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Promotion of positive youth development through a horticultural therapy program among Chinese adolescents

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Abstract: Most of the horticultural therapy programs have been conducted among individuals with special needs or health-related problems. To better understand how these programs can benefit other service recipients, more research is warranted. The present study investigated the impacts of a horticultural therapy program among Chinese secondary school students (Secondary 2) across three years (2013-2015). Both qualitative and quantitative data were collected to explore how the participants perceived such a program. Results showed that over 90% of the students were satisfied with the program and the program implementers. Similar results were shown in the focus group interview data, with participants reporting positive changes in their intra- and interpersonal growth. Findings of the present study extend the literature by demonstrating the beneficial effects of horticultural therapy on adolescents with greater psychosocial needs.

Keywords: Horticultural therapy, positive youth development, Chinese students, Project P.A.T.H.S., Hong Kong

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Introduction

The practice of horticultural therapy (HT) can be dated back to the 1800s when agricultural activities were used to help mental patients. Since the early 1900s and post-war era, horticultural activities have been used for physical rehabilitation in hospital programs (1). Over the past few decades, horticulture, including planting and gardening activities, has been extensively used in psychotherapy and rehabilitation programs in the United States. The establishment of the National Council for Therapy and Rehabilitation through Horticulture (re-named as American Horticultural Therapy Association, AHTH in 1988) further advanced the development of horticultural therapy. After several decades of research and practice, horticulture is regarded as effective in improving cognitive functioning, psychological well-being, as well as social and physical functioning through promoting human-nature interaction (2-4).

Horticultural therapy (HT) was defined by Davis (1, p.3) as "a process through which plants, gardening activities, and the innate closeness we all feel toward nature are used as vehicles in professionally conducted programs of therapy and rehabilitation". It is noted that horticulture could be used as a therapeutic modality, which offers numerous advantages in the working process, where people are involved in planning, growing and caring for plants. Horticultural therapy could take effect on individuals by providing meaning to and motivating participants through planting process, end products, interaction among participants, and the relationship between humans and environment. It emphasizes the client's engagement in plant-related activities and holds a belief that the active process of horticulture could achieve its therapeutic effects contributing to the designed treatment goals, such as improving mood or attention (2,5,6). Haller (6) summarized that the interaction between humans and plants could bring several advantages, including the encouragement of personal growth and wellness (e.g. the development of positive characteristics like patience and inner peace), mental restoration from fatigue, addressing the innate psychological needs such as providing better living environment, and offering meaning and purpose for establishing a healthy lifestyle. These advantages explained the ways of how horticulture may influence and bring positive changes to individuals.

Many studies have documented the use of horticultural activities in different settings and its benefits to service targets. Haller (7) suggested three main settings using horticultural programs with therapeutic focus: rehabilitation, psychiatric intervention, and long-term care. In rehabilitation programs, horticultural activities are designed for facilitating clients' recovery from an accident or illness, while in psychiatric intervention programs, horticulture activities are planned for managing or healing the illness by increasing tolerance of frustration and managing stress or coping with grief. Regarding long-term care, the activities are designed for maintaining personal functioning such as helping residents relinquish control over their lives through planting. In fact, horticultural activities are widely used in services for elderly with physical disabilities and cognitive impairments such as Alzheimer's disease and dementia (8,9).

In Hong Kong, horticultural and gardening activities are also implemented in nursing homes for the elderly with physical, social, and/or cognitive dysfunction (10,11). Horticultural therapy has been found to be effective in preventing the decline of mental abilities and promoting the overall functioning of the service recipients (12). Besides aged people, it is suggested that horticultural activities could benefit people at different life stages and with special needs (2). For example, a study found that planting activities were effective for children in reducing attention deficit symptoms (13). Another study also found that patients with clinical

depression experienced a significant reduction of depressive symptoms after a therapeutic horticulture program. Most of the patients in this study found the program to be meaningful to them and influential for their view about life (14).

