Original Research Article

The Impact of Aromatherapy Gelatin Cold Compresses on the Concentration Level of Students in the Covid-19 Pandemic Online Class

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Abstract

Introduction: Stressful circumstances presented by the Covid-19 pandemic led to reduced levels of study concentration among students, and these conditions had been linked with dopamine levels.

Objectives: This study aimed to evaluate the impact of aromatherapy gelatin cold compress in increasing the study concentration of students by decreasing stress levels and elevating dopamine levels during the Covid-19 pandemic online class.

Methods: The study participants consisted of 42 students, who were selected using the simple random sampling method. Subsequently, the participants were comparably divided into control and treatment groups. Compress intervention was given to the treatment group on the forehead for 10 min before studying online. The Visual Analog Scale (VAS) and Stroop test were then used to determine stress and concentration levels of the students, respectively. The catecholamine fractionated urine was used to measure dopamine levels. Analysis was carried out using Paired T-test and Independent T-test with $\alpha = 0.05$ and CI = 95%.

Results: The mean value of the VAS before and after treatment was 5.81 ± 2.48 and 5.28 ± 2.61 in the control ($p = 0.205$), as well as 6.28 ± 1.62 and 4.38 ± 1.89 in the treatment group ($p = 0.000$). The mean interference score of the Stroop test before and after treatment was 13.16 ± 1.05 and 13.22 ± 1.31 among the controls ($p = 0.947$), while 13.35 ± 6.94 and 8.92 ± 5.91 were recorded in the treatment group ($p = 0.000$). The average dopamine levels before and after the intervention were 145.50 ± 7.94 mg/mL and 146.65 ± 8.23 mg/mL creatinine among the controls ($p = 0.542$), while 145.35 ± 1.03 mg/mL and 265.18 ± 1.27 mg/mL creatinine were obtained in the treatment group ($p = 0.01$). Furthermore, the results showed that the creatinine levels were within the normal ranges. The Independent T-test of stress, concentration, and dopamine levels obtained $p = 0.024$, $p = 0.010$, and $p = 0.090$, respectively.

Conclusion: Aromatherapy gelatin cold compress was effective in increasing study concentration by decreasing stress levels and increasing dopamine levels during the Covid-19 pandemic online class.

Keywords

Aromatherapy, cold compress, concentration, covid-19, dopamine levels, gelatin, stress levels

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Introduction

The covid-19 pandemic, which has been affecting Indonesia since early March 2020, has led to significant changes in various aspects of life (Wahono et al., 2021; Fathoni et al., 2022). The global landscape has also been profoundly altered by the pandemic's effect on health, economics, society, education, and spirituality (Dewi et al., 2021; Susanti et al., 2021). In Malang, East Java, Indonesia, the learning process has experienced a substantial shift,

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transitioning to online learning based on government guidelines for the past 2 years. Consequently, students are required to adapt on multiple fronts, including study schedules, classroom atmosphere, learning devices, interactions with lecturers and classmates, and radiation of screen devices to the eyes (Dewi et al., 2021; Palar et al., 2021). With daily screen time exceeding 5 hours, students participate in both synchronous and asynchronous online learning sessions organized by their institutions. The absence of direct in-person supervision from lecturers can sometimes lead to feelings of monotony, drowsiness, and difficulty in maintaining focus (Marouane et al., 2015).

Initial data on the challenges faced by students who participated in online learning during the Covid-19 pandemic was gathered through direct interviews with five respondents, without the intention of conducting a pilot study. The results from the interviews were used to develop a plan for a larger study investigating the impacts of online learning on student engagement and performance. Furthermore, the results showed that the participants experienced boredom and difficulties with prolonged screen time, thereby affecting their ability to interact with educational content (Mei et al., 2021). This was in line with Son et al. (2020), where the majority of the students were more stressed and anxious, with the major symptom being difficulty concentrating when studying online. Study concentration has been linked with dopamine, a neurotransmitter with multifaceted roles within the brain, which also act as stress hormone (Olguin et al., 2016). Maintaining balanced dopamine levels is pivotal in regulating emotions, sustaining mood, nurturing enthusiasm, eliciting positive feelings, influencing the function of body organs, and enhancing the ability to focus attention (Tyng et al., 2017; Alexander et al., 2021).

