What Can "Garden" Do for Children: A Systematic Review of the Literature

Li Jiahong, Li Xuelian, and Du Fangjuan*

School of Karst Science, Guizhou Normal University, Guiyang 550001, China
Email: hitomitongpo@163.com (L.J.H.); lixuelian789@163.com (L.X.L.); dfj521@gznu.edu.cn (D.F.J.)
*Corresponding author
Manuscript received December 12, 2024; accepted June 7, 2025; published July 25, 2025.

***Abstract*—Evidences have shown that healing gardens and gardening are playing an important role in increasing communication between sick children and nature, improving cognitive abilities and promoting psychological recovery. Total 35 records were identified in this paper and we discussed the children, gardens and activities, it should be help us better understand what garden and gardening can do for children. This paper aims at giving an overview of research covering two aspects of gardens and children namely garden usage and gardening activities experiments. We explored the areas of research by 1) integrating the studies of related children' needs; 2) synthesizing the role of gardens settings (garden usage); and 3) assessing the specific impact of gardening experiment. We suggest that future research could focus on the issue of garden design and corresponding activities to promote social support and care for children with special needs.**

***Keywords*—healing garden, activities, gardening, children with special needs**

I. Introduction

Nature makes a positive contribution to human health [1–4]. "Healing landscape" concept has broader idea of environments health promoting, which integrates various elements of landscape design to create landscape environments with positive emotional guidance and is an integrated space of natural elements and activities [4, 5]. Healing garden as a form of healing landscape that can provide a spatial design with the intention of specific therapeutic effects and promote and improving the health and well-being of people with diseases [6–8]. Moreover, regularly exposure to nature has positive cognitive, social, physical and emotional effects on children [9–11], and help them promote psychological qualities, cognitive abilities and imagination and creativity therefore enhance childhood development [12, 13]. While healing garden playing an important role in increasing communication between sick children and nature, improving cognitive abilities and promoting psychological recovery [14].

Contact with nature can be achieved in a variety of ways such as viewing outdoor natural environments [15], spending recreational time in nature [16], and playing with animals in meadows [10], etc. Gardens are a kind of near-nature space in cities [17]. Visiting gardens also has the same positive benefits as contacting nature [18]. Therefore, nature contact can also be extended to the interaction between people and healing gardens: the active participation of people in the experience and the passive reception of messages coming from the environment with the five senses [17].

This paper provides a comprehensive overview between children and gardens. A rigorous and holistic search and literature assessment procedure was employed to sort out and extract evidence from the existing literature and publications. The aim of the study was to explore how gardens can be employed to enable the benefits of nature to support the development and wellbeing of children in various settings. Various settings providing access to "near natural spaces" including gardens in hospitals and schools, parks and forest like settings were explored. Moreover, the research and application of healing gardens and activity experiences for children with cancer in the landscape design process can be further explored.

II. Materials and Methods

A. Overall Search Strategy: Literature Search and Study Selection

This review search was conducted in ScienceDirect, PubMed, Web of Science, Google Scholar, EBSCO and CNKI databases. This paper followed the Preferred Reporting Items for Systematic Reviews (PRISMA) procedure to screen our records (Fig. 1). We included any studies that satisfied the following criteria: (1) relevant studies of garden. (2) the report details are accessible in the text, figures, forms or supplementary materials. (3) A multitude of studies have exhaustively investigated the effects of gardening on the dietary habits of children [19]. Thus, those studies are not considered for inclusion.

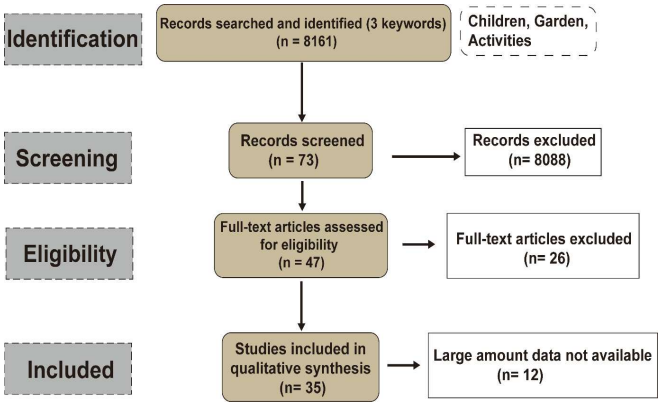

Fig. 1. PRISMA flow diagram of the steps involved in literatures collection and selection.