Previous horticultural activity programs were mostly implemented among individuals with cognitive or social impairments (9,15), at-risk youth (16,17), people with mental or physical health problems (18,19), and the elderly (20-22). Researchers argued that the therapeutic benefits of horticultural therapy are not limited to any particular ages, genders, cognitive or physical abilities, or cultural groups (23), and regular exposure to nature and green space promotes psychological well-being (13,24,25). Horticultural therapy also promotes quality of life and impacts service recipients positively by reducing stress and enhancing self-esteem and happiness (26-29). In fact, many horticultural programs target specific populations including battered women (30) and criminal offenders (16,31). However, it is rare to use horticultural therapy for promoting adolescent development. Theoretically, youth population with developmental needs could benefit from the horticultural activities in promoting their personal growth. There are some existing studies documenting the benefits of planting in an indoor environment for university students (32) and office workers (33).

Recently, horticultural therapy has been introduced in school contexts (e.g., 34,35). For example, Robinson and Zajicek (36) found that elementary school students in an experimental group showed significant improvement in their social skills (teamwork) and self-understanding compared to those in the control group after participating in a one-year school garden program. Similar results were found in other gardening intervention studies (37,38). Horticultural therapy can serve as an ideal context for promoting holistic development among children and adolescents (e.g., 39). Nevertheless, to date, few studies have examined the possible impacts of horticultural therapy among secondary school students by using both qualitative and quantitative approaches. Researchers (35,40) argued the need to combine both qualitative and quantitative methods when studying the outcomes of these school gardening programs. Multiple data collection approaches, including surveys, interviews, and observations, should be used to strengthen the convergent validity of the evidence for effects on the student and school levels (40, p.860). Therefore, the present study explored the perception on a horticultural therapy program designed for high school students with greater psychosocial needs. The impacts of the program are discussed in terms of the quantitative and qualitative evaluation outcomes.

Methods

A total of 59 secondary school students (Secondary 2, equivalent to Grade 8) from two schools participated in the after-school horticultural program in three years (n=20 in 2013; n=12 in 2014; n=27 in 2015). Typically, the HT program was conducted once a week over a 12-week period. Each session lasted for 90-120 minutes. Most of the activities were conducted in classroom except for two sessions, which were outdoor camping and farm visiting (see Table 1). Written consents were obtained from participants and their parents or caretakers prior to the data collection.

Data Collection

Quantitative data

Students were invited to complete a subjective outcome evaluation form, which assessed three aspects of the program, namely program quality (8 items), implementer quality (8 items) and perceived program effectiveness (8 items). A total of 43 questionnaires were collected (n=15 in 2013; n=10 in 2014; n=18 in 2015) with a response rate of 73%. A six-point Likert scale was used (1=Strongly disagree to 6=Strongly agree). All data were analyzed using SPSS version 23.

Qualitative data

In addition, 14 students were recruited to participate in a focus-group interview once they had completed the HT program. Two interviews were conducted in a classroom (n=7 in March 2014; n=7 in March 2015). Participants were asked to describe their experiences in the program and satisfaction with the program. An interview guide was used to assess the participants' perception and overall experiences of the program. Themes related to the perception of the program were categorized and coded by a trained research assistant. To enhance validity, two researchers who were familiar with the program reviewed the emerged themes (41) and reached consensus.

Results

Quantitative Data

Descriptive statistics are shown in Table 2. Percentages of responses to the three aspects of program evaluation are presented in Tables 3-5. A majority of students were satisfied with the program (100% in 2013; 90% in 2014, 94% in 2015, Table 3) and the program implementers (90% in 2013; 95% in 2014, Table 4). Regarding the effectiveness of the program, students reported that the program enhanced their problem solving skills (93% in 2013; 90% in 2014, 100% in 2015, Table 5) and would join similar programs in the future (93% in 2013; 90% in 2014, 78% in 2015, Table 5).

Qualitative Data

Students' perceptions of the program were assessed based on the focus-group interviews. Several major themes were extracted from the qualitative data. First, students indicated that they perceived the activities positively after participating in the program. They reported positive changes in their attitudes towards nature.

> "After starting to plant, I have changed my values towards plants and flowers. Before, I could only make them die."

> "The seeds I planted were different than before; they would not die quickly, and even can germinate. I changed my attitude towards their vitality. They are strong."

Also, students specified that they learned to pay attention and became more patient after participating in the program.