In this study, gelatin and peppermint-citrus-based aromatherapy were used as a nursing cold compress therapy, namely aromatherapy gelatin cold compress to overcome stress and increase concentration. Therefore, this study aims to evaluate the impact of aromatherapy gelatin cold compress in increasing the study concentration of students by decreasing stress levels and elevating dopamine levels during the Covid-19 pandemic online class. The results are expected to be useful in developing novel cold compress therapeutic effects and provide more information about compress device used.

Review of Literature

In nursing, there were two kinds of compress therapy, namely hot and cold compress. Cold compress was often used to reduce fever, pain, and swelling (Kozier et al., 2010). Furthermore, its other effects had also been recently studied, including its ability to relieve stress by lowering prefrontal cortex temperature and impact on stress hormone balance (Dewi et al., 2021; Dewi et al., 2016; Dewi et al., 2017; Dewi, 2017; Dewi, 2021; Dewi et al., 2021). Cold compress was a therapy that used cold temperatures stored in tools, such as wet washcloths, ice bags, and jelly bags to obtain a therapeutic effect (Kozier et al., 2010).

Gelatin was widely known as a jelly-forming protein derivative that was used in the food, beverage, pharmaceutical, cosmetic, chemical, photography, and military industries. Furthermore, it had biodegradable or eco-friendly properties and was often produced from pati (Winarti, 2012). According to previous studies, gelatin jelly could be used to maintain frigid temperatures for an extended period, while gelatin powder had recently become popular on social media as a face mask (Maruka & Nurfadilah, 2020). The face mask was a type of thin jelly that later inspired the creation of cold compress device in the form of thick jelly mixed with peppermint-citrus-based aromatherapy. This tool was designed to relieve stress and boost concentration while studying online. The mechanism observed was the increase of dopamine levels through the catecholaminergic system after being given cold compress on the forehead (Dewi et al., 2021).

Aromatherapy was a therapy that used essential oils or pure oil extracts to improve or maintain health, arouse enthusiasm, refresh, as well as soothe the mind and body (Astuti, 2015). Several essential oils, such as lavender, tea tree, peppermint, and citrus, had been investigated and proven to be beneficial as mild sedatives. These materials were reported to have the ability to calm the central nervous system, thereby aiding in the treatment of insomnia caused by stress, anxiety, tension, and depression (Dewi et al., 2021; Setyoadi & Kushariyadi, 2011). A recent study showed that after the administration of essential oil aromatherapy intervention, the respondents experienced a significant improvement in sensations of comfort and relaxation (Agarwal et al., 2022). Peppermint and citrus had been shown to have the ability to stimulate sensors and receptors, affect other organs, produce a strong emotional response, and provide a synergistic boost in energy and focus (Sowndhararajan & Kim, 2016; Kennedy et al., 2018; Koyama & Heinbockel, 2020). Therefore, this study aims to evaluate the impact of aromatherapy gelatin cold compress in increasing the study concentration of students by decreasing stress levels and increasing dopamine levels during the Covid-19 pandemic online class.

Research Questions

1. Does aromatherapy gelatin cold compress decrease stress levels?
2. Does aromatherapy gelatin cold compress increase study concentration?
3. Does aromatherapy gelatin cold compress increase dopamine levels?

Materials and Methods

Design

This was an experimental study, consisting of a pre-test–post-test control group design. The study procedures were carried out entirely online, using Google Forms, Google Meet, and an online delivery service in August 2021 in Malang, East Java, Indonesia, for 2 weeks. Participants underwent an initial pre-test assessment to establish a baseline measurement. Following this, the experimental intervention was implemented. Subsequently, a post-test assessment was administered to measure the impact of the intervention on the participants' outcomes. This design allowed for the collection of data at two key points in time, before and after the intervention, providing a comprehensive understanding of the changes resulting from the experimental procedures.

Sample

The sample population in this study consisted of 170 bachelor's degree students at levels 1, 2, and 3, who were not active in any organizations. Based on Lemeshow and David's formula (1997) using 50% population estimation proportion and sample size correction to anticipate dropout, a minimum calculation of 16 samples per group was obtained.