B. Literature Collection and Quality Assessment

This paper was conducted by the topic search from titles, abstracts, and keywords. The relevant literatures about "gardens" and "children" were searched through the following main themes: (Children OR young people OR kid OR adolescent OR child OR teenagers OR young*) AND (garden OR garden* OR healing garden OR therapeutic garden OR sensory garden OR garden environment OR

hospital garden) AND (Gardening OR garden* OR horticultural activities OR horticultural therapy OR garden activities OR garden-related OR garden-based OR garden therapy). Assessing quality involves evaluating the degree to which potential sources of bias were introduced into individual studies during the design, implementation, and analysis phases. To ensure high-quality content, the Joanna Briggs Institute (JBI) Critical Appraisal Inventory was used to evaluate the methodological quality of the gardening experiment [20], which included randomized controlled trials and non-randomized experimental studies.

III. Result and Discussion

The information extracted from the literature searched including: (1) title, authors, and year of publication; (2) research questions, design, data, study population, and sample size; and (3) the main benefits/results/effects/changes/findings of the study. The research was categorized according to the theme "Garden usage" and "Gardening experiment". "Garden usage" included studies of user experience, satisfaction, barriers and improvements to visiting gardens and others. "Gardening experiment" included garden as an intervention, approach, tool and form of learning for education or healthy lifestyle development [21, 22].

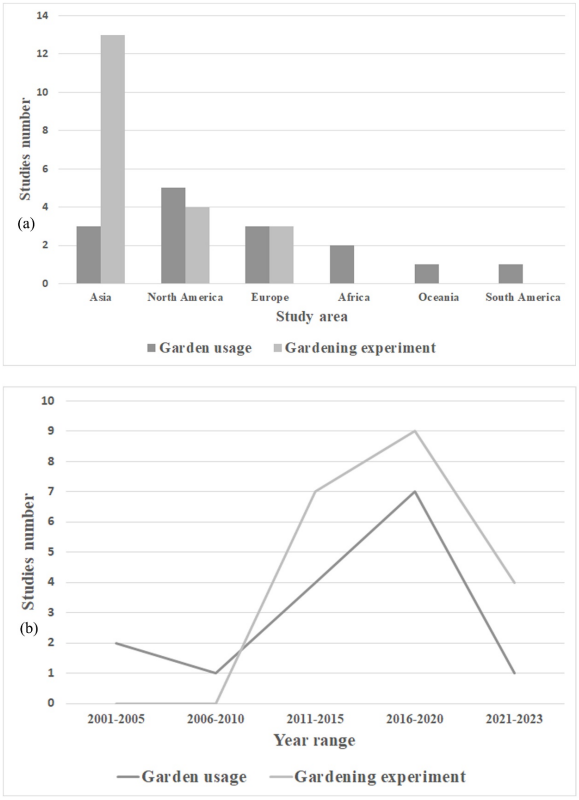

Fig. 2. (a) The studies of garden usage and gardening experiment by continent; (b) The garden usage and gardening experiment studies number of published by year (to October 2023).

A total of 35 studies were included in the analysis, of which 15 were garden usage studies (Fig. 3(1)) and 20 were gardening experiment studies (Fig. 3(2)). Fig. 2(a) shown the studies of garden usage and intervention by continent. The studies included in the analysis majority conducted in Asia (total 16 studies with 3 usage studies and 13 intervention studies) and North America (total 9 studies with 5 usage studies and 4 intervention studies), followed by Europe (total 6 studies with 3 usage studies and 3 intervention studies). As shown in Fig. 2(b), there was an incremental trend in both types of studies between 2010 and 2020, with more studies of garden interventions than usage from 2010 onwards. This signaled a growing emphasis on gardening activities to enhance children's interactions with nature and gain the benefits.

A. "Garden Usage" Studies and Different Settings

As can be seen from the use of healing gardens in children's hospitals, medical institutions and rehabilitation centers, the majority activities in garden involve sitting, relaxing, enjoying and engaging with natural elements. The purpose and function of these gardens is to provide healing and relaxation for pediatric patients. Garden features are designed to encourage interaction with the environment by providing interesting and distracting designs, such as whimsical or surprising designs [23, 24].

Most studies of school gardens have reported on their use as outdoor teaching sites, places for physical activity and spatial vehicles for contact with nature, with activities focused mainly on gardening. Controlled trials have been conducted to explore the impact of school garden environments versus classrooms on students' cognitive performance and attention processes [25, 26]. In addition, one study explored 20 factors related to the benefits of school gardens, including the effects of the plant factor, the activity factor and other factors, showing the specific factors that influence the benefits of activities in school gardens [27].

