

PLANT GARDENING AND MENTAL HEALTH DURING COVID-19: A CORRELATIONAL STUDY

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ABSTRACT

The COVID-19 pandemic contrived and brought traumatic impacts to individuals. This tough situation affected the mental health especially those at a young age. In order to cope with the stress caused by changes in the community and the threat of the virus itself, some people engaged in psychologically helpful leisure activities such as practicing plant gardening. Gardening has been proven to help in reducing the impact of tension and pressure from the outside environment which can cause a person to suffer anxiety, depression, and other mental difficulties. Thus, this study tends to articulate the (1) demographics of the respondents according to sex and age (2) the mental health status of the respondents after engaging in plant gardening and (3) if there a significant relationship between the demographics of the respondents. It aims to determine the benefits of plant gardening among senior high school and college students during the pandemic wherein it follows certain demographics, and the sample are examined all in one specific point in time. Home Gardeners Survey questionnaire is a two-paged research instrument developed to gather a range of how mental health is affected by plant gardening. It is resulted in this study that majority of the fifty-one (51) respondents from Colegio de San Juan de Letran experienced the benefits of positivity, calmness, and restoration that plant-gardening contributes to their overall state of mind. Most of participants acknowledge that gardening can be used as a treatment to improve the mood of a person despite of the burden one is facing due to pandemic.

Keywords: *plant-gardening, mental health, pandemic, effects, students*

INTRODUCTION

Gardening is a habit of developing plants in as a piece of nature that has been considered as restorative for individuals encountering mental health difficulties (Camic et al., 2013). Horticultural practice such as planting gives chances to enhance attention and direction through caring about plants in the garden (Cheol et al., 2016). According to Shiue (2015), plant gardening has been accounted for being beneficial for one's mental health in all populaces since 2000 as it reminds and interfaces us in nature to look and focus more on greater view to ease manifestation of mental issues. Since natural environment habits require less effort attention, it serves as a way to avoid the distraction from everyday living as it improves psychological well-being through emotional regulation and help relieves from mental difficulties (Pachana et al., 2020). As being a vital source ecologically, plants and agricultural gardening provides social, emotional and as well as mental

advantages for human's health and development (Abak et al., 2019).

People have a fundamental role in biological system. The interactions in varieties of plant species affect the relationship between individual and environment (Maria, 2014). For about two million years, plants have been part of human condition and made its behavioural effects as the reciprocity becomes deep and prolonged. It is inconceivable that plants would be devoid to nature for the reason that individuals become dependent to plants in their everyday living. Throughout the advancement of humans, there has been a constant connection that grows within the plant and person (Guy, 2017). The interaction with nature assist to develop the mind from mental fatigue from outside performances (Flora, 2010), prevent stress damage and promote recovery (Walter et al., 2013), reduced the risk of anxiety (Hosseini, 2018) and

increase the value of physical functional abilities of individuals experiencing mental health problems (Han et al., 2018).

During the past few years, mental disorders have been increasingly perceived as one of the development issues in the world (Votruba, 2014). Mental health is considered as a topic of public concern up until now since 14% of global burden of disease that corresponds to neuropsychiatric problems, most of which is caused by long-term depression, alcohol and drug dependency, psychoses, and other common mental problems (Prince, 2007). Individuals, specifically in the Europe and the USA, frequently avoid or postpone help-seeking for mental health professionals. People in the low to middle socioeconomic class are most likely to be untreated which may lead to troublesome consequences. For instance, untreated psychosis may lead to worse results such as bipolar disorder, depression, and anxiety disorders (Clement, 2014).

Globally, there has been a study in Nova Scotia, Canada (Unruh, 2004) wherein it was concluded that there are various meanings of plant gardening on every person, and it can differ due to factors such as their personal interests, experience on gardening, and their present situations. Additionally, it has been disclosed that plant gardening can possibly be one's way of coping due to stressful situations and it also contributes to one's spiritual, physical, emotional, and social state of well-being (Elings, 2006). One of the most frequently used method of people-nature interaction is through gardening in which it can be enjoyed even in the comfort of their homes, and this is being used in a lot of countries. Specifically, it is estimated that there are 27 million people, 40% of the total population, that are active in gardening in United Kingdom (U.K.) alone.

There have been numerous studies regarding the mental help seeking among Filipinos and they have concluded that services for mental health are hard to access and monetarily available. Some factors that have stopped or dispirited Filipinos from seeking help from mental health professionals include stigma, humiliation, and collectivist beliefs (Tuliao, 2014). In order to solve this, it has resulted that the more time a human spends the day in gardening and engage himself to participate on it, the better enhancement of mood and improvement of mental stability would be visual (Shaw, *The Positive Effects on Mental Health of Visiting Botanic Gardens.*, 2015). Nationally, there are approximately 117 million people and 32 million people that actively participates in gardening in the U.S. and Japan, respectively (Soga, 2017). Since 1817, plants have already been used to promote the development of good mental state and is considered therapeutic for meant illness treatment.

Moreover, plants symbolize life and hope for the future (Lin, 2014).

Nevertheless, the pandemic due to Coronavirus COVID-19, hugely impacted everyone and operations all over the world. Locally, in the Philippines, different industries have been temporary closed, community quarantine and limited operation of industries have been implemented. This Coronavirus is just like no other, even pandemics from the past have caused psychosocial disturbances as well which can be a lot harder to tell than other illnesses (Pastor, 2020). A study has been conducted that assessed 398 parents of children that experienced isolation or quarantine due to the disease and it was found that 30% of the contained children and 25% of the quarantined parents have adhere to have post-traumatic stress disorder (PTSD) (Hossain, 2020). Apart from the fact that the level of person's productivity is far from the past because of CoVid-19 changes that our society has faced during this pandemic, individuals begin to feel the loss of freedom and apathy that makes emotional stress (Farinetti et al., 2020), increase the loneliness (Garwood and Florillo, 2020) and have a sense of uncertainty in staying at homes (Zheng et al., 2020).

Accordingly, the data regarding the gardening effects on mental health are retrieved from 55 participants who practice plant gardening for the betterment of their mental health through the distribution of questionnaires that researchers will prepare which includes the cognitive, behavioral and affective components to measure attitudes toward plants, its significance, effects and use. Pre-survey as well as the survey itself will be done online using Google Forms with demographic attributes such as age, sexual orientation and having a garden (yes/no).

