a preference for biomorphism with "animal shapes . . . combinations of flowers . . . water fountains with flower beds instead of water fountains alone" [14] as they felt calmer. Therefore,

shape is an important contribution to children's healing gardens in healthcare to offer them restoration during their feelings of perturbation.

Another, more seminal, study on biophilia identifies humankind's natural tendencies towards biophilia. Ulrich conducted a study (1984) [13] on hospital patients where some had a window view of nature, and the control group had a brick wall view [13,24]. The latter patients had slower recovery rates, complained of more pain, and requested more medication than those who had a view of nature [13,24]. Overall, they stayed approximately one and a half days longer than those with a nature view [13,24]. Therefore, biophilia can improve recovery rates [53]. This research has been repeated in many ways with consistent findings. Despite the maturity of the study, it is still the most pioneering study and is still referenced today.

However, Ulrich's study fails to provide quantifiable evidence, and a more recent and quantifiable study shows a direct positive correlation between stress reduction and green space. Bloemsma et al. (2021) [54] found that there was a daily decrease in saliva cortisol levels in children who accessed more residential green space in contrast to a group of children who accessed less green space, who had increased levels of saliva cortisol [54].

Therefore, it can be concluded that children exposed to green spaces regularly have lower chronic stress levels [54]. This conclusion indicates that biophilia is intrinsically linked to our biological nature to be outdoors and offers a sense of restoration [44]. This may have been innate from the beginning of evolution, when the genus Homo from Africa relied on connecting with the environment to hunt for food [8,55]. In concurrence to this, Wilson included evolution as supportive evidence for the theory of biophilia [26,56]. Wilson claims that if humankind's ancestors were also the genus Homo, then during 99% of human evolution humans have had to depend on information they learned from the physical environment [26].

A core purpose for biophilic design is to reduce stress levels, in which natural scenes activate cells that induce pleasure [57]. The type of natural scene is suggested to be a savannah climate, as "the savannah theory" states that humans subconsciously prefer these environmental features [39]. This originates from Heerwagen and Orians (1992) who found that fossil-based evidence indicates mankind originated from African savannahs [39]. Thus, features such as "distant views, water, copses of shade trees" are favourable in healing garden designs to create a serene environment [39]. Appleton developed the prospect–refuge theory from the savannah theory [2]. His theory states that humankind's preference for the landscape is "from perception of what is needed for survival" [2]. This includes a "clear view (prospect)" of our surroundings from a vantage point "without being seen (refuge)" [2]. Therefore, water, seating, and spaces created in shade and for refuge are important features to reduce stress levels in healing gardens.

Studies by Marcus and Barnes (1999) found that people go outdoors with the intention of alleviating stress. Healing gardens also "foster restoration from stress" [6] through experiential factors of biophilia such as water, plants, and the prospect–refuge theory rather than modern medicine. Another factor is through "positive distractions" [45]. The distractions are seen as "environmental features that elicit positive feelings" such as the sound of rushing water [32,33]. Another theory that creates restoration is the attention restoration theory [8,58] which proposes concentration and brain restoration can be improved through spending time in or looking at nature. This is because the natural environment recharges the human mind, allowing more focus on tasks [59]. These theories indicate the necessity of healing gardens in healthcare facilities, as they alleviate stress for children in between medical treatments, resulting in "happier children that recover faster" [60]. However, this may only succeed if there is a consistent engagement with nature that is sustained [39].

Without healing gardens and the biophilic connection to nature, there is no restoration to the mind, which can lead to "nature-deficit disorder" [29]. Though this is not a medical term, it is used to describe the "repercussions to the health of our children" [42] when staying in sedentary indoor environments. The result of this "alientation from nature" [29] (p. 36)

has been linked to ADHD, obesity, depression, anxiety, and increased stress levels [42]. Reducing stress levels is critical to children as "childhood stress is evident in increasing rates of depression, anti-social behaviour" [61]. Therefore, without healing gardens children cannot experience nature as "a separate peace" [29] and may fail to gain any restoration.

The importance of restoring the mind is also vital for adults as "longer term stress can contribute to heart disease, cancer, type 2 diabetes" [2,8]. Healing gardens can offer a "buffering relationship between life stressors and psychological distress" [32]. Louv also found that teenagers visited nature after distressing events and concluded that "nature also offers nurturing solitude" [29]. Therefore, healing gardens are not age dependent and their therapeutic benefits can be extended to a variety of users, including those who feel marginal, such as teenagers.

Overall, the research suggests that the need for biophilia is inherent and can increase recovery rates, create better health outcomes, and alleviate stresses for children. This is supported by the theories which suggest "nature offers healing for a child" [29] (p. 7). The research also explores the effects on children without healing gardens and the extension of benefits from healing gardens to other users. In conclusion, our analysis revealed that research on the theories of healing gardens across different research disciplines dates back two decades [62]. For example, Stigsdotter and Grahn (2002) [62] conducted a thorough analysis of the theories about the therapeutic effects of gardens from diverse research disciplines, which they divided into three different schools: the Healing Garden School, the Horticultural Therapy School, and the Cognitive School [62]. The Healing Garden School theorises that visitors' health benefits primarily stem from their experiences within the garden environment, which encompasses its design and contents [62]. In contrast, the Horticultural Therapy School suggests that the health benefits primarily arise from engaging in garden-related activities [62]. Lastly, the Cognitive School proposes that health benefits are derived from a combination of factors, including visitors' experiences of the garden environment and activities, as well as their individual background and character [62]. Other studies include that by Jiang (2014) [34], who conducted a study on the concept of therapeutic landscapes and healing gardens in Western societies. This study identified four major schools of theories: (1) medical geography, (2) environmental psychology, (3) "salutogenic environment" and the ecological approach, and (4) horticultural therapy [34]. The medical geography school focuses on the concept of sense of place and identifies four dimensions of therapeutic landscapes, namely the natural environment, built environment, symbolic environment, and social environment [34,63]. The environmental psychology school incorporates two major theories: (1) the attention restoration theory (ART), which identifies four features of a restorative environment—being away, extent, fascination, and compatibility [34,58,64]—and (2) the aesthetic–affective theory (AAT), which draws on psycho-evolutionary theories and identifies three features of healing gardens: relief from physical symptoms, illness, or trauma, stress reduction for individuals dealing with emotionally and/or physically stressful experiences, and an improvement in overall sense of wellbeing [6,13,34].

The ecological psychology school includes the salutogenic environment and therapeutic landscape based on theories of environmental affordances and ecological psychology [34,65–67].

Recently, the salutogenic theory has become a buzzword in healthcare architecture around the world [68]. The concept of "salutogenic design", which Alan Dilani coined in the late 1990s, is centred on encouraging "wellness factors" in hospital design to create a restorative environment for its patients [15,69]. The term "salutogenic" is frequently misused by architects who do not fully understand how to incorporate salutogenic methodology into their designs, resulting in a misunderstanding of what salutogenesis truly means [68].

3.3. The Value of Play and the Impact on Children's Development

The opportunity for play is what makes healing gardens differ for children in comparison to healing gardens in general. Play is a means of expression for children and is crucial for their development, especially in unfamiliar and intimidating environments such as healthcare facilities. The importance of play in healing gardens and the effect it has on child development was explored in our literature review. We found that there is a substantial body of evidence supporting play's value for children's healthy development [70].

