Horticultural therapy for enhancing children's body-mind-spirit holistic health: A randomized controlled trial

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Abstract: Grounded in the holistic health theory of body-mind-spirit, this study uses a horticultural group intervention approach to examine the effectiveness of promoting holistic child development in social work practice. It aims to provide innovative perspectives and methodologies for social work practitioners and to support the creation and growth of child-friendly communities in mainland China. The study was conducted in the Z Child-Friendly Community of N City and involved 160 children who were divided into an intervention and control group for practical implementation. Evaluation was carried out using both quantitative and qualitative techniques. The results indicate that the Body-Mind-Spirit Horticulture group intervention is effective in promoting holistic health development in children by reducing stress, optimising emotional state, and promoting harmonious coexistence with nature. These findings have significant practical relevance. The study also discusses the challenges and limitations of implementing the holistic health group counselling programme in child-friendly communities.

Keywords: body-mind-spirit holistic health; horticultural therapy; randomized controlled trial; social work

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Introduction

The rising prevalence of mental health issues among children and adolescents has become a global concern, particularly in the context of rapid socio-economic development. According to the World Health Organization (2021), approximately 14% of individuals aged 10-19 years worldwide experience mental health challenges. In mainland China, this issue is particularly pronounced, with sleep disorders, depression, and anxiety affecting 25.2%, 14.6%, and 12.3% of elementary school students, respectively (Li et al., 2022). The National Child Development Programme (2021-2030) highlights the critical need to enhance mental health services for children in China, reflecting the increasing urgency of addressing this issue. Factors such as academic pressure, family tensions, and social isolation have exacerbated the mental health challenges among Chinese children (Li et al., 2022). Urban children are especially vulnerable, facing unique risks due to limited living space and reduced access to outdoor activities, which negatively impact both their physical and mental well-being (Nyahuma-Mukwashi et al., 2021). As a result, there is a pressing need for effective interventions that reduce stress, foster positive emotions, and create supportive environments that cater to children's unique needs and voices.

The growing mental health crisis among children and adolescents has led to increasing attention on holistic, multidimensional intervention frameworks that go beyond symptom management. Traditional approaches to mental health have often treated psychological issues in isolation, neglecting the interconnected nature of physical, emotional, and spiritual well-being. In response to these limitations, integrative models have emerged as innovative strategies within the field of psychosocial intervention, particularly in East Asian contexts. The Integrative Body-Mind-Spirit (IBMS) model, first developed by Professor Chan Lai-wan and her research team at the University of Hong Kong in the early 1990s, represents a paradigm shift in mental health and social work interventions. Grounded in Eastern philosophies and contemporary psychological theories, the IBMS model emphasizes the dynamic interplay between the body, mind, and spirit as the foundation of human well-being (Chan et al., 2002). Rather than viewing health from a purely biomedical perspective, the IBMS model adopts a holistic lens that prioritizes physical activity, emotional regulation, and spiritual reflection as interconnected pathways to healing and growth. It aims not only to alleviate distress but also to

promote positive development, resilience, and a sense of purpose. This model has been successfully applied in both individual and group settings, showing measurable improvements in participants' psychological well-being, stress coping capacity, and self-perception (Lee et al., 2018; Ng et al., 2024; Srinivasa Murthy, 2024). Within the IBMS framework, conceptual adaptation is a key element, helping individuals reframe life experiences, reconstruct meaning, and restore inner harmony. Emotional regulation techniques such as mindfulness, guided imagery, and expressive arts, support participants in managing negative emotions, while physical movement or relaxation exercises restore balance at the somatic level. This integrative methodology is particularly suitable for children and adolescents, whose developmental needs are multidimensional and who benefit from interventions that are experiential, engaging, and strengths based.