In this regard, this study intended to find evidence of plant gardening's effect on the respondents' mental health. Specifically, this study aims to: (1) determine the demographics of the respondents in terms of their age and sex; (2) describe the mental health status of the respondents after engaging in plant gardening; and (3) determine if there is a significant difference among the mental health status of the respondents after engaging in plant gardening according to their sex.

The limitation of the study may not be generalized to those who started practicing plant gardening many years ago considering that the study will only focus and access the participants who are just started planting in the beginning of the crisis and have an age of above 18 for the reason that they are the ones prone in emotional distress and affected by the effects of COVID-1919 burden (Eisner et al., 2020). With this in mind, the researchers intend to articulate the mental health

status of people who are undergoing stress and related problems due to the pandemic that are involved in plant gardening, explore the interrelationship between people-plant interactions and be purposive at understanding of gardening towards its beneficiaries to a mental health of a well-being.

This research stands for its contributions to: (1) Students to be able to understand how helpful gardening is and the different benefits plants that helps them to analyze the significance of it. Through this study, they are able to identify their mental health status by knowing the effects of plant gardening to them whether it brings positive or negative impacts. (2) Adults gain ideas towards the relationship between gardening and mental health that improve their daily living and productivity. (3) con

THEORETICAL BACKGROUND

Two ascendant theories considered to be essential in finding the effects of plant-gardening on mental health. First is *Overload and Arousal Theory* (Ulrich and Parsons, 1992). This hypothesis represents that in the modern society, people are continually besieged with so much noise, uncertainty and visual complexity that reflects on how the individuals think and response to its actions. Some environmental factors can overpower one’s senses and lead to harming levels of mental and physiological energy. Nature conditions overwhelmed by plants, then again, are less mind complex and have designs that lessen arousal and, in this way, minimize our sentiments of stress. Moreover, Kaplan and Kaplan (1989) studied in *Stress Recovery Theory and Attention Restoration Theory* that commitment to environmental habits secures individuals against the natural stressors and offer psychological, emotional, and mental restoration. Exposure to plants and nature intervenes the effects of negative feelings and enhanced the positive emotions and mind-set to improve intellectual performance and to recover from physiological symptoms of stress. Both theories explained the influence of plant-gardening on mental health and the benefits of people-plant interaction despite of the society imbalances. In respect to this, the researchers hypothesized that the gardening has a huge impact on mental health of individuals and can be a coping strategy to relieve the psychological problems caused by the CoVid-19 pandemic.

Several results in published studies are found to be aligned with the hypothesis that plant gardening effectively decrease the attentional fatigue during mental difficulties brought by the environment imbalances. Study from Shaw

(2015) proved that gardening carried out positive and successful contributions to emotional and mental wellness of individuals having connection to plants by engaging themselves to create and accomplished something productive despite the environmental difficulties that the society are facing. In times of stressful days, the mood capacity of a person had boost and increased as it helps everyone to combat loneliness and improves the quality of life (Hayes, 2017). Experimental research from (Berto, 2014) found evidence that interaction of people to nature have rebuild the mind to recover from pressure and mental fatigue that ecological stressors produce. Taking care, a garden offers one’s physiological, enthusiastic and consideration to restore the productivity that have loss due to environmental changes. According to (Bentsen et al., 2018) their participants who are psychologically exhausted and started themselves to engage in exposure to environment had a higher positive mood potential and better improvements in their daily task than the individuals who have not been expose to environment.

Conceptual Framework

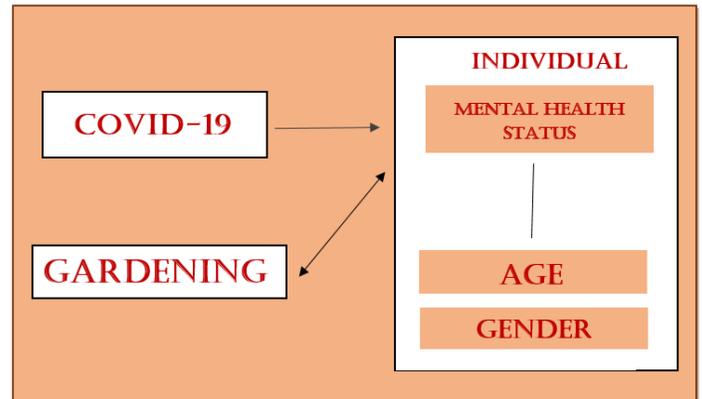


Figure 1: Conceptual Framework

This conceptual framework represents the relevant variables that the researchers are expected to find out throughout the research. This study will be conducted by comparing the independent and dependent variables. The research objectives will be carried out through studying the relationship between plant gardening and mental health during COVID-19.

To demonstrate the expected cause-and-effect relationship, the use of boxes and lines on diagram illustrates the interaction of people to plants and how the key factors connect with each other. The arrows represent how the demographics influenced the plant gardening then how this

activity affected the mental health status of individuals. In regards with the published studies about plant gardening, benefits and effectiveness of this outdoor habit has been constant to many which makes it to be controlled variable. Nevertheless, demographics such as age and gender influenced one's mental health resiliency in this time of pandemic.

People-plant Interaction

Gardens can be moderately serving various gatherings of individuals, including children, the older and people with disabilities. A regular practice of planting can improve physical, mental and social wellbeing. Consequently, in a long-term perspective, plants can lighten and prevent different health problems and medical issues that the present society faces (Yamaura et al., 2017). Nowadays, our environment has isolated individuals from daily contact with the green environment and this has prompted an overall disparity of social development which has prevented the physical and mental adaptation of people to plants and its surroundings (Toskovic, 2017). A feeling of nature was made by bringing connections to people and making interactions in a more extensive way to meditate the difficulties in social associations (Fortune et al., 2015). The human interaction with plants and nature may contribute to the performance and mentality of well-being and has likewise been developed as a study of science, which is frequently named horticulture therapy which means the practice of gardening that serves as leisurely habit for many (MacMillan, 2013). Contact with nature is related to human well-being and health. The people-plant interaction provides strength through contact with nature, interceding associations with others and building the feel of situations. Given this information, planting exercises can be utilized as occupational treatments (Bratman et al., 2020). Approximately 70% out of all the households in United States of America (USA) connect with nature through some way of gardening or by taking care of plants as a form of leisure (Guy, 2017). The result proposed that horticultural activities such as planting, floral arranging, creating indoor beds, preparing soil and creating individual garden when utilized in a group-based setting, has a prompt and positive outcome on life fulfillment, prosperity, and self-idea of individuals (Walsh et al., 2000).