The term "play deprivation" [71] is correlated with children who have "a wide range of physical and emotional problems" [71] (p. 2). Panskepp, a leading researcher, explored the effect of play on children's brain development [71,72]. He found that there was faster and more extensive brain development in children who regularly played [71,72]. This is shared by several studies that found children with consistent exercise through outdoor play had a higher performance in cognitive tests than those who did not play [71,73–75]. Thus, "play constitutes an essential parameter of the normal psychosomatic development of children" [76].

Specifically, the importance of children's outdoor play in a natural environment is invaluable as it "improves the child's immune system, stimulates his imagination and creativity" [77]. Play can be used as expression to develop a healthy mental state; Frost maintains the view that play and art assist children in coping "with fear and trauma by providing a medium for self-expression" [30,78]. This aligns with Freud, Erikson, and Isaacs who state children's subconscious anxieties are reflected through fantasy play [30].

In further exploration, outdoor free play creates more opportunity for a range of play than sedentary indoor play [8,79]. Shim et al. (2001) [80] found that children were more involved in complex peer play outside [8,80] and Hartle (1996) [81] discovered a higher stimulation in social play and increase in parallel play outside rather than inside [8,81].

The exposure from healing gardens to different types of play can present healing gardens as a safe space for children to "participate in the passive or active play activity . . . away from the confinement of the wards" [1]. Consequently, there is an opportunity for them to use outdoor play as a social activity [30,82]. This social interaction can form connections between children, making them feel less lonely in their experiences and creating a sense of comfort in an unfamiliar setting [76]. Thus, children gain a sense of agency and control in an unfamiliar setting through outdoor play in healing gardens, and this allows them to change "hospitalization into a positive rather than a negative experience" [76]. However, this empowerment is limited if children are not given the freedom to take risks. The prenotion of risk often results in a safety first approach to play for children. Professor Woolley developed the acronym "KFC; Kit, Fence and Carpet" for "unimaginative and standardized playgrounds" [83,84], which are often "hard landscapes . . . seen as a safety net but are a cage for children's development" [61] (p. 39). The consequence is fewer social skills and more aggression found in school playgrounds [61], thus suggesting green spaces allow for more exploration in play and child development.

The design of the space is not wholly dependent on offering children the opportunity to explore, and "attitudes and awareness of staff towards children with disabilities will greatly affect the . . . depth of integration" [31] for children's exploration of outdoor play.

In summary, as suggested by the research, the diversity in play types and emotional, social, physical, and cognitive benefits are incomparable to sedentary indoor play and can only be provided appropriately through healing gardens. Healthcare facilities' risk-averse approach should not be a barrier for these benefits as "children with physical, mental, emotional and social disabilities have an equal right to play opportunities" [31], including outdoor play. Therefore, healing gardens with outdoor active free play should be a necessity for healthcare facilities. However, despite the many benefits of introducing play into healthcare settings, this can be challenging due to the layout and functionality of healthcare spaces. For example, public areas in paediatric healthcare environments, such as waiting rooms, hallways, and hospital gardens, are used for mundane activities, emphasising the important need for ongoing sensory stimulation and entertainment for

children's cognitive development [85]. Health professionals define "play" in public areas of paediatric healthcare facilities as an activity that assists children in making the most of their waiting time, reducing their anxiety and nervousness, and improving their interactions and communication with health professionals during their clinical visit [85,86]. This is known as humanising children's healthcare [85,86]. An additional challenge is the budget, as Starlight Children's Foundation found that in over half of hospitals in the United Kingdom there is no budget for play and over thirty per cent have no play professionals [87,88]. Those which did have funding for play had only allocated GBP 500 for the year [87,88].

An adequate budget and appropriate design layout of public areas are critical for children's hospitals, in which children and teenagers can maintain a sense of identity and autonomy through self-directed play activities [85]. Outdoor gardens, in particular, have the potential to foster and facilitate the healing process of sick children by allowing them to experience biotic, physical, and climatic factors in nature, as well as the diversity of forms, colours, textures, and shapes of landscape elements [1,85]. Atriums, waiting rooms, hospital gardens, and other public spaces must be thoughtfully designed to provide self-directed play activities [85,89]. Age-appropriate play areas are preferred by younger children and teenagers [12,89]. Consequently, this can help children cope with treatment both in preparation and post-procedural play.

3.4. Policies

We conducted extensive research on policies related to healing gardens during our literature review. However, we found an insufficiency of policies that addressed this problem specifically. Nonetheless, we were able to identify policies from other domains that could be linked back to healing gardens. For example, the United Nations' Rights of the Child to Play [30,43], the PiPA method for inclusion in play [43,90], and a Scottish Government policy for outdoor play [91] are all policies that could be associated with healing gardens.

In conclusion, despite the obvious numerous benefits of healing gardens in hospitals, there appears to be a lack of specific policies in place to support their creation and maintenance. This is concerning, and it emphasises the importance of policymakers prioritising the implementation of such policies. Without clear policies, hospitals may struggle to allocate resources to developing and maintaining these green spaces. Policymakers must recognise the value of these spaces and prioritise their development to ensure that children in hospitals have access to green spaces that can support their physical and mental wellbeing, including play activities.

3.5. Challenges, Opportunities, and Best Practices

We found that healing gardens are being overlooked as a solution to current issues, such as the lack of planning for the location of children's healthcare facilities regarding levels of air pollution. For example, "2 of the biggest children's hospitals in the UK, Great Ormond Street Hospital and Birmingham's Children Hospital, are located in areas with unsafe levels of pollution" [92]. Additionally, over 2000 health centres are in areas that have some of the most life-threatening air pollutants [92]. Therefore, adapting the outdoor environment to make it safe for children to play by implementing healing gardens is the most feasible solution, as "Green spaces can improve the quality of air we breathe" [93] (p. 14). This is already under way; the redeveloped proposal for Great Ormond Street Hospital is considered industry leading and includes a strategy to reduce the pollution in the area through green infrastructure [94]. This is also crucial for the reduction of noise pollution as noise can reduce any physiological, restorative benefits of healing gardens [6,95]. Noise pollution can be reduced through thick vegetation and trees [96]. Figure 2 shows the proposed green infrastructure outside Great Ormond Street Hospital to reduce pollution.

Figure 2. Proposed Green Infrastructure for Child-Friendly Environment at Great Ormond Street Hospital. (Image courtesy of LDA Design).

The previous study is evidence that implementing green infrastructure such as healing gardens, as a strategy to reduce pollution, is a practical application as it is an ongoing project. Subsequently, the benefits of healing gardens can be extended from children's wellbeing to climate action, as described by Sustainable Development Goal 13 [97], for the environment, thus working towards current United Nations goals and presenting healing gardens as a viable feature for hospitals.

In addition, edible healing gardens can be part of a larger concept of edible green infrastructure [98,99]. Specifically, edible healing gardens in hospital settings can provide several benefits, including improved nutrition, increased food security, educational opportunities, and therapeutic benefits for patients and staff [100]. An excellent example of a community-based edible healing garden is the Edible Healing Garden in Los Angeles, which aims to address nutrition insecurity in the medically underserved population [101].

Through the provision of education on gardening, nutrition, and cooking, the garden empowers families and children with knowledge, food sovereignty, and access to healthy foods. Moreover, it advocates for food equity and cultural diversity while also creating a safe space for people to cultivate their own food. The garden's ultimate objective is to empower every family and child struggling with food insecurity, enabling them to access healthy and culturally appropriate foods. Additionally, the garden has been designed as a healing environment for the paediatric population at the LAC + USC hospital [101].