Complementing the IBMS model, Horticultural Therapy (HT) has been increasingly recognized as a therapeutic modality that aligns well with holistic health approaches. HT involves guided interaction with plants and natural environments to support cognitive, emotional, and social development (Davis, 2024). Rooted in the restorative effects of nature, HT promotes mindfulness, sensory stimulation, and hands-on learning, providing children with a safe and nurturing space to express themselves (Oh et al., 2020; Davis, 2024). Activities such as planting, harvesting, and garden design are not only physically engaging but also offer symbolic opportunities for emotional exploration and personal growth (Wang & Boros, 2025). The act of nurturing plants mirrors the nurturing of the self, enabling participants to establish a sense of responsibility, patience, and achievement. In recent years, HT has gained traction in China as a core component of child and adolescent psychosocial support, particularly in urban settings where children's access to green space and nature is limited. Researchers such as Shao et al. (2020) and Li et al. (2024) have documented the effectiveness of horticultural interventions in enhancing children's emotional regulation, attention span, and social connectedness. Moreover, the interactive and sensory-rich nature of HT makes it particularly suitable for group-based interventions, offering opportunities for teamwork, communication, and community building (Oh et al., 2020).

However, despite the promising outcomes reported in studies utilizing both the IBMS model and HT, there are several limitations that warrant further investigation. First, while the IBMS model emphasizes the spiritual dimension of well-being, its application to children and adolescents, who may have varying levels of understanding and interest in spiritual concepts, has not been fully explored. The challenge lies in adapting the model to be developmentally appropriate while still maintaining its integrative intent. Furthermore, the cultural nuances that influence the interpretation of spirituality in Eastern contexts require further attention (Chan, 2021). Similarly, while HT has shown positive results in enhancing emotional and social well-being, its practical application remains underexplored in certain regions and settings. For instance, the availability of appropriate horticultural facilities

in urban environments is a significant limitation that restricts the widespread adoption of HT. Moreover, there is a lack of standardized protocols and frameworks for HT, leading to variability in intervention design and implementation (Li et al., 2024). These inconsistencies make it challenging to draw conclusive, generalized recommendations for practitioners working in diverse settings. Another significant gap in the literature is the integration of IBMS and HT into a single cohesive intervention. While both models are individually recognized for their therapeutic potential, few studies have examined how their combination can be leveraged to maximize benefits. This presents a critical gap, as the synergistic effects of combining body, mind, and spirit with nature-based therapy, could offer a unique, multidimensional solution for addressing mental health challenges in children and adolescents.

Considering the limitations in current research, the primary objective of this study is to integrate the IBMS (Integrative Body-Mind-Spirit) framework with horticultural therapy to foster a stronger connection between children and nature through their 'five senses'. This connection aims to improve physical fitness, significantly reduce psychological stress, and enhance children's sense of self-worth and fulfilment. The group intervention is designed to have a holistic and positive impact on the child, addressing three key aspects: physical, mental, and spiritual well-being. At the same time, it helps to build a child-friendly community, which is an innovative attempt to explore the practice of social work with children. Specifically, this study will design group activities from the three aspects of body, mind, and spirit to support the healthy development of children. In connection with horticultural therapy, children will be organised to participate in activities such as horticultural planting and horticultural decoration, so that they can move their bodies in the natural environment, improve muscle strength and body coordination, and improve their physical fitness and they will be guided to relieve stress and regulate their emotions. Encourage children to share their gardening experiences and exchange their feelings in a team, so as to enhance their understanding and trust, improve their teamwork ability, and build their self-confidence and sense of achievement. Guide children to appreciate the beauty and harmony of nature in gardening activities, deeply understand the growth and changes of life, learn to value and respect life, and cultivate their awareness of environmental protection and reverence for nature.

Materials and Methods

Participants

This study was approved by the Ethics Committee of Nanjing Normal University (approval number: NNU202501017). A total of 160 children aged between 9 and 14

years, with a mean age of 12.42 years, participated in the study. The required sample size of 160 participants was estimated based on a power analysis that considered the expected effect size, the desired statistical power, and an alpha level of 0.05. All participants were recruited from Z community in N city and were carefully screened based on specific inclusion and exclusion criteria. These criteria required participants to be aged between 8 and 16 years, capable of giving informed consent, and to have parental consent to participate in the project. Ethical considerations were discussed in detail both verbally and in writing by the researchers, who clarified the purpose, nature, duration, contact information, confidentiality, and the participant's right to participate or withdraw at any time. In addition, participants were required to be free of serious medical or psychiatric conditions and not to be receiving treatment for such conditions. Eligible participants were then randomised to either the intervention group or the waitlist control group.

