Effects of pet fish-assisted therapy on the depression of elderly patients at home care facilities

Alvin Sabihon[1], Patricia Juliet Ayqui[1], Princess Cuaresma[1], Keith B. Ugale[1], and Dennis B. Brosola[1]*
[1] *National University-Manila*
**Corresponding Author: dbbrosola@national-u.edu.ph*

Abstract: Pet fish-assisted therapy aims to provide therapeutic intervention for elderly clients involving the fish as part of the treatment. The therapy has psychological benefits that could enhance the individual behavioral, social, emotional, cognitive, and physical functioning. The study aimed at determining the effects of pet fish-assisted therapy on the depression of elderly patients. A total of 60 elderly patients were selected from three different nursing home facilities. The researchers grouped the respondents accordingly, where thirty (30) of them were from a control group and another thirty (30) from the experimental. The cluster random sampling technique was utilized by the researchers to determine the respondents who were included in the study. The patients who were screened through the BDI and have passed the inclusion/exclusion criteria were assigned to the experimental and controlled groups. The findings revealed that there is a significant difference between the pretest and post-test. In terms of the level of depression between the pretest among the experimental group and control group, the findings revealed that there is no significant difference between the scores of the experimental group and the control group. However, during the post-test, the result indicates that there is a significant difference between the scores of the experimental and the control group. Since the study was conducted in a small group of participants, it is recommended for the future related study to have a large group in conducting the study.

Keywords: *pet fish-assisted; depression; elderly*

1. INTRODUCTION

Depression is a serious disorder affecting many people around the world. Commonly, people suffer from depression because of different factors. It poses a great risk because symptoms that affect how we think, act, feel, and perform daily activities such as sleeping, socializing, and eating, to name a few, may arise once a person is depressed. Depression is characterized by a persistent feeling of sadness, lack of interest in activities, and fatigue. The feeling of sadness is common to people at times. However, if the feeling of sadness continuous for weeks and

interfere with activities of daily living, a thorough assessment may be needed as this may be a serious manifestation of depression.

Most people perceive depression as an onset of sudden blues where there is a sudden change in mood and has no implications for concern. What people do not know is that depression is one of the leading causes of mortality in the world. It is often neglected of its dangers because of its misconception. It is characterized as one of the most disabling disorders in the world by the World Health Organization (World Health Organization, 2015).

Loneliness, boredom, helplessness, and hopelessness are only some of the psychological imbalances that residents, especially the elderly, often endure during their stay. Anxiety, dementia, malaise, fatigue, and depression are the most common diagnoses of these patients. The disorders mentioned may be exhibited in several ways, ways in which may be harmful not only to the people around him or her but also to herself. Elderly people are at bigger risk of having depression due to their age and the environment that they are later exposed to. Most elderly patients have difficulty dealing with their depression. According to the latest survey conducted among the elderly, 6 million are affected by late-life depression but only 10% of them receive treatment (WHO, 2015). Depression is manifested in different ways among the elderly. The symptoms may be interpreted as effects of certain drugs or caused by other illnesses, making depression to be neglected instead of being treated. Late-life depression differs from depression among young adults as it is more associated with other medical illnesses and lasts longer. Furthermore, late-life depression is often associated with cardiac diseases, suicide attempts, and death.

A variety of strategies and innovations have been discovered and developed for elderly patients to contribute to alleviating their depression. One of the latest therapeutic regimens is animal-assisted therapy. In the study conducted by Clements, Valentin, Jenkins, Rankin, Baker, Gee & Snellgrove (2019) interacting with fish in aquariums was beneficial for psychological and physiological well-being among the elderly. Similarly, interaction with fish in aquariums reduces anxiety, increased tolerance to pain, and increases nutritional intake and body weight among elderly residents from dementia units (Buttelmann, Rompke, 2014). Indeed, the aquarium is a small piece of the tank that provides an overview of the watery world of sea creatures. The colorful fishes and plants in the aquarium stimulate to relax the mind of the elderly clientele. Fish tanks hold the attention of their viewers and induced a safe natural environment.

The researchers conducted this study because of five (5) reasons. First, the researchers of this study were the first ones to experiment on the effects of pets, particularly fishes, on the depression of elderly people. Upon thorough review of past literature, no studies have utilized fishes as their tool of intervention. Most of the studies in the past years focused on the effects of the canine and feline companions and their effects on the

mental health of the subjects. The researchers wish to establish research that aims to highlight the effectiveness of fishes on the mental health of depressed elderly patients.

Second, the disadvantages that previous studies found out using pet therapy were cut down. One of the complaints of pet therapy utilizing cats and dogs is the allergic reaction of the patients to the fur of these animals. This was debunked by utilizing a pet fish because of the absence of fur. Furthermore, these types of pets take a lot of effort from the persons involved.

Third, this research will contribute to the variety of options that pet therapy offers for those who wish to undergo the treatment. Aside from the common cats and dogs, fishes will also provide similar effects to the elderly subjects. Fourth, this type of treatment is friendly to the elderly subjects since it does not pose great harm to their safety. Dogs and cats may become aggressive especially when there are external stimuli that make them aggressive. Statistics by the WHO showed that about 1000 U.S. citizens are brought to the hospital because of dog bite injury. 86% of these reported cases have induced bodily harm. 76% of these cases have led to fatalities. Based on the data revealed (WHO, 2015) about 2-50% of animal bites cases account for cat-bite injuries. About 18 per 100 000 population were cat-bite. The researchers proposed the use of fishes because of the safety that they provide. They are put into a bowl and just stay inside the bowl. There is no fear of them afflicting harm or injury.