A total of 60 individuals were randomly and equally divided into control and treatment groups using a Random Team Generator. Stress, concentration, and dopamine levels were then measured, and data were validated to ensure the comparability between groups. Samples with substantial standard deviation were deleted, leading to the presence of 21 participants in each group and totaling 42 individuals (Lemeshow & David, 1997).

Inclusion/Exclusion Criteria

The inclusion criteria included: (a) being domiciled in Malang, (b) having an interference score (representing concentration levels) of 13 or higher, (c) being willing to be a respondent, (d) being able to read, (e) being able to recognize cold and distinguish between different temperatures for body tissues, (f) being able to tolerate cold well, (g) being fully conscious and in good general condition, (h) having a refrigerator at home, and (i) having creatinine levels within normal ranges (20-275 mg/dL). Meanwhile, the exclusion criteria included: (a) cold allergy, (b) open wound on compressed area (forehead), (c) circulatory disturbances, (d) Raynaud's syndrome in lupus, and (e) colorblind.

Ethical Clearance

This study received an Ethical Approval Letter from the Health Research Ethics Commission. Faculty of Medicine Universitas Brawijaya (No. 197/EC/KEPK/07/2021). In accordance with the approved ethical guidelines, stringent measures were implemented to ensure the confidentiality of participants' data. The participants were recruited through WhatsApp invitation, and detailed information about the study was provided in a recruitment statement. This statement outlined the purpose of the research, the voluntary nature of participation, and the procedures involved. Prior to their involvement, each participant provided informed consent, indicating their understanding and willingness to participate.

Instrumentation

1. The Visual Analog Scale (VAS)The Visual Analog Scale (VAS) measured the respondent's stress levels, and the instrument was calibrated from 0 to 10, where 0 indicated no stress and 10 inferred extreme stress. Furthermore, the respondents were asked to select a number score that reflected their condition, and the measurement results were recorded on Google Forms. The validity and reliability scores of the VAS were 0.83 and 0.89, respectively (Pratidya et al., 2020).
2. Stroop TestStroop color and word test (Stroop test) was an instrument in the form of a card containing a word in written color to measure levels of concentration. In this study, the Stroop test card was modified as a PowerPoint slide, which was presented to the respondents through Google Meet. The participants were required to name the word and color of the writing on the card, and the time taken for each measurement was recorded. For example, if the card shown contained the word "red" in green writing, the respondent must say "red" in the first measurement and "green" in the second measurement. The assessment of this test was carried out by measuring the speed of the participants in mentioning the colors and words in the 25 available cards using a stopwatch for each measurement. The time taken for the respondent to mention the writing color of each word in the 25 cards was reduced by the time taken to read the word to obtain an interference score. An interference score of less than 13 was considered a good concentration, while values ≥ 13 indicated poor concentration (Scarpina & Tagini, 2017). The validity and reliability scores of the Stroop test were 0.014 and 0.86, respectively (Savaş et al., 2020). In this study, the respondent's interference score must be 13 or higher.
3. Catecholamine Fractionated UrineThe laboratory conducted the measurement of dopamine levels using the catecholamine fractionated urine technique, which involved following standard laboratory procedures with urine samples. The participants collected random urine in a container and sent it to the laboratory through an online delivery service, along with the Covid-19 screening form. At the laboratory, the urine samples were subjected to high-performance liquid chromatography processing

using the catecholamine fractionated urine method. Furthermore, the normal range for dopamine levels was determined to be between 40 and 390 mcg/g creatinine, with the recommended creatinine value being 20-275 mg/dL.

Preparing Aromatherapy Gelatin Cold Compress and Preparation Before Conducting the Online Class

The manufacture of aromatherapy gelatin cold compress was carried out using a procedure that had been patented in Indonesia (No. S0XXXXXXXX3). A total of two aromatherapy gelatin cold compress and the usage instructions were delivered to students' homes through an online delivery service, along with two urine containers for measuring dopamine levels and two bundles of the Covid-19 screening forms. While waiting for the scheduled online class, Google Forms containing the instruments to be used and the Google Meet link were prepared.