Gardens for children in forests, public spaces and parks, serving school-age children or urban children, and corresponding organizational activities are mostly aimed at education and the cultivation of values. They allow children to integrate with nature - nature education, outdoor education, environmental education - including values such as the concept of life, aesthetic values and humanistic values [28].

B. "Gardening Experiment" Studies' Aims and Outcomes

1) Physical and mental rehabilitation

Rehabilitation-oriented activities are commonly gardening activities, which typically involve the maintenance and management of gardens, with programs including but not limited to digging, planting, watering, weeding, and harvesting [29]. (1) project diversification. Different gardening projects may influence the magnitude of associated health benefits. Three projects, flower arranging, planting and flower pressing, reduced salivary cortisol levels in primary school children to varying degrees and reduced stress levels in relationships, school life, personal problems and family life [30] (Fig. 3(3)). Another study found that harvesting activities were more effective in improving children's brain activity and attention than other activities such as planting, sowing and mixing soil [31] (Fig. 3(4)); and (2) therapeutic functions from garden maintenance [32]. Gardening has important rehabilitative benefits for children with cancer in terms of improving physical function and mental health (Fig. 3(5)). Children with cancer who are potentially at risk of metabolic syndrome do not carry out high-intensity exercise to receive the beneficial effects due to

weak gross motor skills and an inability to perform strenuous exercise [33] (Fig. 3(6)). One way to avoid this risk is to engage in gardening tasks [34, 35]. Studies have shown that they can achieve comparable levels of metabolic expenditure to moderate to vigorous physical activity. What's more, gardening is one of the most common forms of contact with nature [36], positive outcomes have been achieved in addressing many issues such as depression, anxiety and behavioral disorders through contact with nature [37, 38] (Fig. 3(7)(8)). For instance, a sense of stability when observing green plants has a positive effect on blood pressure and pulse rate and can activate the immune system during gardening [39] (Fig. 3(9)). Contact with plants during activities leads to positive emotional states (Fig. 3(10)), increased emotional intelligence and social skills (Fig. 3(11)), reduced stress and can benefit the healing process of patients due to the improved immune function [40, 41].

2) Physical and mental health promotion

Several studies have examined the relationship between gardening and health promotion in terms of disease prevention, the establishment of good lifestyle habits, and the promotion of healthy development, including but not limited to functional and mental health. Many studies and reviews of school gardening programs found that the majority of health outcomes related to children included two aspects: (1) the development of nutritional concepts, behaviors and habits (nutrition education) (Fig. 3(12)); and (2) the promotion of physical activity levels. The activities lead to the establishment of healthy eating concepts in the form of a curriculum, and a series of gardening activities using school gardens as a teaching tool or educational site, which can improve children's perceptions of fruit and vegetable consumption and change their physical behavior or improve physical activity by the process of horticultural activities [42–44].

In addition, lack of exposure or reduced frequency of exposure to nature might increase the mental health problems such as stress, depression, loneliness and attention disorders [37, 38, 45]. Some gardening programs in school gardens are primarily to increase the opportunities for children to be exposed to nature [46]. It can contribute to reconnecting children with nature in rehabilitation gardens whit activities such as field work, sandbox play and animal [17, 47].

3) Physical and mental growth and development

Growth and development-oriented gardening activities focus on the development of children's skills and personal abilities.

Gardens as experiential learning environments can provide children with direct hands-on experience to build new knowledge, develop skills and values (Fig. 3(13)), strengthen moral education, increase responsibility and appreciate nature [48, 49].

School gardens can be used as teaching tools or environments where gardening are presented in the form of lessons [50, 51]. They provide children with a curriculum experience of the process of planting, caring and managing plants through to harvesting, allowing them to understand the journey and meaning of life [52]. Biology courses activities in forest gardens satisfy children's personal development by providing a learning environment and opportunity for them to understand and develop the relationships between organisms and develop many values [28, 53]. To achieve growth and development purposes, public children gardens in the United States offered as many as 11 types of activities and could be categorized into 10 themes, with observation and visual arts being the activities with a high number of participants, and the rest of the activities are storytelling, gardening and others [54, 55].

