

ORIGINAL RESEARCH

# Coronaphobia and Coping among the Bereaved: The Mediating Role of Gardening during the Covid-19 Pandemic



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## Article Info

Article History:  
Received: 15 February 2022  
Revised: 28 March 2022  
Accepted: 30 March 2022  
Online: 27 April 2022

Keywords:  
Bereavement coping;  
Coronaphobia; gardening;  
mediation analysis; Philippines

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## Abstract

**Background:** There are growing reports on the benefits of gardening on physical and mental health especially during lockdowns, but very limited studies presented how this affects a person's fear of COVID-19 and coping from grief and loss.

**Purpose:** This study aimed to assess the mediating effects of gardening on coronaphobia and bereavement coping.

**Methods:** This study utilised a cross-sectional design using self-report scales. A total of 200 participants were selected through referral sampling following a set of criteria. Both researcher-made and standardized questionnaires were utilized in the collection of data. Multiple linear regression was utilized to analyse association between the study variables

**Results:** Results revealed that gardening has significant partial mediating effects in the relationship between fear of COVID-19 and coping ( $B=-0.078$ ,  $z=-3.55$ ,  $p=0.001$ ). Fear of COVID-19 negatively affects gardening ( $\beta=-0.157$ ,  $p=0.001$ ), while gardening positively affects coping ( $\beta=0.497$ ,  $p=0.001$ ). Nevertheless, the results also indicate that even accounting for the mediating role of gardening, fear of COVID-19 still has a negative impact to coping ( $\beta=0.148$ ,  $p=0.001$ ).

**Conclusion:** Gardening is an adaptive practice in ameliorating stress and improving a person's resilience and bereavement coping. This study adds to the body of knowledge on the benefits of gardening particularly on its mediating role between fear of COVID-19 and bereavement coping. Gardening activities as a complementary intervention may be recommended to bereaved individuals to help them improve coping and grief.

**How to cite:** De los Santos, J. A. A., Daiz, B. G., & Rosales, E. L. (2022). Coronaphobia and coping among the bereaved: The mediating role of gardening during the COVID-19 pandemic. *Nurse Media Journal of Nursing*, 12(1), 13-23. <https://doi.org/10.14710/nmjn.v12i1.44769>

## 1. Introduction

The unprecedented impact of COVID-19 cuts across all aspects of human life and has caused palpable physical and psychological distress to all people. The pandemic created a horrendous picture of the world we live in today due to the increasing number of deaths, pain, and grief of family members left behind. As of September 1, 2021, the record logs 218,205,951 confirmed cases of COVID-19, including 4,526,583 deaths (WHO, 2021).

The perilous impact of the pandemic on the physical, mental and psychological health is insurmountable and extraordinary. Economic shutdowns, local lockdowns, home quarantine, and social isolation became common in the new normal. The virulence and high transmissibility of the virus have caused humans to extreme feelings of fear and anxiety of their safety and their loved ones, isolation, depression, and for some, even mental challenges have started to manifest (Usher et al., 2020). For instance, coronaphobia otherwise known as a dysfunctional fear of COVID-19 (Labrague & De los Santos, 2020) is a palpable experience especially during the first few months of the pandemic where uncertainty on the management, and imminent threat to life was at hand. This was especially true among those who cared for the inflicted of the virus in the frontline. Nevertheless, fear and anxiety, and psychological distress is a universal experience globally across life span (Sarfika et al., 2021).

Bereavement is a profound and challenging process that comes in many forms but is ultimately sourced and brought about from a loss of a loved one. For instance, the literature presents pet bereavement, a natural grieving experienced by pet owners who have lost their companion and friend (Park et al., 2021). Losing a child is another example that is a significant

life-changer among parents. A series of coping interventions and strategies may be needed towards healing and acceptance from a traumatic loss of a child (Currie et al., 2018). Reports of behavioural changes such as poor self-esteem, anxiety and depression, and poor outlook in life were among the psychological changes observed among young adults who have lost their parents (Lundberg et al., 2018).

In the time of pandemic, the increasing death toll from those who have succumbed to the disease was a horrendous reality felt across the globe. Grieving and bereavement were difficult and distressingly altered from how it was in the norm (Carr et al., 2020). The bereaved kin grieves in isolation and lack emotional support due to imposed health and social restrictions. Undoubtedly, the pandemic has amplified the feeling of anguish and contributed to physical and psychological distress, prolonging the agony among those still grieving due to the loss of a loved one. The trauma from bereavement may even lead to the development of psychopathological manifestations such as depression, hallucinations, and other adverse psychological outcomes needing professional help, particularly among those who have unexpected peer, parental, or spousal loss (Johnson et al., 2017; Kamp et al., 2017).