A delayed intervention design was used, where the participants were randomized using a Random Team Generator. The treatment group received aromatherapy gelatin cold compress intervention, while the controls did not initially receive any initial treatment. After the study procedures, the controls also received the intervention to ensure that both groups were treated fairly and received the same care, allowing for a comparison of treatment effects.

Procedure for Giving Aromatherapy Gelatin Cold Compress

The procedure for administering aromatherapy gelatin cold compress was detailed in the usage instructions in the form of a paper sheet and a tutorial video. All participants were required to follow the usage instruction to minimize bias. Aromatherapy gelatin cold compress was opened and put immediately on the forehead area for 10 min before beginning an online study online. The treatment group in the study received the intervention, while the controls were left untreated during the procedures. However, the controls were provided with aromatherapy gelatin cold compress after the study to ensure fairness. To ensure justice in ethical considerations, the treatment and control groups were kept separate. Furthermore, the delayed intervention design was implemented to ensure that the control group also received the treatment at a later stage. The entire process, for both groups, was carried out through Google Meet to ensure intervention fidelity.

Stress, Concentration, and Dopamine Levels Measurement

This study employed three different measures to assess various factors. Stress, concentration, and dopamine levels were measured using the VAS, Stroop test, and catecholamine fractionated urine test, respectively. Furthermore, to be eligible for participation, individuals had to meet the inclusion criteria, which required direct measurements of concentration and dopamine levels. The baseline values of all variables were established by collecting pre-test measures before the administration of the intervention. The inclusion criterion of an interference score (representing concentration levels) of 13 or higher was measured before the study commenced. As part of the data collection procedure, all respondents underwent an assessment of their interference score before receiving the treatment. Individuals with values of 13 or higher were selected as participants, while those with scores below 13 were excluded. Following the intervention, post-test measurements were taken, and the recorded results were entered into a designated Google Form for data analysis. It was important to note that no specific procedures or measurements were conducted for the controls during the online class.

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Statistical analysis. SPSS for Windows version 16.0 was used to evaluate all the data obtained on stress (VAS scores), concentration (interference scores), and dopamine levels. Furthermore, the Shapiro–Wilk test was used to determine the distribution, and the results showed normal distribution. The data were then evaluated using a Paired T-test to determine the differences between the pre-test and post-test. An Independent T-test was also employed to assess the variations between the control and treatment groups. The significance levels were 0.05, with a 95% confidence interval.

Results

Sample Characteristics

This study was conducted on 42 students from Malang who studied online in Indonesia during the Covid-19 pandemic. The majority of the participants were female (85,71%) and aged 18-40 years old (100%), with a mean age of 19.47. Furthermore, all the respondents were currently enrolled in college for their undergraduate studies, as shown in Table 1.

Aromatherapy Gelatin Cold Compress Increased Study Concentration

According to concentration measurement using the Stroop test, the mean interference score before receiving aromatherapy gelatin cold compress was 13.16 ± 1.05 and $13.35 \pm 6{,}94$ in the control and treatment groups, respectively. After the application of the intervention for 10 min on the forehead, the mean study concentration in the control and intervention groups was 13.22 ± 1.31 and 8.92 ± 5.91, respectively. Statistical analysis using the Paired T-test revealed that the

difference in the pre-test and post-test was insignificant ($p = 0.95$) among the controls but was significant ($p = 0.00$) in the treatment group. In the Independent T-test, the difference between both groups were significant ($p = 0.01$). Based on these results, aromatherapy gelatin cold compress increased the study concentration of the students**,** as shown in Figure 1.

Aromatherapy Gelatin Cold Compress Decreased Stress Levels

The average stress levels of students before being given aromatherapy gelatin cold compress were 5.8 ± 2.48 and 6.28 ± 1.62 in the control and treatment groups, respectively. After the application of the intervention for 10 min on the forehead before studying online, the average levels were 5.3 ± 2.60 and 4.4 ± 1.80 in the control and treatment groups, respectively. The difference between the pre-test and post-test using Paired T-test in the controls showed $p = 0.205$, and the treatment group showed $p = 0.000$. The results of the Independent T-test showed that both groups were significantly different ($p = 0.024$). Based on these results, the intervention decreased stress levels, as shown in Figure 2.