Healthcare facilities need to consider the effects healing gardens can have on post-patient care. Modern life has influenced outdoor play significantly, and most children play with iPads instead of footballs. Even so, there is evidence of benefits, with those who use technology more frequently having higher scores on reading tests [102]. However, this can lead to immoderate uses of technology such as silicon faith [29], where parents over-rely on technology as a distraction for children because of their fear of children's outdoor safety.

To aid the instilling of play in healing gardens, practitioners and parents need to take on an active role. Parents must become play champions [103] to ensure there is supervised, guided play [104] without taking agency away from children. This is critical for children to tailor the environment to their own subconscious needs which will benefit their psychological development. With play being a coping mechanism for ongoing treatments, as found in a literature review on play [30], practitioners also need to take responsibility to educate parents on the benefits of outdoor play. For this to occur, it is argued that practitioners need to change their current attitude to outdoor play, as this can influence their role in promoting outdoor play to parents and provisions to children's healing gardens. Subsequently, the healthcare facility can create a larger impact on children's psychological

and physical development through instilling children's play in healing gardens without them being in-patients.

In support of the above, the construction of healing gardens in healthcare facilities would support the promotion of outdoor play and stewardship. The experience of play in healing gardens will enable children to form valuable biophilic connections [29]. Should a child have a traumatic experience with their medical procedures [30,78], healing gardens can act as a refuge, thus forming a positive relationship to nature and a journey for their innate biophilic sense to be explored. An exemplary illustration of this sense of refuge is the Crown Sky Garden in a paediatric clinic, Lurie Children's Hospital, Chicago. It received an Honour Award from ASLA (2013) [105] for its nonformal play and horticultural healing garden, inducing active participation from children. The garden is successful in catering to a variety of children using sensory elements with wood, light, sound, and water features [105]. With the right budget, this could be a universal implementation. For a practical real-life application of healing gardens in healthcare facilities, it is recognised that there are opposing arguments and considerations for the implementation of healing gardens.

Past debates argued that gardens put economic pressures on hospitals and financial resources are better spent on direct patient care or the advancement of technologies within hospitals [4,106]. In response to this, there is evidence that access to views of nature can speed up recovery rates and result in fewer requests for pain relief medication, thus reducing costs for hospitals in the long term and freeing up bed spaces faster [107]. The benefits of healing gardens are extended to nurses who feel more productive and less fatigue [27], which benefits the healthcare facility as fatigue may lead to poor judgement [8] that can have severe implications. Natural England estimated a total saving of GBP 2.1 billion a year in health costs if there is sufficient access to green space [108]. In England's current economic climate, healing gardens are a sustainable strategy to reduce financial pressures as they save on resources and their extended benefits to a variety of users add value to them as an investment.

Additionally, the lack of attention healing gardens receive as a solution reflects the misuse of a salutogenic approach, as opposed to the pathogenic approach. A salutogenic approach could maximise the potential financial benefits as it is accepting of a variety of medical approaches, such as healing gardens, rather than only relying on medication.

The counter argument to Forman's view, that money is better spent on medical advancements such as technology, is that humans undervalue that fact that humankind was born in nature [41]. Presently, our daily environment is taken over by concrete jungles and an urban complex, but it is important to remember that "Nature is not just something around us; we are part of nature and it is part of us" [6] (p. 9). Technology should not hold a higher value when humans are designed to live and engage with nature, which evolution is proof of. The focus on technology can lead to impoverishing humankind's innate tendency engage in the natural world [50], which may lead to our demise. Instead, nature should be seen as crucial to the existence of humankind and a focus on biophilic immersion alongside medical advancements should be of current importance.

Healing gardens are significantly underestimated and are only seen as visually pleasing elements of a building. Some of the contributors to this are politics and economics, which have a predominant role in the planning and design of green spaces. The current political stance for children's outdoor play areas takes on a "catalogue shopping approach" [61] by which financial targets and unworkable time frames are implemented, argued by Brown. The result is a process of "box ticking" [61] which aims to achieve regulatory biodiversity net gain, but fails to respond to the environment and needs of children and limits the benefits of green spaces. The cause of this is stakeholders' urgency to begin collecting a return on their money as politics and economics lead them to attempt to monetise green spaces, agreed by Unmüßig (2014) [109]. However, they fail to recognise the purpose of healing gardens, which is to better wellbeing. A suggested solution is to conduct more research into healing gardens to prompt medical recognition. This will

discontinue the undermining and scepticism of healing gardens and, instead, prioritise them in healthcare facility designs.

Medical recognition would support a policy to require all healthcare facilities to have a healing garden. From the research conducted, there has been a noticeable lack of policies and guidelines for green space in healthcare facilities in contrast to schools. In the 1990s, the UK Government noticed there was limited access to green spaces due to urban planning priorities and urban lifestyles [110]. Subsequently, Accessible Natural Green Space in Towns and Cities (ANGSt) standards were created. "There should be provision of the widest range of access opportunities for people of all abilities, ages, ethnic groups and social circumstances to actively engage in" [111] (p. 14). While the policy recognises the need for inclusive diversity, it is argued that this is currently not met but planning regulation for children's healthcare facilities to require healing gardens would fulfil this.

To counteract arguments that healing gardens are expensive, a hospital in Singapore has floor to ceiling windows with a view of a sky garden that has limited patient accessibility. This is practical and low budget as it reduces maintenance costs with less people using the garden, areas can be overgrown, and physical access is not required, only visual access through windows. A similar initiative has been carried out at the Jacobs Medical Centre, University of California. Here, they have positioned hospital beds in an angular position, offering a better view into the garden and to make it easier for nurses to check in on patients simultaneously.

Vapaa (2002) argues a healing garden cannot be wholly successful in a healthcare facility as healing gardens should be designed to "reflect their owner" [24] which cannot be applied to public healthcare environments. However, researchers such as Vapaa fail to outline the difference between therapeutic and healing gardens in their definitions, where therapeutic gardens are designed for a target audience and healing gardens appeal to a wider audience. Vapaa's argument also fails to consider humankind's shared innate biophilic sense as quantified through saliva cortisol levels [54] and blood pressure studies [45]. From this, singular design features can elicit restorative responses from a mass of individuals. Subsequently, Vapaa is correct; healing gardens will not be designed for a specific audience, such as children with specific abilities, but that does not deter their success as they will still benefit a variety of users, which makes them successful.

The continued and future importance of children accessing healing gardens is evident in the new Cambridge Children's Hospital design, and the facility is set to begin construction in 2024 (Figure 3). Within the design and access statement (PART 5A, 2021), the "four core values for the landscape proposal are green, playful, legible and integrated" [112]. It notes "the positive effects of access to nature on patients, visitors, and staff" [112], justified through Ulrich's research and Kaplan's restorative environment theory. A strength is the integration of green space inside the building as well as outside, creating a fully immersive biophilic experience for children. Therefore, the need for children to access healing gardens is still of current and future relevance and, with biophilic designs such as this, the industry is heading in the right direction, but they need to be on a larger scale.

Figure 3. Visualisation of the interior and exterior of Cambridge Children's Hospital design. (Image courtesy of Hawkins\Brown and White Arkitekter).

This review has identified several case studies that demonstrate the potential benefits of healing gardens for various individuals in healthcare settings. The benefits extend beyond just children, and include patients, staff, and visitors. Healing gardens can lead to improved health and wellbeing, as well as cost savings for hospitals and health systems, as shown in studies conducted by Cordoza et al. (2018) [113], Grahn et al. (2017) [114], and Stigsdotter and Grahn (2003) [115].