Ethics approval and consent to participate

This study was approved by Ethics Committee of Nanjing Normal University. Informed consent was obtained from all the participants.

The interventions

Guided by the integrative body-mind-spirit (IBMS) framework, a six-session horticultural programme was developed to address children's psychosocial needs through nature-based engagement. Each 60-90-minute session focused on specific therapeutic goals, as shown in Table 1. In addition to the group activities, the researchers also actively established close contact with the community, fully integrated and used various community resources, and used unused vacant land to create a small garden for horticulture to provide a space for children and adolescents to get close to nature. From time to time, after the group activities, the researchers also conducted nature and aesthetic education activities, guiding the children to explore and learn in the natural environment, enriching their after-school life, relieving stress, and improving their physical and mental health.

Tabel 1
The interventions and their objectives

Session 1. Creative Flower Arrangement 1. Get to know each other, explain the group's theme and objectives 2. Establish group rules to improve everyone's bonding 3. Make flower arranging fun and rewarding
Session 2. Pressed Flower Art 1. Enjoy the process of making pressed flower art and feel the excitement of seeing your ideas come to life 2. Boost group members' communication and interaction, strengthening their bonding with each other
Session 3. Leaf Printing Workshop 1. Do leaf printing to help to relax 2. Ask group members to create and share things to make them feel more confident
Session *4. Pressed Flower Bookmarks* 1. Use the pressed flowers from the third section to make bookmarks and enjoy the feeling of excitement 2. Work together as a group and enjoy the beauty of plants
Session *5. Succulent Planting Session* 1. Play some warm-up games and talk about what was done in the last session to help group members communicate and interact with each other better and get to know each other better 2. Plant succulents to encourage group members to pay attention to the growth of plants in their daily life and learn about environmental protection 3. The participants were told in advance that the group was about to end and dealt with their parting emotions
Session *6. Harvest* 1. Work together to complete the botanical painting 2. Summarise what learnt in the first five sessions of the group, consolidate your gains, and enhance your confidence in facing learning and life

Section 1: Creative Flower Arrangement.

This session started with a warm-up game to enhance the understanding and communication among group members. After familiarization, the researchers introduced the main purpose of the group to the group members and organized them to work together to formulate a group contract. During this session, group members were encouraged to speak actively and put forward their suggestions and ideas. In the flower arranging activity, researchers patiently explained to the children the skills and precautions of flower arranging and encouraged them to give play to their creativity and create freely, so that they could learn and grow in practice. At the end of the activity, the researchers organized the children to display their works and share their creative ideas and feelings. The children said that this activity gave them a sense of joy and achievement in creating flowers, and enhanced their understanding and appreciation of nature.

Section 2: Pressed Flower Art.

In the first half of this activity, the researchers first led the group to look for the flower materials needed for flower pressing in the community, to go into the natural environment and get closer to the plants to communicate and interact with them to get relaxation and relieve pressure. Afterwards, the researchers guided the children to try to express their emotions with flowers and plants, and to feel the connection between themselves and nature. The process of flower pressing was full of stress relief and fun, and the children gradually got involved in the experience of flower pressing and had more communication and interaction when they helped each other to arrange the flowers, which enhanced the relationship between the group members.

Section 3: Leaf Printing Workshop

At the outset of this session, participants, guided by researchers, carefully selected leaves, and floral materials with distinct textures from the community garden. They shared their choices and personal reflections on the selected materials. During the latter half of the session, researchers observed children fully immersed in the leaf-printing process, engaging deeply with nature. The creation of leaf-printed bags allowed participants to gain substantial experiential insights. In the concluding phase, children showcased their works and exchanged reflections on their creative journeys. During the debriefing, the researchers emphasized the uniqueness of everyone's value and creativity, drawing parallels to the diverse leaf-printed outcomes crafted from identical materials.