Table 1. Sample Characteristics.

Characteristics	Control	Treatment	*p*-value
Gender, n (%)			
Male	2 (9.50)	4 (19.05)	0.183
Female	19 (90.50)	17 (80.95)	
Age (years) (mean + SD)	19.52 +0.81	19.43 +0.92	0.283
Current education, n (%)			
Bachelor degree	21 (100)	21 (100)	1.000
Master degree	0 (0)	0 (0)	
Doctoral degree	0 (0)	0 (0)	
Stress levels (mean + SD)	5.81±2.48	6.28±1.62	0.927
Concentration levels (mean + SD)	13.16 ±1.05	13.35 ±6.94	0.563
Dopamine levels (mg/mL creatinine) (mean + SD)	145.50 ±7.94	145.35 ±1.03	0.700

Aromatherapy Gelatin Cold Compress Increased Dopamine Levels

The mean dopamine levels of students before being given aromatherapy gelatin cold compress were 145.5 ± 7.94 mcg/g and 145.35 ± 1.03 mcg/g creatinine in the control and treatment groups, respectively. After being given the intervention, the mean levels were 146.65 ± 8.23 mcg/g and 265.18 ± 1.28 mcg/g creatinine in the control and the treatment groups, respectively. The Paired T-test results showed differences between the pre-test and post-test control ($p = 0.54$) and treatment ($p = 0.01$) groups. However, the independent T-test showed that both groups were not significantly different ($p = 0.09$) (Figure 3).

Discussion

This study aimed to assess the impact of aromatherapy gelatin cold compress on decreasing stress levels, as well as increasing concentration and dopamine levels among students engaged in online learning during the Covid-19 pandemic. The average stress levels of students in Malang, East Java, Indonesia, before the intervention ranged from 5 to 6 on a scale of 1 to 10, coinciding with a decline in their concentration levels. This result was consistent with a study in Medan, North Sumatra, Indonesia, which reported mild to moderate stress levels among students due to online learning during the Covid-19 pandemic (Wahyu & Simanullang,

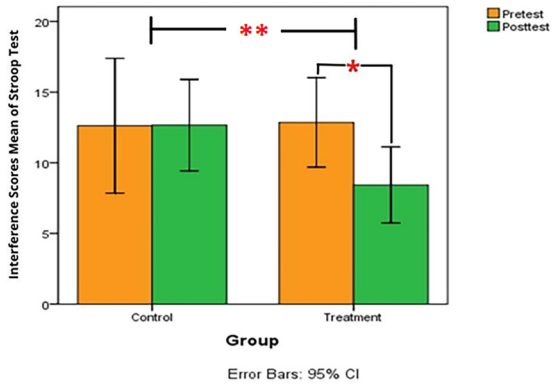

Figure 1. The Interference Scores Mean of Stroop Test among Control and Treatment Group (n=42).*Indicates $p<0.05$ according to Paired T-Test and **indicates $p<0.05$ according to the Independent T-Test.

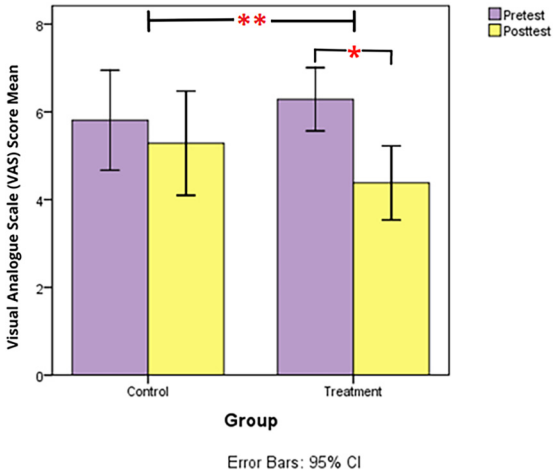

Figure 2. The Visual Analog Scale scores mean among control and treatment group (n=42). *Indicates $p<0.05$ according to Paired T-test and **indicates $p<0.05$ according to the Independent T-test.