For example, Legacy Emanuel Health in Portland, Oregon has a healing garden that is accessible to staff, patients, and families. The garden was designed with natural features, which are more effective in reducing stress than hardscapes [113]. The garden's proximity to hospital units is crucial for usability, as it takes just a few seconds to a couple of minutes to reach [113]. Cordoza et al. (2018) found that nurses who had access to this garden reported lower levels of burnout and job-related stress [113].

The Alnarp Rehabilitation Garden at the Swedish University of Agricultural Sciences (SLU) campus offers rehabilitation programs for individuals with stress-related psychiatric disorders and/or depression [114,115]. The garden is divided into two parts, one more demanding and focused on cultivation and horticultural therapy, and the other less demanding and focused on a more nature-oriented and restorative function [114,115]. The Glass Garden at the Rusk Institute was a children's garden that unfortunately suffered damage from a hurricane in 2012 [116]. However, it was used by patients of all ages for horticultural therapy activities, which helped them to rehabilitate physical and cognitive functioning as part of their occupational therapy programme [116]. The Children's Play Garden at the Rusk Institute of Rehabilitation Medicine was designed to promote physical, psychological, and social development of children under twelve [116]. The landscape architect achieved the design goals with unique strategies, such as manipulating topography, incorporating natural materials and features, and designing custom play equipment [117].

Lastly, the Olson Family Garden at St. Louis Children's Hospital is located on the rooftop and is specifically designed for children and families who want a place for privacy, solace, and healing [118]. The garden features a variety of plants and flowers, as well as places to sit and rest, including a swing, benches, and small coves [118]. Additionally, crafts, puppet shows, and other activities are available for children [118].

3.6. Research Gaps

Through the theories of biophilia [26,41], detected stress levels from saliva [54], and others, there is some quantitative evidence to support the medical effects of healing gardens but not enough to uphold them. Thus, a major research gap is contemporary quantifiable studies to prove the underlying theories of healing gardens rather than accepting them universally. This research will act as a catalyst for an increase in recognised medical research into the psychological and physical benefits of healing gardens to be produced, including randomised measures of benefits from healing gardens, measurable consistency of heart rate, and external variables. Healing gardens may then hold higher medical value and become a plausible option to work alongside treatments and offer a sense of restoration. Eventually, a policy may be implemented to require healthcare facilities to include healing gardens.

An empirical study into current outdoor play provisions within healthcare facilities for children and the quality of this play should be conducted. They should be compared with the outdoor play provisions and quality of play for children who are not in hospital. This would offer better insight into the current available provisions for children in healing gardens and where improvements are needed.

Fortunately, this gap is beginning to be filled with forest bathing. The observation that nature induces relaxation [119] is beginning to be medically accepted in the NHS and is a good starting point for healing gardens.

As a further step, there needs to be a cost–benefit analysis report of healing gardens to develop a greater investment appeal for stakeholders. As support, research into specific design features and their direct clinical effects on users will aid this report and landscape architects in designing features to make healing gardens even more cost-effective. Therefore, another gap is a summary of design elements to compose a healing garden.

3.7. Design Recommendations

Design elements such as adequate shading and comfortable seating have been proposed in the past to increase garden visits in healthcare settings [120]. However, previous research did not find a significant relationship between the presence of such design elements and garden use [120]. A study conducted in three paediatric hospitals in east Texas with five outdoor green spaces found that negative feedback about poor shade and seating quality was negatively correlated with staff garden use [120]. The study proposed new design standards and statistically supported earlier hospital garden design recommendations, which included functionality, visibility, accessibility, exclusivity, and the provision of shade and seats [120].

Based on the secondary research and the case studies of Legacy Emanuel Health, Alnarp Therapy Garden, Glass Garden at the Rusk Institute, and St. Louis Children's Hospital, the following elements should be seen as a starting point for the design of healing gardens in healthcare facilities. The literature review suggests a specific design guide for healing gardens in healthcare facilities be researched and put together using a holistic approach and primary research. Specifically, healing gardens should be designed using evidence-based design (EBD) [16,121].

Successful design elements include (Figure 4):

- Open space allowing for flexibility of play [91].
- Signage to location of garden (way finding) with accessible wheelchair-friendly paths [27].
- Sensory planting.
- Natural forms such as biomorphism and biomimicry.
- Natural/warm-toned colours imitating a savannah landscape [39] or blues and greens [32].
- Elements that correspond to art and music (sculptures).
- Educational boards to explain what a healing garden is.
- Moveable seating.
- Private courtyard derived from the prospect–refuge theory [2].

Unsuccessful design elements:

- Inadequate shade [27].
- Uncomfortable seating options [27].
- Limited seating options [27].
- Open seating areas as they reduce a sense of prospect–refuge [122,123].
- Isolated location from pedestrian routes [27].

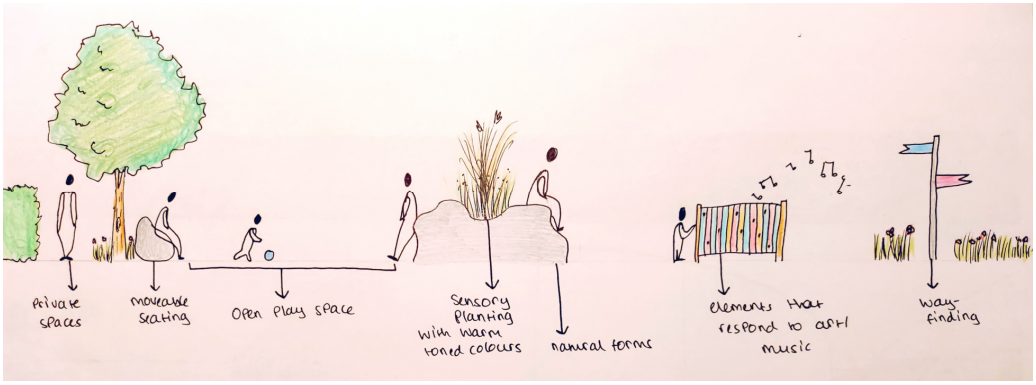

Figure 4. Successful healing garden design elements.

The function of the composition of healing gardens should not be valued over restorative elements. Accessibility and flexibility for children to claim the garden as their own play space are critical. This design summary should be considered as a way forward for healthcare facilities to re-evaluate the success of their healing gardens and consider reconstruction. Furthermore, to improve the design of healing gardens for children in hospital settings, a collaborative and interdisciplinary approach involving various disciplines and educational backgrounds is necessary. This includes landscape architecture, horticulture, psychology, paediatrics, and other relevant scientific and professional disciplines [124].

3.8. Study Limitations

During our review of the literature, we found only a few recent studies. This limited amount of current research is a potential limitation of our review, but previous studies have produced consistent results despite gaps of up to 20 years. Furthermore, most available data on healing gardens for children are based on qualitative data obtained from patients' personal experiences. This leads to assumptions about biophilia's impact based on data correlations rather than adequate quantified research. We used several databases for our literature review, but we did not use the Web of Science database, which may have provided additional relevant studies.

Another limitation of our literature review is that we found only publications in English, and we might have excluded relevant literature from other countries, especially for the policy aspects. Other countries may have policies in place for healing gardens for children in healthcare settings, which we were unable to examine due to the language barrier. Further research that includes literature from various languages and sources may provide a more comprehensive understanding of healing gardens for children in healthcare settings.

Finally, in this study, we found that most studies were undertaken in Western countries, which may limit the findings' generalisation to other contexts.