Fifth, Pet fishes can be sold anywhere. There is a wide variety of these animals that can complement the taste of the buyers. Adding to its availability is the cost of buying it. Pet fish prices may vary depending on the type of fish. Prices may start as low as 10 pesos for small fishes. Pet stores can also be found in almost all corners, like public markets, or even malls. Since depression has been one of the commonly neglected serious mental disorders, especially among elderly people, the researchers dig into possible solutions that are easier, economic, and readily available. The researchers came up with the utilization of pet fishes as companions of the elderly. It would be a first for the pet therapy community to conduct this experiment to utilize fish as our catalysts, hence, making the researchers do experimental research on its effectiveness and add it to the official list of therapy pets.

1.1 Depression

Depression is a highly prevalent form of acute illness in a geriatric hospital (Luppa, Sikorski, Luck, Weyerer, Villringer & Konig, 2012) but most are undiagnosed and are often left untreated. A meta-analysis study reported that there was a worldwide prevalence of late-life depression between 4.7% to 16% (Barua, Ghosh, Kar, & Basilio, 2011). Common symptoms would include persistent sadness, significant decrease or increase in appetite or weight, insomnia or hypersomnia, and withdrawal

from regular social activities (The Australian Psychological Society Limited, 2017). Because of mistaken diagnoses, this type of patients often endures bigger healthcare costs (Bock, Brettshcneider, Weyerer, Werle & Wagner, 2016) and longer stays in the hospital (Prina, Deeg, Brayne, Beekman, & Huisman, 2012), sometimes leading to increased mortality (Pan, Sun, Okereke, Rexrode, & Hu, 2011).

Geriatric major depression is the major burden among the elderly. The condition can decrease a person's quality of life and can have significant clinical and social implications in the lives of the elderly (Grover, Malhotra, 2016) with some associated with multimorbid and functional loss (Smith, Soubhi, Fortin, Hudon, & O'Dowd, 2012). There are benefits identified of antidepressants among patients with acute physical illnesses, but its adverse effects may limit therapy range, especially with patients with cardiac problems (Coupland, Dhiman, Morris, Arthur & Barton, 2011). Selective serotonin reuptake inhibitors are a good first-line strategy in terms of efficacy and tolerability (Allan & Ebmeier, 2013).

There are different psychotherapies available to date that may act as alternates to the use of antidepressant medication, reducing drug-related side effects (Krishna, Honagodu, Rajenda, Sundarachar, Lane & Lepping, 2013). Several causes lead to depression such as biological and social factors. Family history or previous episodes of severe sadness are associated with an increased risk for depression. (Australian Psychological Society, 2017). Studies have found that many older adults who have committed suicide visited their physician very close to the time of suicide. Twenty percent of the recorded cases account for those who committed their act on the same day of the visit and forty percent within a week of the suicide (Australian Psychological Society, 2017).

1.2 Animal- Assisted Therapy

An innovative approach has been introduced and this is called Animal-Assisted Therapy (AAT). The goal of this therapy is to provide therapeutic intervention for humans by involving animals in their treatment. The focal point of this structured therapy is to increase behavioral, social, emotional, cognitive, or physical functioning (IAHAIO), 2014). One of the common goals of the researchers in utilizing AATs is to find out its neurologic (Lasa, Bocanegra, Alcaide, Arratibel, Donoso & Ferreiro, 2013) and psychotherapeutic effects (Gilmer, Baudino, Goddard, Vickers, & Akard, 2016) (Krishna, Honagodu, Rajendra, Sundarachar, Lane & Lepping, 2013) to different population groups. Animal choices may range from dogs, cats, birds, guinea pigs, to dolphins (Hiroharo, Shinpei, Kiichiro, Hyuntae, Hiroyasu, 2014). Although animal-assisted therapy is widely used, little is known about the perception and attitude towards its use.

1.3 Fishes and Aquariums

Fishes have been accounted for many physiologic and psychological benefits to different age groups. Viewing fish in aquarium have a significant positive effect in psychological well-being of a person. Gee, Reed, Whiting, Friedmann, Snellgrove & Sloman (2019) watching fish decreases the stress and anxiety of older clients with dementia. Eating in font of the aquarium increases appetite (Edwards & Beck, 2014), decreases blood pressure and heart rate (Wells, 2005). In the study conducted by the results revealed that companionship is the potential benefit of fish therapy. With some reported of being highly attached (Langfield & James, 2009). Moreover, the feeling of loneliness has been decreased (Clements, Valentin, Jenkins, Rankin, Baker, Gee & Snellgrove, 2019) Affective sate of older client has significantly improved after viewing an aquarium exhibit for 10 minutes. (Cracknell, White, Pahl, Nichols & Depledge, 2016).