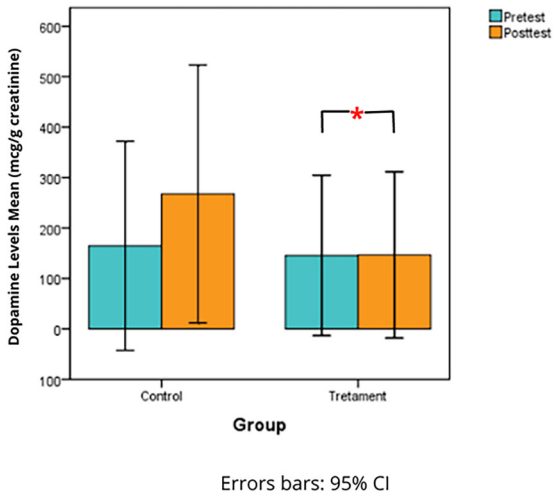

Figure 3. Dopamine Levels Mean among Control and Treatment Group (n=42). *Indicates $p<0.05$ according to Paired T-Test.

2020). Furthermore, Brun et al. (2022) showed that the participants were moderately stressed due to the viral outbreak. According to Pebriani et al. (2021), these stress levels could be attributed to various factors, including boredom, poor internet connection, limited internet quota, difficulties in concentration and comprehension, excessive workload, and inadequate understanding of electronic media.

Stress was a subjective experience characterized by an inverse relationship between reality and expectations. When this condition triggered the amygdala, it often led to the release of epinephrine and norepinephrine by the adrenal glands into the bloodstream at a rapid rate. Meanwhile, the prefrontal cortex stimulated the release of dopamine and norepinephrine. This physiological response typically led to increased heart rate, blood pressure, emotional arousal, as well as decreased rational function (Dewi et al., 2016). The dysregulation of dopamine, norepinephrine, epinephrine, and cortisol levels during stress influenced the fight-or-flight responses, leading to eustress or distress (Ranabir & Reetu, 2011). The concept of eustress and distress, as depicted by the Yerkes-Dodson curve, was linked to individual performance. The curve suggested that performance improved along with physiological or mental arousal up to a certain point, known as eustress. However, when arousal levels became excessively high, performance declined and was referred to as distress (Cohen, 2011). These results were consistent with this study, where students' ability to concentrate while studying began to decline due to moderate stress levels, suggesting they were approaching the stage of distress (Dewi et al., 2016). Similar results were also obtained by Holister et al. (2022), where the majority of the participants struggled with maintaining connections with peers and instructors, as well as managing the pace of coursework during online study. A study by Baltà-Salvador et al. (2021) explored the impact of prolonged online learning on students' concentration levels. The results showed a similar pattern of decreased concentration and impaired cognitive control among the participants during remote learning. Moreover, McManus et al. (2020) conducted a meta-analysis of studies examining the effects of stress on cognitive performance. The results indicated that increased levels were consistently associated with reduced concentration and diminished cognitive abilities.

Concentration referred to an individual's ability to fully engage in a task without being easily distracted (Schmidt, 2020). However, concentration ability varied among individuals and was closely related to cognitive control and frontal lobe functioning. The interference score of the Stroop test was a useful measure to assess cognitive control and integrity (Liu et al., 2015). In this study, the average interference scores of students before receiving the intervention were above 13, indicating poor levels or a decline in integrity and cognitive control during online study. Cools et al. (2019) showed that cognitive control was associated with the production of dopamine, a hormone synthesized in the prefrontal cortex of the frontal lobe. Ciampa et al. (2022) also used positron emission tomography imaging to show that individuals with these abilities exhibited increased dopamine release in the prefrontal cortex during tasks requiring executive functions. This result suggested that the hormone played a crucial role in supporting these mental processes. Furthermore, a study by Ceccarini et al. (2020) used functional magnetic resonance imaging to investigate the relationship between dopamine and cognitive control. The results showed that individuals with higher levels of dopamine synthesis capacity in the prefrontal cortex showed improved cognitive control performance.

