

## **Cover letter**

Mohamed Hussein Ramadan Atta  
faculty of nursing, Alexandria University, Egypt  
Alexandria governorate, Smouha area, Egypt

**Dear Editor: Clinical trial**

**Date: 3-10-2023**

We confirm that this work is original title: **Effect of Horticultural Nursing Program on psychological wellbeing, Hope, and Social Adjustment among patients with psychotic disorders.**

**In this study, we show that.**

### **Introduction**

The World Health Organization (WHO) stated that the worldwide prevalence of psychotic disorders is estimated to be around 3 in 1000 individuals with 3.5% of the general population (WHO, 2019). Psychotic disorders affect a person's thoughts, behavior, and emotions which are characterized by symptoms such as delusions, hallucinations, disorganized speech, and behavior. These disorders are linked to a significant loss of psychological wellbeing, which can lead to feelings of hopelessness, helplessness, and despair (Heinze et al., 2018; de Winter et al., 2022).

Patients with psychotic disorders often experience poor psychological wellbeing, which encompasses negative emotions such as anxiety, depression, fear, hopelessness, and despair. The factors contributing to this poor wellbeing are complex and can include biological, environmental, and social causes (Fornells-Ambrojo et al., 2016). Furthermore, symptoms of psychotic disorders, such as delusions, hallucinations, depressed and shifted mood can contribute to negative emotions, which can impact the overall psychological wellbeing of the patient. The prevalence of poor psychological wellbeing among psychotic patients is high, and it can significantly reduce their quality of life, impair their daily functioning, and increase their risk of self-harm and suicide. Adding, psychotic patients often experience a loss of hope, which refers to a state of pessimism and despair where individuals feel their situation is unlikely to improve. (Heinze et al., 2018; Shenoy & Praharaj 2023).

Poor social adjustment is a common challenge experienced by individuals with psychotic disorders. It refers to difficulties in adapting to and functioning in social situations and relationships (Smart et al., 2020). Furthermore, Tee et al., 2020 highlighted the importance of social support and social networks in promoting social functioning and reducing social isolation among individuals with psychotic disorders. Poor social adjustment can significantly impact the lives of individuals with psychotic disorders, reducing their quality of life, impairing their ability to function in daily life, and increasing their risk of relapse and hospitalization (Couture et al., 2019). Therefore, providing complementary interventions to routine care aimed at improving social adjustments and improving levels of hope which enhance psychological wellbeing are essential for the well-being of individuals with psychotic disorders (Kontos et al., 2021).

Complementary interventions, also commonly referred to as complementary and alternative medicine or integrative approaches, can offer several potential benefits for individuals with psychotic disorders. It's important to note that while some complementary interventions may be helpful, they should not be used as a substitute for evidence-based medical treatment. Horticulture therapy as one of complementary therapy is an effective and promising intervention for individuals with psychotic disorders, providing a range of benefits for their physical and mental well-being (Patricia et al., 2017; González et al., 2011; Siu et al., 2020)

Horticulture therapy involves gardening and plant-related activities as a form of therapeutic intervention, enhance patient to be mindful to current environment and promote relaxation which can reduce symptoms such as anxiety, depression, and social isolation, improve cognitive function, and promote overall well-being .With this respect, there is an urgent need to find a sustainable and eco-friendly solution for this complex issue by returned to nature and utilizing the low cost and current resources at the same time to make a signification reduction in the psychotic disorder's symptoms (Gorman, & Anwar, 2022; González et al., 2011; Kontos et al., 2021).

For instance, a systematic review by Van den Berg et al. (2015) found that horticulture therapy had positive effects on social functioning and quality of life in individuals with various mental health conditions. Horticulture therapy is promising therapy in promoting hope, the well-being of individuals with psychotic disorders, providing a low-cost, non-invasive, and engaging therapeutic option (Hernandez, & Garcia, 2022; Lu et al., 2021; Siu et al., 2020).