Statement of the Problem

The main problem of this study is to assess the effects of animal-assisted therapy, specifically pet fish-assisted therapy on the depression of elderly residents in nursing home care facilities. This study was guided by the following questions formulated by the researchers:

1. What is the level of depression of the participants during the pretest among the:
   1.1 Experimental Group
   1.2 Control Group
2. What is the level of depression of the participants during the posttest among the:
   2.1 Experimental Group
   2.2 Control Group
3. Is there a significant difference in the level of depression between the two groups during:
   3.1 Pre-test
   3.2 Post-test
4. Is there a significant difference in the level of depression between the pretest and posttest among the:
   4.1 Control Group
   4.2 Experimental Group

2. METHODOLOGY

A true experimental design was utilized in the study. The researchers exploited this type of research method to manage the independent variable. The participants of the study were divided into two groups namely the experimental group, which is exposed to pet fish-assisted therapy, and the control group who is not exposed to the

intervention. The participants of the study have randomly selected the samples and evaluate the effect of the pet fish-assisted therapy on the independent variable and the dependent variable. Results of both groups were compared with each other during pretest and posttest.

The study was conducted from three (3) nursing home institutions namely (1) Camillus Medhaven Inc in Marikina City and (2) Good Samaritan Nursing Home Institution also located in Marikina City and (3) Anawim Lay Mission Foundation Incorporated. The respondents of the study consisted of sixty (60) elderly depressed clients. The researchers grouped the respondents accordingly, where thirty (30) of them were from the control group and another thirty (30) from the experimental. Clustered Sampling Technique was utilized by the researchers to determine the respondents who were included in the study. The patients who were screened through the BDI and have passed the inclusion/exclusion criteria were assigned to the experimental and controlled groups.

Inclusion criteria

The respondents should be:

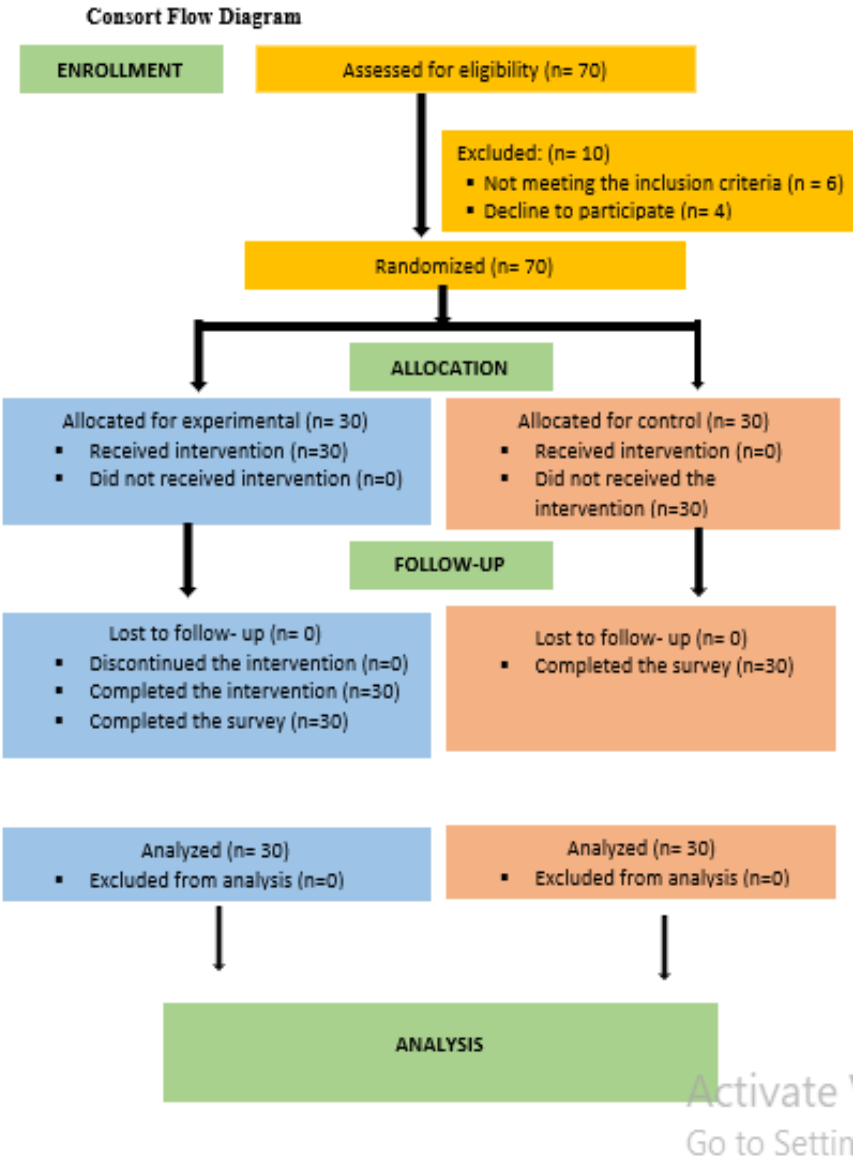
1. Screened as depressed, with a score of 14 and up, using the BDI-II screening tool.
2. Within the age range of 60-80 years old
3. Know how to read and write
4. A resident of a home care facility

Exclusion criteria

Should not have any mental disorders which could alter the results such as, but are not limited to:

1. Schizophrenia
2. Dementia
3. Alzheimer’s

4. Schizoid Personality



The researchers purchased the Beck Depression Inventory-II (BDI-II) and were used it as the main tool of the study. The Beck Depression Inventory (BDI) is a series of questions developed to measure the intensity, severity, and depth of depression in patients with psychiatric diagnoses and assess a specific symptom common among people with depression. The BDI Tool was used during the screening test, pretest, and posttest to measure the depression level of the participants. The tool was derived from the BDI. The 21-item self-administered survey is scored on a scale of 0-3 in all lists of four statements arranged in increasing severity

about a particular symptom of depression. Each of the 21 items corresponding to a symptom of depression is summed to give a single score for the Beck Depression Inventory-II (BDI-II). There is a four-point scale for each item ranging from 0 to 3. The total score of 0–13 is considered minimal range, 14–19 is mild, 20–28 is moderate, and 29–63 is severe. The psychometric properties of the BDI- II tool, for the reliability- the test-retest stability is (0.93). The internal consistency (coefficient alpha) is 0.92-0.94. The construct validity was high when compared to the BDI (0.93).

The three (3) nursing home institutions permitted the researchers to conduct the study. The respondents received a cover letter explaining the purpose of the study and the instructions on how to answer the questionnaire. The research questionnaires were distributed to the respondents after they permitted the researchers. The experimental group received individually a small aquarium that they can bring inside their room. The respondents were given two hours of exposure to the aquarium where they fed, changed the water, and put-on artificial plants. The experimental group was exposed to 40 hours of pet fish therapy. Meanwhile, the control group was observed during the usually scheduled activity. Specifically, the control group was instructed to join the bingo game during the afternoon socialization event.

The gathered data underwent statistical treatment. To determine the level of depression of the respondents during the pretest and posttest weighted mean was utilized. To determine the significant difference in the level of depression between the experimental and control groups T-Test was utilized. Lastly, to determine the significant difference between the pretest and posttest among the experimental group and control group T-Test was utilized.

Ethical Consideration

The researchers attended the basic Good Research Practice seminar conducted by the Department of Nursing. Approval from the Nursing Home Facilities was obtained before the conduct of the study. Proper instructions were given to all concerned participants of the study which include the main objective of the study was declared in the informed consent. The anonymity of the participants was strictly observed; hence the researchers ensured the confidentiality of the obtained information and responses to the study.

3. RESULTS AND DISCUSSION

Mean Distribution of Level of Depression of Respondents during the pre-test and post-test.

Table 1. Level of depression of respondents during the pre-test and Post-test for the experimental group.

	Pretest		*Posttest*	
	Mean	*Interpretation*	*Mean*	*Interpretation*
Sadness	1.40	MILD	0.47	MINIMAL
Pessimism	1.2 0	MILD	0.5	MINIMAL
Past Failure	1.07	MILD	0.6	MINIMAL
Loss of Pleasure	1.41	MILD	0.63	MINIMAL
Guilty Feelings	1.31	MILD	0.67	MINIMAL
Punishment Feelings	1.22	MILD	0.5	MINIMAL
Self-Dislike	1.0	MILD	0.47	MINIMAL
Self-Criticalness	1.91	MODERATE	0.7	MINIMAL
Suicidal Thoughts or Wishes	0.53	MINIMAL	0.17	MINIMAL
Crying	1.76	MODERATE	1	MILD
Agitation	1.47	MILD	0.77	MILD
Loss of Interest	1.31	MILD	0.73	MINIMAL
Indecisiveness	1.37	MILD	0.67	MINIMAL
Worthlessness	1.27	MILD	0.53	MINIMAL
Loss of Energy	1.40	MILD	0.73	MINIMAL
Changes in Sleeping Pattern	2.03	MODERATE	1.50	MINIMAL
Irritability	1.33	MILD	0.73	MINIMAL
Changes in Appetite	1.53	MODERATE	1.33	MILD
Concentration Difficulty	1.43	MILD	0.73	MINIMAL
Tiredness or Fatigue	1.37	MILD	0.93	MILD
Loss of Interest in Sex	1.60	MODERATE	0.93	MILD
Total	28.92	MODERATE	15.42	MODERATE

Legend: 0.00-0.75: Minimal, 0.76-1.51: Mild, 1.52-2.27: Moderate, 2.28- 3.00: Severe
For BDI- II Interpretations: 0-13: Minimal, 14-19: Mild, 20-28: Moderate, 29-63: Severe

Table 1 shows the summary of mean scores of the experimental group during the pretest and posttest. Each mean score has its interpretation based on the mean score guideline that the researchers used based on the test score guideline provided by Aaron Beck's BDI-II. A total mean score of 28.93 was obtained in the pretest mean scores which fall under the category of Moderate Depression using the test score guideline of the BDI- II. On the other side, a mean score of 15.43 with a corresponding interpretation of Moderate Depression was obtained in the posttest scores.

The study measures the characteristic attitudes and symptoms of depression among elderly persons. The symptoms are (1) Sadness (2)

Pessimism (3) past failure (4) Loss of pleasure (5) Guilty feelings (6) Punishment feelings (7) Self-dislike (8) Self-criticalness (9) Suicidal thought (10) Crying (11) Agitation (12) Loss of interest (13) Indecisiveness (14) Worthlessness (15) Loss of energy (16) Changes in sleeping patterns (17) Irritability (18) Changes in appetite (19) Concentration difficulty (20) Tiredness of fatigue (21) Loss of interest in sex.

