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The Effect of Siamese Oranges on Distress, Pulse, Blood Pressure

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ABSTRACT

Distress is one of the daily psychological complaints of modern society that cannot be avoided. Distress can attack students who are in the learning process, especially first-year students. The level of distress in first-year students is relatively high due to adjustment to the new environment, lack of adaptability and many demands that must be done such as completing assignments. High distress can be reduced by giving aromatherapy. One of them is aromatherapy produced by Siamese oranges. Siamese oranges have many benefits, one of which is obtained from their skin which can emit aromatherapy that can provide a sense of calm and relieve anxiety. The aim was to determine the effect of siamese oranges on distress, pulse, blood pressure in Level 1 Nursing Students of Health Polytechnic of Pangkal Pinang. The research design used was a quasi-experimental one group pretest and posttest. The sample was 74 people with a total sampling technique. The variables were Distress with the Kessler Psychological Distress Scale, Pulse and BP. This study showed that before the intervention the average distress was 3.5, pulse 81.43 times/minute, SBP 109 mmHg, DBP 75.47 mmHg and after the intervention the average distress was 2.16, pulse 83.07, SBP 106.49 mmHg, and DBP 73.38 mmHg and there was an effect of tangerine on distress (0.000), pulse (0,043), and BP (0,000) in Level 1 students of the Ministry of Health Polytechnic of Pangkal Pinang. Tangerine produces aromatherapy that can affect the reduction of distress, pulse and blood pressure.

Keywords: distress, blood pressure, pulse, siamese orange

INTRODUCTION

Distress is one of the daily psychological complaints of modern society that cannot be avoided. Factors that trigger stress include modernization, industrialization, and very rapid and rapid technological advances. This causes changes in the social pressures of modern life that have a significant impact on physical and mental health (Damayanti et al., 2021). Students are one of the individuals who can experience stress. A student is someone who is in the process of acquiring or studying knowledge and is being trained in a type of higher education. Higher education is embedded in an educational environment where various situations occur and create demands for the people who live there. The prevalence of stress in students is 38.91% worldwide, 61.3% in Asia, and 71.6% in Indonesia (Kadek et al., 2024). The level of stress in first-year students is relatively high due to adjustment to the new environment and lack of adaptability (Miswanto et al., 2024).

Findings from Princess Nourah binti Abdulrahman University's study on depression in first-year nursing science students in Riyadh, Saudi Arabia. There was a statistically significant positive connection between depression and all subscales of academic stress. Studying in a group setting is the primary significant predictor of depression, followed by self-inflected stress, study year, and sleep issues, according to the regression model, which explains 49.0% of the variance in the depression scale. First-year students' mean depression scores differed significantly from those of students in other study years (Andargeery, 2024). According to the results related to the Overview of Stress Levels Based on the Characteristics of First Year Students of the Faculty of Nursing at the University of Tanjungpura Subtained experienced a lot of moderate stress (90.0%) (Vania et al., 2023). Based on the results of the above research, it can be concluded that nursing students in the first year experience moderate stress and severe depression.

When students enter the college system, various challenges and changes can occur, this is due to differences in the nature of education in high schools (SMA) and universities such as differences in curriculum. The application of the education curriculum in nursing is the Indonesian National Qualifications Framework and then combined with the agreement from AIPVIKI (Djaafar et al., 2020).

Feeling anxious and unable to adjust to new environmental conditions or situations results in the emergence of various forms of complaints such as aggravating existing cardiovascular disease, digestive system disorders, tension in certain parts of the body, decreased immunity, depression, unclear anxiety, and emotional imbalance. Stress that affects nursing students can also occur due to the application of the educational curriculum implemented (Santoso et al., 2020). The results of interviews with 10 Level 1 Nursing Students of Health Polytechnic of Pangkal Pinang found that they had difficulty in carrying out lectures, frequent schedule changes, lots of assignments and difficult to understand courses. This causes stress, anxiety, and fear if this lecture cannot be completed on time.

