The Anxiolytic Effects of Oral Chamomile

Evelyn Drake

Case Western Reserve University

USSO 286V: Management of Chronic Illness in a Cultural Context

Dr. Zhang, Dr. Blake

May 4, 2023

Abstract of Introduction and Methods

Background

Anxiety disorders are increasingly prevalent throughout the world, especially in the wake of the COVID-19 pandemic. Chamomile (*Matricaria chamomilla*) consumed orally, typically through a tea, has been traditionally used for centuries as an herbal remedy. Specifically, chamomile tea is alleged to have anxiolytic effects.

Objectives or Purposes

I hypothesize that chamomile, consumed orally, will be superior to placebo in treating symptoms of anxiety disorders. I initially wanted to examine its impact on college students, as anxiety among this demographic is a significant problem. However, I broadened my hypothesis's population of interest to anyone suffering from anxiety symptoms, as there were not enough clinical trials examining the effects of chamomile on college students specifically. I wanted to study the effects of chamomile tea specifically, but I found thorough research on other forms of oral chamomile extract which I wanted to include.

Methods

I used the Case Western Reserve University library catalog and PubMed to find 8 peer-reviewed papers (ideally published from 2018 onwards, but only the majority found satisfied these criteria) containing information surrounding the topic. I will then analyze the results of these studies to compare the experimental findings to my hypothesis.

Results

The first study (Amsterdam et al., 2009) attempted to examine the efficacy of oral chamomile extract for treating the symptoms of generalized anxiety disorder. The researchers constructed a randomized, double-blind, placebo-controlled efficacy and tolerability trial to test the effects of oral chamomile extract on the symptoms of generalized anxiety disorder symptoms. The researchers hypothesized that the use of chamomile extract therapy would be superior to placebo for the treatment of generalized anxiety disorder. The researchers started with 61 adults with mild generalized anxiety disorder (4 excluded) and assigned 57 randomly to two groups: a double-blind chamomile extract group (n=28) and a placebo group (n=29) They all had a diagnosis of generalized anxiety disorder, and they were excluded for other mental health disorders, substance abuse, use of anxiolytic or antidepressant drugs (including herbal medicines), and allergies to chamomile or its relatives. The researchers studied the changes over time in the patients' total Hamilton Anxiety Rating (HAM-A) scores, which was defined as the primary outcome. The trial took place at the Depression Research Unit of the University of Pennsylvania. The researchers gave subjects 220mg capsules identical in appearance of either chamomile extract or lactose monohydrate. They also controlled for the scent of the chamomile extract by placing a drop of chamomile extract in the lid of the placebo medication containers. The patients initially took one capsule daily for a week, which was increased to two capsules daily for the next week. After the second week, they eliminated patients without at least a 50% reduction in their baseline HAM-A scores from the study. The remaining patients received 3 capsules daily for week 3 and 4 capsules daily for week 4. Afterwards, the patients with a 50% or more reduction in their baseline HAM-A scores took 5 capsules daily for weeks 5 through 8. The researchers conducted outcome measurements at baseline as well as weeks 2, 4, 6, and 8 of

treatment. After the trial was conducted, statistical analysis revealed a significantly greater reduction of the average HAM-A scores of the chamomile group compared to the placebo group.

Next, Keefe and colleagues conducted an open-label study in 2016 to examine the effects of chamomile extract on patients with moderate to severe generalized anxiety disorder. They hypothesized that the use of chamomile extract would significantly reduce GAD symptoms in the subjects. They conducted an open-label examination of the use of 1,500mg of chamomile extract per day for 8 weeks. 179 subjects participated in the study, 15.6% of them discontinued treatment early, and 58.1% of them showed a response to the treatment (defined by the researchers as a 50% or greater reduction in a patient's GAD-7 score). 23.5% of the subjects experienced a rapid reduction in anxiety symptoms (50% or greater GAD-7 reduction) just 2 weeks after treatment began.