Section 4: Pressed Flower Bookmarks

The researchers guided children in showcasing their pressed flower artworks, encouraging them to explore the textures and fragrances of dried flowers. During the bookmark-making activity, participants designed diverse bookmarks. Some incorporated floral motifs to symbolize hope, while others used leaves to represent natural resilience. At the session's conclusion, children shared the symbolic meanings of their creations, highlighting how the activity enhanced their manual dexterity, creativity, and problem-solving skills.

Section 5: Succulent Planting Session

In the succulent planting session, group members choose containers to plant the succulents and personalize them with tools such as twine and coloured pencils, attaching labels to record the information. Upon completion, the group displayed their works and shared their experience. The researchers summarized the harvest of the activity, emphasized the precautions for succulent care, and encouraged the group to pay attention to the growth of plants in their daily life and cultivate environmental awareness. In addition, the theme and content of the next activity were also previewed.

Section 6: Harvest

In this session, the group members collaborated to complete the plant paintings, and the children discussed and solved problems together during the production. The researchers summarized the highlights and shortcomings of the first five sessions at the end of the activity. In the subsequent sharing session, the researchers invited each child to take turns coming up to the stage and sharing his/her growth and gains in the gardening group. Some children mentioned the colour matching and spatial layout they learned from the creative flower arrangement. Some talked about how to wait patiently for the results of the flower pressing experience and learned about emotional management; the making of leaf topiary packs enabled the children to feel the beauty of nature's textures and the fun of creation; the making of pressed flower bookmarks exercised their hands-on skills and creativity; and the planting of succulents enabled them to experience the wonders of life growth and responsibility. Succulent planting made them appreciate the wonder and responsibility of life growth.

At the parting ceremony, the researchers encouraged the children to apply the skills and attitudes learned in the gardening group to their daily lives, and it is hoped that they could continue to appreciate and care about the nature, protect

the environment, and learn to release stress. At the same time, the researchers also listened to the children's feedback and suggestions for future gardening activities.

Measures

Both the intervention and control groups were assessed at two points: at the baseline (at the start of the study) and at the end of the sessions. The intervention group began their first session only after the completion of all initial assessments. The decision not to include an additional follow-up data point was primarily driven by practical considerations, including the duration of the intervention and the potential for participant attrition over an extended follow-up period. Additionally, various external factors, such as the seasonal nature of horticultural therapy and the participants' school schedules, could have interfered with data collection at later points. The outcome measure used was the Comprehensive Well-Being Scale (CWBS) (Sham et al., 2021), a 20-item, 5-point Likert scale designed to evaluate multidimensional well-being. Higher scores on the CWBS indicate better well-being. The scale consists of two subscales: Intrapersonal Well-Being (10 items), which measures physical health, emotional regulation, self-acceptance, and life purpose; and Transpersonal Well-Being (10 items), which assesses connectedness with others, society, the environment, and transcendent values. The internal consistency of the CWBS, as indicated by its alpha coefficients, ranged from 0.79 to 0.91. The CWBS has been validated for use with Chinese populations in Hong Kong and encompasses physical, psychological, social, and spiritual dimensions, consistent with holistic recovery models.

Statistical analysis

Data analysis was conducted using SPSS software to assess the effectiveness of the horticultural group intervention. Prior to performing statistical tests, normality tests were conducted on pre- and post-test scores for both the intervention and control groups to ensure the assumption of normal distribution was met. Given the normal distribution of the data, parametric tests were employed for further analysis. For within-group comparisons, paired samples t-tests were used to evaluate the changes in body-mind-spirit scale scores between pre- and post-intervention measurements. Independent samples t-tests were performed to compare the baseline and post-intervention scores between the intervention and control groups. Additionally, the difference between pre- and post-test scores (values) was analysed using independent samples t-tests to examine whether the intervention led to a significant change in the scores relative to the control group.