Students who are stressed facing lectures can affect blood pressure. The results of the study showed that more than half of students who are distressed experience increased blood pressure (Nurrahmah et al., 2023). When facing stress, the hypothalamus is activated to synthesize corticotropin-releasing factor (CRF) and vasopressin. CRF stimulates the anterior pituitary gland to release adrenocorticotropic hormone (ACTH), which in turn causes the adrenal cortex to make glucocorticoids, or cortisol. When levels of cortisol exceed the capacity of the enzyme 11β-hydroxysteroid dehydrogenase type 2 (HSD2) to convert it to cortisone, cortisol binds to

the mineralocorticoid recep Kidneys reabsorption of sodium and potassium increases as a result of this interaction, which increases blood volume and blood pressure (Reshawn et al., 2021).

In addition, Acute stress causes increased heart rate, heart muscle contraction, heart dilation, and blood diversion to large muscles. If the continued activation of the sympathetic nervous system and the hypothalamic-pituitary-adrenal axis causes increased levels of stress hormones such as cortisol and epinephrine. Stress hormones can increase oxidative stress, endothelial dysfunction, and inflammation, thus causing impaired vascular function (Chu et al., 2024).

Stress can be overcome with non-pharmacological therapy, namely aromatherapy. One of the aromatherapy that can reduce stress is aromatherapy produced from the peel of the Siamese orange fruit. Siamese orange peel (*Citrus x aurontium L*) contains abundant limone compounds. According to Fitri's research (2024), the highest content in Siamese orange peel (*Citrus x aurontium L*) is limonene at 79.85%, followed by linalool at 6.24%, beta meristin at 4.82%, beta pinene at 2.54% and alpha pinene at 1.14% (Fitri et al., 2024)**.** Limonene increases the protein expression of tyrosine hydroxylase and GAD-67 and significantly upregulates dopamine levels in the striatum. In addition, tissue dopamine levels increased after limonene treatment, and depolarization-induced GABA release was enhanced by limonene pre-treatment in PC-12 cells. Dopamine and γ-aminobutyric acid (GABA) have been reported to play important roles in modulating anxiety in different parts of the brain (Alkanat & Alkanat, 2023).

The limonene content found in orange peel can be used to reduce stress. According to research on postpartum women at Wilayah Kerja Puskesmas Sumberbaru Kabupaten Jember, average anxiety for postpartum women before aromatherapy was administered was 19,58 (SD±5,6), whereas after aromatherapy was administered, it was 12,71 (SD±6,0) (Rahayu, 2023). The D-limonene has been found to have antidepressant-like properties, reducing anhedonic and defensive behaviours and the impairing effects of stress on learning and memory tests (Alkanat & Alkanat, 2023). Therefore, researchers want to examine the effect of siamese oranges on distress, pulse, blood pressure in Level 1 Nursing Students of Health Polytechnic of Pangkal Pinang.

METHODS

This type of research is quantitative with a quasi-experimental research design of one group pretest and posttest. This study aims to identify the effect of Siamese oranges on stress in Level 1 Nursing Students of Health Polytechnic of Pangkal Pinang. The sampling technique used the total sampling method with a sample size of 74 people.

The measuring instrument used was the Kessler Psychological Distress Scale. This questionnaire has 10 questions and has 4 categories, namely normal (<20), mild (20-24), moderate (25-29), and severe (≥30). Before the intervention was given, the stress level was measured first. The technique for administering Siamese oranges is 1) Selecting fresh Siamese orange peel, which does not smell bad, and is yellow/green in color; 2) Wash and dry the Siamese orange peel; 3) Slice the Siamese orange peel about 1 cm x 5 cm; 4) Weigh 100 grams of Siamese orange peel and put it in plastic; 5) One plastic is counted as one dose; 6) The packaging of the Siamese orange peel.

The intervention procedure is 1) Preparing the respondents, arranging the respondents' positions as much as possible and as comfortable as possible; 2) Providing a pre-test sheet; 3) After the pre-test measurement, give a 5-minute gap then immediately carry out the intervention of smelling the Siamese Orange peel with a frequency of 1 time for 5 minutes; 4) Evaluation with a post-test sheet at 5 minutes after the intervention of smelling the Siamese Orange peel. The procedure for administering Siamese Oranges has been declared ethical by the Health Polytechnic of Pangkal Pinang with the number 77/EC/KEPK-PKP/VIII/2024. The results of the measurement data will be analyzed using the Wilcoxon test with a p value <0.05 to determine whether or not there is a difference in stress before and after the intervention, namely the administration of Siamese oranges.