Horticulture therapy has been found to have positive effects on individuals with psychotic disorders, promoting social interaction, reducing social isolation, and improving cognitive function (González et al., 2011; Hemmati-Sadeghi et al., 2021; Siu et al., 2020; Van den Berg et al., 2015). Effectiveness of horticulture therapy in enhancing well-being, reducing symptoms, and facilitating social adjustment in this population, is (González et al., 2011; Siu et al., 2020; Van den Berg et al., 2015).

The research on horticulture therapy's impact on psychological well-being, hope, and social adjustment among patients with psychotic disorders holds significant importance for both patients and nursing professionals. It suggests that horticulture therapy programs can be a valuable therapeutic option, offering a non-invasive and engaging approach to promoting psychological well-being and social adjustment (González et al., 2011; Siu et al., 2020; Van den Berg et al., 2015). Additionally, by fostering social interaction and reducing isolation, horticulture therapy

provides opportunities for individuals with psychotic disorders to connect with others and establish supportive relationships (González et al., 2011; Siu et al., 2020).

Nurses have a crucial role in implementing and advocating for horticulture therapy programs, facilitating patient engagement, and providing ongoing support throughout the therapeutic process. The research underscores the potential of innovative and effective therapeutic interventions, such as horticulture therapy, to improve patient outcomes and enhance nursing practice (González et al., 2011; Siu et al., 2020; Van den Berg et al., 2015).

**The present study aimed to:**

Assess the impact of Horticultural Therapy Program on Psychological wellbeing, Hope, and Social Adjustment among patients with psychotic disorders.

**Research Hypothesis:**

Patients with psychotic disorders who received Horticultural Therapy exhibited higher psychological wellbeing, Hope, and Social Adjustment than those who didn't receive it.

**Study method& Procedure**

**Research Design:**

A quasi- experimental research design will be followed.

**Setting:**

The research took place at El-Maamoura Hospital for Psychiatric Medicine, which is affiliated with the Ministry of Health and Population. This hospital serves three governorates: Alexandria, Matrouh, and El-Beheira. It consists of a total of 21 wards, providing a combined capacity of 948 beds. Among these wards, 14 are dedicated to psychiatric care, catering to approximately 880 patients with psychotic disorders. Within the psychiatric wards, there are six free wards and four private wards, with two private wards for males and two for females. The private wards accommodate around 130 patients with psychotic disorders at any given time.

In addition to the general wards, the hospital includes specialized units, such as male and female intensive psychiatric care wards, adolescent wards, a psycho-geriatric ward, an addiction center, and an outpatient clinic for psychiatric and substance-dependent patients.

**Administrative steps**

Official written permission from General Secretariat of Mental Health and El-Maamoura Hospital for Psychiatric Medicine will be obtained for conducting the study after taking the ethical approval.

### **Ethical Considerations:**

The necessary formal approval and permission to conduct the study will be obtained from the Research Ethics Committee of the Faculty of Nursing, Alexandria University, Egypt. Patients will be informed about the purpose of the study and an informed written consent will be obtained. Also, they will tell that they have the right to refuse to participate in the study and that their decision will not affect their care. In addition, they will also say that they have the right to withdraw from the study at any time even after starting and that their privacy and confidentiality will be maintained.

### **Participants:**

The G\* Power windows 3.1.9.7 program will be used to estimate the sample size using the following parameters: total sample size around 880, effect size = 0.5,  $\alpha$  err prob=0.05, Power (1- $\beta$  err prob) =0.95, Number of groups=2, Number of measurements=3, Corr among rep measures=0.5. The program estimates a minimum sample size of 54 patients, the researchers decided to recruit 60 patients for the control group and 60 patients for the study group. To be eligible in the study, patients diagnosed with schizophrenia and bipolar disorder with no comorbidity, not in the acute stage, absence of any allergy toward plants, their duration of illness not exceeding 10 years and able to communicate coherently and relevantly as well as can read and write.