Difficulties on Mental Health During Coronavirus

The pandemic brought about by COVID-19 is viewed as a serious health issue, mainly since the majority of the infected people don't show indications and can transmit the

disease (Amaral, 2020). During the past centuries, one of the ways to prevent the spread of an infection is through isolation or quarantine. This is used to limit the contamination among people and ways to implement this is by having short-to-medium-term lockdowns, curfews, travel restrictions, and restricting mass gatherings among people. These ways or methods result to the everyday routines of most people to change drastically (Usher, 2020). Depression, excessive sadness, stress, and nervousness can likewise influence individuals at this period. Stress is predominantly identified with the volume of accessible data which doesn't continually carry clear information as for chances, duration of the pandemic, impact on the economy, among different factors. (UN, 2020). The feeling of being unsafe and fears concerning the virus outbreak, in addition to lockdowns and quarantine, are predicted to result to an increase in cases of suicide, as well as mental issues linked to suicide (Xiong, 2020). Additionally, hoaxes, misleading news, lack of information regarding the cause or progress of the disease and its outcomes are instances of disease-fear contagion nexus which can be linked to the feeling of unsafety among people. Moreover, social, and economic groups that are most vulnerable and at risk of psychological harm in these situations include children, adolescents, old people, people with low socioeconomic status, females, and people with preceding mental health issues (Usher, 2020).

Mental Health Benefits

Gardening can take different structures, from straightforward demonstrations of planting and keeping up house plants to green complex multistep exercises. A few restorative advantages from cultivating and agriculture have been proposed throughout the years such as decreasing a person's feeling of loss; giving chance to innovativeness, self-expression, social communication, and sensory incitement; expanding confidence; and improving the whole mental capabilities. (Glicksman, 2013) There is impressive proof of the restoration impacts of plant-gardening related with a decreased risk of mental trouble, burdensome manifestations, clinical tension and the way that people who are presented to settings with plants or have any connection with common, instead of assembled situations, have lower levels of negative feelings and have relatively more significant levels of good emotions (Van den Berg et al., 2015). Individuals presented to situations with the presence of nature had low recurrence brain waves and less mind action in the frontal areas, showing restorative and congenial emotions (Norwood et al., 2019). Another significant aspect is the formation of spaces with attributes of commonality, support and quietness. The utilization of known

plants is reliable, as they make a situation that depicts family comfort, bringing a feeling of relaxation to the individuals who practice gardening (Cooper, 2005). Thus, plants present in the garden add excellence to the conditions and bring greater moods to well-being, stimulating happiness and satisfaction. These attributes are significant to help with confronting social isolation and the difficulties of the crisis experienced because of the Covid-19 pandemic. (Nascimento et al., 2020)

Demographics

According to Statista Research Department, 10.79 percent of respondents aged 18 to 29 have a long time expressed that they did planting within the 12 months (2018). A few ponders have been conducted that center on planting as a relaxation interest. The surveys shows that planting attains cooperation, and that the larger part of cultivators is more on grown up adults. Being uncover to plant gardening is evade and a get away from the challenging life circumstances. It is required for a few grown-ups to maintain a strategic distance from social contacts with others, to seek isolation and calm conditions; for others it is to look for rest and to loosen up. As result of social isolation, there were changes within the propensities and schedules of families, which can provoke some changes in the mental well-being of a person, everything will be equivalent. Complexity of people such as difficulties on concentrating, easily irritation and misery can be noticed (UN, 2020). The COVID-19 pandemic disruptively affects our society. Productivity losses because of the limitations determined in absenteeism (36%) and presenteeism (30%) for countries such as Belgium, and (19%) and (35%) for the Netherlands. A study stated that productivity losses were accounted for the respondents aged 18-35 usually with a contamination (Krol et al., 2020). A specific notable talk rotates around the idea of being a "productive" domestic gardener in a time of widespread. Whereas the "productive" gardener discussion shows up to be kind and indeed perfect, overemphasizing it neglects the subtleties of lesson elements in domestic gardening. It too dangers idealizing the part of the person nursery worker as the arrangement to the emergency, subsequently downplaying the significance of tending to broader basic issues in crisis administration and nourishment material (Monteforio, 2020). When the coronavirus underscores an age of separating, gardening emerges as a cure, expanding the guarantee of contact with something true. This period is one of significant forlornness, and the multiplication of advanced technology is as it was one of the causes. That vacancy moreover continues from the amazing withdraw of nature, a handle underway well some time recently screen habit (Atkinson, 2020). The findings

demonstrated that, regardless of 'working' in the garden or 'planting' in the garden, the gardens produce an extensive restorative advantage for older adults. Therefore, the influence of being forced to leave gardening due to sickness or collapse may have a disastrous result on a person's self-identity (Pashana et al., 2020)

METHODOLOGY

Research Design

The statistics that will be made from the survey data and will be collected by the researchers will be in a Correlational Design. This research design will be used since the main purpose of the study is to determine the benefits of plant gardening among senior high school and college students during the pandemic wherein it follows certain demographics, and the sample are examined all in one specific point in time. This research design may guide researchers in assessing these outcomes in a further quantitative approach as it is primarily useful for guiding future research to know the significant relationship of variables without experimentation. Survey questions in cross-sectional design may request demographics such as age and gender, especially for the appraisal of respondent's mental health.

Research Instrument

Home Gardeners Survey questionnaire is a two-paged research instrument developed to gather a range of how the mental health being affected by plant gardening (Catanzaro, 2004). In this research, the questionnaire regarding about the study will be used to accomplished quantitative method that is divided into three portions. In the first section, gardeners were approached to choose the exercises wherein they participate and were gotten some information about which classifications of plants they develop and about their yearly expenditures on plants. The second area contained eight questions regarding personal demographics. The last section contained 15 explanations starting "Home gardens provide...", and respondents were examined to rate the significance from every statement to them or their own lives. Home gardener survey questionnaire uses Likert scale which ranges from 1 = not important to 5 = extremely important. This questionnaire is appropriate since it has the purpose to relatively collect the statistical status of gardeners during pandemic and how plant gardening affect their mental health. The responses will be used

to decide the findings whether plant gardening brings positive or negative impacts to individual's mental health.