C. Construction of Specialized Children's Healing Gardens

1) Children's healing garden

Cooper Marcus believes that healing gardens should have the design essentials of intelligibility, accessibility, intimacy, comfort, exploration, purpose, privacy, positive artistry and ease of maintenance. It is further suggested that "patient-specific healing gardens" should be constructed for vulnerable patients, which means an increasing refinement of the consideration of patients' needs and a clearer requirement for rehabilitation landscape design [56].

Gardens designed for children with special needs are an effective intervention and supportive approach. a sensory garden for children with ASD [57], which design is based on the premise of exposure to nature, with appropriate mitigating approaches based on the sensory issues of ASD children. It provides a calming effect for highly children while a stimulating effect for less reactive children. The use of healing gardens for positive therapeutic interventions with sick children is an effective way to improve the well-being of hospitalized children [58, 59]. For example, a program of organized rehabilitative care activities for children with disabilities was implemented in the spiral garden by professional artists, rehabilitation staff, facilitators and volunteers, site coordinators and nurses, which engages children in collective experiences and promotes peer interaction and friendship [60].

2) Activities in healing garden

Activities that can encourage children to reap the benefits of being close to nature should be more further explored and studied.

Changing the format and modifying activities may suit the needs. For example, childhood patients who are unable to get out of bed or walk around, have little access to the hospital green space or to the healing garden. Creating micro-landscape-dish garden (a plant-related handicraft activity)-is one of the rehabilitative intervention that can offer hospitalized children an opportunity to connect with plants, which consists of small vegetable garden craft was created by volunteers and children using non-hazardous, sterilized materials. The results showed that the dish garden enhanced children's physical and neuropsychological health through visual distraction [61]. It is possible to use plant-related or nature-related elements to promote participation through active and passive activities.

Organizing more activities in the healing garden to get the body moving, such as regular gardening programs that allow children to get close to nature and arrange light work to grow their own plants or vegetables, during which they can weed pulling, soil turning, loosening and other maintenance activities, and experiencing the joy of harvesting when the

plants mature. This long-term continuum of activities promotes physical and psychological healing and enhances the effectiveness of treatment, healing and health care [62].

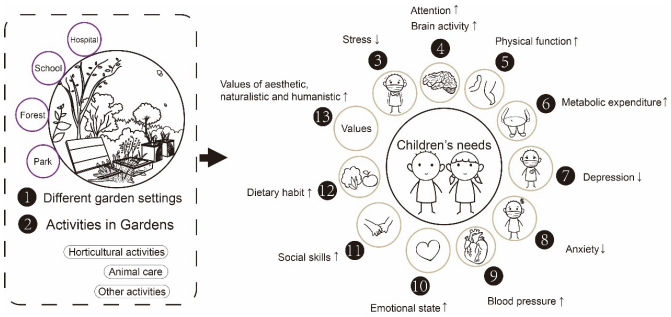

Fig. 3. Children and studies of garden usage and experiment: (1) Different settings of garden usage studies; (2) Activities of gardening experiment studies; (3) Horticultural activities (HAs) (e.g., flower arranging, planting and flower pressing) can reduce the stress of primary school children; (4) HAs (e.g., harvesting activities) and animal care can improve children's brain activity and attention; (5) Physical activity function enhanced; (6) HAs provide appropriate physical activity to promote metabolic expenditure; (7) HAs reduced depression and (8) anxiety; (9) Positive to blood pressure; (10) Good emotional state; (11) Social skills increased; (12) The effects of dietary habit; (13) The development of values (e.g., aesthetic, naturalistic and humanistic). ↑ mean positive, promote, increase, rise; ↓ mean negative, inhibit, decrease, reduce.

IV. Conclusion

In this article, we proposed and illuminated the garden settings and activities or interventions related to garden, our results show that two types of garden studies focused on different questions, one exploring garden environments, the use and effects of space; the other examining garden interventions, the health benefits of activities (includes 'rehabilitation and health promotion in physical and mental health' and 'growth and development'). Organized activities also lead people to nature contact. A breakthrough is needed to further explore the diversity of garden activities and their health benefits for children at a theoretical level to guide and plan the design suggestions for the construction of relevant specialized gardens. We suggest that future research of gardens on children could focus on the issue of garden design and corresponding activities to promote children's well-being.

Conflict of Interest

The authors declare no conflict of interest.

Author Contributions

Li Jiahong conducted the research and analyzed the data; Li Jiahong, Li Xuelian and Du Fangjuan wrote the paper; all authors had approved the final version.