"I learned to be detail-minded and attentive to what others say. For example, if the sprouts are not properly developed, the plants will not grow well. That's why you need to pay close attention."

A number of students indicated that the program was beneficial to their interpersonal relationships. They commented that their social and communication skills were improved after participating in the program. They learned to respect others and speak confidently.

"I treat my friends better. I always spoke to my friends in a rude manner, just like ordering them. But now I won't behave like that. I will listen to them first…"

"I have learned to restrain myself… I could not stop talking with my classmates during the class, but now I will listen to what others say before I speak. Because there are other members and everyone should be included in the sharing… I should listen to others, respect others, and I shouldn't occupy all the time by sharing my views."

"I have become more outspoken and talkative. Actually, when I was in a class, I was so passive to answer questions and always asked other classmates to speak first… even when I worked in a group. But now, as we always had group discussions (in the horticulture group), like what we are doing here, my confidence has increased and now I will be the first one to answer the questions in class."

"Sometimes I would be a bit impolite to my family… I think my family relationship improved after we grew a plant together. For example, before I always quarreled with my elder sister, but when planting a plant, we needed to cooperate with each other. If my sister watered it again after I just had watered it, the plant would have died."

A number of participants commented that they applied what they learned in the program to other domains.

Academic domain: "I have learned to study hard… It means I must devote more time, and sacrifice time to study."

Family domain: "I was seldom aware of my father's health and thought he was okay. But recently he came back home more frequently… I found his diet was bad, and his health was worse than before. I became more worried about him and now will pay more attention to his health."

Peers Domain: "I have become more patient. In the past, I hated waiting for others... but now I can wait for someone in a subway station or line up for something… I think it's because I need to water the plants regularly and become more patient after these regular practices…"

Discussion

The purpose of the present study was to explore the perceptions on school-based horticultural programs of secondary school students. The quantitative findings showed that participants perceived the program positively and felt the program was beneficial to their development. The results are consistent with findings in prior studies (42-44). The majority of the participants indicated that they benefited from the interaction with nature and others. Perhaps taking care of plants and building new contacts with others outside the classroom promoted individual aspirations and contributed to a meaningful life. These results are consistent with the findings in horticultural therapy literature (45). Nowadays, people usually spend their time indoors, such as playing computer games. This green-based intervention provides an opportunity for participants to interact with others and contact with natural environments (e.g., plants, flowers, leaves, sunlight, and seeds). Natural environment (e.g., plants, water, and soil) fosters positive emotion, decreases physiological arousal and encourages positive thinking (46). The psychophysiological benefits are further supported in another experimental study (47). The results of the present study are consistent with prior findings (47-49) and underscore the benefits of horticultural programs for promoting psychological well-being and interpersonal relationships in Chinese service recipients.

Also, contact with the natural environment allows the students to leave their stressful everyday life. In particular, these green-based activities provide an alternative way to help students recover from academic-related stress. Different plants such as flowering plants and foliage plants perform a symbolic function as a sign of nature, which serves as a “co-therapist” (50,51) and provides students a relief from the attention fatigue associated with their heavy academic study load (52). The stress relief function is supported by the Stress Recovery Theory (53) and a number of empirical studies (54-56). Our findings showed that the goals of the program were achieved and that the students benefited from this program by engaging in a reflective thinking process to evaluate their strengths and views of themselves.

Besides, the presence of informal learning environment facilitated the interaction among the participants. They learned to work together with respect and caring in order to complete the assigned tasks. Through this interaction, they developed mutual understanding and appreciation of the individual differences among the participants. These social benefits were in line with the prior findings that horticultural activities had positive effects on service recipients in promoting their social competence and interpersonal skills (16,36,54).

Several strengths of the present study can be highlighted. First, a psychometrically sound measure was used to evaluate the subjective outcome of the program. Second, the impact of the horticultural program was assessed in a Chinese context, where such research has rarely been conducted. Third, both qualitative and quantitative methods were adopted. However, the present study also has limitations. First, as the present findings were based on a case study, more research is needed to investigate a wider range of green-based activities and participants. Second, as horticultural therapy is “a time-proven practice” (5), future research should adopt longitudinal designs to study the long-term impact of the program. Finally, as the sample size of the present study was small, a large sample should be employed in future studies.