4. Conclusions

In this paper, the history and origins of healing gardens have been explored with their evolution over time, the underlying theories of healing gardens such as biophilia [42], the savannah theory [39], colour [45], shape [50], attention restoration theory [8,58], positive distractions [45], and prospect–refuge theory [2], and the impact they have on humankind's relationship to nature. Adjacently, the importance of play in correlation to children's development socially [76], cognitively [71,73], and emotionally [30,78] and the impact

of play deprivation [71] in a frightening place such as a healthcare facility have been investigated. Following this, the environmental [94] and economic benefits [108] healing gardens can bring to healthcare facilities and their practical applications in industry [39] have been suggested and researched. Overall, this has been conducted through previous examples and secondary research through a comprehensive literature review.

Our research question was "Why should it be a policy for all healthcare facilities to have healing gardens for children?" At present, landscape architecture and the health industry undervalue healing gardens and, subsequently, they are overlooked in the medical field and commercially. The result is no policy requiring healing gardens to be present in healthcare facilities and therefore they are not used enough. Consequently, the opportunity for children to immerse themselves in play, specifically outdoor play as it carries more benefit [77], and express their subconscious fears [30] is not given. Moreover, their intellectual and physical development [8] is stunted. Healing gardens are a financial investment in children's wellbeing which is what healthcare facilities are built to improve and, without healing gardens, the improvement of children's wellbeing is significantly limited.

In current practice, the psychological benefits children receive from healing gardens are poorly appreciated but with policies for healthcare facilities to construct healing gardens the benefits can be recognised. As a next step, it is suggested that there be assessments of current healing gardens in healthcare facilities and the results to be used as fortification for the expansion of research on healing gardens. Eventually, this would lead to the implementation of a policy for healing gardens in healthcare facilities. The criticism of the current healing garden definition and terms should also be paid attention to, as it is the more appropriate to encapsulate the essence of a healing garden, which is not to heal children but to become a place of freedom of expression. In this sense, a freedom garden can offer restoration like other healing gardens but is tailored for children's use.

"The healing garden is both a process and a place. It is a concept at the meeting point of medicine and design" [5] (p. 22). Our very being relies on nature for survival. With growing pressures of an urban lifestyle, this is a critical relationship to maintain. It is therefore hoped that the enduring importance healing gardens have held should continue and that landscape architects will be advocates for this agenda, as stewardship is wholeheartedly implied within the role.

Author Contributions: Conceptualization, S.K.-J.D.; methodology, A.R.; writing—original draft preparation, A.R.; writing—review and editing, S.K.-J.D., A.R. and J.L. All authors have read and agreed to the published version of the manuscript.

Funding: This research received no external funding.

Institutional Review Board Statement: Not applicable.

Informed Consent Statement: Not applicable.

Data Availability Statement: All data pertaining to the research are contained within the article.

Acknowledgments: We would like to express our sincere gratitude to the three anonymous reviewers for their invaluable comments and suggestions that helped us to improve the quality of our paper. We would also like to extend our thanks to LDA Design, Hawkins\Brown, and White Arkitekter for providing us with the images of their projects, which we have included in this publication.

Conflicts of Interest: The authors declare no conflict of interest.

References

1. Said, I. Therapeutic Effects of Garden: Preference of Ill Children Towards Garden Over Ward in Malaysian Hospital Environment. *J. Teknol.* **2003**, *38*, 55–68. [CrossRef]
2. Marcus, C.C.; Sachs, N.A. *Therapeutic Landscapes: An Evidence-Based Approach to Designing Healing Gardens and Restorative Outdoor Spaces*; Wiley: Hoboken, NJ, USA, 2013; ISBN 9781118231913.
3. Cartwright, M. Medieval Monastery. Available online: https://www.worldhistory.org/Medieval_Monastery/ (accessed on 5 January 2023).

4. Whitehouse, S.; Varni, J.W.; Seid, M.; Cooper-Marcus, C.; Ensberg, M.J.; Jacobs, J.R.; Mehlenbeck, R.S. Evaluating a children's hospital garden environment: Utilization and consumer satisfaction. *J. Environ. Psychol.* **2001**, *21*, 301–314. [CrossRef]
5. Marcus, C.C. Healing Gardens in Hospitals. *Des. Heal.* **2007**, *1*, 1–27.
6. Marcus, C.C.; Barnes, M. *Healing Gardens: Therapeutic Benefits and Design Recommendations*; Wiley Series in Healthcare and Senior Living Design; Wiley: Hoboken, NJ, USA, 1999; ISBN 9780471192039.
7. Moorhouse, D. Disease in the Industrial Revolution. Available online: https://schoolshistory.org.uk/topics/british-history/industrial-revolution/disease-industrial-revolution/ (accessed on 5 January 2023).
8. Read, E. *Children's Hospice Gardens: Using Nature to Enhance Well-Being*; Elizabeth Read: Llangibby, UK, 2019.
9. Cook, G.C. Henry Currey FRIBA (1820–1900): Leading Victorian hospital architect, and early exponent of the "pavilion principle". *Postgrad. Med. J.* **2002**, *78*, 352–359. [CrossRef]
10. Florence, N. *Notes of Hospitals*, 3rd ed.; Longman, Roberts and Green: London, UK, 1863.
11. Morris, R.E. The Victorian 'Change of Air' as medical and social construction. *J. Tour. Hist.* **2018**, *10*, 49–65. [CrossRef]
12. Reeve, A.; Nieberler-Walker, K.; Desha, C. Healing gardens in children's hospitals: Reflections on benefits, preferences and design from visitors' books. *Urban For. Urban Green.* **2017**, *26*, 48–56. [CrossRef]
13. Ulrich, R. View through a window may influence recovery from surgery. *Science* **1984**, *224*, 420–421. [CrossRef]
14. Allahyar, M.; Kazemi, F. Effect of landscape design elements on promoting neuropsychological health of children. *Urban For. Urban Green.* **2021**, *65*, 127333. [CrossRef]
15. Abdelaal, M.S.; Soebarto, V. Biophilia and Salutogenesis as restorative design approaches in healthcare architecture. *Archit. Sci. Rev.* **2019**, *62*, 195–205. [CrossRef]
16. Paraskevopoulou, A.T.; Kamperi, E. Design of hospital healing gardens linked to pre- or post-occupancy research findings. *Front. Archit. Res.* **2018**, *7*, 395–414. [CrossRef]
17. Andreucci, M.B.; Russo, A.; Olszewska-Guizzo, A. Designing Urban Green Blue Infrastructure for Mental Health and Elderly Wellbeing. *Sustainability* **2019**, *11*, 6425. [CrossRef]
18. Jonveaux, T.R.; Batt, M.; Fescharek, R.; Benetos, A.; Trognon, A.; Bah Chuzeville, S.; Pop, A.; Jacob, C.; Yzoard, M.; Demarche, L.; et al. Healing Gardens and Cognitive Behavioral Units in the Management of Alzheimer's Disease Patients: The Nancy Experience. *J. Alzheimers Dis.* **2013**, *34*, 325–338. [CrossRef]
19. Uwajeh, P.C.; Iyendo, T.O.; Polay, M. Therapeutic gardens as a design approach for optimising the healing environment of patients with Alzheimer's disease and other dementias: A narrative review. *Explore* **2019**, *15*, 352–362. [CrossRef] [PubMed]
20. Jonveaux, T.R.; Fescharek, R. When Art Meets Gardens: Does It Enhance the Benefits? The Nancy Hypothesis of Care for Persons with Alzheimer's Disease. *J. Alzheimers Dis.* **2018**, *61*, 885–898. [CrossRef]
21. Jesson, J.; Matheson, L.; Lacey, F.M. *Doing Your Systematic Review—Taditional and Systematic Techniques*; SAGE Publications Ltd.: London, UK, 2011; Volume 3, ISBN 9781848601543.
22. Bandara, W.; Furtmueller, E.; Gorbacheva, E.; Miskon, S.; Beekhuyzen, J. Achieving Rigor in Literature Reviews: Insights from Qualitative Data Analysis and Tool-Support. *Commun. Assoc. Inf. Syst.* **2015**, *37*, 8. [CrossRef]
23. Atkinson, L.Z.; Cipriani, A. How to carry out a literature search for a systematic review: A practical guide. *BJPsych Adv.* **2018**, *24*, 74–82. [CrossRef]
24. Vapaa, A.G. Healing Gardens: Creating Places for Restoration, Meditation, and Sanctuary. Master's Thesis, Virginia Polytechnic Institute and State University, Blacksburg, VA, USA, 2002.
25. Tyson, M. *The Healing Landscape: Therapeutic Outdoor Environments*, 1st ed.; McGraw-Hill: London, UK, 1998; ISBN 0070657688 9780070657687.
26. Krčmářová, J. EO Wilson's concept of biophilia and the environmental movement in the USA. *Internet J. Hist. Geogr. Environ. Hist.* **2009**, *6*, 4–17.
27. Marcus, C.C.; Barnes, M. *Gardens in Healthcare Facilities: Uses, Therapeutic Benefits, and Design Recommendations*; The Center for Health Design, Inc.: Concord, CA, USA, 1995.
28. Hartig, T.; Marcus, C.C. Essay: Healing gardens-places for nature in health care. *Lancet* **2006**, *368*, 36–37. [CrossRef]
29. Louv, R. *Last Child in the Woods: Saving Our Children from Nature-Deficit Disorder*, 1st ed.; Algonquin Books: Chapell Hill, NC, USA, 2005.
30. Santer, J.; Griffiths, C.; Goodall, D.L. *Free Play in Early Childhood: A Literature Review*; National Children's Bureau: London, UK, 2007; ISBN 9781905818105.
31. Moore, R.C.; Goltsman, S.M.; Iacofano, D.S. *Play for All Guidelines: Planning, Design, and Management of Outdoor Play Settings for All Children*, 2nd ed.; MIG Communications: Berkeley, CA, USA, 1992.
32. Gaminiesfahani, H.; Lozanovska, M.; Tucker, R. A Scoping Review of the Impact on Children of the Built Environment Design Characteristics of Healing Spaces. *HERD Health Environ. Res. Des. J.* **2020**, *13*, 98–114. [CrossRef]
33. Pearson, M.; Gaines, K.; Pati, D.; Colwell, M.; Motheral, L.; Adams, N.G. The Physiological Impact of Window Murals on Pediatric Patients. *HERD Health Environ. Res. Des. J.* **2019**, *12*, 116–129. [CrossRef]
34. Jiang, S. Therapeutic landscapes and healing gardens: A review of Chinese literature in relation to the studies in western countries. *Front. Archit. Res.* **2014**, *3*, 141–153. [CrossRef]
35. Eckerling, M. Guidelines for designing healing gardens. *J. Ther. Hortic.* **1996**, *8*, 21–25.
36. Lei, Y.; Jin, H.; Wang, J. The current status and prospect of healing garden. *Chin. Landsc. Archit.* **2011**, *27*, 31–36.
37. Li, Q.; Tang, X. Quality evaluation index system of healing gardens. *J. Shanghai Jiaotong Univ. Agric. Sci.* **2012**, *30*, 58–64. [CrossRef]