People who have experienced loss does different coping strategies. The literature discussed extensive styles on how people cope through the grieving process. Generally, coping can be classified as (1) Problem-oriented coping where the person performs active involvement in creating solutions to resolve the situation, (2) Emotion-oriented coping, on the other hand, pertains to expressing feelings and active rationalisation about the situation, and lastly, the (3) Avoidant coping which involves repressive and maladaptive behavioural responses (Fisher et al., 2020; Huh et al., 2017).

One interesting study on coping is the diversion of orientation whereby the person diverts towards restoration instead of the experience of loss. This makes them more adept at managing well and adjusting to the experience of loss (Lundorff et al., 2019). By conscious effort of removing the self from despair such as those that fosters physical diversion of energy and attention, a person experiencing grief and loss restores emotional healing. Restorative coping may involve physical activities, which has been shown to improve coping during times of adversaries and loss (Wicker & Orłowski, 2021). Being physically active is a form of expressive distraction and a conscious way of diverting from thoughts of grief and despair. Engaging in gardening, for example, is an assistive therapeutic approach that helps the bereaved go through the grieving process. Likewise, the literature suggests that persons who engage in gardening activities are more likely to be relieved of stress and find meaningful acceptance of their lost relationships (Lin et al., 2014; Machado & Swank, 2017). Engaging in green activities such as gardening have been found to produce therapeutic effects and reduced reports of emotional trauma and stress while enhances self-awareness and sense of well-being and grief reduction (Thieleman et al., 2021; Cacciatore et al., 2019).

The literature presented recent studies on the practice of gardening in the time of COVID-19, where it has been identified as one of the positive coping behaviours and produced affective benefits (Daiz et al., 2022; Lades et al., 2020; Moore & Lucas, 2020; Serino & Ratilla, 2021). Likewise, there are growing reports on how it has helped reduced coronaphobia and improved mental health, especially during lockdowns (Theodorou et al., 2021; Weerakoon et al., 2021). However, most of the literature presented theoretically based interventions but has not clearly shown their effectiveness (Kocken et al., 2020).

There was an increased practices observed among people fascinated towards plants and gardening especially during the lockdown, yet there is seemingly lack studies on gardening as a therapeutic approach. This prompted the researchers to conduct this study. Moreover, it was aimed to bridge this gap and add the context of gardening as a means of coping during the COVID-19 pandemic. It was hypothesised that coronaphobia affects a person's coping, and gardening activities can mediate this. Specifically, this study aims to determine the effect of gardening activities to a person's coping in grieving and loss, and fear of COVID-19.

## **2. Methods**

### **2.1 Research design**

This study utilised a quantitative cross-sectional design using survey questionnaires. Cross-sectional design was ideal in this study as it aimed to observe the participants through a single data collection between first half of the year 2021.

## *2.2 Setting and participants*

The researchers utilized an online calculator (Soper, 2022) to achieve an anticipated effect size of 0.15 in the multiple regression analysis of five predictors. The researchers set the desired statistical power level to 0.8, with a probability level of 0.01 which revealed that the study can proceed with 127 minimum required sample. For this study, 200 participants were recruited to ensure that the data were suitable for the analysis.

The participants included residents from one province in Central Philippines. The researchers initially identified twenty possible participants who is fit based on a criterion set. The selected participants were then asked for referrals who share the same characteristics. Email addresses and social media messenger were asked by the researchers from the participants for the distribution of online questionnaire and data retrieval. Specifically, included were those of legal age, self-declared gardeners who own a garden or are tending plant collections at home and have experienced a loss of a loved one within the last four years. Literature suggests that bereavement may last up to four years post-loss (Kamp et al., 2017). Excluded in the study were farmers who do farming and gardening roles as their primary source of living.

## *2.3 Measurement and data collection*

To answer the objectives of the study, self-report questionnaires were utilized in the gathering of the needed data. Considering movement restrictions such as lockdowns and quarantine protocols, the researchers resorted to an online mode of data collection. These questionnaires were prepared using Google Form and were later sent to email addresses or social media messengers. Necessary follow-ups and reminders to the participants was done to get the desired number of samples.

