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The Effect of Temulawak (*Curcuma xanthorrohza roxb.*) and Lavender (*Lavandula angustifolia mill.*) Aromatherapy on Increasing Childrens Learning Achievement in Software-Defined Networking

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ABSTRACT

Essential oils are fragrance agents in plants. Essential oils have a volatile component in some plants with certain characteristics. At present, essential oils have been used as perfume, cosmetics, food additives and medicine. Empiric ethnopharmacology studies on aromatherapy plants show that Indonesia has 49 types of aromatic plants from 22 types of tribes, 12 of which are empirically used as aromatherapy with calming and refreshing effects. One example of aromatherapy used is the ginger rhizome (Curcuma xanthorrihza Roxb) *and Lavender flower* (Lavandula angustifolia Mill). *Learning achievement is the acquisition of knowledge or skills developed by subject matter, usually indicated by test scores or numerical scores assigned by the teacher.*

This study aims to determine the effect of ginger rhizome (Curcuma xanthorrihza Roxb) *essential oils and Lavender flowers* (Lavandula angustifolia Mill). *As aromatherapy in increasing children's learning achievement.*

The results showed a significant value of 0,000, namely <0.05. This shows the relationship between the two significant variables. While the value of person correlation obtained a value of 0.817. By looking at positive values, there is an influence on the administration of aromatherapy Temulawak rhizome plants (Curcuma xanthorrohza Roxb) *Zingiberaceae family and* (Lavandula angustifolia Mill) *Lamiaceae family on the learning achievement of SDN 1 Rempoah positive students, which means that aromatherapy can improve learning achievement.*

Keywords: Temulawak; Lavender; Aromatherapy; Learning achievement

INTRODUCTION

Essential oil is a fragrant agent in plants. Essential oil has volatile component in some plants with certain traits. Currently, essential oil is used as perfume, cosmetic, additive in foods and drugs. The fragrant component in essential oil interact rapidly when inhaled, the compound interacts with central nervous system and directly stimulate the olfactory system, then this system will stimulate the nerves in the brain under equilibrium of the

cerebral cortex. Fragrant compounds in essential oil of certain plants are shown to also affect locomotor activity.

The study of essential oil affecting locomotor activity was started who reported that 1,8-cineole compound isolated from rosemary flower's essential oil could decrease mice's locomotor activity, after said mice was induced by caffeine stimulant compound. Clinical test on sedation effect of lavender oil was started by Buchbauer who showed that the fragrance from lavender's essential oil could decrease locomotor activity in human. The study on aromatherapy's activity scientifically is still lacking in Indonesia.

Essential oils are fragrance agents in plants. Essential oils have a volatile component in few plants with definite characteristics. Now-a-days, essential oils have been used as perfume, cosmetics, food additives and medicine. Empiric ethnopharmacology conducted studies on aromatherapy plants which shows that Indonesia has 49 types of aromatic plants from 22 types of tribes, 12 of which are empirically used as aromatherapy with narcotic and refreshing effects. One of the example for aromatherapy used is the ginger rhizome (*Curcuma xanthorrihza Roxb*) and Lavender Flower (*Lavandula angustifolia Mill*).

The essential oil separation method uses the steam distillation method (used for separation technique), after which the essential oil collected is detected to ensure its purity. The results determines that Temulawak essential oil and Lavender essential oil were carried out by using the steam distillation method, obtained levels of 2.3% and 1.8%. Essential oils in Temulawak were analyzed by testing their physical properties which incorporate specific gravity, solubility in ethanol 90%, solubility in chloroform and oil in NaCl. The identified results obtained in the Temulawak rhizome and Lavender plants are specific gravity 0.9436 and 0.8221. Solubility in ethanol 90% with a volume ratio of 1:3.7 mL and 1:3.3 mL solubility in $CHCl_3$ of 1:3.3 mL and 1:3.3 mL upon the addition of NaCl in the oil reduction occurs.

Empiric ethnopharmacology study of aromatherapy plants shows that Indonesia has 49 types of aromatic plants from 22 types of family, 12 types of them are used empirically as aromatherapy with relaxing and refreshing effect on the body. Aromatherapy plants in this study were Temulawak (*Javanese ginger*) Rhizome (*Curcuma xanthorrihza Roxb*) and Lavender flower *(Lavandula angustifolia Mill*). Essential oil contained in Temulawak can be used as aromatherapy to reduce stress level. The main components of lavender are linalyl acetate and linalool ($C_{10}H_{18}O$). Linalool is the main active component which has a role of anti-anxiety effect (relaxation) in lavender, which hopefully can increase student's interest and achievement on learning.

Learning motivation happens because of student's willingness, needs, passion and drive to participate and become successful in learning process. This is what makes a student involved in academic activities and makes them struggle when condition become hard, this also determines how much they should learn. Based on Feng, Fan and Yang, high learning motivation and confidence in student will result in good learning achievement. Learning is a complex process which is not easy to describe. Learning is similar to behavior changes which happen as a result of experience and not associated with temporary condition. Meanwhile, learning achievement has a variety of definition. Bossaert, Doumen, Buyse and Verschueren defined learning achievement as student's in meeting short or long term goals in education. Lassiter seen student's learning achievement as strong student performance in certain academic fields. Meanwhile, Good and Chien stated that student's learning achievement is the acquisition of knowledge or skills developed by subject matter, usually indicated by test scores or numeric scores assigned by the teacher [1-6].