RESULTS

Respondent Characteristics

The frequency distribution of respondent characteristics based on age obtained the majority aged 19 years as many as 62 respondents (83.8%), aged 18 years as many as 5 respondents (6.8%) and aged 20 years as many as 5 respondents (6.8%) and aged 21 years as many as 2 people (2.6%). This can be seen in table 1.

Table 1. Frequency Distribution Based on Age

Age	Frequency (f)	Percentage (%)
18 year old	5	6,8
19 year old	62	83,8
20 year old	5	6,8
21 year old	2	2,6
Total	74	100,0

Frequency distribution of respondent characteristics based on gender obtained the majority of female gender as many as 71 respondents (95.9%) and male as many as 3 respondents (4.1%). This can be seen in the table 2.

Table 2. Frequency Distribution Based on Gender

Gender	Frequency (f)	Percentage (%)
Male	3	4,1
Female	71	95,9
Total	74	100,0

Distress Level

Frequency distribution based on the level of distress of Level 1 Nursing Students of Health Polytechnic of Pangkal Pinang before the intervention (pretest) is the severe stress category of 48 respondents (64.9%), the normal category of 3 respondents (4.1%), the mild category of 5 people (6.8%) and the moderate category of 18 respondents (24.3%). The stress level of students after the intervention (posttest) is the normal category of 25 respondents (33.8%), the mild category of 19 respondents (25.68%), the moderate category of 23 respondents (31.08%), and the severe category of 7 respondents (9.4%). This can be seen in the table 3.

Table 3. Frequency Distribution Based on Distress Level Before and After Intervention

Distress Pretest	Frequency (f)	Percentage (%)	Distress Posttest	Frequency (f)	Percentage (%)
(1)	(2)	(3)	(4)	(5)	(6)
Normal	3	4	Normal	3	4,1
Mild	5	6,8	Normal	4	5,4
			Mild	1	1,4
Moderate	18	24,3	Normal	10	13,5
			Mild	8	10,8
Severe	48	64,9	Normal	8	10,8
			Mild	10	13,5
			Moderate	23	31,1
			Severe	7	9,4
Total	74	100,0	Total	74	100

Pulse and Blood Pressure

The results of this study found that the average pulse rate before intervention was 81.43 times/minute and the average pulse rate after intervention was 83.07 times/minute. The average systolic blood pressure before intervention was 109 mmHg and after intervention was 106,49 mmHg. The average diastolic blood pressure before intervention was 75,47 mmHg and after intervention was 73,38 mmHg. This can be seen in the table 4

Table 4. Pulse and Blood Pressure Before and After Intervention

Indicators tested	Pretest	Posttest
Pulse	81,43	83,07
Sistolic Blood Pressure	109	106,49
Diastolic Blood Pressure	75,47	73,38

The Effect of Siamese Orange on Distress, Pulse, and Blood Pressure

The results of bivariate data analysis obtained distress has a p value of 0.000 p <0.05 then Ha is accepted, pulse has a p value of 0.043 p <0.05 then Ha is accepted, and systolic and diastolic pressure have a p value of 0.000 p <0.05 then Ha is accepted. These results can be obtained that the intervention of tangerine has an effect on distress, pulse, systolic pressure, and diastolic pressure in Level 1 Nursing Students of Health Polytechnic of Pangkal Pinang. This can be seen in the table 5.

Table 5. The Effect of Siamese Orange on Distress, Pulse, and Blood Pressure

Variabel	Z	Sig
Distress	6,99	0,000
Pulse	2,02	0,043
Sistolic Pressure	7,52	0,000
Diastolic Pressure	7,54	0,000

DISCUSSION

The results of the study showed that the majority were 19 years old. According to WHO (2018), being between 10 and 19 years old is included in adolescence. Adolescence is a period of developmental transition from childhood to adulthood (Widiani et al., 2023). Developmental changes occur between childhood and adulthood resulting in physical, cognitive, and psychosocial changes (Backes & Bonnie, 2019). When these changes occur, stress can occur. Adolescents in early adulthood are more likely to experience anxiety when completing their student responsibilities because the tasks they have to complete are so heavy. Students who think too much cause stress (Miswanto et al., 2024).