Because of the lack of standardised stool that measures assess perceptions to gardening, the researchers devised a tool where items were lifted from literature and experiences among people who do gardening. The items were finalised after the subject matter expert validation test for face and content validity. It revealed that the item content validity index (I-CVI) ranges between 0.8-0.9. This suggests that the items in the scale are relevant and valid to measure the intended construct the scale intends to measure. Meanwhile, the scale validity index (S-CVI) score obtained 0.92 suggesting that the scale has high validity. Pilot testing of the instrument was done with thirty people of the same characteristics as the participants in this study. The score revealed a high internal consistency and reliability of  $\alpha=0.90$ . The scale has 23 items and utilizes a five-point Likert scale scored between 1-5 described as 'strongly disagree', 'disagree', 'neutral', 'agree' and 'strongly agree' respectively.

There were five other standardised scales we used to assess for Fear of COVID-19, Stress, Health, Resilience and Coping. The English version of the instrument was used for the participants to answer. Guidance and assistance were made by the researchers whenever clarification and translation to vernacular was necessary.

The Fear of COVID-19 Scale (Ahorsu et al., 2020) was used to assess the participants' feelings of fear of the currently experienced pandemic or coronaphobia. The scale has a total of seven items with 5 point options described from 'strongly disagree' equivalent to 1 point, and 'strongly agree', which is equivalent to 5 points. The scale originally has an excellent internal consistency with a value of  $\alpha=0.82$ . As for the present study, the scale likewise showed excellent internal consistency based on the Cronbach's alpha value of  $\alpha=0.86$ .

Stress was measured using the Perceived Stress Scale (Cohen et al., 1983). The scale is composed of ten items and is scored using a 5-point Likert, where one refers to "never". The highest possible score for the scale is 5, which means "very often". The scale has an acceptable internal consistency value of  $\alpha=0.78$ . The scale showed an excellent internal consistency based on the Cronbach's alpha value score of  $\alpha=0.94$  on this present study.

The Health Orientation Scale was utilised to measure the participants' health (Snell et al., 1991), particularly on the perceived health status subscale. The participants scored the items using a 5-point Likert scale where one is "not at all characteristic to me", and five is "very characteristic of me". The subscale has an acceptable internal consistency value at  $\alpha=0.79$ . Reliability score of the scale in this present study revealed a Cronbach's alpha value of  $\alpha=0.72$

The Brief Resilience Scale (Smith et al., 2008) assessed the participant's resilience. The scale is composed of six items and is scored using a 5-point Likert scale. The scale is scored from

1 to 5 where one is “strongly disagree”, two is “disagree”, three is “neutral”, four is “agree”, and five is “strongly agree”. Originally, the scale shows a consistent reliability score of 0.69. In the current study, the scale showed excellent reliability based on the Cronbach’s alpha value of  $\alpha=0.98$ .

Coping was assessed using the Coping Assessment for Bereavement and Loss Experiences (Crunk, 2004). Eleven items comprise the scale, which is answerable using a 5-point Likert scale. The lowest possible score is 1, which indicates “never”, and five as the highest possible score means “daily”. The scale presents a good reliability score of 0.80. For the current study the scale showed excellent reliability score of  $\alpha=0.98$ .

#### 2.4 Data analysis

Data were organised using a spreadsheet. Analysis was done using SPSS version 22 software. The Spearman rho correlation analysis was utilised to assess the correlation between the variables in the study. Multiple regression analyses were done to assess the predictors of gardening its effects on fear of COVID-19, health, stress, resilience, and bereavement coping. The direct and indirect effect of gardening on the relationship between fear of COVID-19 and bereavement coping was analysed using multiple linear regression and was interpreted following Baron and Kenny’s (1986) four-step approach namely: (1) establishing an effect variable that can be mediated; (2) identifying the mediator variable as an outcome variable; (3) controlling the causal variable while establishing relationship between the mediator on the outcome variables, and; (4) establishing the mediating effect.

#### 2.5 Ethical considerations

This study underwent technical and ethical review by the Visayas State University College of Nursing Research Review Committee and was given a code number RES-CON-S2020.08. The introductory page on the forwarded link contained the informed consent where the participants' agreement to partake in the survey voluntarily is indicated by clicking on the proceed button.

### 3. Results

#### 3.1 Characteristics of the participants

Table 1 presents the characteristics of the participants in the study. Results show that majority are in their productive years of 21-40 years old (53%). Most of the participants were female (65%) and are married (47%). Most of the participants have finished college (34.5%) and are currently self-employed (33%).