In general, the current study revealed that horticultural programs are feasible and desirable choices for after-school programs designed for students with greater psychosocial needs. The green-based programs promote psychological well-being and facilitate interpersonal skills among Chinese adolescents with greater psychosocial needs. Our findings shed light on evaluation research by showing the potential benefits of horticultural programs. This provides implications for practitioners and educators when designing successful holistic youth programs.

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Table 1. Background of the horticultural program

	2013	2014	2015
Period	• After-school period • one session per week (total 12 sessions) • 90-120 minutes per session		
No. of schools	1 school	1 school	2 schools
Program participants	20 students	12 students	27 students
Program implementers	1 horticultural therapist	2 horticultural therapists	2 horticultural therapists
Horticultural activities	• An introduction to the school gardening (e.g., introducing plants and seedlings, basic plant care) • Teaching and practicing gardening techniques and skills: plant propagation (types of separation), cutting (techniques, time, types), planting, and weeding • Introducing different characteristics of foliage and flowering plants • Cooking with herbs, craft activities (e.g., pressed flower photo frame, decorating vase) • Visiting farm gardens		

Table 2. Descriptive statistics among variables across years

		2013 (*n*=15)	2014 (*n*=10)	2015 (*n*=18)
	Scale	M (SD)	M (SD)	M (SD)
Content (8 items)	1-6	5.40 (.48)	5.64 (.64)	5.24 (.63)
Effectiveness (8 items)	1-6	5.70 (.62)	5.70 (.62)	5.28 (.58)
Implementers (8 items)	1-6	5.78 (.63)	5.78 (.63)	5.46 (.51)
Total (24 items)	-	5.70 (.61)	5.70 (.61)	5.34 (.53)

Table 3. Frequency of the positive views towards the program

	2013 (*n*=15)			2014 (*n*=10)			2015 (*n*=18)		
	Slightly agree *n* (%)	Agree *n* (%)	Strongly agree *n* (%)	Slightly agree *n* (%)	Agree *n* (%)	Strongly agree *n* (%)	Slightly agree *n* (%)	Agree *n* (%)	Strongly agree *n* (%)
1. The activities were well planned.	1 (7%)	10 (67%)	4 (27%)	1 (10%)	2 (20%)	7 (70%)	4 (22%)	8 (44%)	6 (33%)
2. The quality of the service was high.	-	9 (60%)	6 (40%)	1 (10%)	2 (20%)	7 (70%)	4 (22%)	6 (33%)	8 (44%)
3. The service provided could meet the participants' needs.	-	8 (53%)	7 (47%)	1 (10%)	1 (10%)	8 (80%)	4 (22%)	7 (39%)	7 (39%)
4. The service delivered could achieve the planned objectives.	-	8 (53%)	7 (47%)	1 (10%)	3 (30%)	6 (60%)	3 (17%)	8 (44%)	7 (39%)
5. I could get the service I wanted.	-	7 (47%)	8 (53%)	1 (10%)	2 (20%)	7 (70%)	2 (11%)	8 (44%)	8 (44%)
6. I had much interaction with other participants.	1 (7%)	7 (47%)	7 (47%)	1 (10%)	2 (20%)	7 (70%)	4 (22%)	8 (44%)	6 (33%)
7. I would recommend others who have similar needs to participate in this program.	1 (7%)	8 (53%)	6 (40%)	1 (10%)	1 (10%)	8 (80%)	3 (17%)	6 (33%)	9 (50%)
8. On the whole, I am satisfied with the service.	-	8 (53%)	7 (47%)	1 (10%)	0 (0%)	9 (90%)	1 (6%)	8 (44%)	9 (50%)

Note. All items are measured using a 6-point scale (1=Strongly disagree to 6=Strongly agree). Only positive responses (Options 4-6) are shown.