A proportionate stratified randomization sample technique from each unit will be obtained using the following formula: Total sample size/ size of the entire population  $\times$  the expected population size of each unit. The required sample size will be selected randomly. Patients of the study group will be randomly subdivided into six groups with ten patients in each group and will receive 8 one-hour group sessions of interventions, in addition to the routine hospital care. The control group will receive routine hospital care only (psychiatric examination, diagnosis, and pharmacotherapy).

A total of 850 participants will be approached, 120 patients will select randomly, 60 for control and study group equal. To ensure that all hospital wards that serve adult patients with psychotic disorders will properly be represented in the study sample, the stratified sampling technique will used through applying the following steps:

- a. The 14 of psychiatric wards will be divided into two strata based on male: female proportion; (8 adult male and 6 adult female wards for psychotic patients).
- b. Considering the male to female wards ratio around (3: 2), random selection of adult psychotic wards will do using simple randomization technique to pick up 50% of these wards (7 wards).
- c. On each randomly selected ward, all patients' medical charts will be screened to identify

patients who met the predetermined inclusion criteria.

d. From all patients who met the predetermined inclusion criteria in the selected ward, one third of them will be picked using simple randomization technique (almost the same proportion used in the decided upon number of subjects. Steps will repeat until the number of decided upon subjects will reached for control and study group 60 patients each.

### **Tools:**

The following four tools will used to collect data:

#### **Tool I: social and health profile form:**

This form divided into two parts:

- **Part I** is concerned with patients' socio-demographic data such as sex, age, marital status, educational level, working status, and place of residence.
- **Part II** aimed to elicit data related to patient's health such as duration of illness, presence of plant allergy, previous psychiatric treatment, and medications currently prescribed.

#### **Tool II: The Herth Hope Index (HHI)**

This scale is a self-reported tool designed to measure an individual's sense of hope and optimism (Herth, 1991). It consists of twelve items that are rated on a four-point Likert scale, ranging from "strongly disagree" to "strongly agree,". The HHI has been used in research studies, including those involving individuals with psychotic disorders, such as schizophrenia, to measure hopefulness, reported to be valid and high internal consistency (coefficient  $> 0.90$ ) (Mahmoud, Ali, & Hafez, 2021).

The reliability of the HHI has been demonstrated in various studies, including those involving individuals with psychotic disorders. Similarly, a study published in the International Journal of Mental Health Nursing in 2019, which evaluated the effectiveness of therapeutic horticulture for individuals with clinical depression, reported high internal consistency for the HHI (González et al., 2011).

#### **Tool III : Ryff psychological wellbeing scale (PWBS):**

The Psychological Wellbeing Scale (PWBS) was developed by Ryff in 1989 and modified to 18 items. The PWBS consists of seven-point Likert scales for each of its six subscales, which include autonomy, environmental mastery, personal growth, positive relations with others, purpose in life, and self-acceptance. The scores for each subscale are averaged, with higher mean scores indicating greater psychological wellbeing. Studies of psychotic patients have shown that the PWBS has high internal consistency, with alpha coefficients ranging from 0.78 to 0.88 (Mahmud, Islam, & Sharif, 2022).

#### **Tool IV: Social Adjustment Scale Self-Report (SAS-SR):**

The Psychological & Social Adjustment Scale is a measure of psychological and social adjustment that will originally be modified by Weissman in 1999. is a paper-and-pencil selfreport scale that measures instrumental and expressive role performance over the past 2 weeks in adults. The 54-

item assessment covers six areas of functioning, including work (either as a paid worker, unpaid homemaker, or student), social and leisure activities, relationships with extended family, role as a marital partner (if applicable), parental role (if applicable), and role within the family unit (including perceptions of economic functioning). The scores for each domain are calculated as averages, with higher mean scores indicating better psychological and social adjustment. The scale has been found to have high internal consistency with alpha coefficients ranging from 0.78 to 0.89 (Gameroff, Wickramaratne & Weissman, 2012).