Research Locale

The study will be conducted in Colegio de San Juan de Letran - Bataan. The locale is situated in Abucay, Bataan. The campus includes a number of senior high school (SHS) and Collegiate students who perform gardening to determine their mental health status subsequent to the plant gardening. The research will be testing the demographics of respondents by knowing the relationship of it to mental health status of each participant. Hence, this will help the researchers evaluate and discover the benefits of gardening among people.

Subject and Sampling

The researchers will be gathering the data from both Senior High School (SHS) and Collegiate students of Colegio de San Juan de Letran - Bataan who have actively practice plant gardening as of the moment. The respondents include people of various ages, gender and length of time of plant gardening in the area. The participants are either male or female with ages ranging from 18 years old since the research study will be focusing the adult for the reason that they are the ones who are usually undergoing mental health problems. The population of the respondents is $n = 374$, which consist of 258 Senior High School students and 118 College students. Using Raosoft, an online sample size calculator, the researchers were able to identify the recommended sample size for the study using confidence level of 95% ($z = 0.95$) and a marginal error of 5% ($e = 0.05$), the sample size is $N = 190$. The sampling technique that will be used in this study will be purposive sampling. This is to knowingly select the participants to gather data and with a specific objective in mind through quantitative research, although it is not in the parametric process, it can also be considered in the quantitative method. Since the research is seeking among people who have been doing planting, it is purposive in nature because it sets a standard for the participants. It is necessarily to use since it has the reliable characterization that will be needed to come up with accurate findings and conclusions. This sampling allows the researchers to reduce the errors and enhance the precision of the data.

Ethical Consideration

To approve this research, consents and permissions such as letters for Senior High School (SHS) and College Department that will be sought from the principal and the dean for the students who are qualified to be respondents will be eligibly participated to fill up the survey. Before proceeding on collecting the data, the given questionnaire must be given to the validator to be able to check the reliability and validity of the questions to the topic in order to aim demographic information that is needed. The information and identification of the respondents will remain confidential as respect for their rights based on Data Privacy Law of 2012. The participants will be given allotted three days to accomplish the pre-survey then proceed to the actual survey that will last for about two weeks. On answering the given questionnaire, the respondents are encouraged to use their Letran e-mail address on responding the given questions to ensure the privacy of the Google forms and information. After gathering the responses of the selected participants, the researchers will proceed to debriefing. This will be done for the participants to know the purpose and aim of the study. In this way, this will ensure that the individuals are fully aware on the intentions of the study and to completely restore the respondents in the status in which they were before the involvement in the study. The researchers will discuss the objectives such as the demographics of the respondents according to sex and age, the mental health status of the respondents after engaging in plant gardening and the significant relationship between the demographics of the respondents for them to understand the main point of the research. The researchers asked permission the author of the chosen questionnaire by sending an email asking for his consent that his questionnaire will be used for the study. After that, the Research Office will now check the validity and relativity of the questions. Once the researchers finished collecting the data and information, a certified Statistician will now review and analyzed the gathered data. The research paper will now be check for Originality check to be able to avoid plagiarism of the paper. And will proceed to Language Edit to check the sentence construction and proper punctuation marks.

Data Procedure

The researchers proposed the research study to the method instructor and begin to start the presentation using gathered reliable and significant studies that strengthens and uphold the study and theories that legitimize the discussions and findings. After the introduction, the researchers proceed on identifying the independent and dependent variables for the

conceptual framework to visualize the relationship between the given variables. Before proceeding on gathering data, it is required to make a letter and consent for the participants to confirm that we have their permission, and they approve to participate on the research study. Once the letters and consents are approved by the department and administration, the researchers will proceed on collecting the data. The researchers will adapt a questionnaire that is relevant to the study and for the validation. At this time, a certified statistician will be the one to check the relativity and validity of the questionnaire of the study. Then, a pre-survey will be conducted to know who the respondents that perform gardening. After knowing the population of qualified participants, it will then proceed to answering the Home Gardener Survey questionnaire that allows the researchers to seek the statistical percentage of the effectiveness of plant gardening on their mental health. The respondents will be given allotted time to respond to the given questionnaire. Through this, the statistical experience of respondents will be tested on how their mental health be affected by plant gardening. After gathering the responses of the selected participants, the researchers will now analyze the collected data and will use it for tallying results and apply the statistical analysis to be used in sample. The focus of the process is to discover the comparison and contrast of the findings related to the theory.

RESULTS

In this regard, this study intended to find evidence of plant gardening's effect on the respondents' mental health. Specifically, this study aims to: (1) determine the demographics of the respondents in terms of their age and sex; (2) describe the mental health status of the respondents after engaging in plant gardening; and (3) determine if there is a significant difference among the mental health status of the respondents after engaging in plant gardening according to their sex.

Statement of the Problem Number 1

As the results of statistics conducted for statement of the problem number 1, the demographic profile of the respondents according to sex, housing type, house spent in plant gardening, kinds of plants that the respondents usually grow either it is indoor or outdoor are as follow:

Table 1. Demographic profile according to sex

Sex	Frequency	Percent
Male	24	47.1
Female	27	52.9
Total	51	100.0

Based on the given table above, the respondents are dominantly composed of female students.

Table 2. Demographic profile according to housing type

Housing	Frequency	Percent
House	50	98.0
Condo	1	2.0
Total	51	100.0

In regard to type of housing, majority of the participants in residential house.

Table 3. Hours spent in plant gardening

Housing	Frequency	Percent
2 hours or below	43	84.3
3-5 hours	6	11.8
5 hours and above	2	3.9
Total	51	100.0

The data showed that the respondents are not spending too long in the garden.

Table 4. Kind of plants that the respondents usually grow

	Frequency	Percent
Outdoor	34	66.7
Indoor	17	33.3
Total	51	100.0

The results revealed that most of the respondents usually take care outdoor plants rather than indoor plants.

Table 5. Kind of indoor plants that the respondents usually grow

	Frequency	Percent
None	20	39.2
Succulents	19	37.3
Palms	5	9.8
Philodendrons	7	13.7
Total	51	100.0

Since outdoor plants are usually the ones that respondents grow, the table above indicated that most of them cultivated no indoor plants.

Table 6. Kind of outdoor plants that the respondents usually grow

	Frequency	Percent
Ornamental	25	49.0
None	12	23.5
Medicinal	7	13.7
Perennial	7	13.7
Total	51	100.0

With the remaining respondents that grow indoor plants, the table showed that ornamental is the most usual plant that the participants nurture.

Statement of the Problem Number 2

From the data that was gathered, the following results done by statistical approach were attained the second statement of the problem.