Table 4. Frequency of the positive views towards the program implementers

	2013 (*n*=15)			2014 (*n*=10)			2015 (*n*=18)		
	Slightly agree *n* (%)	Agree *n* (%)	Strongly agree *n* (%)	Slightly agree *n* (%)	Agree *n* (%)	Strongly agree *n* (%)	Slightly agree *n* (%)	Agree *n* (%)	Strongly agree *n* (%)
1. The worker(s) has professional knowledge.	-	6 (40%)	9 (60%)	1 (10%)	1 (10%)	8 (80%)	1 (6%)	9 (50%)	8 (44%)
2. The worker(s) demonstrated good working skills.	-	5 (33%)	10 (67%)	1 (10%)	1 (10%)	8 (80%)	1 (6%)	9 (50%)	8 (44%)
3. The worker(s) was well prepared for the program.	-	6 (40%)	9 (60%)	1 (10%)	0 (0%)	9 (90%)	2 (11%)	6 (33%)	10 (56%)
4. The worker(s) understood the needs of the participants.	-	7 (47%)	8 (53%)	1 (10%)	0 (0%)	9 (90%)	1 (6%)	5 (28%)	12 (67%)
5. The worker(s) cared about the participants.	1 (7%)	5 (33%)	9 (60%)	1 (10%)	0 (0%)	9 (90%)	0 (0%)	8 (44%)	10 (56%)
6. The worker(s)' attitudes were good.	-	6 (40%)	9 (60%)	1 (10%)	0 (0%)	9 (90%)	0 (0%)	9 (50%)	9 (50%)
7. The worker(s) had much interaction with me.	1 (7%)	6 (40%)	8 (53%)	1 (10%)	0 (0%)	9 (90%)	3 (17%)	7 (39%)	8 (44%)
8. On the whole, I am satisfied with the worker(s)' performance.	-	6 (40%)	9 (60%)	1 (10%)	0 (0%)	9 (90%)	1 (6%)	7 (39%)	10 (56%)

Note. All items are measured using a 6-point scale (1=Strongly disagree to 6=Strongly agree). Only positive responses (Options 4-6) are shown.

Table 5. Frequency of the positive views towards the effectiveness of the program

	2013 (*n*=15)			2014 (*n*=10)			2015 (*n*=18)		
	Slightly agree *n* (%)	Agree *n* (%)	Strongly agree *n* (%)	Slightly agree *n* (%)	Agree *n* (%)	Strongly agree *n* (%)	Slightly agree *n* (%)	Agree *n* (%)	Strongly agree *n* (%)
1. The program I joined helped me a lot.	1 (7%)	10 (67%)	4 (27%)	1 (10%)	1 (10%)	8 (80%)	3 (17%)	10 (56%)	5 (28%)
2. The program I joined enhanced my growth.	2 (13%)	9 (60%)	4 (27%)	1 (10%)	0 (0%)	9 (90%)	3 (17%)	8 (44%)	7 (39%)
3. In the future, I would join similar program(s) if needed.	1 (7%)	8 (53%)	6 (40%)	1 (10%)	0 (0%)	9 (90%)	4 (22%)	5 (28%)	9 (50%)
4. I have learnt how to help myself through participating in the program.	1 (7%)	10 (67%)	4 (27%)	1 (10%)	1 (10%)	8 (80%)	3 (17%)	11 (61%)	4 (22%)
5. I have positive change(s) after joining the program.	1 (7%)	9 (60%)	5 (33%)	1 (10%)	0 (0%)	9 (90%)	1 (6%)	9 (50%)	8 (44%)
6. I have learned how to solve my problems through participating in the program.	1 (7%)	10 (67%)	4 (27%)	1 (10%)	1 (10%)	8 (80%)	0 (0%)	11 (61%)	7 (39%)
7. Compare with before joining this program, my behavior has become better.	-	11 (73%)	4 (27%)	1 (10%)	3 (30%)	6 (60%)	3 (18%)	6 (35%)	8 (47%)
8. Those who know me agree that this program has induced positive changes in me.	2 (13%)	8 (53%)	5 (33%)	1 (10%)	2 (20%)	7 (70%)	0 (0%)	10 (59%)	7 (41%)

Note. All items are measured by a 6-point scale (1=Strongly disagree to 6=Strongly agree). Only positive responses (Options 4-6) are shown.