Results

The quantitative analysis was performed to assess the efficacy of the horticultural group intervention on holistic child development. Data were collected through pre- and post-intervention measurements for both the intervention and control groups. Initial normality tests confirmed that the data followed a normal distribution, which allowed the use of parametric tests, specifically paired samples t-tests for within-group comparisons and independent samples t-tests for between-group comparisons.

The paired samples t-test results (Table 2) revealed a statistically significant difference between pre-test and post-test scores for the intervention group on the CWBS ($p < 0.05$). Specifically, the intervention group showed a mean improvement of 6.75 points, from a pre-test score of 68.50 (± 11.40) to a post-test score of 75.25 (± 5.25). This suggests that participation in the horticultural intervention led to measurable improvements in the holistic health indicators assessed. However, it is important to note that the intervention group exhibited a greater variation in scores compared to the control group, with a lower average pre-test score and a larger post-test score variability. This greater variability could be attributed to several factors. First, the heterogeneous nature of the intervention group, including varying levels of engagement with the horticultural activities, might have contributed to a wider range of outcomes. Participants who were more involved in the intervention may have experienced greater improvements, while those less engaged or affected by external factors (e.g., personal circumstances, motivation) could have seen less benefit. Additionally, the testing effect may have played a role, as repeated measurements during the intervention could influence participants' responses, either positively or negatively. Furthermore, random assignment does not always ensure perfectly matched groups in terms of baseline characteristics, which may explain the observed differences in variability. In contrast, the control group demonstrated minimal change, with a mean difference of only 0.75 points (from 72.12 ± 4.45 to 72.80 ± 3.64), and this difference was not statistically significant ($p = 0.142$).

Table 2
Paired Samples t-Test.

Variant	Pre and Post Test Scores (Mean± SD)		Mean Difference (Post-test-Pre-test)	t	*p*
	Pre-test	Post-test			
Intervention Group	68.50± 11.40	75.25± 5.25	6.75	2.718	0.030*
Control Group	72.12± 4.45	72.8± 3.64	0.75	1.655	0.142

Note: *p<0.05

The independent samples t-test (Table 3) was conducted to compare the pre-test and post-test scores between the intervention and control groups. Prior to the intervention, no significant differences were found between the two groups in terms of baseline scores (p = 0.424). Similarly, post-test scores did not show a statistically significant difference between the groups (p = 0.214). However, when examining the differences between pre- and post-test scores (values), a significant divergence was observed. The intervention group experienced a mean increase of 6.75 points (± 7.02), while the control group showed a mean decrease of 0.125 points (± 0.35), with the difference between the groups being statistically significant (p = 0.028).

Table 3
Independent Samples t-Test.

Variant	Levene Test		Group (Mean±SD)		t	*p*
	F	p	Intervention Group (n=80)	Control Group (n=80)		
Pre-test Score	6.131*	0.027	68.50± 11.40	72.12± 4.45	-0.838	0.424
Post-test Score	0.017	0.897	75.25± 5.25	72.8± 3.64	1.301	0.214
Difference (Post-test-Pre-test)	11.296**	0.005	6.75± 7.02	-0.125± 0.35	2.764*	0.028

Note: **p<0.01, *p<0.05

In summary, the quantitative analysis demonstrates that the horticultural group intervention effectively enhanced the holistic health development of children, as reflected in the body-mind-spirit scale scores. The intervention group exhibited significant improvements in their overall well-being, with statistically meaningful increases in their scores compared to the control group. While no significant differences were observed between the groups in baseline or post-test scores, the pre-post-test differences revealed the intervention's positive impact on children's development. These findings suggest that the horticultural activities have the potential to promote holistic child development, improving both physical health and psychological well-being, with implications for the design of child-focused interventions in community settings.