**The Preparation Phase**

**Pilot study**

To assess the transparency, objectivity, viability, relevancy, and applicability of the research tools, a pilot study will perform on 20 patients who met the inclusion criteria .The patients in this group will not be included in the study sample. Study tools will test-retest reliability will do for the study tools; The Herth Hope Index (HHI), Psychological &Social Adjustment Scale and Ryff psychological wellbeing scale (PWBS).

**Implementation of the Horticultural Therapy Program**

On each recruited ward patients will interview individually to establish rapport and to apply tool I (A Socio-demographic and Clinical data Structured Interview Schedule) to elicit their sociodemographic and clinical characteristics. Each patient gets detailed explanations in relation to the aim of the study and objectives of the training and tool I, II, III, and IV. The latter two steps will do for the control group to take base line data and cross matching with study group will be applied.

Egyptian Horticultural Therapy Program will develop by researcher in psychiatric nursing and **botanist** (reference) that included planting, watering, follow up, and harvesting plants. It consisted of eight group sessions; a 30-minute session will be conducted once a week for eight weeks. The first introductory session will concern participants sharing their interest in and experiences with plants, defining the goals of HT about their past horticulture experiences. At the end of the first session, a written plan for every session (time, duration, and setting) will be scheduled individually with each patient. Session conduct by two general group as female group and male group.

The therapist emphasized the use of two plants, one that produces a crop (Cloves) and the other one aromatic and floral plant (Lavender). *Insert Table 1*

Session	General objective:	Steps
Opening session	Emphasizing the general aim of	General information about

<p>I-</p>	<p>-planting</p> <p>Empowering self-competency to take care of plant</p>	<p>-psychosocial benefit of planting.</p> <p>Name the plants with presentable product of Cloves and Levander.</p> <p>Asking about feeling toward plants and process of planting</p> <p>Give detailed brochure about steps of planting.</p> <p>Providing tool of planting -(seeds, seedlings, soil, pots.....)</p> <p>Give note of schedule about daily expression of emotion</p>
<p>II- Beginning of Hope</p>	<p>- Learning and practicing planting</p> <p>- Assuring the understanding</p>	<p>- ???????</p>
<p>III- It grows green</p>	<p>- Learning and practicing propagation skills.</p> <p>- Reflecting on and sharing thoughts about the vitality of plants.</p>	<p>- Expression of patients note</p>
<p>IV- Attention and follow up</p>	<p>- Focusing on patients' emotions</p> <p>- Practice the emergency care</p>	<p>- Debriefing and expression of patient's emotion</p> <p>- Write note about current</p>

	<p>of planting</p>	<p>state. _____</p>
--	--------------------	---------------------

		<ul style="list-style-type: none"> <li>-</li> <li>- n to the complain about planting.</li> </ul>
<b>V- Mindfulness: watching, and smell plants tasting ing the</b>	<ul style="list-style-type: none"> <li>- Experiencing mindfulness techniques during the activities.</li> <li>- sharing thoughts about using this experience in mindful eating, and its potential use as a relaxation activity.</li> </ul>	<ul style="list-style-type: none"> <li>- Present moment awillness of watching, tasting and smelling.</li> <li>- Describe the current view, smell, and taste in a nonjudgment attitude.</li> <li>- Correct the patient’s description as focus on past/ future or previous judgmental talks.</li> </ul>
<b>VI- Exhibition Garden: collective view</b>	<ul style="list-style-type: none"> <li>- learning to design a pot garden using various plants and decorations.</li> <li>-</li> </ul>	<ul style="list-style-type: none"> <li>- Present every patient plant.</li> <li>- share thoughts about the feeling of appreciation.</li> </ul>
<b>VII- Time of harvesting</b>	<ul style="list-style-type: none"> <li>- Practicing harvesting.</li> </ul>	<ul style="list-style-type: none"> <li>- share the symbolic meaning of harvesting. To share overall feedback about the HT sessions.</li> </ul>
<b>VIII- Ending session</b>	<ul style="list-style-type: none"> <li>- Describing overall feedback about the HT sessions.</li> </ul>	<ul style="list-style-type: none"> <li>- Ask about meaning of growing.</li> <li>- Describe benefits and</li> </ul>



		hazards of planting
--	--	---------------------

### **Evaluation or Follow-up Phase**

The evaluation phase encompassed a post-test assessment after one month and a 3-month followup assessment using the outcome measures administered at baseline that will be conducted for both groups (study and control groups) through interviewing the participants individually to ensure the effectiveness of the HT.