The results of the study showed that the majority were female. The most respondents of this study were women, which means that the highest proportion of interest in nursing education is more women than men. Men have lower anxiety levels than women. In terms of psychology, women have less ways of coping than men, so this becomes a source of personal stress (Cholankeril et al., 2023)**.**

The results of data analysis show that the intervention of tangerines has an effect on distress in Level 1 Nursing Students of Health Polytechnic of Pangkal Pinang. The use of orange peel aromatherapy as a non-drug self-therapy is still rarely done in the community so that information about the use of aromatherapy is still lacking. Aromatherapy using plants is known to reduce stress and anxiety. People who are stressed may also see and feel changes in their bodies, such as decreased thinking ability, memory, and concentration. When a stressor is

present, the brain receives the stressor as a response that affects the hypothalamus. Stress is associated with an increase in the hormone cortisol, so when stress occurs, the hypothalamus is stimulated to release corticotropin-releasing hormone (CRH). An increase in CRH causes CRH to stimulate the anterior pituitary gland to release hormones. This increase in the hormone cortisol is the body's response to stressors, causing the body to experience stress (Kageyama et al., 2021).

Siamese orange peel (*Citrus x aurontium L*) contains abundant limone compounds. Essential oils have d-limonene compounds which are proven to be able to become aromatherapy or have odors that can relax respondents (Panduwati et al., 2022)**.** The same research results were also shown in a study conducted that aromatherapy from sweet orange peel can relieve anxiety, thus making respondents relax.

However, the effect of essential oils on blood pressure can be seen from a decrease in blood pressure in respondents who have high blood pressure and an increase in respondents who have low blood pressure (Juliana et al., 2024)**.** The results of the study showed that inhaling orange essential oil can provide a calming effect that can affect pulse rate, respiratory rate, and systolic blood pressure in people with heart disease (Tahmasebi et al., 2020). When the patient inhales lemon aromatherapy, the cilia of the nasal receptor cells will respond, and electrochemical messages will be transmitted through the olfactory tract to the limbic system. The limbic system will stimulate the patient's memory and emotional response (Sattayakhom et al., 2023). Furthermore, the hypothalamus acts as a regulator to produce signals that must be delivered to the brain. The signals received by the brain will be converted into electrochemical compounds in the form of neurotransmitters serotonin and endorphins (Pourghane et al., 2022). These two compounds provide a calming and relaxing effect on people with hypertension and smooth blood flow. This relaxed condition causes blood pressure to decrease (Handayani & Rohani, 2024).

Therefore, a special strategy is needed to help reduce stress disorders. Healing stress disorders can be done non-pharmacologically and through relaxation such as aromatherapy, laughter therapy, and meditation (Juliana et al., 2024). Orange aromatherapy reduces stress through the mechanism of the olfactory system. The resulting odor is captured by the olfactory epithelium, a receptor with 20 million nerve endings. The odor is then transmitted as a message to the olfactory center located at the back of the nose. Aromas containing essential oils including the active ingredients linalool and linalyl acetate are transported by neurons to the limbic system and then to the hypothalamus. Smells that evoke calm emotions stimulate an area of the brain

called the raphe nucleus to release serotonin (Agarwal et al., 2022). The relaxing sensation provided by Citrus Bergamia is due to the restoration of normal circulation. Serotonin causes euphoria, relaxation, and sedation**.**

CONCLUSION

1. The results of the study indicate that there is a difference in distress levels, namely a decrease in distress before the intervention was carried out and after the intervention was given.
2. The results of the study showed that there was a difference in pulse, namely an increase in pulse before the intervention was given and after the intervention was given.
3. The results of the study showed that there was a difference in systolic blood pressure and diastolic blood pressure, namely a decrease in systolic blood pressure and diastolic blood pressure before the intervention was given and after the intervention was given.
4. The results of the study indicate that there is an effect of Siamese oranges on distress, pulse and blood pressure.

LIMITATION

The sample selection in this study was limited to first-year respondents of the Nursing Students of Health Polytechnic of Pangkal Pinang, thus limiting the generalization of the findings to a wider population. These sampling limitations may cause the findings to be specific to first-year students of the Nursing Department of the Ministry of Health Polytechnic of Pangkalpinang, and caution is advised when attempting to generalize the results to other populations or settings.

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