Another study concerning the use of chamomile extract therapy was conducted by Keefe and colleagues in 2018. They hypothesized that GAD patients with changes in their stress biology (increase of morning cortisol and the diurnal cortisol slope) following chamomile extract therapy would show superior changes in their symptoms than those who did not. The researchers studied a group of 179 adults diagnosed with generalized anxiety disorder, conducting an open-label clinical trial of chamomile extract. The subjects collected saliva samples at home, enabling the researchers to study their salivary cortisol levels. The subjects were instructed to collect samples at 8am, 12pm, 4pm, and 8pm for three days before their treatment started and three days after their treatment concluded (saliva was not collected during the 8-week treatment period). Only 45 subjects made it to the end of the trial with valid measurements of salivary cortisol, and the average subject studied showed a change of 9.4 points on the GAD-7 scale. 71.1% of the subjects experienced a 50% or greater reduction from their baseline GAD-7 score. The

researchers also found that a greater improvement of anxiety symptoms was associated with a change in cortisol levels.

The next study examining the efficacy of chamomile extract therapy was conducted by Amsterdam and colleagues in 2020. The researchers hypothesized that chamomile extract would reduce anxiety symptoms in GAD patients with or without comorbid depression. They identified 179 patients who received therapy with open-label chamomile extract daily for 8 weeks. After the open-label portion, the patients showing a 50% or greater reduction in their baseline GAD-7 scores would continue the open-label therapy for 4 weeks. The patients who continued to respond to the chamomile extract therapy moved on to a randomized double-blind trial to compare the effects of chamomile versus placebo for preventing GAD symptoms. The researchers only analyzed the data from the 8-week-long open-label portion of the study in their publication, however. The researchers found that chamomile extract was effective at treating anxiety in subjects with generalized anxiety disorder.

Also, Mao and colleagues published an evaluation of the long-term anxiolytic effects of chamomile extract in 2016, which analyzed the second, double-blind phase of the previous study. The patients who continued to show a response after the 12 week open-label period moved onto a randomized, double-blind placebo trial for an additional 26 weeks. The primary outcome measured by the researchers was the relapse or lack thereof of the patient's generalized anxiety disorder. The researchers found that 25.5% of the placebo group experienced a relapse in generalized anxiety disorder while only 15.2% of participants in the chamomile group experienced a relapse. Furthermore, the participants in the chamomile group were significantly less likely to experience symptoms of generalized anxiety disorder in comparison to the placebo group.

The next trial, conducted by Chaves and colleagues in 2020, attempted to isolate and explore an active ingredient that may be responsible for chamomile's effects on the central nervous system. The researchers extracted and purified a substance called glucuronoxylan (SN-50R) from chamomile tea through an extensive series of chemical processes. After this, they tested the effects of this substance on mice (in dosages of either 3, 10, or 30 mg/kg), comparing it to a placebo (saline, 10 mL/kg) and diazepam (1 mg/kg). 30 minutes after the treatment was administered to the mice, each mouse was individually placed in a polypropylene box, each lined with 5 cm of sawdust and containing 24 glass marbles. After 30 minutes, the number of marbles buried was recorded, as marble burying in mice is theorized to be an anxiety-related behavior (more marbles buried is correlated with higher anxiety). After the experiment was conducted, the researchers found that the mice treated with 3 mg/kg of SN-50R buried 72% fewer marbles than the control group, the mice treated with 10 mg/kg of SN-50R buried 91% fewer marbles than the control group, and the mice treated with 30 mg/kg of SN-50R buried 96% fewer marbles than the control group. Compared to the mice treated with diazepam, the mice treated with SN-50R at all dosages buried fewer marbles.

The next study (Ghamchini et al., 2019) was one of two studies examining the anxiolytic effects of chamomile tea as opposed to an extract. The researchers focused on cancer patients treated with chemotherapy, identifying 110 patients with cancer who enrolled in the study. 55 patients were placed in the control group, and 55 patients were placed in the intervention group. Each patient was evaluated for their baseline anxiety level using the Beck Anxiety Inventory. After this, the 2 week treatment period began, where patients were asked to consume chamomile tea once a day for two weeks. Finally, the anxiety levels of the patients were evaluated using the same scale after the treatment period. While the anxiety scores decreased for the intervention

group, they also decreased significantly for the placebo group. After conducting logistic regression analysis, the researchers found that the intervention's anxiolytic effects were not statistically significant compared to the placebo.