Funding

This work was supported by the National Natural Science Foundation of China [grant number: 41861029]; the Science and Technology Support Project of Guizhou Science and Technology Department [grant number: 2022-254].

Acknowledgment

The authors wish to thank the funding of the Science and Technology Support Project of Guizhou Science and Technology Department [grant number: 2022-254].

References

[1] R. Kaplan, S. Kaplan, *The Experience of Nature: A Psychological Perspective*, Cambridge university press, 1989

[2] R. S. Ulrich, R. F. Simons, B. D. Losito, E. Fiorito, M. A. Miles, and M. Zelson, "Stress recovery during exposure to natural and urban environments," *Journal of Environmental Psychology*, vol. 11, no. 3, pp. 201–230, 1991. https://doi.org/10.1016/S0272-4944(05)80184-7.

[3] T. Hartig, R. Mitchell, S. De Vries, H. Frumkin, "Nature and health," *Annual Review of Public Health*, vol. 35, pp. 207–228, 2014. DOI: 10.1146/annurev-publhealth-032013-182443.

[4] J. Lee, "Experimental study on the health benefits of garden landscape," *International Journal of Environmental Research and Public Health*, vol. 14, no. 7, 2017. https://doi.org/10.3390/ijerph14070829.

[5] S. L. Bell, R. Foley, F. Houghton, A. Maddrell, and A. M. Williams, "From therapeutic landscapes to healthy spaces, places and practices: A scoping review," *Social Science & Medicine*, vol. 196, pp. 123–130, 2018. https://doi.org/10.1016/j.socscimed.2017.11.035.

[6] C. C. Marcus, M. Barnes, (Eds.). *Healing Gardens: Therapeutic Benefits and Design Recommendations (Vol. 4)*, John Wiley & Sons, 1999.

[7] H. El Barmelgy, "Healing gardens' design," *International Journal of Education and Research*, vol. 1, no. 6, p. 4, 2013.

[8] C. Erbino, A. Toccolini, I. Vagge, and P. S. Ferrario, "Guidelines for the design of a healing garden for the rehabilitation of psychiatric patients," *Journal of Agricultural Engineering*, vol. 46, no. 2, pp. 43–51, 2015. https://doi.org/10.4081/jae.2015.426.

[9] S. Tillmann, D. Tobin, W. Avison, J. Gilliland, "Mental health benefits of interactions with nature in children and teenagers: A systematic review," *Journal of Epidemiology and Community Health*, vol. 72, no. 10, pp. 958–966, 2018. https://doi.org/10.1136/jech-2018-210436.

[10] G. N. Bratman, C. B. Anderson, M. G. Berman, B. Cochran, S. De Vries, J. Flanders, G. C. Daily, "Nature and mental health: An ecosystem service perspective," *Science Advances*, vol. 5, no. 7, 2019, eaax0903. DOI: 10.1126/sciadv.aax0903.

[11] L. Martin, M. P. White, A. Hunt, M. Richardson, S. Pahl, J. Burt, "Nature contact, nature connectedness and associations with health, wellbeing and pro-environmental behaviours," *Journal of Environmental Psychology*, vol. 68, 101389, 2020. DOI: 10.1016/j.jenvp.2020.101389.

[12] S. Nedovic and A. M. Morrissey, "Calm active and focused: Children's responses to an organic outdoor learning environment," *Learning Environments Research*, vol. 16, pp. 281–295, 2013. https://doi.org/10.1007/s10984-013-9127-9.

[13] E. Flouri, E. Midouhas, H. Joshi, "The role of urban neighbourhood green space in children's emotional and behavioural resilience," *Journal of Environmental Psychology*, vol. 40, pp. 179–186, 2014. https://doi.org/10.1016/j.jenvp.2014.06.007.

[14] R. I. Momtaz, R. Shaban, "The impact of healing gardens on improving psychological recovery of Children–application on pediatric cancer hospital in Egypt," *Journal of Engineering Sciences*, vol. 46, no. 3, pp. 333–345, 2018. https://doi.org/10.21608/jesaun.2018.114651.

[15] L. E. Keniger, K. J. Gaston, K. N. Irvine, R. A. Fuller, "What are the benefits of interacting with nature?" *International Journal of Environmental Research and Public Health*, vol. 10, no. 3, pp. 913–935, 2013.