38. Wang, X.; Li, J. Analysis of the healing landscape and its relevant conceptions. *J. Beijing Univ. Agric.* **2012**, *27*, 71–73.
39. Browning, W.D.; Ryan, C.O. *Nature Inside—A Biophilic Design Guide*; RIBA Publishing: London, UK, 2020; ISBN 9781003033011.
40. Rogers, K. Biophilia Hypothesis. Available online: https://www.britannica.com/science/biophilia-hypothesis (accessed on 10 March 2023).
41. Wilson, E.O. *Biophilia*; Harvard University Press: Cambridge, UK, 1986.
42. Montgomery, J. *Nature as Healer and Teacher—The Importance of Reconnecting Children to the Earth for Physical and Emotional Wellbeing*; City University of Seattle: Seattle, WA, USA, 2015.
43. Russo, A.; Andreucci, M.B. Raising Healthy Children: Promoting the Multiple Benefits of Green Open Spaces through Biophilic Design. *Sustainability* **2023**, *15*, 1982. [CrossRef]
44. Zhong, W.; Schröder, T.; Bekkering, J. Biophilic design in architecture and its contributions to health, well-being, and sustainability: A critical review. *Front. Archit. Res.* **2022**, *11*, 114–141. [CrossRef]
45. Kellert, S.R.; Heerwagen, J.; Mador, M. *Biophilic Design: The Theory, Science, and Practice of Bringing Buildings to Life*; Wiley: Hoboken, NJ, USA, 2008; ISBN 9780470163344 0470163348.
46. Sadick, A.-M.; Kamardeen, I. Enhancing employees' performance and well-being with nature exposure embedded office workplace design. *J. Build. Eng.* **2020**, *32*, 101789. [CrossRef]
47. Dankner, S. Using Positive Visual Distractions and Color in Healthcare Settings to Reduce Patient Stress & Increase Patient Satisfaction. Available online: https://www.c-sgroup.com/-/media/files/literature/awp/flyers/sally_dankner_white_paper.ashx (accessed on 14 March 2023).
48. Lacy, M.L. *The Power of Colour to Heal the Environment*; Rainbow Bridge: London, UK, 1996; ISBN 0952870002 9780952870005.
49. Park, J.G. Color Perception in Pediatric Patient Room Design: Healthy Children vs. Pediatric Patients. *HERD Health Environ. Res. Des. J.* **2009**, *2*, 6–28. [CrossRef] [PubMed]
50. Kellert, S.R.; Calabrese, E.F. The Practice of Biophilic Design; Biophilic Design: 2015. Available online: www.biophilic-design.com (accessed on 14 March 2023).
51. Biomimicry Institute. What Is Biomimicry? Available online: https://biomimicry.org/what-is-biomimicry/ (accessed on 14 March 2023).
52. Tate Biomorphic—Art Term. Available online: https://www.tate.org.uk/art/art-terms/b/biomorphic (accessed on 10 March 2023).
53. Soderlund, J.; Newman, P. Biophilic architecture: A review of the rationale and outcomes. *AIMS Environ. Sci.* **2015**, *2*, 950–969. [CrossRef]
54. Bloemsma, L.D.; Wijga, A.H.; Klompmaker, J.O.; Hoek, G.; Janssen, N.A.H.; Oldenwening, M.; Koppelman, G.H.; Lebret, E.; Brunekreef, B.; Gehring, U. Green space, air pollution, traffic noise and saliva cortisol in children. *Environ. Epidemiol.* **2021**, *5*, e141. [CrossRef]
55. Harari, Y.N. *Sapiens: A Brief History of Humankind*; Harvill Secker: London, UK, 2014; ISBN 1846558239.
56. Kellert, S.R.; Wilson, E.O. *The Biophilia Hypothesis*; Island Press: Washington DC, WA, USA, 1993; Volume 4.
57. Sternberg, E.M. *Healing Spaces: The Science of Place and Well-Being*, 1st ed.; Belknap Press of Harvard University Press: Cambridge, UK, 2010; ISBN 9780674057487.
58. Kaplan, R.; Kaplan, S. *The Experience of Nature: A Psychological Perspective*; Cambridge University Press: New York, NY, USA, 1989; ISBN 0-521-34139-6/0-521-34939-7.
59. Shackell, A.; Walter, R. *Greenspace Design for Health and Well-Being*; Forestry Commission: Edinburgh, Scotland, 2012; ISBN 9780855388539.
60. Holmes, D. The Landscape Spaces of Nelson Mandela Children's Hospital. Available online: https://worldlandscapearchitect.com/the-landscape-spaces-of-nelson-mandela-childrens-hospital/?v=79cba1185463#.YyR6uXbMJPY (accessed on 14 March 2023).
61. Souter-Brown, G. *Landscape and Urban Design for Health and Well-Being: Using Healing, Sensory and Therapeutic Gardens*; Routledge: Oxfordshire, UK, 2015; ISBN 0415843529.
62. Stigsdotter, U.; Grahn, P. What makes a garden a healing garden? *J. Ther. Hortic.* **2002**, *13*, 60–69.
63. Gesler, W.M. *Healing Places*; G—Reference, Information and Interdisciplinary Subjects Series; Rowman & Littlefield: Lanham, MD, USA, 2003; ISBN 9780742519565.
64. Han, K.-T.; Ruan, L.-W.; Liao, L.-S. Effects of Indoor Plants on Human Functions: A Systematic Review with Meta-Analyses. *Int. J. Environ. Res. Public Health* **2022**, *19*, 7454. [CrossRef]
65. Heft, H. Affordances and the perception of landscape: An inquiry into environmental perception and aesthetics. In *Innovative Approaches to Researching Landscape and Health: Open Space: People Space 2*; Ward-Thompson, C., Aspinall, P., Bell, S., Eds.; Routledge: Abingdon, UK, 2010.
66. Gibson, J.J. *The Ecological Approach to Visual Perception*; Psychology Press: New York, NY, USA, 2014; ISBN 9781315740218.
67. Gordon-Rawlings, T.; Russo, A. Exploring the effects of the COVID-19 pandemic on people's relationships with gardens. *Emot. Sp. Soc.* **2023**, *46*, 100936. [CrossRef]
68. Golembiewski, J.A. Salutogenic Architecture in Healthcare Settings. In *The Handbook of Salutogenesis*; Mittelmark, M.B., Sagy, S., Eriksson, M., Bauer, G.F., Pelikan, J.M., Lindström, B., Espnes, G.A., Eds.; Springer: Berlin/Heidelberg, Germany, 2016; pp. 267–276. ISBN 9783319046006.
69. Rynor, B. Beautifying hospitals: A tough sell. *Can. Med. Assoc. J.* **2010**, *182*, E633–E634. [CrossRef] [PubMed]