The experimental group received the pet-fish therapy. The small aquarium with two fishes was utilized by the researchers in the conduct of the study, wherein the participants were given two hours a day for four weeks with a total of 40 hours in the entire therapy. The researchers allowed the participants to feed the fishes, change the water, and put-on artificial plants in the aquarium. During the first observation, the participants were observed on their usual afternoon activity which was the bingo game. The most prevalent symptom for the experimental group during the first observation is the changes in the sleeping pattern as it obtained a mean score of 2.03, which is interpreted as moderate. Surprisingly, there was a notable improvement in the sleeping pattern on the second observation where participants were given enough time to interact with the fishes. The results revealed a mean score of 1.63 interpreted as mild.

Depression was regarded as a common risk factor for developing insomnia for an elderly client. Hence, sleep disturbance is a common manifestation during the depression. Depressed patients manifesting sleep disturbance are most likely to develop more advanced symptoms of depression and difficulties in treatment (Hinkelmann, Moritz & Botzenhardt, 2012). However, most studies have revealed that sleep disturbance is not only a prodromal manifestation of depression but also an independent risk factor for subsequent depression. Based on the study of Barclay and Gregory (2013) the results revealed that sleep disturbance was induced by several factors such as environmental, stress, or other mental disorders. Also, Lind, Aggen, Kirkpatrick, Kendler, and Amstadter (2015) revealed that genetic influence played a significant role in the development of sleep disturbance in a depressed client. A genetic factor that is known to be crucial in the generation and regulation of circadian rhythm was found to be involved in depression (Li, Bunney, & Meng, 2013).

Changes in sleep patterns are a common mechanism of the normal aging process. Frequent arousal contributes to the difficulty of falling asleep and staying asleep for older people (Gulia, Kumar, 2018). On the lighter side, fish therapy improved the sleeping pattern of the patients. According to Velasco (2013), fish tanks significantly decrease stress and increase pleasant feelings. These helped them achieve changes in their sleeping pattern. The second most prevalent symptom for the experimental group during the first observation (pretest) is the self-criticalness (1.91)

interpreted as moderate. As an observation, elderly patients in the home care facilities are encouraged to have self-openness and familiarity with people, place, and routines or activities. It is helpful as this allows the elderly clients to promote awareness and decrease the avoidant behavior.

Agitation ranked as the second highest with the obtained mean of 0.77, which is interpreted as mild. For elderly depressed clients, agitation is characterized by psychomotor, suicidal ideas, and somatic symptoms (WHO, 2011). Furthermore, behavioral agitation is also characterized by lowered mood, loss of appetite, sleep disturbance, and feelings of guilt and worthlessness. For psychomotor agitation, it is usually characterized by an inability of sitting still or not moving, excessive talking, unintentional or purposeless motions. In some cases, there is also hostility, poor impulse control, tension, and violent behavior (Mohr, Lovera, Brown, Cohen, Neylan, Henry, Siddique, Jin, et, al, 2012). Pet fish-assisted therapy has improved the psychomotor domains of the elderly client. Movements have become synchronized; tension control has increased, and violent behavior has been shifted to more meaningful action.

Table 2 shows the summary of mean scores of the control group during the pretest and posttest. Each mean score has its interpretation based on the mean score guideline that the researchers used based on the test score guideline provided by Aaron Beck's BDI-II. A total mean score of 29.96 was obtained in the pretest mean scores which fall under the category of Severe Depression using the test score guideline of the BDI-II. A mean score of 24.64 with a corresponding interpretation of Moderate Depression was obtained in the posttest scores.

The control group was observed during the usually scheduled activity. Specifically, the control was tasked to join the bingo game during the afternoon socialization event. The results revealed that crying and changes in appetite ranked the highest with an obtained mean score of 1.77 respectively during the pretest and 1.70 on the posttest. Crying emphasizes a need for communication, attention, and release of tension and is considered a universal response for communicating distress (Laan, Van Assen & Vingerhoefs, 2012). Several situations cause severe sadness to elderly people and most of the time can lead to the shedding of tears. **(X)** Coyne (2013) investigated that depressed elderly people have increased crying when reading newspapers, watching heavily emotional provoking shows or when attending to one's thoughts, or simply by being alone.

Research studies have revealed that aquariums are beneficial in healthcare settings (Cracknell, White, Pahl & Depledg. 2017). There is also a study where findings revealed that pet fish-assisted therapy has reduced emotional burden (Buttelmann & Römpke. 2014). People who have an aquarium at home consider their fish to be a source of companionship and feel an emotional connection with the animals (Langfield &James, 2009). In this study, elderly people with depression were seen smiling and continuously talking to the fish during the entire

therapy session. It may be a good sign that these elderly depressed clients were interacting with the fish. Furthermore, social interaction among other elderlies who received pet-assisted therapy has improved.