[16] M. P. White, I. Alcock, J. Grellier, B. W. Wheeler, T. Hartig, S. L. Warber, L. E. Fleming, "Spending at least 120 minutes a week in nature is associated with good health and wellbeing," *Scientific Reports*, vol. 9, no. 1, pp. 1–11, 2019.

[17] T. H. Guo, L. Dong, "Restoration of Children's connection with nature—therapeutic garden for nature-deficit disorder," *Chinese Landscape Architecture*, vol. 31, no. 8, pp. 62–66, 2015.

[18] D. T. C. Cox, D. F. Shanahan, H. L. Hudson, R. A. Fuller, & K. J. Gaston, "The impact of urbanisation on nature dose and the implications for human health," *Landscape and Urban Planning*, vol. 179 (September 2017), pp. 72–80, 2018. https://doi.org/10.1016/j.landurbplan.2018.07.013.

[19] M. R. Savoie-Roskos, H. Wengreen, C. Durward, "Increasing fruit and vegetable intake among children and youth through gardening-based interventions: a systematic review," *Journal of the Academy of Nutrition and Dietetics*, vol. 117, no. 2, pp. 240–250, 2017. https://doi.org/10.1016/j.jand.2016.10.014.

[20] S. Moola, Z. Munn, C. Tufanaru, E. Aromataris, K. Sears, R. Sfetcu, & P. F. Mu, "Chapter 7: Systematic reviews of etiology and risk," *Joanna Briggs Institute Reviewer's Manual*, The Joanna Briggs Institute, vol. 5, pp. 217–269, 2017.

[21] K. R. Skelton, C. Lowe, D. A. Zaltz, S. E. Benjamin-Neelon, "Garden-based interventions and early childhood health: An umbrella review," *International Journal of Behavioral Nutrition and Physical Activity*, vol. 17, no. 1, pp. 1–19, 2020. https://doi.org/10.1186/s12966-020-01023-5

[22] D. Williams, "Garden-based education," in *Oxford Research Encyclopedia of Education*, 2018. https://doi.org/10.1093/acrefore/9780190264093.013.188.

[23] C. C. Marcus and M. Barnes, "Gardens in healthcare facilities: Uses, therapeutic benefits, and design recommendations," Martinez, CA: Center for Health Design, 1995.

[24] C. C. Marcus, N. A. Sachs, "Therapeutic landscapes: An evidence-based approach to designing healing gardens and restorative outdoor spaces," John Wiley & Sons, 2013.

[25] L. Mason, L. Manzione, A. Ronconi, F. Pazzaglia, "Lessons in a green school environment and in the classroom: Effects on students' cognitive functioning and affect," *International Journal of Environmental Research and Public Health*, vol. 19, no. 24, 2022. https://doi.org/10.3390/ijerph192416823.

[26] L. Mason, B. Zagni, F. Bacchin, C. Frison, S. Scrimin, "Children's attentional processes in outdoor and indoor environments: The role of physiological self-regulation," *International Journal of Environmental Research and Public Health*, vol. 19, no. 20, 2022. https://doi.org/10.3390/ijerph192013141.

[27] Y. Y. Chang, W. C. Su, I. C. Tang, C. Y. Chang, "Exploring the benefits of school gardening for children in Taiwan and identifying the factors influencing these benefits," *HortTechnology*, vol. 26, no. 6, pp. 783–792, 2016. https://doi.org/10.21273/HORTTECH03074-16.

[28] P. Askerlund, E. Almers, "Forest gardens–new opportunities for urban children to understand and develop relationships with other organisms," *Urban Forestry and Urban Greening*, vol. 20, pp. 187–197, 2016. https://doi.org/10.1016/j.ufug.2016.08.007.

[29] Y. A. Oh, A. Y. Lee, K. J. An, S. A. Park, "Horticultural therapy program for improving emotional well-being of elementary school students: an observational study," *Integrative Medicine Research*, vol. 9, no. 1, pp. 37–41, 2020. https://doi.org/10.1016/j.imr.2020.01.007.

[30] M. J. Lee, W. Oh, J. S. Jang, J. Y. Lee, "A pilot study: Horticulture-related activities significantly reduce stress levels and salivary cortisol concentration of maladjusted elementary school children," *Complementary Therapies in Medicine*, vol. 37, pp. 172–177, 2018. https://doi.org/10.1016/j.ctim.2018.01.004.

[31] S. O. Kim, J. E. Jeong, Y. A. Oh, H. R. Kim, S. A. Park, "Comparing concentration levels and emotional states of children using electroencephalography during horticultural and nonhorticultural activities," *HortScience*, vol. 56, no. 3, pp. 324–329, 2021. https://doi.org/10.21273/HORTSCI15522-20.