In terms of dopamine levels, this study observed an average of approximately 145 mcg/g creatinine, falling within the normal range of 40-390 mcg/g creatinine. This result indicated that despite the elevated stress levels and reduced concentration observed, the hormone remained within the expected range. This was consistent with other studies investigating dopamine levels and cognitive functioning in relation to stress and concentration (Olguin et al., 2016; Astuti et al., 2022). However, it was worth noting that further studies were needed to explore the specific mechanisms underlying the interplay between dopamine, stress, and concentration in the context of online learning.

The results of this study indicated a trend of increased dopamine levels following the administration of aromatherapy gelatin cold compress, although this difference was not statistically significant when compared to the controls. Based on these results, the cooling effect of the intervention could have played a role in reducing the temperature of the prefrontal cortex, promoting brain relaxation, and inhibiting the excessive release of catecholamines. However, it was important to note that the participants in this study were actively engaged in answering the given questions, and this could have contributed to the observed increase in dopamine

levels. In line with these results, previous studies had also explored the impact of various interventions on dopamine levels and cognitive functioning. For instance, Krishnakumar et al. (2015) conducted a study examining the effects of meditation on the hormone and found a significant increase after the intervention. This suggested that treatments targeting relaxation and stress reduction had the potential to modulate dopamine levels. Furthermore, a study by Gorrell et al. (2022) investigated the influence of physical exercise on the release of the hormone and showed a positive correlation between these variables. These results supported the notion that different interventions could have varying effects on hormonal regulation.

The administration of aromatherapy gelatin cold compress led to decreased stress levels and increased concentration among students. The intervention combined gelatin cold compress and peppermint-citrus-based aromatherapy (Setyoadi & Kushariyadi, 2011). The application of gelatin cold compress for 10–20 min effectively lowered the temperature of the prefrontal cortex, leading to reduced levels of cortisol and norepinephrine. Consequently, this decrease in stress hormone levels contributed to the reduction in stress and improvement in concentration. The peppermint-citrus-based aromatherapy employed in the intervention stimulated sensory receptors and affected various organs, eliciting a robust emotional response (Sowndhararajan & Kim, 2016; Agarwal et al., 2022). The citrus scent stimulated the raphe nuclei to release serotonin, producing a relaxing effect through the inhibition of cell excitation (Romadoni & Julianto, 2014). These results were consistent with previous studies investigating the effects of aromatherapy and temperature modulation on stress and concentration. For instance, a study by Ghavami et al. (2022) examined the impact of lavender aromatherapy on stress reduction and found a significant decrease among participants. Falla et al. (2021) explored the influence of temperature modulation on cognitive performance and showed improved concentration and task performance when the prefrontal cortex was cooled.

Strengths and Limitations

The results of this study were an innovation in the nursing field regarding the benefits of cold compress as therapy for stress and increasing concentration, along with other known effects, such as reducing fever, swelling, and pain. Although this study was carried out online, intervention fidelity was ensured through the provision of usage instruction in the form of a paper sheet and a tutorial video, along with meetings on Google Meet. Due to the limited finances and time available for the procedures, large-scale studies are advised to ensure that the benefits of aromatherapy gelatin cold compress are widely available. Consequently, the quality of nursing services could be improved based on existing evidence-based practice.

Implications for Practice

The results could be used as a reference and model for independent nursing interventions, such as cold compress, aimed at reducing stress, increasing study concentration, and increasing dopamine levels. This study was also an application development of basic nursing studies and psychoneuroimmunology. Furthermore, the results were expected to help nurses understand the benefits of cold compress made from natural eco-friendly materials, such as gelatin, peppermint, and citrus, leading to increased nursing knowledge (Ahsan et al., 2021; Wisnasari et al., 2021).

In the world of education, the intervention could be given to students to increase their learning concentration through nursing therapy. This cold compress application could also be used for online studying and offline studying in front of a computer.

Conclusion

In conclusion, aromatherapy gelatin cold compress was effective in increasing the study concentration of students by decreasing stress levels and increasing dopamine levels during the Covid-19 pandemic online class.

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Declaration of Conflicting Interests

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