Give the detailed session and material for control group if needed.

### **Statistical analysis plan**

Quantitative data will be analyzed and presented using various statistical measures. To assess the normality of distribution, the Kolmogorov-Smirnov test will be performed. Descriptive statistics such as range (minimum and maximum values), mean, standard deviation, and median will be used to summarize and describe the quantitative data. The significance of the results obtained from statistical tests will be evaluated at the 5% level.

For qualitative data, numbers and percentages will be used to describe and summarize the findings. On the other hand, quantitative data will be summarized using the minimum and maximum values to reflect the range of the data. The mean will be employed as a measure of central tendency in statistical significance testing, while the standard deviation provides information about the variability of the scores in the dataset.

Chi-square test, Monte Carlo test: used to test the significance of result of qualitative variable.

In addition, paired t-test will be used to test the significance of result of normal quantitative variables.

Marginal Homogeneity Test Non-parametric significance tests will be used for two dependent samples and McNemar test significance with two dependent sample studies.

## References:

- Kule M, Kaggwa MM. Adherence to Typical Antipsychotics among Patients with Schizophrenia in Uganda: A Cross-Sectional Study. *Schizophr Res Treatment*. 2023 Feb 3;2023:7035893. doi: 10.1155/2023/7035893. PMID: 36778520; PMCID: PMC9918368.
- Yang, Y., Ro, E., Lee, T.-J., An, B.-C., Hong, K.-P., Yun, H.-J., Park, E.-Y., Cho, H.-R., Yun, S.-Y., Park, M., Yun, Y.-J., Lee, A.-R., Jeon, J.-I., Jung, S., Ahn, T.-H., Jin, H.-Y., Lee, K. J., & Choi, K.-H. (2022). The Multi-Sites Trial on the Effects of Therapeutic Gardening on Mental Health and Well-Being. *International Journal of Environmental Research and Public Health*, 19(13), 8046. <https://doi.org/10.3390/ijerph19138046>
- Kontos K, Koutsou S, Sismanidi A, Theodoropoulou N, Nikolopoulou V, Filippiadou M, Papazisis G. The effects of horticultural therapy on the functionality of psychotic patients employed in the green unit of the psychiatric hospital of thessaloniki greece. *Eur Psychiatry*. 2021 Aug 13;64(Suppl 1):S506. doi: 10.1192/j.eurpsy.2021.1354. PMCID: PMC9475942.
- Couture, S. M., Garcia-Sanchez, A. M., Penn, D. L., & Wall, M. M. (2019). Social cognition and social functioning in schizophrenia. *Journal of Clinical Psychology*, 75(3), 397-412. doi: 10.1002/jclp.22699
- Mahmoud, A.S., Ali, S.I., & Hafez, A.A. (2021). Relation between the Level of Hope and Functional Recovery among Patients with Schizophrenia. *Port Said Scientific Journal of Nursing*, 8(3), 601.
- de Winter, L., Couwenbergh, C., van Weeghel, J., Hasson-Ohayon, I., Vermeulen, J. M., Mulder, C. L., Boonstra, N., Klaver, K. M., Oud, M., de Haan, L., & Veling, W. (2022). Changes in social functioning over the course of psychotic disorders - A meta-analysis. *Schizophrenia Research*, 239, 55-82. doi: 10.1016/j.schres.2021.11.010. PMID: 34844096.
- Gameroff, M. J., Wickramaratne, P., & Weissman, M. M. (2012). Testing the Short and Screener versions of the Social Adjustment Scale – Self-report (SAS-SR). *International Journal of Methods in Psychiatric Research*, 21(1), 52–65. doi:10.1002/mpr.358.
- González, M. T., Hartig, T., Patil, G. G., Martinsen, E. W., & Kirkevold, M. (2011). A prospective study of group cohesiveness in therapeutic horticulture for clinical depression. *International Journal of Mental Health Nursing*, 20(2):119-29. doi: 10.1111/j.14470349.2010.00689.x.
- Heinze, K., Lin, A., Nelson, B., Reniers, R. L. E. P., Uptegrove, R., Clarke, L., Roche, A., Lowrie, A., & Wood, S. J. (2018). The impact of psychotic experiences in the early stages of mental health problems in young people. *BMC Psychiatry*, 18, 214. doi: 10.1186/s12888-0181767-y. PMID: 29954377, PMCID: PMC6025824.
- Herth, K. (1991). Development and refinement of an instrument to measure hope. *Scholarly Inquiry for Nursing Practice*, 5(1), 39-51.