[32] A. Scartazza, M. L. Mancini, S. Proietti *et al*. "Caring local biodiversity in a healing garden: Therapeutic benefits in young subjects with autism," *Urban Forestry and Urban Greening*, vol. 47(March), 126511, 2020. https://doi.org/10.1016/j.ufug.2019.126511.

[33] C. K. Blair, A. Madan-Swain, J. L. Locher *et al.* "Harvest for health gardening intervention feasibility study in cancer survivors," *Acta Oncologica*, vol. 52, no. 6, pp. 1110–1118, 2013. https://doi.org/10.3109/0284186X.2013.770165.

[34] S. A. Park, H. S. Lee, K. S. Lee, K. C. Son, C. A. Shoemaker, "The metabolic costs of gardening tasks in children," *HortTechnology*, vol. 23, no. 5, pp. 589–594, 2013. https://doi.org/10.21273/horttech.23.5.589.

[35] S. A. Park, A. Y. Lee, K. S. Lee, K. C. Son, "Comparison of the metabolic costs of gardening and common physical activities in children," *Korean Journal of Horticultural Science and Technology*, vol. 32, no. 1, pp. 123–128, 2014. https://doi.org/10.7235/hort.2014.13122.

[36] M. Soga, K. J. Gaston, Y. Yamaura, "Gardening is beneficial for health: A meta-analysis," *Preventive Medicine Reports*, vol. 5, pp. 92–99, 2017. https://doi.org/10.1016/j.pmedr.2016.11.007.

[37] N. J. Harper, "Wilderness therapy, therapeutic camping and adventure education in child and youth care literature: A scoping review," *Children and Youth Services Review*, vol. 83, pp. 68–79, 2017. https://doi.org/10.1016/j.childyouth.2017.10.030.

[38] N. J. Harper, C. R. Fernee, L. E. Gabrielsen, "Nature's role in outdoor therapies: An umbrella review," *International Journal of Environmental Research and Public Health*, vol. 18, no. 10, 2021. https://doi.org/10.3390/ijerph18105117.

[39] R. S. Ulrich, "Aesthetic and affective response to natural environment," In *Behavior and the Natural Environment*, Boston, MA: Springer US.85-125, 1983. https://doi.org/10.1007/978-1-4613-3539-9_4.

[40] K. M. Dillon, B. Minchoff, K. H. Baker, "Positive emotional states and enhancement of the immune system," *International Journal of Psychiatry in Medicine*, vol. 15, no. 1, pp. 13–18, 1985. https://doi.org/10.2190/r7fd-urn9-pq7f-a6j7.

[41] R. S. Ulrich, R. Parsons, "Influences of passive experiences with plants on individual well-being and health," *The role of horticulture in human well-being and social development*, vol. 93, p. 105, 1992.

[42] T. P. Holloway, L. Dalton, R. Hughes, S. Jayasinghe, K. A. E. Patterson, S. Murray, R. Soward, N. M. Byrne, A. P. Hills, K. D. K. Ahuja, *Children : A Realist Synthesis*, pp. 1–22, 2023.

[43] S. O. Kim and S. A. Park, "Garden-based integrated intervention for improving children's eating behavior for vegetables," *International Journal of Environmental Research and Public Health*, vol. 17, no. 4, 2020. https://doi.org/10.3390/ijerph17041257.

[44] S. Koch, T. M. Waliczek, J. M. Zajicek, "The effect of a summer garden program on the nutritional knowledge, attitudes, and behaviors of children," *HortTechnology*, vol. 16, no. 4, pp. 620–625, 2006. https://doi.org/10.21273/horttech.16.4.0620.

[45] Y. Shao, M. Elsadek, B. Liu, "Horticultural activity: Its contribution to stress recovery and wellbeing for children," *International Journal of Environmental Research and Public Health*, vol. 17, no. 4, 2020 https://doi.org/10.3390/ijerph17041229.

[46] N. Huys, K. De Cocker, M. De Craemer, M. Roesbeke, G. Cardon, S. De Lepeleere, "School gardens: A qualitative study on implementation practices," *International Journal of Environmental Research and Public Health*, vol. 14, no. 12, pp. 8–19, 2017. https://doi.org/10.3390/ijerph14121454.