70. Bento, G.; Dias, G. The importance of outdoor play for young children's healthy development. *Porto Biomed. J.* **2017**, *2*, 157–160. [CrossRef]
71. Almon, J. *Improving Children's Health through Play: Exploring Issues and Recommendations*; Alliance for Childhood and US Play Coalition: College Park, MD, USA, 2018.
72. Panksepp, J. Can PLAY diminish ADHD and facilitate the construction of the social brain? *J. Can. Acad. Child Adolesc. Psychiatry* **2007**, *16*, 57–66. [PubMed]
73. Hillman, C.H.; Pontifex, M.B.; Raine, L.B.; Castelli, D.M.; Hall, E.E.; Kramer, A.F. The effect of acute treadmill walking on cognitive control and academic achievement in preadolescent children. *Neuroscience* **2009**, *159*, 1044–1054. [CrossRef]
74. Donnelly, J.E.; Hillman, C.H.; Castelli, D.; Etnier, J.L.; Lee, S.; Tomporowski, P.; Lambourne, K.; Szabo-Reed, A.N. Physical Activity, Fitness, Cognitive Function, and Academic Achievement in Children. *Med. Sci. Sport. Exerc.* **2016**, *48*, 1197–1222. [CrossRef] [PubMed]
75. Ulset, V.; Vitaro, F.; Brendgen, M.; Bekkhus, M.; Borge, A.I.H. Time spent outdoors during preschool: Links with children's cognitive and behavioral development. *J. Environ. Psychol.* **2017**, *52*, 69–80. [CrossRef]
76. Koukourikos, K.; Tzeha, L.; Pantelidou, P.; Tsaloglidou, A. The Importance of Play During Hospitalization of Children. *Mater. Socio Med.* **2015**, *27*, 438. [CrossRef]
77. Parizi, M.K. Children's Healing Garden V2.00. Available online: https://worldarchitecture.org/architecture-projects/hvghe/children-s-healing-garden-v2-00-project-pages.html (accessed on 5 January 2023).
78. Frost, J.L. Lessons from Disasters: Play, Work, and the Creative Arts. *Child. Educ.* **2005**, *82*, 2–8. [CrossRef]
79. Tremblay, M.; Gray, C.; Babcock, S.; Barnes, J.; Bradstreet, C.; Carr, D.; Chabot, G.; Choquette, L.; Chorney, D.; Collyer, C.; et al. Position Statement on Active Outdoor Play. *Int. J. Environ. Res. Public Health* **2015**, *12*, 6475–6505. [CrossRef] [PubMed]
80. Shim, S.-Y.; Herwig, J.E.; Shelley, M. Preschoolers' Play Behaviors with Peers in Classroom and Playground Settings. *J. Res. Child. Educ.* **2001**, *15*, 149–163. [CrossRef]
81. Hartle, L. Effects of Additional Materials on Preschool Children's Outdoor Play Behaviors. *J. Res. Child. Educ.* **1996**, *11*, 68–81. [CrossRef]
82. Cullen, J. Preschool children's use and perceptions of outdoor play areas. *Early Child Dev. Care* **1993**, *89*, 45–56. [CrossRef]
83. Schofield, E. How the Van Campenvaart Playground Is Breaking Boundries. Available online: https://land8.com/how-the-van-campenvaart-playground-is-breaking-boundries/ (accessed on 5 January 2023).
84. Woolley, H.; Lowe, A. Exploring the Relationship between Design Approach and Play Value of Outdoor Play Spaces. *Landsc. Res.* **2013**, *38*, 53–74. [CrossRef]
85. Jiang, S. Positive Distractions and Play in the Public Spaces of Pediatric Healthcare Environments: A Literature Review. *HERD Health Environ. Res. Des. J.* **2020**, *13*, 171–197. [CrossRef]
86. Corsano, P.; Majorano, M.; Vignola, V.; Guidotti, L.; Izzi, G. The waiting room as a relational space: Young patients and their families' experience in a day hospital. *Child. Care. Health Dev.* **2015**, *41*, 1066–1073. [CrossRef]
87. Little Journey Limited. The Power of Play in Healthcare. Available online: https://www.littlejourney.health/news/power-of-play-in-healthcare (accessed on 13 April 2023).
88. Starlight Children's Foundation. *The Importance of Play in Hospital 2021*; Starlight Children's Foundation: London, UK, 2021.
89. Halim Babbu, A.; Haque, M. A framework for the design of pediatric healthcare environment using the Delphi technique. *Ain Shams Eng. J.* **2023**, *14*, 101975. [CrossRef]
90. Plan Inclusive Play Area. *PiPA (Plan Inclusive Play Area): The Complete Checklist*; Inclusive Play: Loanhead, UK, 2015.
91. Scottish Government. Out to Play—Creating Outdoor Play Experiences for Children: Practical Guidance. Available online: https://www.gov.scot/publications/out-play-practical-guidance-creating-outdoor-play-experiences-children/pages/9/ (accessed on 5 January 2023).
92. British Lung Foundation. Toxic Air at the Door of the NHS—British Lung Foundation. Available online: https://www.blf.org.uk/take-action/campaign/nhs-toxic-air-report (accessed on 5 January 2023).
93. Diener, A.; Mudu, P. How can vegetation protect us from air pollution? A critical review on green spaces' mitigation abilities for air-borne particles from a public health perspective—With implications for urban planning. *Sci. Total Environ.* **2021**, *796*, 148605. [CrossRef] [PubMed]
94. Global Action Plan. Great Ormond Street Hospital's Clean Air Journey. Available online: https://www.actionforcleanair.org.uk/health/clean-air-hospital-framework/gosh-clean-air-hospital (accessed on 5 January 2023).
95. Mace, B.L.; Bell, P.A.; Loomis, R.J. Aesthetic, affective, and cognitive effects of noise on natural landscape assessment. *Soc. Nat. Resour.* **1999**, *12*, 225–242. [CrossRef]
96. Ow, L.F.; Ghosh, S. Urban cities and road traffic noise: Reduction through vegetation. *Appl. Acoust.* **2017**, *120*, 15–20. [CrossRef]
97. United Nations. *General Assembly Transforming Our World: The 2030 Agenda for Sustainable Development*; United Nations: New York, NY, USA, 2015.
98. Russo, A.; Cirella, G.T. Urban Sustainability: Integrating Ecology in City Design and Planning. In *Sustainable Human—Nature Relations: Environmental Scholarship, Economic Evaluation, Urban Strategies*; Cirella, G.T., Ed.; Springer: Singapore, 2020; pp. 187–204. ISBN 978-981-15-3049-4.
99. Russo, A.; Escobedo, F.J.; Cirella, G.T.; Zerbe, S. Edible green infrastructure: An approach and review of provisioning ecosystem services and disservices in urban environments. *Agric. Ecosyst. Environ.* **2017**, *242*, 53–66. [CrossRef]