- Ibrahim, A. K., Kelly, S. J., Adams, C. E., & Glazebrook, C. (2013). A systematic review of studies of depression prevalence in university students. *Journal of Psychiatric Research*, 47(3), 391-400. [<https://doi.org/10.1016/j.jpsychires.2012.11.015>]
- Lu, S., Zhao, Y., Liu, J., Xu, F., & Wang, Z. (2021). Effectiveness of Horticultural Therapy in People with Schizophrenia: A Systematic Review and Meta-Analysis. *International Journal of Environmental Research and Public Health*, 18(3), 964. doi: 10.3390/ijerph18030964. PMID: 33499390, PMCID: PMC7908324.
- Mahmud, A., Islam, S., & Sharif, F. (2022). Components and Predictors of Psychological Wellbeing in Young Adults. *Eurasia Proceedings of Educational & Social Sciences (EPESS)*, 25, 166-193. Ryff, C. D., Almeida, D. M., Ayanian, J. S., Carr, D. S., Cleary, P. D., Coe, C., ... Williams, D. (2010). National Survey of Midlife Development in the United States (MIDUS II), 2004-2006: Documentation of psychosocial constructs and composite variables in MIDUS II Project 1. Ann Arbor, MI: Inter-university Consortium for Political and Social Research.
- Shenoy, S., & Praharaj, S.K. (2023). Risk factors associated with suicide attempts in patients with schizophrenia: an observational study from South India. *Middle East Current Psychiatry*, 30, 48. doi: 10.1186/s42985-023-00048-9.
- Shryock, S. K., & Meeks, S. (2018). Assessing psychological wellbeing in individuals with schizophrenia and bipolar disorder: A validation of the Psychological Wellbeing Scale (PWBS). *Journal of Mental Health*, 27(6), 543-549. [<https://doi.org/10.1080/09638237.2017.1407701>](<https://doi.org/10.1080/09638237.2017.1407701>)
- Siu, A.M.H., Kam, M., & Mok, I. (2020). Horticultural Therapy Program for People with Mental Illness: A Mixed-Method Evaluation. *International Journal of Environmental Research and Public Health*, 17(3), 711. doi: 10.3390/ijerph17030711.
- Smart, E. L., Brown, L., Palmier-Claus, J., Raphael, J., & Berry, K. (2020). A systematic review of the effects of psychosocial interventions on social functioning for middle-aged and older-aged adults with severe mental illness. *International Journal of Geriatric Psychiatry*, 35(5), 449-462. doi: 10.1002/gps.5264. PMID: 31919890.
- Tee, H., Priebe, S., Santos, C., Xanthopoulou, P., Webber, M., & Giacco, D. (2020). Helping people with psychosis to expand their social networks: the stakeholders' views. *BMC Psychiatry*, 20, 29. doi: 10.1186/s12888-020-2442-2.
- Van den Berg, P., Wendel-Vos, W., Van Poppel, M., Kempen, G., Van Mechelen, W., & Maas, J. (2015). Health benefits of green spaces in the living environment: A systematic review of epidemiological studies. *Urban Forestry & Urban Greening*, 14(4). doi: 10.1016/j.ufug.2019.126543
- Weissman, M. M. (1999). Social adjustment scale – self-report technical manual. Toronto, OT: Multi-Health Systems.
- World Health Organization. (2019). Mental disorders. Retrieved from <https://www.who.int/news-room/fact-sheets/detail/mental-disorders>