[47] Y. Feng, Y. Lin, N. Zhang, X. Jiang, L. Zhang, "Effects of animal-assisted therapy on hospitalized children and teenagers: A systematic review and meta-analysis," *Journal of Pediatric Nursing*, vol. 60, pp. 11–23, 2021. https://doi.org/10.1016/j.pedn.2021.01.020.

[48] R. Bowker, P. Tearle, "Gardening as a learning environment: A study of children's perceptions and understanding of school gardens as part of an international project," *Learning Environments Research*, vol. 10, no. 2, pp. 83–100. https://doi.org/10.1007/s10984-007-9025-0.

[49] M. Montessori, *The Montessori Method*, Transaction publishers, 2013.

[50] D. Blair, "The journal of environmental education the child in the garden: An evaluative review of the benefits of school gardening the child in the garden," *The Journal of Environmental Education*, vol. 40, no. 2, pp. 15–38, 2009. http://www.tandfonline.com/loi/vjee20%0Ahttp://www.tandfonline.com/page/terms-and-conditions.

[51] K. G. Burt, P. Koch, I. Contento, "Development of the GREEN (Garden Resources, Education, and Environment Nexus) tool: An evidence-based model for school garden integration," *Journal of the Academy of Nutrition and Dietetics*, vol. 117, no. 10, pp. 1517–1527, 2017. https://doi.org/10.1016/j.jand.2017.02.008.

[52] N. M. Wells, K. S. Lekies, "Nature and the life course: Pathways from childhood nature experiences," *Children, Youth and Environments*, vol. 16, no. 1, pp. 1–25, 2006.

[53] R. Hansmann, S. M. Hug, K. Seeland, "Restoration and stress relief through physical activities in forests and parks," *Urban Forestry and Urban Greening*, vol. 6, no. 4, pp. 213–225, 2007. https://doi.org/10.1016/j.ufug.2007.08.004.

[54] M. H. Kwon, C. Seo, J. Kim, M. Kim, C. H. Pak, W. K. Lee, "Current status of children's gardens within public gardens in the United States," *HortTechnology*, vol. 25, no. 5, pp. 671–680, 2015. https://doi.org/10.21273/horttech.25.5.671.

[55] M. H. Kwon, J. Kim, C. Seo, C. W. Lee, E. J. Jang, and W. K. Lee, "Education programs in public children's gardens in the United States," *HortTechnology*, vol. 26, no. 1, pp. 70–82 , 2016. https://doi.org/10.21273/horttech.26.1.70.

[56] H. Gardens, *Therapeutic Benefits and Design Recommendations*, by CC Marcus, M. Barnes. New York, 1999.

[57] H. Barakat, A. F. Bakr, Z. El-sayad, "Nature as a healer for autistic children," *International Journal of Environmental Science & Sustainable Development*, vol. 3, no. 1, pp. 42–62, 2018. https://doi.org/10.21625/essd.v3iss1.277.

[58] S. Blaschke, "The role of nature in cancer patients' lives: A systematic review and qualitative meta-synthesis," *BMC Cancer*, vol. 17, no. 1, pp. 1–13, 2017. https://doi.org/10.1186/s12885-017-3366-6.

[59] S. Pouya, O. Demirel, "What is a healing garden?" *Pouya and Demirel/Akdeniz Univ. Ziraat Fak. Derg.*, vol. 28, no. 1, pp. 5–10. www.ziraatdergi.akdeniz.edu.tr.

[60] E. Smart, B. Edwards, S. Kingsnorth, S. Sheffe, C. J. Curran, M. Pinto, S. Crossman, G. King, "Creating an inclusive leisure space: strategies used to engage children with and without disabilities in the arts-mediated program Spiral Garden," *Disability and Rehabilitation*, vol. 40, no. 2, pp. 199–207, 2018. https://doi.org/10.1080/09638288.2016.1250122.

[61] M. A. Yar, F. Kazemi, "The role of dish gardens on the physical and neuropsychological improvement of hospitalized children," *Urban*

Forestry and Urban Greening, vol. 53(May), 126713, 2020. https://doi.org/10.1016/j.ufug.2020.126713.

[62] L. E. McCurdy, K. E. Winterbottom, S. S. Mehta, J. R. Roberts, "Using nature and outdoor activity to improve children's health," *Current Problems in Pediatric and Adolescent Health Care*, vol. 40, no. 5, pp. 102–117, 2010. https://doi.org/10.1016/j.cppeds.2010.02.003.