Participation in the programme enabled children to engage more frequently with outdoor environments beyond the confines of academic routines, thereby enhancing their physical stamina and immune resilience. The parents of the children were unanimous in their endorsement of the programme, and the researchers documented enhanced manual skills as well as creative problem-solving abilities, as evidenced by activities such as floral arranging and bookmark crafting. Nature immersion was identified as a vital outlet for alleviating academic and daily pressures. The children displayed a consistent level of enthusiasm during the sessions, and reported a reduction in stress, an improvement in mood, and a sustained feeling of joy. The completion of horticultural projects instilled tangible pride, with many

proactively discussing plant care post-session, thereby demonstrating nurtured patience and accountability. This study draws from observational records to explore the mechanisms through which group interventions advance holistic body-mind-spirit health in children.

Through participation in group activities, the children were able to have more contact with the outdoor environment after school, which could enhance their physical fitness and improve their immunity. Parents were very supportive of this activity, and the researchers also observed that the children's hands-on skills were honed, and their creativity and practical skills were enhanced in the process of making flower arrangements, bookmarks, and other horticultural works. For example:

> 'I love making pressed flower bookmarks! Last time, I used petals and leaves to make a little butterfly. After that, Mom and I even bought tools to make tons more at home!' (8 years old, female)

> 'Before, I'd just do homework after school. Now, with the gardening group, I get to run around in the community garden every day. Mom says I've been eating way more!' (11 years old, male)

Psychologically, getting close to nature provides an excellent way for children and teenagers to relax and release the pressure of school and life. They are fully committed to the group activities and actively cooperate with them, from which they feel happy, their tensions are relieved, and their negative emotions are released. For example:

> 'Lately, I've been telling my little succulent all my worries. It feels like having a tiny friend who listens.' (11 years old, female)

Whenever they finished their own gardening creation, the children would gain a sense of achievement. Many of them even took the initiative to share their experience of caring for succulents with researchers after the planting activity, which cultivated their patience and responsibility. More importantly, this platform provides children and youths with opportunities to communicate with each other and share their experiences, which promotes interactions among children in the community, improves their interpersonal relationships, and broadens their social support network. For example:

> 'The tomato plant I grew with Mom finally sprouted! Now, the first thing I do after school is check how much taller it's gotten!' (10 years old, female)

> 'Our group plant collage is a mix of everyone's ideas—it's like a teamwork masterpiece!'(10 years old, male)

On a spiritual perspective, through close contact with nature, the children deeply felt the power of plants from their five senses and learned about the growth process of plants and the balance of the ecosystem, thus cultivating environmental and ecological awareness. The interaction with plants allowed them to explore their inner world more deeply and realize the deep connection between themselves and nature. This awakening not only enhances their self-awareness but also helps them better appreciate the meaning and value of life. The patience and concentration required for gardening activities also taught the children to be still and observe the growth and changes of plants carefully, thus developing their inner peace and meditation skills. For example:

> 'When I tried pressing flowers, the petals kept flying everywhere because they were so thin. I almost cried! But the social worker taught me to take deep breaths and stay calm. Now, even tricky stuff feels easier.' (10 years old, female)

Discussion

This study provides compelling evidence that the horticultural group intervention, based on the Integrative Body-Mind-Spirit (IBMS) theoretical framework, effectively promotes holistic child development. The results demonstrate significant improvements in the physical, psychological, and spiritual well-being of children in the intervention group, validating the core principles of the IBMS model (Chan et al., 2002). Both quantitative and qualitative findings underscore the positive impacts of horticultural activities on children's overall development, offering new insights into how nature-based interventions can be leveraged to enhance child well-being.