- Patricia L. Gerbarg, Philip R. Muskin, Richard P. Brown. *Complementary and Integrative Treatments in Psychiatric Practice*. (2017). United States: American Psychiatric Publishing
- Gorman, L. M., Anwar, R. (2022). *Mental Health Nursing*. United States: F.A. Davis.
- Hernandez, S. & Garcia, J. (2022). *The Sustainable City XVI*. (n.d.). United Kingdom: WIT Press.
- Xu M, Lu S, Liu J, Xu F. Effectiveness of horticultural therapy in aged people with depression: A systematic review and meta-analysis. *Front Public Health*. 2023 Mar 8;11:1142456. doi: 10.3389/fpubh.2023.1142456. PMID: 36969640; PMCID: PMC10031070.
- Mourão I, Mouro CV, Brito LM, Costa SR, Almeida TC. Impacts of therapeutic horticulture on happiness and loneliness in institutionalized clients with mental health conditions. *British Journal of Occupational Therapy*. 2022;85(2):111-119. doi:10.1177/03080226211008719
- Chu HY, Chan HS, Chen MF. Effects of Horticultural Activities on Attitudes toward Aging, Sense of Hope and Hand-Eye Coordination in Older Adults in Residential Care Facilities. *Int J Environ Res Public Health*. 2021 Jun 18;18(12):6555. doi: 10.3390/ijerph18126555. PMID: 34207071; PMCID: PMC8296344.
- Fernando, T. D., Yak, K., Ala, A. W., & Hangawatha, T. M. (2016). Effects of Horticultural Therapy on Hope and Wellbeing of Hospitalized Patients. In *Proceedings of 15th Agricultural Research Symposium* (pp. 209-213). Department of Horticulture and Landscape Gardening, Faculty of Agriculture and Plantation Management, Wayamba University of Sri Lanka.
- Zhong YQ, Tu HM. Horticultural Activity Type, Psychological Well-Being, and Fruit and Vegetable Intake. *Nutrients*. 2020 Oct 28;12(11):3296. doi: 10.3390/nu12113296. PMID: 33126480; PMCID: PMC7692162.
- Sia, A., Ng, K. S. T., Ng, M. K. W., Chan, H. Y., Tan, C. H., Rawtaer, I., Feng, L., Mahendran, R., Kua, E. H., & Ho, R. C. M. (2018). The Effect of Therapeutic Horticulture on the Psychological Wellbeing of Elderly in Singapore: A Randomised Controlled Trial. *Journal of Therapeutic Horticulture*, 28(1), 1–10. <https://www.jstor.org/stable/26598039>
- Ng, T. K. S., Gan, D. R. Y., Mahendran, R., Kua, E. H., & Ho, R. C. M. (2021). Social connectedness as a mediator for horticultural therapy's biological effect on community-dwelling older adults: Secondary analyses of a randomized controlled trial. *Social Science & Medicine* 284, September, 114191
- Sempik, J., Rickhuss, C., & Beeston, A. (2014). The Effects of Social and Therapeutic Horticulture on Aspects of Social Behaviour. *British Journal of Occupational Therapy*, 77(6). DOI: 10.4276/030802214X14018723138110
- Oh, Y.-A., Lee, A.-Y., An, K. J., & Park, S.-A. (2020). Horticultural therapy program for improving emotional well-being of elementary school students: An observational study. *Integrative Medicine Research*, 9(1), 37-41. <https://doi.org/10.1016/j.imr.2020.01.007> ↗

**Thank you so much.**

**Thank you for your consideration of this research.**

**Sincerely,**

**[Mohamed Hussein Ramadan Atta]**