The final study, conducted by Bazrafshan and colleagues in 2020 and published in 2022, attempted to compare the effects of lavender and chamomile tea on the anxiety symptoms of postmenopausal women. The researchers selected 96 people from a group of 288 menopausal women using systematic random sampling to participate in the study. The researchers used the Spielberger state and trait anxiety questionnaire, which was administered before and after the intervention. 32 subjects were placed into a control group, 32 subjects were placed into a lavender tea intervention group, and 32 subjects were placed into a chamomile tea intervention group. The patients in the intervention groups were instructed to brew 2g of the provided plant leaves (either lavender or chamomile depending on the assigned group) twice a day, once in the morning and once at night. Additionally, the patients were required to brew the leaves for 10-15 minutes in 300 mL of boiling water to standardize the strength of the tea between subjects. This treatment period lasted for 2 weeks. Overall, the researchers found that there was not a significantly significant change in anxiety scores for the control group, there was a statistically significant decrease in anxiety scores for both intervention groups. However, they found no discernible difference between the efficacy of lavender and chamomile tea.

Discussion

Argument

Overall, it appears that chamomile, administered orally as either a tea or an extract, has the potential to provide anxiolysis to patients suffering from anxiety symptoms. The studies

focusing on extracts from chamomile flowers (Amsterdam et al., 2009; Amsterdam et al., 2020; Chaves et al. 2020; Keefe et al., 2016; Keefe et al., 2018; Mao et al., 2016) all showed promising results. The study conducted by Amsterdam and colleagues in 2009 showed a statistically significant decrease in baseline to postintervention HAM-7 scores in the patients given chamomile extract compared to the patients given a placebo. Next, the study conducted by Keefe and colleagues in 2016 was an open-label investigation of the use of chamomile extract for symptoms of generalized anxiety disorder. The majority of the subjects demonstrated a decrease of 50% or greater in their GAD-7 scores. Another trial was conducted by Keefe and colleagues in 2018, which showed that cortisol levels played a role in the efficacy of the use of chamomile extract for generalized anxiety disorder. In this trial, 71.1% of the subjects experienced a 50% or greater reduction from their baseline GAD-7 score. In 2015 (published in 2020), Amsterdam and colleagues conducted another trial with the purpose of exploring the effects of chamomile extract therapy on patients with generalized anxiety disorder. They found that the use of chamomile extract was an effective treatment for symptoms of generalized anxiety disorder. Furthermore, Mao and colleagues examined the long-term portion of this trial in 2016. They found that the use of chamomile extract, when compared to placebo, is a statistically significant preventative measure against GAD relapse. Finally, Chaves and colleagues extracted and purified an active ingredient with hypothesized anxiolytic properties (SN-50R) from chamomile flowers in 2020. They tested this extract on mice at different dosages in comparison to saline and diazepam, setting up a marble-burying experiment to examine the mice's anxiety. Notably, the mice buried fewer marbles at all dosages of SN-50R compared to the mice treated with either saline or diazepam, demonstrating the substance's anxiolytic properties.

The final two studies (Bazrafshan et al., 2022; Ghamchini et al., 2019) specifically examined the effects of chamomile tea on anxiety. The trial conducted by Bazrafshan and colleagues in 2022 compared the efficacy of lavender and chamomile tea to placebo. The researchers found that both lavender and chamomile tea led to a significantly significant decrease in the anxiety symptoms of postmenopausal women compared to placebo. Despite this, lavender and chamomile tea were both comparably effective for the treatment of anxiety. Therefore, chamomile tea may not necessarily work better than other types of herbal teas. Furthermore, the trial conducted by Ghamchini and colleagues in 2019 also cast doubt about the efficacy of chamomile tea. The researchers found that the effects of chamomile tea on anxiety were not statistically significant in comparison to placebo. Based on the current evidence, it appears that chamomile extract may be more effective than chamomile tea for relieving anxiety symptoms.