First, the study highlights that the horticultural intervention substantially enhances children's physical health, emotional well-being, and social adaptation. Statistically significant improvements in the comprehensive well-being scores, support the efficacy of the intervention in addressing multiple dimensions of child development. This aligns with findings from previous studies, such as those by Shao et al. (2020) and Li et al. (2024), which documented the positive effects of horticultural therapy on children's psychological well-being, but with a primary focus on mental health outcomes. By broadening the scope to include physical and spiritual dimensions, this study expands on earlier research, underscoring the value of an integrated, body-mind-spirit approach to child development. Qualitative assessments revealed further insights, emphasizing improvements not only in physical health but also in creativity, social cohesion, and emotional resilience. These findings are consistent with research by Lu et al. (2023), which highlights the role of nature-based interventions in fostering creativity and emotional regulation.

Furthermore, the study's focus on social cohesion among children adds a layer of social development that is often overlooked in traditional therapeutic interventions. The results suggest that engaging children in horticultural activities in group settings can foster collaboration, build social skills, and improve peer relationships, contributing to a more cohesive social environment.

While previous studies on horticultural therapy have focused on isolated psychological outcomes (e.g., Shao et al., 2020), this research distinguishes itself by adopting a more comprehensive, multidimensional approach. By integrating the IBMS framework, it offers a holistic model that encompasses not only emotional and psychological health but also the physical and spiritual dimensions of well-being. This broader perspective is consistent with the empirical work of Moreira (2022), who argues that a holistic approach to health considers the interaction of environmental, physical, and emotional factors in shaping individual well-being. Moreover, this study extends the context of intervention beyond the individual or family level, as is common in many therapeutic programs (e.g., Li et al., 2024), and moves into the community realm. By transforming underutilized community spaces into horticultural activity zones, the study demonstrates the potential of community-based interventions to promote child-friendly environments. This approach not only addresses the individual child's well-being but also fosters broader community engagement, contributing to the sustainable use of local resources. These findings align with the work of Barton and Pretty (2010), who emphasize the importance of community-level interventions in building supportive environments for children's development.

This study also provides practical insights into how horticultural interventions can be utilized in the creation of child-friendly communities. The intervention model's emphasis on community resource utilization highlights the potential of turning public spaces into dynamic areas for children to engage with nature, improving both individual and collective well-being. This is especially relevant in urban settings where access to natural environments is limited. By repurposing idle community spaces, social work practitioners can promote sustainable development and contribute to the creation of child-centred environments. The broader implications of these findings suggest that horticultural therapy, particularly when implemented as part of a community-based intervention, can play a significant role in addressing the multifaceted needs of children. Beyond therapeutic outcomes, the intervention fosters a sense of connection to the environment, promoting ecological awareness and social responsibility. This aligns with the work of Silva et al. (2024), who argue that nature-based interventions can contribute to environmental stewardship while enhancing psychological and social well-being.

Conclusions

While the findings of this study are promising, there are limitations that must be considered. The sample was limited to one child-friendly community in N City, which may affect the generalizability of the results. Future research should aim to replicate this study in different regions and with diverse demographic groups to determine the broader applicability of the IBMS horticultural intervention. Additionally, although the study assessed immediate outcomes, long-term follow-up studies would be valuable to evaluate the sustainability of the intervention's effects on children's holistic development. Furthermore, the integrated nature of the body-psychology-spirit model presents challenges in isolating the independent effects of each component. Future research could explore the individual contributions of each dimension-physical, psychological, and spiritual-to determine the specific pathways through which horticultural therapy influences child development. This would provide a more granular understanding of how nature-based interventions work and inform the refinement of intervention strategies.

In conclusion, this study provides robust evidence supporting the use of a horticultural group intervention based on the IBMS framework to promote the holistic development of children. By integrating physical, psychological, and spiritual dimensions, the intervention offers a comprehensive approach to child development that has significant practical applications for social work practice. Moreover, by extending the intervention to the community level, this study highlights the importance of creating supportive, child-friendly environments that foster sustainable growth and well-being. Future research should continue to explore the long-term effects of horticultural therapy and its potential to enhance child development in diverse contexts.

Availability of data and materials.

The data and materials that support the findings of this study are available from the authors upon reasonable request.

Ethics approval and consent to participate.

Competing interests.

The authors have no competing interests to declare that are relevant to the content of this study.

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