Sharing with crying as the highest obtained mean is the changes in appetite. It is natural to observe that elderly people may tend to have decreased appetite, this may be due to the body's natural metabolism that as we aged metabolism decreases. However, sudden changes such as the decrease in appetite or skipping of meals in a day are the most observed appetite-related behavior of the depressed elderly. Weight loss due to decreased appetite is an early warning sign of depression. According to (Gilmer, Baudino, Goddard, Vickers, Akard, 2016) increase in pleasant feelings and decreases in stress were associated with pet fishes and fish tanks. These factors affect the appetite of people. Decreases in these factors may affect the appetite of those with depressive disorder. During pet fish therapy, elderly clients have the time to feed the fishes in the fish tank. The researchers believed that the feeding activity of the elderly with the fishes somehow encourages them to be responsible for their nutrition.

Table 2. Level of depression of respondents during the pre-test and post-test for the control group.

	Pretest		*Posttest*	
	Mean	*Interpretation*	*Mean*	*Interpretation*
Sadness	1.3	MILD	0.87	MILD
Pessimism	1.53	MODERATE	1.17	MILD
Past Failure	1.37	MILD	1.2	MILD
Loss of Pleasure	1.43	MILD	1.3	MILD
Guilty Feelings	1.6	MODERATE	1.03	MILD
Punishment Feelings	1.23	MILD	1.03	MILD
Self-Dislike	1.33	MILD	1.1	MILD
Self-Criticalness	1.63	MODERATE	1.4	MILD
Suicidal Thoughts/Wishes	0.63	MINIMAL	0.63	MINIMAL
Crying	1.77	MODERATE	1.4	MILD
Agitation	1.47	MILD	1.37	MILD
Loss of Interest	1.33	MILD	1.27	MILD
Indecisiveness	1.63	MODERATE	1.17	MILD
Worthlessness	1.47	MILD	1.27	MILD
Loss of Energy	1.47	MILD	1.1	MILD
Changes in Sleeping Pattern	1.63	MODERATE	1.63	MODERATE
Irritability	1.37	MILD	1.03	MILD
Changes in Appetite	1.77	MODERATE	1.70	MODERATE
Concentration Difficulty	1.4	MILD	0.93	MILD
Tiredness or Fatigue	1.27	MILD	1.17	MILD
Loss of Interest in Sex	1.5	MILD	0.87	MILD
Total	29.96	SEVERE	24.64	MODERATE

Legend: 0.00-0.75: Minimal, 0.76-1.51: Mild, 1.52-2.27: Moderate, 2.28- 3.00: Severe
For BDI- II Interpretations: 0-13: Minimal, 14-19: Mild, 20-28: Moderate, 29-63: Severe

Meanwhile, the symptoms obtained the second-highest mean is indecisiveness, self-criticalness, and changes in the sleeping pattern (1.63), which are interpreted as moderate (pretest). Whereas agitation ranked the second highest with an obtained mean of 1.37, which is interpreted as mild. Indecisiveness is considered a defining characteristic of depression.

In a study conducted by Leykin, Derubeis & Roberts (2011) it was found out that depressive symptoms were associated with self-reported suboptimal decision-making styles in every-day life, increased dependence on people, increased brooding, and reduced reliance on one's intuitions. Also, Leykin, Derubies & Roberts (2011) stated that depressed individuals' decision-making abilities are affected by social situations, career situations, potential conflict, self-improvement, family, and relationships. The results of the study also revealed that depressive symptoms were associated with poor decision making, reduced activity, decreased self-efficacy, and increased negative emotions.

Table 3. A significant difference in the level of depression between the experimental and control groups during pretest and posttest.

Mean Scores of Depression	***df***	*Pretest M(SD)*	*Posttest M(SD)*	*Significant value (P-value)*
Experimental Group (n=30)	29	28.9(9.33)	15.43(7.09)	7.932
Control Group (n=30)	29	29.97(9.16)	24.63(9.23)	4.212

Table 3 shows the significant difference in the level of depression between the experimental and control group during pretest and posttest. In the experimental group during the pretest, a test score of 28.9 was obtained with a standard deviation of 9.33. During the posttest, the experimental group obtained a lower test score of 15.43 with a standard deviation of 7.09. Instead of a p-value, a significant value was obtained, which is just an equivalent of a p-value in a distribution. A significance level of 0.05 has a significance value of 2.045. Since a significance value of 7.932 was obtained after comparison of the scores, this indicates that there is a significant difference between the scores of the pretest and posttest.

In the control group, during the pretest, a test score of 29.97 was obtained with a standard deviation of 9.16. In the post-test of the experimental group a test score of 24.63 with a standard deviation of 9.23. Since a significance value of 4.212 was obtained after comparison of the scores, which was higher than the value of α which is 2.045, this indicates

that there is a significant difference between the scores of pretest and post-test.

A study conducted by Edwards & Beck (2002) revealed that the use of fish improved the cognition, physical and psychosocial interaction of the elderly residents in the nursing home facility. The improvement was observed by the researchers, those elderly residents who have undergone pet-fish-assisted therapy have noticeable relief of loneliness and boredom, improved social interaction, laugh, and smile most of the time in the entire therapy session. The pet fish-assisted therapy improved the condition of the residents. Looking back at the result of the study the huge difference in the results from pretest and posttest was the confirmation that the residents of the nursing home facility benefited at best during the pet fish-assisted therapy.

Table 4. A significant difference in the level of depression between the pretest and posttest among the experimental group and control group.