Table 7. Importance of plant gardening in everyday living of respondents

	Statement	Median	IQR	Interpretation
1.	Plant builds up the interaction with people.	4	2, 6	Very important
2.	Gardening provides psychological benefits.	4	3, 5	Very important
3.	Gardening releases bad emotions.	4	2, 6	Very important
4.	Planting provide food to a family.	4	2, 6	Very important
5.	Gardening increases self-esteem.	4	2, 6	Very important
6.	Gardening strengthens social communication.	4	2, 6	Very important
7.	Home gardens provide control of nature.	5	2, 8	Extremely important
8.	Home gardens help the person to reduce his/her difficulties.	4	2, 6	Very important
9.	Gardening helps you to express yourselves.	4	2, 6	Very important
10.	Planting is a way to come home to nature.	4	3, 5	Very important
11.	Home gardens provide physical benefits.	4	2, 6	Very important
12.	Plant gardening helps one to restore a memory to his experiences.	4	2, 6	Very important
13.	Home gardens provide spiritual meaning.	4	2, 6	Very important

14. Planting is a source of happiness and leisure.	5	4, 6	Extremely important
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*Note: 1 - Not important, 2 - Somewhat important, 3 - Important, 4 - Very important, 5 - Extremely important

From the first (1st) statement up until the sixth (6th) statement, the median result of the 51 responses per statement has maintained its consistency. Firstly, statement one (1): "Plant builds up the interaction with people." Next is statement two (2): "Gardening provides psychological benefits." Followed by statements three (3): "Gardening releases bad emotions", statement four (4): "Planting provide food to a family", statement five (5): "Gardening increases self-esteem" and lastly, statement number six (6): "Gardening strengthens social communication." The said six (6) statements have the same median result of four (4) which is interpreted as Very important. On statement seven (7): "Home gardens provide control of nature." It resulted to a median of five (5) which interprets as extremely important. Consistency of interpretation on statement eight (8) until statement thirteen (13) is also noticeable. It includes statement eight (8): "Home gardens help the person to reduce his/her difficulties", statement nine (9): "Gardening helps you to express yourselves", statement ten (10): "Planting is a way to come home to nature", statement eleven (11): "Home gardens provide physical benefits", statement twelve (12): "Plant gardening helps one to restore a memory to his experiences", and lastly, statement thirteen (13): "Home gardens provide spiritual meaning." These six (6) statements have a median result of four (4) which is interpreted as Very Important. Finally, statement fourteen (14): "Planting is a source of happiness and leisure." Out of the fifty-one (51) responses, the median result is (5) which interprets as extremely important.

Table 8. Perceived impact of plant gardening on respondents' mental health

Statement	Median	IQR	Interpretation
1. Plant gardening serves as stress reliever.	4	3, 5	1.80-2.59
2. Plants keep you keep calm in times of difficulties.	4	2, 6	1.80-2.59
3. Home gardens help me clear my thoughts.	4	2, 6	1.80-2.59
4. Plant Gardening conveys a positive energy at home	4	3, 5	1.80-2.59

5. You lessen your feeling of anxiety when you are in garden.	4	2, 6	1.80-2.59
6. Planting helps me reduce my exhaustion.	4	2, 6	1.80-2.59
7. Garden experience lengthens my patience.	4	2, 6	1.80-2.59
8. Plant gardening establishes one's capacity to think.	4	2, 6	1.80-2.59
9. Having garden is expensive and not worthy.	3	0, 6	2.60-3.39
10. Taking care in plant makes you overthink.	3	1, 5	2.60-3.39
11. Planting increases your level of fatigue.	3	1, 5	2.60-3.39
12. My mind freshens up whenever I am in garden.	4	2, 6	1.80-2.59
13. Gardening is a stressful activity.	2	-1, 5	3.40-4.19
14. Being interact in nature is mentally exhausting.	2	0, 4	3.40-4.19
15. Plant gardening reduces your worries and tensions	4	2, 6	1.80-2.59

*Note: 1 - Disagree, 2 - Somewhat disagree, 3 - Neither agree or disagree, 4 - Somewhat agree, 5 - Strongly agree

Out of the 51 responses per statement, the results starting from the statement one (1) up until statement eight (8) are identical. These include statement one (1): "Plant gardening serves as stress reliever", statement two (2): "Plants keep you calm in times of difficulties", statement three (3): "Home gardens help me clear my thoughts", statement four (4): "Plant Gardening conveys a positive energy at home", statement five (5): "You lessen your feeling of anxiety when you are in garden", statement six (6): "Planting helps me reduce my exhaustion", statement seven (7): "Garden experience lengthens my patience", and statement eight (8): "Plant gardening establishes one's capacity to think." The median result of these eight (8) statements is four (4) which is interpreted to 1.8-2.59. For statements nine (9), ten (10), and eleven (11), the median results are also the same. These are statement nine (9): "Having Garden is expensive and not worthy", statement ten (10): "Taking care in plants makes you overthink", and statement eleven (11): "Planting increases your level of fatigue." Out of the fifty-one (51) responses per statement, the median result of the three statements is three (3) which is interpreted to 2.60-3.3. As for the twelfth (12th) statement: "My mind freshens up whenever I am in garden." The median result is four (4) which

is somewhat agree. Statement thirteen (13): "Gardening is a stressful activity.", and statement fourteen (14): "Being interact in nature is mentally exhausting." both have the same median result that is 2 which is interpreted to 1.8-2.59. Lastly, for statement fifteen (15): "Plant gardening reduces your worries and tensions." The result is interpreted to 1.80-2.59 which has a median of four (4).

STATEMENT OF THE PROBLEM NO. 3

Table 9. T-test results comparing males and females on gardening

		Levene's Test for Equality of Variances		t-test for Equality of Means		
		F	Sig.	t	df	Sig. (2-tailed)
Plant Gardening	Equal variances assumed	1.183	.282	-1.319	49	.193
	Equal variances not assumed			-43.961	43.961	.200

The table presents that the level of importance of plant gardening between male and female groups has no statistically significant difference, $t(49) = -1.319, p = 0.193$.