Implications and Limitations

Based on my examination of the existing scientific literature surrounding the anxiolytic properties of oral chamomile, it appears that the use of chamomile may be effective for the treatment of anxiety. Particularly, based on the existing literature, chamomile extract shows the most promise as an alternative treatment for anxiety. Despite this, several of these studies contain limitations, providing a need for further research into this topic. For example, the open-label phases of some trials did not include a placebo group, making it more difficult to discern the true anxiolytic effects of chamomile (Keefe et al., 2016; Keefe et al., 2018, Amsterdam et al., 2020). Additionally, only one of the trials compared the efficacy of chamomile to other anxiolytic medications like benzodiazepines (Chaves et al., 2020). Furthermore, Bazrafshan and colleagues acknowledged that the potential psychological impacts of the COVID-19 pandemic may have limited their findings. It is important to recognize that, according to Mao and colleagues, there

has not been research conducted on the long-term safety profile of chamomile extract, especially in higher dosages. This is an important avenue for further research.

Conclusion

Overall, it appears that oral chamomile may be an effective treatment for mild anxiety symptoms. Based on the existing scientific literature, there is more evidence to support the use of chamomile extract compared to the use of chamomile tea. Further research should be conducted to address the aforementioned limitations of the studies examined within this paper.

References

Amsterdam, J. D., Li, Q. S., Xie, S. X., & Mao, J. J. (2020). Putative Antidepressant Effect of Chamomile (Matricaria chamomilla L.) Oral Extract in Subjects with Comorbid Generalized Anxiety Disorder and Depression. *The Journal of Alternative and Complementary Medicine*, *26*(9), 815–821. https://doi.org/10.1089/acm.2019.0252

Amsterdam, J. D., Li, Y., Soeller, I., Rockwell, K., Mao, J. J., & Shults, J. (2009). A randomized, double-blind, placebo-controlled trial of oral Matricaria recutita (chamomile) extract therapy for generalized anxiety disorder. *Journal of Clinical Psychopharmacology*, *29*(4), 378–382. https://doi.org/10.1097/JCP.0b013e3181ac935c

Bazrafshan, M.-R., Masmouei, B., Soufi, O., & Delam, H. (2022). Comparison of the Effectiveness of Lavender and Chamomile Herbal Tea on Anxiety and Depression in Postmenopausal Women: A Randomized Controlled Trial. *Women's Health Bulletin*, *9*(3). https://doi.org/10.30476/whb.2022.94844.1172

Chaves, P. F. P., Hocayen, P. de A. S., Dallazen, J. L., de Paula Werner, M. F., Iacomini, M., Andreatini, R., & Cordeiro, L. M. C. (2020). Chamomile tea: Source of a glucuronoxylan with antinociceptive, sedative and anxiolytic-like effects. *International Journal of Biological Macromolecules*, *164*, 1675–1682. https://doi.org/10.1016/j.ijbiomac.2020.08.039

Ghamchini, V. M., Salami, M., Mohammadi, G. R., Moradi, Z., Kavosi, A., Movahedi, A., Bidkhori, M., & Aryaeefar, M. R. (2019). The Effect of Chamomile Tea on Anxiety and Depression in Cancer Patients Treated with Chemotherapy. *Journal of Young Pharmacists*, *11*(3), 309–312. https://doi.org/10.5530/jyp.2019.11.62

Keefe, J. R., Guo, W., Li, Q. S., Amsterdam, J. D., & Mao, J. J. (2018). An exploratory study of salivary cortisol changes during chamomile extract therapy of moderate to severe generalized anxiety disorder. *Journal of Psychiatric Research*, *96*, 189–195. https://doi.org/10.1016/j.jpsychires.2017.10.011

Keefe, J. R., Mao, J. J., Soeller, I., Li, Q. S., & Amsterdam, J. D. (2016). Short-term open-label chamomile (Matricaria chamomilla L.) therapy of moderate to severe generalized anxiety disorder. *Phytomedicine: International Journal of Phytotherapy and Phytopharmacology*, *23*(14), 1699–1705. https://doi.org/10.1016/j.phymed.2016.10.013

Mao, J. J., Xie, S. X., Keefe, J. R., Soeller, I., Li, Q. S., & Amsterdam, J. D. (2016). Long-term chamomile (Matricaria chamomilla L.) treatment for generalized anxiety disorder: A randomized clinical trial. *Phytomedicine: International Journal of Phytotherapy and Phytopharmacology*, *23*(14), 1735–1742. https://doi.org/10.1016/j.phymed.2016.10.012