Mean Scores of Depression	*Pretest M(SD)*	*Posttest M(SD)*
df	29	29
Experimental Group (n=30)	28.9(9.33)	15.43(7.09)
Control Group (n=30)	29.97(9.16)	24.63(9.23)
Significant value (t -value)	0.5169	4.3285

Table 4 shows the significant difference in the level of depression between the pretest and post-test among the experimental and control groups. In the pretest, a test score of 28.9 was obtained with a standard deviation of 9.33 in the experimental group. Meanwhile, a test score of 29.97 and a standard deviation of 9.16 were obtained from the control group. A computed t-score of 2.0017 which is equivalent to the α of 0.05 was obtained. Since an at-value of 0.5169 was obtained, this indicates that there is no significant difference between the scores of the experimental group and the control group.

During the post-test, the experimental group obtained a test score of 15.43 with a standard deviation of 7.09 while the control group obtained a test score of 24.63 with a standard deviation of 9.23. A significance value of 4.3285 was obtained after comparison of the scores, which is higher than the computed t-score, indicates that there is a significant difference between the scores of the experimental group and the control group.

Fish therapy could be a breakthrough in animal-assisted therapy in different forms of maladaptive patterns of behavior. The study proved that fish therapy could help elderly persons to recover from depressive symptoms. Furthermore, the therapy has offered psychosocial benefits to elderly people.

Animals as a companion are valued for its effects on the social interaction of the elderly clients (Walsh, 2009). A study was conducted by Baun & McCabe (2003) pets like dog, cats, fishes in the aquarium provides a calming and soothing effect that stimulate social interaction among elderly people. The researchers have noticed a development in the social interaction of the elderly residents in the home care facilities. As evidence by, the family members of the elderly residents also participated in the pet fish-assisted therapy that allows having an open channel of communication from the residents and their family members. Most residents have developed confidence in sharing their experiences while taking care of their fishes. As the intervention ends most of the residents requested to keep the fish tanks in their rooms which were approved by the staff nurses and the family members.

4.CONCLUSION

In general, pet fish-assisted therapy is effective in decreasing the symptoms of depression of elderly people. Moreover, pet fish-assisted therapy has shown significant benefits on the psychological wellness of elderly clients. Particularly to those elderly who were diagnosed with depression. The results of the study could be the first step for health care professionals to consider innovative therapeutic regimens because everyone has a different situation, hence needs a unique recovery process. For the experimental group, pet fish-assisted therapy provides a sense of comfort and company because animals can be a good socialization tool that may help the depressed client to decrease the symptoms of depression. Human-animal interaction has benefits for the therapeutic purposes of clients with psychological disorders. Utilizing pet fish-assisted therapy as a supportive therapeutic tool could promote rehabilitation and enhanced the well-being and recovery of the client. Hence, this therapy could be an important therapeutic tool in the field of health care.

For the control group since the findings of the study revealed mild to moderate depression. The researchers discussed the findings of the study with the nurse managers and proper referral to a physician was conducted. After the completion of the study, the researchers continued the pet fish-assisted therapy with the control group. The researchers donated the fish tanks and other accessories to the health facilities.

Since the study was conducted in a small group of participants, it is recommended for the future related study to have a large group in conducting the study.

REFERENCES

Allan, C. L., & Ebmeier, K. P. (2013). Review of treatment for late-life depression. *Advances in Psychiatric Treatment*, 302-309.

Barclay, N.L., & Gregory, A.M. (2013). Quantitative genetic research on sleep: a review of normal sleep, sleep disturbances, and associated emotional, behavioral, and health-related difficulties. *Sleep Med Rev*, 17(1): 29– 40.

Barua, A., Ghosh, M., Kar, N., & Basilio, M. (2011). Prevalence of depressive disorders in the elderly. *Annals of Saudi Medicine*.. 31(6):620-4.

Baun, M., & McCabe, B. (2003). Companion animals and persons with dementia of the Alzheimer's type: Therapeutic possibilities. *American Behavioral Scientist*,47(1), 42–51.

Bock, J.-O., Brettschneider, C., Weyerer, S., Werle, J., & Wagner, M. (2016). Excess health care costs of late-life depression - Results of the AgeMooDe study. *Journal of Affective Disorders*, 139-147.

Buttelmann D, Römpke AK. (2014). Anxiety-reducing effect: dog, fish, and plant in direct comparison. *Anthrozoos*. 2014;27(2):267–77.

Clements, H, Valentin, S, Jenkins, N, Rankin, J, Baker, J, Gee N, & Snellgrove, D. (2019). The Effects of Interacting with Fish in Aquariums on Human Health and well-being: A Systematic Review. *PONE Journal*, 14(7).

Cracknell D, White MP, Pahl S, Depledge MH. (2017). A preliminary investigation into the restorative potential of public aquaria exhibits a UK student-based study. *Landsc Res*, 42(1):18–32.

Cracknell D, White MP, Pahl S, Nichols WJ, Depledge MH. Marine biota and psychological well-being: a preliminary examination of dose–response effects in an aquarium setting. *Environ Behav*. 2016;48(10):1242–69.

Coupland, C., Dhiman, P., Morris , R., Arthur, A., & Barton, G. (2011). Antidepressant use and risk of adverse outcomes in older people: population based cohort study. *BMJ*. https://doi.org/10.1136/bmj.d4551.