Table 10. T-test results comparing males and females on mental health

		Levene's Test for Equality of Variances		t-test for Equality of Means		
		F	Sig.	t	df	Sig. (2-tailed)
Mental Health	Equal variances assumed	3.266	.077	-3.415	49	.001
	Equal variances not assumed			-48.716	48.716	.001

The table presents that the perceived impact of gardening on mental health between male and female groups has statistically significant difference, $t(49) = -3.415, p = 0.001$

DISCUSSION

According to the results based on the statistical approach that was conducted by statistician, the demographics of the respondents such as sex, housing type, house spent in plant gardening, kinds of plants that the respondents usually grow either it is indoor or outdoor are used to determine the relationship of plant gardening and mental health.

SEX. The collected data resulted that most of the respondents perform gardening are female with a total of 27 (52.1%) while 24 males attained (47.1%). The outcome showed that half of the participants are engaging and having a habit and leisure time in garden are most likely to be women. Likewise, it is observable that the gender cannot greatly affect and influence the practice of gardening since the range of data are not significantly apart from each other. According to Plant Geek, it was discovered in UK that gender is not relevant when it comes to passion and hobbies such as plant gardening. There are no such standards to which sexes must be present in garden a lot of times. Planting isn't about feminism only; male can do likewise spent their interest in horticultural activity. Thus, growing plants is a practice for everyone regardless of their sexuality and age.

HOUSING TYPE. Regarding the type of housing a participant has, results showed that majority of the respondents are currently living in residential house that obtained 98.0%. The rest of the 2% is from a participant who spends his life in condo. This may indicate that most of our plant owners, who live in residential houses, find it convenient to take care and plant a garden in their own place with the benefit of having sufficient space. Basically, all the things that will be needing to start a garden will always be accessible at home.

HOURS SPENT IN PLANT GARDENING. Based on the results, the majority of 43 students (84.3%) are spending two hours or below on doing plant gardening while there are a total number of 6 students (11.8%) who spent 3-5 hours on plant gardening and the remaining 2 students (3.9%) spent their time on plant gardening for 5 and above hours. As regards to this, it is constant for the respondents that gardening has become their leisure past time and a habit activity that one can actually fulfil his day by performing in the garden. It is demonstrated that the hours they spent on gardening intervention shows that they make more time outdoors in nature and gives them much more positive outlook on life when doing gardening. It is related to study by Barnicle et al., (2003) stated that communicating with the natural environment enhances people's emotions of strength and energy and, as a result, has a significant positive impact on overall mental wellbeing. The people who spend

time outside every day are less likely to be depressed or stressed, and therefore have fewer burdens on their mental health. Studies have proven that people who spend more time outside in nature have better mental health and a more positive outlook on life (Barnicle et al., 2003)

KIND OF PLANTS THAT RESPONDENTS USUALLY GROW. The result shows that the total number of 34 students (66.7%) have seen growing and planting outdoor plants while the remaining 17 number of students (33.3%) are usually growing indoor plants. It is for the that outdoor plants give more satisfaction and positivity to the respondents compared to indoor plants for the reason that it gives more peace and stability of mind when one is gardening in open space rather than being locked up in closed area. In addition, outdoor plants are more easily to grow and cost lesser than those that are in indoor. A study stated that outdoor plants growth generally results in much larger areas, which means much higher yields. This is because outdoor plants usually have all the space it needs to increase, and all the sunlight it needs to grow while growing indoors plants includes much more treatment and preparation than growing outdoors plants, since moisture and nutrients are not supplied (Zamnesia, 2020).

KIND OF OUTDOOR PLANTS. With regards to the outdoor plants that the respondents usually grow, 25 of them (49.0%) grow Ornamental plants which are composed of almost half of the responses. Coming next are the 7 of the respondents (13.7%) who grow Medicinal plants. Perennial plants are being grown by 7 of them (13.7%), as well. The results also showed that 12 out of the 51 students (23.5%) are not active in outdoor gardening. Outdoor plants showcase natural elements which may distract the gardeners from negative emotions such as stress and as a result, positive emotions arouse among people. A view of green areas outdoors can also be one way to manage pain among the people themselves. The freshness of the air and the sunlight that comes with growing outdoor plants provide one's wellbeing, as well (Raanaas et al., 2011).

KINDS OF INDOOR PLANTS. According to the result, it has been seen that majority (39.2%) of the respondents do not grow indoor plants which is composed of 20 students. However, 31 out of the 51 students do grow them. To be specific, 19 among the respondents (37.3%) grow Succulents. Followed by the 7 students who grow Philodendrons (13.7%), and the remaining who grow Palms (9.8%). As the people tend to experience mental health problems, indoor plants become a way to enlighten the mood of the house. Indoor plants provide a part of the benefits offered by the experience of nature seen outdoors (Bringslimark et al., 2009). It correlates to the findings of the study which have shown that individuals grow

Succulents plants because it can add up oxygen in the surroundings that can remove the toxicity of the environment. These benefits, specifically in one's mental or psychological state, shows why people grow indoor plants. Aside from aesthetic benefits that plants offer, it serves a big role with regards to the wellbeing of the population (Lohr, 2010).

Importance of plant gardening in everyday living of respondents

On the importance of plant gardening in the everyday lives of the respondents, the findings showed that they value this type of activity, and it radiates a positive energy among the respondents. It is significant to point out that most of individuals contemplate that plant gardening gives off happiness, leisure, and provides control of nature were considered as extremely important which means that the respondents definitely do well out of plant gardening in terms of their physical, mental, spiritual state which is likely why they consider it important (Sheavly, 2007). Not just that, plant gardening is not just considered important for the benefits it provides for one's sake, but it also provides comfort for one's family (Okyat, 2011). It showed that cultivation of plants is reliable, as they make a circumstance that portrays support, carrying a sensation of unwinding to the negativity that one can feel any time (Cooper, 2005). The interpretations on each of the statements do not vary from each other that plant gardening serves an important role for the respondents. Thus, plant gardening provides benefits to the gardeners' lives which makes it important.

Perceived impact of plant gardening on respondents' mental health

Based on the response of the participants, plant gardening has positive impacts to mental health of individuals. Majority of the students do somewhat agree that this horticultural practice can be a way to distract oneself from the stress and other psychological problems. The statistics manifested that most of them can experience the calmness and peace of mind every time they are performing gardening. The respondents concede that nature can clear the thoughts from overthinking the negative possibilities that anyone can experience due to the COVID-19 (Banerjee, 2020). It is proven that individuals are more likely to endure the positive energy at home after the time they spent in garden (Smith, 2007). Otherwise, all of the respondents are neither agree nor disagree that having a garden is expensive and not worthy. Furthermore,

students are somewhat disagreed that gardening is a stressful activity and could cause a person mentally exhausted. To sum it up, most of the respondents gained beneficial and healthy impacts brought about by plant gardening.