**Table 1.** Characteristics of the participants

Variables	<i>f</i>	%
Age		
20 and below	11	5.5
21-40	106	53
41-60	63	31.5
61 and above	20	10
Sex		
Female	130	65
Male	70	35
Marital Status		
Single	85	42.5
Married	94	47
Separated/Divorce	8	4.0
Widow	13	6.5
Education		
Elementary	28	14.0
High-School	35	17.5
College	69	34.5
Post-graduate	68	34.0

**Table 1.** Continued

Variables	<i>f</i>	%
Employment		
Employed full-time	32	16.0
Employed part-time	12	6.0
Retired	21	10.5
Seeking opportunities/unemployed	14	7.0
Self-employed	66	33.0
Student	55	22.5

### 3.2 Correlations between gardening, fear of COVID-19, health, stress, resilience and coping

Table 2 presents the correlation of the study variables. The results suggest that gardening has shown significant relationships with Fear of COVID-19, Stress, Resilience and Coping among the study variables. More specifically, gardening showed an inverse relationship with Fear of COVID-19 ( $r=-0.327$ ,  $p=0.001$ ), and Stress ( $r=-0.173$ ,  $p=0.014$ ). Positive correlations were observed between gardening and resilience ( $r=0.221$ ,  $p=0.002$ ), and coping ( $r=0.399$ ,  $p<0.001$ ). Health was not found to have any significance with gardening.

**Table 2.** Correlations between gardening, fear of COVID-19, health, stress, resilience and coping (n=200)

Variables	M (SD)	Coefficient	<i>p</i> -value
Fear	2.67 (0.82)	-0.327	0.000
Health	3.40 (0.48)	0.013	0.853
Stress	3.14 (0.48)	-0.173	0.014
Resilience	3.82 (0.51)	0.221	0.002
Coping	3.82 (0.56)	0.399	0.000

This study was conducted to determine if gardening influences Fear of COVID-19, Health, Stress, Resilience and Coping. Presented in Table 3 are the results of the regression analysis between gardening and the other key variables of the study. Results show that 19.7% of the variance in gardening can be explained by the five predictors,  $F(5,194)=9.504$ ,  $p<0.001$ . The results further suggest that only fear and coping is associated with gardening. Specifically, we found a negative association between gardening and fear of COVID-19 ( $\beta=-0.217$ ,  $p=0.008$ ). Meanwhile, it showed a significantly positive association with bereavement coping ( $\beta=0.319$ ,  $p<0.001$ ).

**Table 3.** Regression analysis on gardening perceptions and key study variables

Variables	B	Std. Error	$\beta$	<i>t</i>	<i>P</i>	95% CI	
						Lower Bound	Upper Bound
Constant	78.648	16.951		4.640	0.000	45.217	112.080
Fear of COVID-19	-0.217	0.080	-0.217	-2.701	0.008	-0.376	-0.059
Health	0.025	0.067	0.024	0.369	0.713	-0.107	0.156
Stress	0.055	0.076	0.055	0.718	0.474	-0.096	0.206
Resilience	0.036	0.075	0.036	0.480	0.632	-0.112	0.184
Coping	0.319	0.073	0.319	4.357	0.000	0.175	0.464

$R^2=0.197$ ;  $F=9.504$ ;  $p<0.001$

### 3.3 Mediating effects of gardening on the relationship between fear of COVID-19 and coping

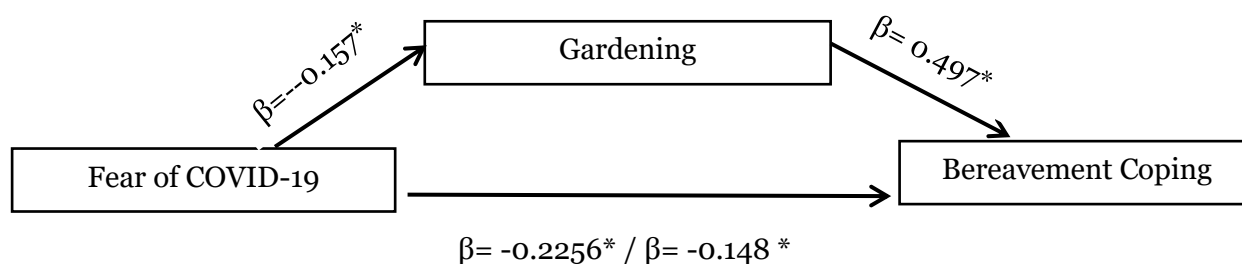
Mediation analysis was done to examine the impact of Fear of COVID-19 on Coping as mediated by Gardening (Table 3, Figure 1). It was hypothesised that being fearful of COVID-19 will negatively affect the coping of a person. Additionally, it was hypothesised that gardening

would mediate this relationship. A series of regression analyses were carried out to test these hypotheses.