Edwards, N. E., & Beck, A. M (2014). Animal-assisted therapy and nutrition in Alzheimer's disease. *Western Journal of Nursing Research*, 24(6).

Gee, N, Reed, T, Whiting, A, Friedmann, E, Snellgrove, D, Sloman, K. (2019). Observing Live Fish Improves Perceptions of Mood, Relaxation and Anxiety, But Does Not Consistently Alter Heart Rate or Heart Variability. *International Journal of Environmental Research and Public Health.* 16(17). https://doi.org/10.3390/ijerph16173113

Gilmer, M., Baudino, M., Goddard, A., Vickers, D. C., & Akard, T. (2016). Animal-Assisted Therapy in Pediatric Palliative Care. *Elsevier Inc.* 51(3):381-95.

Gulia K, Kumar, V, M. (2018). Sleep disorders in the elderly: A growing challenge. *Psychogeriatrics*, 18 (3)155-165.

Hinkelmann, K., Moritz, S., & Botzenhardt, J. (2012). Changes in cortisol secretion during antidepressive treatment and cognitive improvement in patients with major depression: a longitudinal study. *Psychoneuroendocrinology*, 37(5) 685– 692.

Hiroharo, K., Shinpei, O., Kiichiro, T., Hyuntae, P., Hiroyasu, O., & Shuichi, H. (2014). Effectiveness of animal-assisted therapy: A systematic review of randomized controlled trials. Tokyo, Japan: *Elsevier Inc.* 22(2):371-90. https://doi.org/10.1016/j.ctim.2013.12.016.

International Association of Human- Animal Interaction Organization, (2014). The IAHAIO definitions for animals assisted interventions and guidelines for wellness of animals involved in AAI. https://iahaio.org/wp/wp-content/uploads/2018/04/iahaio_wp_updated-2018-final.pdf.

Krishna, M., et al. (2013). A systematic review and meta-analysis of group psychotherapy for sub-clinical depression in older adults. *International Journal of Geriatric Psychiatry*, 881-888.

Laan, A. J., Van Assen, M. A. L. M., & Vingerhoets, A. J. J. M. (2012). Individual differences in adult crying: The role of attachment styles. *Social Behavior and Personality: An International Journal*, *40*(3), 453-472.

Langfield J, James C. (2009). Fishy tales: experiences of the occupation of keeping fish as pets. *Br J Occup Ther.* 2009;72(8):349–56.

Lasa, S. M., Bocanegra, N., Alcaide, R., Arratibel, M., Donoso, E., & Ferriero, G. (2013). Animal assisted interventions in neurorehabilitation: a review of the most recent literature. *Neurologia.* 30(1):1-7.

Leykin, Y., Derubies, R., & Roberts, C.S. (2011). Decision-Making and Depressive Symptomatology. *Cognit Ther Res* 2011; 35(4): 333-341.

Li, J.Z., Bunney, B.G., & Meng, F. (2013). Circadian patterns of gene expression in the human brain and disruption in major depressive disorder. *Proc Natl Acad Sci* USA. 2013; 110(24): 9950– 9955.

Lind, M.J., Aggen, S.H., Kirkpatrick, R.M., Kendler, K,S., & Amstadter, A.B. (2015). A longitudinal twin study of insomnia symptoms in adults. *Sleep*, 38(9): 1423– 1430.

Luppa, M., et al. (2012). Prevalence and risk factors of depressive symptoms in latest life-results of the Leipzig Longitudinal Study of the Aged (LEILA 75+). *International Journal of Geriatric Psychiatry*, 286-295.

Grover, S., & Malhotra, N. (2016). Depression in elderly: A review of Indian research. *Journal of Geriatric Mental Health*, 2(1):4.

Mohr, D., et al. (2012). A randomized trial of stress management for the prevention of new brain lesion in MS. *Neurology*. 31;79(5):412-9.

Pan, A., et al. (2011). Depression and risk of stroke morbidity and mortality: A meta-analysis and systematic review. *JAMA*, 1241-1249.

Prina, A., Deeg, D., Brayne, C., Beekman, A., & Huisman, M. (2012). The association between depressive symptoms and non-psychiatric hospitalisation in Older Adults. *PLOS One*. 7(4). https://doi.org/10.1371/journal.pone.0034821.g001

Smith, S. M., Soubhi, H., Fortin, M., Hudon, C., & O'Dowd, T. (2012). Managing patients with multimorbidity: systematic review of interventions in primary care and community settings. *BMJ 2012;345.* https://doi.org/10.1136/bmj.e5205

The Australian Psychological Society Limited. (2017, February 24). *Understanding late-life depression*. https://www.psychology.org.au/publications/tip_sheet/late_depression/

Walsh, F. (2009). Human-animal bonds I: The relational significance of companion animals. *Family Process*, 48(4), 462–480.

Wells, D. (2005). The Effect of Videotapes of Animals on Cardiovascular Responses to Stress. *Stress and Health* 21(3), 209-213. https://doi.org/10.1002/smi.1057

World Health Organization. (2011). World Health Statistics. https://www.who.int/whosis/whostat/2011/en/

World Health Organization. (2015). Ageing and Health. *World report on ageing and health*. https://www.who.int/ageing/publications/world-report-2015/en/