The T-Test results comparing males and females on gardening.

The result showed that there is no significant difference on the level of importance of plant gardening between males and females. It is related to the study by Norton (2013) that it is equal for gender to gain the beneficial effects of plant gardening. The impacts of plants to individuals are not based on human sexuality which visualize the idea of masculinity and feminism. For instance, Reyes-García et al. (2010) explored that home gardens in Spanish found out that in spite of the fact that overall richness of plant's benefits, it didn't contrast upon the sex of the gardener, however, woman is more likely to do better than man in garden. In particular, ladies grow more plant species than men, specifically of ornamental plants, and individual gardeners persuaded in nature association tend to cultivate emphatically unique kinds of plants in their gardens (Lin et al., 2020).

T-test results comparing males and females on mental health

It is proven that there is a statistically significant difference in the perceived impact of gardening on mental health when divided according to their sex, male and female. According to McFarland et al., 2018, males and females gave thematic responses with significant differences. Males are more seen in the area of food and nutrition as to why they participate in gardening. On the other hand, females use this activity for productivity for personal purposes and leisure (McFarland et al., 2018). Moreover, differences in mental health problems and coping mechanisms exist among genders (Rosenfield et al., 2012). With that being said, it shows the relationship between the impact of gardening on mental health and the sex of the gardeners for the reason that both genders are seen to have different ways in handling mental health problems, thus, having various impacts of gardening in their mental health.

CONCLUSION

Based on the findings of the study, the researchers therefore conclude that individuals who participated in home gardening do benefit from it when it comes to their mental health. The study unearthed that gardening provides psychological benefits to the students. During the pandemic

caused by COVID-19, it has brought negative emotions which may explain the increase of individuals to start to grow plants, may it be outdoor or indoor, for them to be able to cope with the situation they are in at the present. There are tons of factors that may affect one's mental health and plant gardening is one way to feel the nature even at the comfort of their homes especially to those who grow outdoor plants. To emphasize, this activity serves as a stress reliever to majority of the fifty-one (51) students from Colegio de San Juan de Letran - Bataan that participated. The students being the respondents of the study, it was observed that it lessens the exhaustion among majority of them. Some people may have a rough time on handling stressful situations and people have different tolerance on it but on the bright side, plant gardening is one of the things that people may do to unwind or may use to take a break from a tiring situation. It was seen that this horticultural activity has helped majority of the students in terms of their overall state during their hard times. With all the changes brought about by the pandemic, it did help to adjust to the 'new normal' of the people especially with the numerous lockdowns and quarantine periods implemented by local and national government. The study also brought to light that regardless of the sex and the housing type of the students, they did not influence and bring effects on the relationship of students who benefit from plant gardening and their mental health. With regards to the amount of time spent on garden, individuals who spent more time in planting experienced the same effect on those who spent less hours. The study indicated that the benefits of gardening on one's mental health and the amount of time spent on gardening do not influence each other. The same goes with the kind of plants that the students usually grow. With that being said, plant gardening serves as a big role on plant gardeners to cope up in their mental health problems as it brings a positive effect in one's way of thinking and restoration especially during COVID-19. Thus, the researchers have recommendation to include this study in relates to subjects that will improve the knowledge and deepen the understanding of students regarding the benefits of plant gardening to mental health. This study that correlates the plant gardening and mental health is suggested for the individuals to address the psychological difficulties that one is experiencing during COVID-19. Adults will gain ideas towards the gardening and mental health that improve their daily living and productivity. Also, mental health Professionals to have wide overview and figure out an in-depth understanding about the outcome of the study. This can be a way for them to promote this as a good impact to those people who also suffer from mental issues. Moreover, it is recommended to have a better result in terms of the significance of relationship between respondent's mental health and gardening. This research has the ability to

strengthen the relationship of individuals to plants that may give them an overview on how gardening could bring a life changer impacts to one's mental health.

REFERENCES

- Abak et al. (2019). Evaluation of the relationship between ornamental plants - based ecosystem. *Ecological Indicators*, 278-288.
- Amaral. (2020). COVID-19, 30 dias no Brasil. *Noticias*.
- Banerjee, C. a. (2020). "Recovering With Nature": A Review of Ecotherapy and Implications for the COVID-19 Pandemic. *Frontiers in Public Health*.
- Bentsen et al. (2018). Attention Restoration Theory II: a systematic. *Journal of Toxicology and Environmental Health, Part B*, 1-42.
- Berto. (2014). The Role of Nature in Coping with Psycho-Physiological Stress:. *Behavioral Science*, 4(4), 294-409.
- Bratman et al. (2020). The impacts of nature experience on human cognitive function and mental health. . *Annals of the New York Academy of Science*, 118-136.
- Camic et al. (2013). Gardening as a mental health intervention:. *A Review Journal*, 18 (4) , 214-225.
- Catanzaro, E. a. (2004). Home Gardeners Value Stress Reduction and Interaction with Nature . *Acta Horticulture* , (639), 269-275.
- Cheol et al. (2016). Gardening Intervention for Physical and Psychological Health Benefits in Elderly Women at Community Centers. *Hortechonology*, 26(4), 474-483.
- Clement, S. S.-L. (2014). Clement, S., Schauman, O., Graham, T., Maggioni, F., Evans-Lacko, S., Bezborodovs, N., ... Thornicroft, G. (2014). What is the impact of mental health-related stigma on help-seeking? A systematic review of quantitative and qualitative studies. *Psychological Medicine*, 45(01), 11-27.
- Cooper. (2005). Help with Healing: green place. *UK: Landscape Design*.
- Eisner et al. (2020). Emotional distress in young adults during the COVID-19 pandemic: evidence of risk and resilience from a longitudinal cohort study. *Psychological Medicine*, 1-32.
- Elings, M. (2006). People-plant interaction: the physiological, psychological and sociological effects of plants on people. *FARMING FOR HEALTH*, 43-55.
- Farinetti et al. (2020). COVID-19 pandemic: the effects of quarantine on cardiovascular risk. *European Journal of Clinical Nutrition*, 74, 852-855.
- Flora, W. a. (2010). Mental Health and Function - A Literature Review. *In: Green Cities: Good Health*, 5-13.
- Fortune et al. (2015). Enabling occupational participation and social inclusion for. *Australian Occupational Therapy Journal*, 62, 428-437.
- Gardener demographics, e. a. (2020). Lin et al.,. *Ecology and Society*, 25(4).
- Garwood and Florillo. (2020). The consequences of the COVID-19 pandemic on mental health and implications for clinical practice. *Euroepan Psychiatry*, 63 (1),1-2.
- Glicksman. (2013). "Being Grounded": Benefits of Gardening for Older Adults in Low-Income Housing. *Journal of Housing for Elderly*, 27, 1-2.
- Guy, O. a. (2017). Gardening for Therapeutic People-Plant Interactions during Long Duration Space Missions. *Open Agriculture*, 2391-9531.
- Han et al. (2018). Reduced stress and improved physical functional ability in elderly with mental health problems following a horticultural therapy program. *Complementary Therapies in Medicine*, 19-23.
- Hayes. (2017). 5 Health Benefits of Gardening . *Healthy Living*.
- Hghes et al. (1990). Software Review: Raosoft Survey. *Sage Journals*.
- Hossain, M. S. (2020). Mental health outcomes of quarantine and isolation for infection prevention: a systematic umbrella review of the global evidence. *Korean Society of Epidemiology* , 1-11.
- Hosseini. (2018). The Therapeutic Effects of Medicinal Plants on Depression and Anxiety Disorders. *Report of Healthcare Journal*, 8(4), 67-80.