**Table 3.** Mediating effects of gardening on the relationship between fear of COVID-19 and coping

Model	SE	$\beta$	Z	p	% Mediation	95% CI	
						Lower bound	Upper bound
Indirect Effect	0.0220	-0.0780	-3.55	< .001	34.6	-0.121	-0.0350
Direct Effect	0.0438	-0.1476	-3.37	< .001	65.4	-0.233	-0.0618
Total Effect	0.0454	-0.2256	-4.97	< .001	100	-0.314	-0.1367

The findings revealed that Fear of COVID-19 negatively affects Coping ( $B=-0.2256$ ,  $z=-4.97$ ,  $p<0.001$ ). Analysing the indirect effects, the results indicate that gardening has significant partial mediating effects in the relationship between Fear of COVID-19 and Coping ( $B=-0.078$ ,  $z=-3.55$ ,  $p<0.001$ ). Fear of COVID-19 negatively affects gardening ( $\beta=-0.157$ ,  $p<0.001$ ), while gardening positively affects coping ( $\beta=0.497$ ,  $p<0.001$ ). Nevertheless, the results also indicate that even accounting for the mediating role of gardening, Fear of COVID-19 still negatively impacts Coping ( $\beta=-0.148$ ,  $p<0.001$ ). Gardening accounts for 34.6% of the total effect.



**Figure 1.** Hypothesized model

#### 4. Discussion

This study was performed to assess the relationship between gardening and key variables, including coronaphobia, health, stress, resilience, and coping. Based on the result, there is an inverse relationship between gardening and coronaphobia and stress. This suggests that the participants who are into gardening display less coronaphobia and stress. To our knowledge, this is the first study to present the negative correlation between coronaphobia and gardening.

The negative correlation suggests that when a person engages in greener activities such as gardening, the less likely is his fear of COVID-19. Moreover, the correlation results of our study support the growing literature on the potential benefits of gardening to people's well-being. One plausible explanation to this phenomenon is the numerous restrictions, lockdowns has made people socially isolated within the safe boundaries of their homes. Green activities served as their diversion to release stress and boredom by doing something creative and fulfilling, and at the same time encourages physical activity. This study is similar to the findings in Italy and Scotland, which found how gardening reduced distress and improves subjective well-being among those on lockdown (Corley et al., 2021; Theodorou et al., 2021). This is also similar to a recent finding which found how gardening improves psychological well-being and reduced the adverse effects of COVID-19 on people's mental health (Kou et al., 2021).

Meanwhile, our findings also revealed a positive correlation between gardening, resilience and bereavement coping. This suggests that participants who are more inclined to gardening appear to be more resilient and positively coping. Our findings are in consonance with other literature, which found how resilience and coping correlates with gardening (Koay & Dillion, 2020). Notably, our results have not seen any significant correlation of gardening to health, which is in contrast to other conducted studies which found the physical benefits of gardening in improving patients with cardiac problems as displayed on their improved hemodynamic

response (Ogura et al., 2021). This can be explained since subjective health was the focus of this study rather than clinical and in vivo measures of health. Regardless, other studies support the health benefits, which is not found in this study (Howarth et al., 2020). Other researchers may take an interest in investigating these conflicting findings in their future research.

The regression analysis revealed that among the key variables of the study, only fear of COVID-19 and bereavement coping shows direct association with gardening. The variables, health, stress, and resilience, were not found to be associated with gardening. Perhaps this is because most literature advocated doing community gardening rather than individual or home gardening, as the former is proven to be more beneficial in increasing resilience and a sense of well-being (Koay & Dillion, 2020). However, the present participants cannot do this because of COVID-19, where social distancing, home quarantine, lockdowns, and other restrictions are observed. To our knowledge, this is the first study to examine the effect of gardening on the participants fear of COVID-19 and bereavement coping. The negative association between the variables fear of COVID-19 and gardening means that feelings of fear of COVID-19 reduces when one is engaged in gardening. Although there is no specific article that presented the exact same variables in this study, the breadth of literature is thorough in discussing the benefits of gardening in improving a person's subjective well-being and anxiety reduction (Corley et al., 2020; Howarth et al., 2020; Kou et al., 2021).