100. O'Neill, C. The Healing Gardens of Makahikilua: The Landscape as a Healer. *J. Ther. Hortic.* **1996**, *8*, 92–96.
101. The Edible Healing Garden Edible Healing Garden. Available online: https://www.ediblehealinggarden.org/about (accessed on 13 April 2023).
102. Packard, E. It's Fun, but Does It Make You Smarter? Available online: https://www.apa.org/monitor/nov07/itsfun (accessed on 5 January 2023).
103. Play Gloucestershire. *Play Nurture Plus Handbook*; Play Gloucestershire: Gloucester, UK, 2022.
104. Zosh, J.M.; Hirsh-Pasek, K.; Hopkins, E.J.; Jensen, H.; Liu, C.; Neale, D.; Solis, S.L.; Whitebread, D. Accessing the Inaccessible: Redefining Play as a Spectrum. *Front. Psychol.* **2018**, *9*, 1124. [CrossRef]
105. ASLA HONOR AWARD—The Crown Sky Garden: Ann & Robert H. Lurie Children's Hospital of Chicago. Available online: https://www.asla.org/2013awards/374.html (accessed on 10 January 2023).
106. Forman, A.D. Healing by Design. *N. Engl. J. Med.* **1996**, *334*, 334–336. [CrossRef]
107. Laursen, J.; Danielsen, A.; Rosenberg, J. Effects of environmental design on patient outcome: A systematic review. *Health Environ. Res. Des. J.* **2014**, *7*, 108–119. [CrossRef]
108. Public Health England. *Improving Access to Greenspace. A New Review for 2020*; Public Health England: London, UK, 2020.
109. Unmüßig, B. Monetizing Nature: Taking Precaution on a Slippery Slope. Available online: https://greattransition.org/publication/monetizing-nature-taking-precaution-on-a-slippery-slope (accessed on 14 March 2023).
110. Olds, A.R. Nature as healer. *Child. Environ. Q.* **1989**, *6*, 27–32.
111. Natural England. *'Nature Nearby' Accessible Natural Greenspace Guidance*; Natural England: Peterborough, UK, 2010.
112. Greater Cambridge Shared. Planning Planning Application Documents. Available online: https://applications.greatercambridgeplanning.org/online-applications/applicationDetails.do?activeTab=documents&keyVal=R08MBZDXKLB00 (accessed on 14 March 2023).
113. Cordoza, M.; Ulrich, R.S.; Manulik, B.J.; Gardiner, S.K.; Fitzpatrick, P.S.; Hazen, T.M.; Mirka, A.; Perkins, R.S. Impact of Nurses Taking Daily Work Breaks in a Hospital Garden on Burnout. *Am. J. Crit. Care* **2018**, *27*, 508–512. [CrossRef]
114. Grahn, P.; Pálsdóttir, A.M.; Ottosson, J.; Jonsdottir, I.H. Longer Nature-Based Rehabilitation May Contribute to a Faster Return to Work in Patients with Reactions to Severe Stress and/or Depression. *Int. J. Environ. Res. Public Health* **2017**, *14*, 1310. [CrossRef]
115. Stigsdotter, U.A.; Grahn, P. Experiencing a Garden: A Healing Garden for People Suffering from Burnout Diseases. *J. Ther. Hortic.* **2003**, *14*, 38–48.
116. Gerlach-Spriggs, N.; Healy, V.J. Rehabilitation and Gardens: The Legacy of Dr. Howard A. Rusk. *SiteLINES J. Place* **2019**, *15*, 15–19.
117. Healthcare Design. Rusk Children's PlayGarden for Interactive Therapeutic Play at the Rusk Institute of Rehabilitation Medicine, NYU Medical Center—New York, NY. Available online: https://healthcaredesignmagazine.com/trends/architecture/rusk-childrens-playgarden-interactive-therapeutic-play-rusk-institute-rehabilitation-medicin/ (accessed on 6 April 2023).
118. St. Louis Children's Hospital. Outdoor Gardens. Available online: https://www.stlouischildrens.org/visit-us/hospital-amenities/play-and-activities/outdoor-gardens (accessed on 6 April 2023).
119. The Forest Bathing Institute Science and Research. Available online: https://tfb.institute/scientific-research/ (accessed on 5 January 2023).
120. Pasha, S. Barriers to Garden Visitation in Children's Hospitals. *HERD Health Environ. Res. Des. J.* **2013**, *6*, 76–96. [CrossRef] [PubMed]
121. Marcus, C.C. The Future of Healing Gardens. *HERD Health Environ. Res. Des. J.* **2016**, *9*, 172–174. [CrossRef] [PubMed]
122. Dosen, A.S.; Ostwald, M.J. Prospect and Refuge Theory: Constructing a Critical Definition for Architecture and Design. *Int. J. Des. Soc.* **2013**, *6*, 9–24. [CrossRef]
123. Appleton, J. *The Experience of Landscape*, 1st ed.; John Wiley and Sons: London, UK; New York, NY, USA, 1975.
124. Stigsdotter, U. Landscape Architecture and Health: Evidence-Based Health-Promoting Design and Planning. Ph.D. Thesis, Swedish University of Agricultural Sciences, Uppsala, Sweden, 2005.