- Krol et al. (2020). Concerns, quality of life, access to care and productivity of the general population during the first 8 weeks of the coronavirus lockdown in Belgium and the Netherlands. *medRxiv*.
- Lin et al. (2020). Gardener demographics, experience, and motivations drive differences in. *Ecology and Society*, 25(4).
- Lin, Y.-J. L.-C. (2014). Planting Hope in Loss and Grief: Self-Care Applications of Horticultural Therapy for Grief Caregivers in Taiwan. *Death Studies*, 38(9), 603-611.
- Lohr. (2010). What Are the Benefits of Plants Indoors and Why Do We Respond. *Acta Horticulturae*, 675-682, 881(2).
- MacMillan, W. a. (2013). The Benefits of Gardening for Older Adults: A Systematic Review of the Literature. *Activities, Adaptation and Aging*, 37 (2), 153-181.
- Maria, C. a. (2014). Exploring the links between agricultural biodiversity, ecosystem services and human well-being : evidence from the Yucatan, Mexico. *Sistema Bibliotecario d' Ateneo*, 269.
- Mehlenbeck et al. (2001). EVALUATING A CHILDREN'S HOSPITAL GARDEN ENVIRONMENT: UTILIZATION AND CONSUMER SATISFACTION. *Journal of Environmental Psychology*, 21 (3), 310-314.
- Nascimento et al. (2020). Pandemic, social isolation and the importance of people-plant interaction. *Ornamental Horticulture*, 26 (3).
- Norwood et al. (2019). Brain activity, underlying mood and the environment: a systematic review. . *Journal of Environmental Psychology*, 65.
- Okyat, Z. a. (2011). Community Gardening: A Parsimonious Path to Individual, Community, and Environmental Resilience. *SpringerLink*, 374-387.
- Pachana et al. (2020). Positive aging benefits of home and community gardening activities: Older adults report enhanced self-esteem, productive endeavours, social engagement and exercise. *Sage Journals*.
- Pastor, C. .-V. (2020). Home Activities of Students to Counter Psychological Disturbances during COVID-19 Pandemic. *International Journal of Psychosocial Rehabilitation*, Vol. 24, Issue 8.
- Prince, M. P. (2007). No health without mental health. *The Lancet*, 370(9590), 859-877.
- Shaw. (2015). The Positive Effects on Mental Health of Visiting Botanic Gardens. *Sibbaldia: The International Journal of Botanic Garden Horticulture*, (13), 51-60.
- Shaw. (2015). The Positive Effects on Mental Health of Visiting Botanic Gardens. *Sibbaldia: The International Journal of Botanic Garden Horticulture*, (13), 51-60.
- Sheavly. (2007). Fostering Children's Interests in Gardening. *Applied Environmental Education & Communication*, 67-75.
- Shiue. (2015). Gardening is beneficial for adult mental health: Scottish Health Survey, 2012-2013. *Scandinavian Journal of Occupational Therapy*, 23 (4), 320-325.
- Smith. (2007). Understanding gardening and dietary habits among youth garden program participants using the Theory of Planned Behavior. *Appetite*, 122-130, 49(1).
- Soga, M. G. (2017). Gardening is beneficial for health: A meta-analysis. *Preventive Medicine Reports*, 92-99.
- Toskovic. (2017). Nature based solution for improving mental health and well-being in urban. *Environmental Research*, 158, 385-392.
- Tuliao, A. P. (2014). Mental health help seeking among Filipinos: a review of the literature. *Asia Pacific Journal of Counselling and Psychotherapy*, 5(2), 124-136.
- UN. (2020). Policy Brief: COVID-19 and the Need for Action on Mental Health. *United Nations*.
- Unruh. (2004). The meanings of garden and gardenings in daily life: A comparison between gardeners with serious health and health participants. *Acta Horticulturae*, (639), 67-73.
- Usher, K. B. (2020). Life in the pandemic: Social isolation and mental health. *Journal of Clinical Nursing*, 2756-2757.
- Van den Berg et al. (2015). Health Benefits of Green Spaces in a Living Environment: A systematic review of epidemiological studies. *Urban Green*, 14(4), 806-816.
- Votruba, N. E. (2014). The importance of global mental health for the Sustainable Development Goals. *Journal of Mental Health*, 283-286 .

Walsh et al. (2000). The Immediate Effects of a Group-Based Horticulture Experience on the Quality of Life of Persons with Chronic Mental Illness. *Occupational Therapy in Mental Health*, 16(1), 15-32.

Walter et al. (2013). Ecological stress memory and cross stress tolerance in plants in the face of climate extremes. *Environmental and Experimental Botany*, 3-8.

Xiong, J. L. (2020). Impact of COVID-19 Pandemic on Mental Health in the General Population: A Systematic Review. *Journal of Affective Disorders*, 55-64.

Yamaura et al. (2017). Gardening is beneficial for health: a meta-analysis. *Preventive Medicine Reports*, 92-99.

Zheng et al. (2020). How to deal with the negative psychological impact of COVID-19 for people who pay attention to anxiety and depression. *Precision Clinical Medicine*.