This study also hypothesised a mediation effect of gardening on the participants coronaphobia and bereavement coping. The results found a partial mediating effect of gardening on the participants fear of COVID-19 and their bereavement coping. Further, based on our results, there is a significant total effect of fear of COVID-19 on bereavement coping. This indicates that participants who are more fearful of COVID-19 tend to have lesser coping of their loss. This finding can be supported by a multitude of literature discussing the exponential fear of COVID-19 across all peoples, underscoring the gravity of the pandemic and its impact on man (De los Santos & Labrague 2021; Saricali et al., 2020). People who are in distress tend to be more fearful of COVID-19 (Rahman et al., 2020). Scholars have suggested that moving towards restorative coping activities is essential to reach the stage of acceptance (Lundorff et al., 2018). However, with the current state of the pandemic, achieving this may be difficult. The bereaved may find it hard to go through the restoration process when certain stressors such as the health threat of COVID-19 and social isolation add as another psychological blow in their already distressed dispositions.

Finally, this paper presents the role of gardening between the relationship of coronaphobia and bereavement coping. Based on our search of available literature, this is the first study to explore the mediating effects of gardening to fear of COVID-19 and bereavement coping. Nevertheless, gardening is well discussed to positively impact a person's general sense of well-being. For instance, Theodorou et al. (2021) presented the mediating effect of gardening on persons in psychological distress due to COVID-19. Additionally, the finding supports that of the posits of Cacciatore et al. (2019) on the benefits of green activities such as farming towards the recovery of traumatic grief. Based on our results, the same is true that gardening positively affects the participants' bereavement coping in time of the pandemic.

## **5. Implications and limitations**

The findings of this study add to the growing body of knowledge on the contribution of practising green spaces in improving a personal sense of well-being. Green activities, horticultural therapy or basic home gardening, are synonymous but is solidified on the interrelationships between nature, man and wellness.

As found in this study, the mediating role of gardening highlights another way of boosting a person bereavement coping, especially in the present time. Given the detrimental effects of COVID-19 on a person's mental health and psychological well-being, it is essential to integrate gardening as a supportive and therapeutic intervention. Of equal importance is embedding green spaces in health facilities especially in hospitals, treatment and rehabilitation centers in order to provide therapeutic and healing spaces among sick patients, provide comfort to worried family members, and bring forth consolation to the weary. Health institutions and practitioners may consider this as another paradigm they can implement when providing supportive care to bereaved clients. Gardening may be regarded as a complementary intervention that can be

incorporated with the more conventional therapies in overcoming concerns on the psychological effects of COVID-19 and towards the recovery of grief and loss.

This study is not without limitations. First, the participants included in this study were taken from one province in the Philippines. Hence generalizability of the results cannot be claimed. Second, the use of a cross-sectional design cannot establish a causal link between the study's variables. It is therefore recommended for future researchers to utilise randomisation of participant samples to establish causality. Third, the partial mediating effect of gardening on the participants' bereavement coping means that some other variables or factors can explain which were not accounted for in this study. Fourth, the developed gardening scale was pilot tested to thirty individuals only, it is recommended for other researchers to utilize bigger number of samples to determine changes in the scales' internal validity. Fifth, the use of a self-report questionnaire may pose possible bias and errors to the participants' answers. It would be best for future researchers to combine qualitative aspects to understand further these variables that may not have been captured using self-report scales.

## 6. Conclusion

Based on the findings of this study, it is concluded that gardening is an adaptive practice in ameliorating stress and improving a person's resilience and bereavement coping. This study adds to the body of knowledge on the benefits of gardening, particularly on its mediating role between fear of COVID-19 and bereavement coping. Gardening activities as a complementary intervention may be recommended to bereaved individuals to help them improve coping and grief.

## Acknowledgment

The researchers would like to thank the participants in the study for sharing their time with the team. Gratitude is likewise expressed to the community leaders who assisted the team in looking for participants in the study. The same amount of gratitude is expressed to Visayas State University College of Nursing for all the technical assistance.

## Author contribution

JAAD: Conceptualization, design, analysis, interpretation of results, manuscript preparation and approval; BD: conceptualization, design, data collection, manuscript preparation and approval; ER: conceptualization, design, data collection, manuscript preparation and approval.

## Conflict of interest

The authors report no actual and potential conflicts of interest

## Funding information

This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors

## Declaration of interest statements

The data that support the findings of this study are available from the corresponding author, upon reasonable request.

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