MATERIALS AND METHODS

Research method

This study was a descriptive analytic study using total sampling design. Samples in this study were all students in grade VI of SDN 1 Rempoah-Baturraden, a total of 93 students divided into 3 classes, Class A and B were given treatment while class C weren't given treatment (as control) [7-9].

Dementia is a term used to explain a collection of memory disorder symptoms such as forgetfulness, disorientation, communication difficulties and the depreciate capability to analyze and make decisions. Oxidative stress is the disproportion between free radicals and antioxidants, a significant pathogenesis in the development of dementia. Increasing oxidative stress challenge brain neuron degeneration which may cause dementia. Brain cells are highly susceptibility to oxidative damage as the brain is an organ which greatly need oxygen. The levels of unsaturated fatty acids in the brain are high, but its antioxidant defense system is relatively weaker than in other organs. Oxidative damage to lipids and proteins may lead to functional and structural disorders of cell membranes, enzyme inactivity and finally cell death. Oxidative damage to lipids produces Malondialdehyde (MDA), 4-Hydroxy-2, 3-Nonenal (HNE), acrolein, etc. Endogenous antioxidants in the body such as Glutathione Peroxidase (GPx) take part in preventing such oxidative damage. Temulawak *(Curcuma xanthorrhiza Roxb.)* is a medicinal herb widely used as raw ingredient in the jamu (traditional medicine) and pharmaceutical industries. Several conducted studies have shown that temulawak contains curcumin and xanthorrhizol compounds which are esteemed as potential antioxidants. Antioxidant activity has proved its function in abating oxidative damage and memory deficit related to neuron degenerative disorders including dementia.

RESULTS AND DISCUSSION

The data on learning achievement was obtained using documentation technic. Documentations used were pretest and postest result of grade VI year 2019 thematic book materials (Tables 1-6).

Table 1: Gender frequency distribution of class VIA students

No.	Gender	Frequency	%
1	Boy	12	42.9
2	Girl	16	57.1
	Total	28	100,0

Table 2: Improvement of class VIA student grades

No.	Grade	Frequency	%
1	Increase	18	64.3
2	Decrease	10	35.7
	Total	28	100,0

Table 3: Gender frequency distribution of class VIB students

No.	Gender	Frequency	%
1	Boy	21	67.7
2	Girl	10	32.3
	Total	31	100,0

Table 4: Improvement of class VIB student grades

No.	Nilai	Frequency	%
1	Increase	25	80.6
2	Decrease	6	19.4
	Total	28	100,0

Table 5: Gender frequency distribution of class VIC students

No.	Gender	Frequency	%
1	Boy	15	44.1
2	Girl	19	55.9
	Total	34	100,0

Table 6: Improvement of class VIC student grades

No.	Grade	Frequency	%
1	Increase	17	50
2	Decrease	17	50
	Total	34	100,0

From the data it can be seen that in class 6A which were given treatment, 64.3% had an increased score and 35.7% had a decreased score. Meanwhile, in treatment groups, the best score was obtained by student in class 6B with 80.6% having increased score and 19.4% having decreased score, compared to those in class 6C which were not given treatment. This proved that the addition of aromatherapy in class for one month will increase student stimulation in learning process. From the data, the result obtained the provision of aromatherapy increased students learning achievement.

Temulawak oil containing Xanthoriza and the main ingredients of lavender are linalyl acetate and linalool ($C_{10}H_{18}O$). Linalool is the main active ingredient which has a role on lavender's antianxiety effect. Lavender oil with its linalool content is one of the most used aromatherapy today, both through inhalation and massage technique on skin. Aromatherapy used through inhalation will enter limbic system where the aroma will be processed so we can smell it. When we inhale a certain aroma, the chemical component will enter olfactory bulb, then to the limbic system in brain. Limbic is the inner structure of the brain which is shaped like a ring and located under cerebral cortex. Limbic system is the center for pain, pleasure, anger, fear, depression and various other emotions. Limbic system receives all information from auditory, vision and olfactory systems.

Lavender oil is one of the aromatherapies famous to have a calming effect, so it can be used as a stress management. According to some studies, lavender oil itself has a significant effect on reducing anxiety, increasing relaxation and improving mood. An increase in learning mood will also increase student learning achievement (Table 7).

Table 7: Correlation test

Correlations	Aromaterapy	Performance
Aromaterapi Pearson correlation	1	817”
Sig (2-tailed)		0
N	28	28
Prestasi Pearsoncorrelation	817”	1
Sig (2-tailed)	0	
N	28	28
”Correlation is significant at the 0.01 level (2-tailed)		

Based on the test result using SPSS, significant result (<0.05) of 0.000 was obtained. It shows that the correlation between both variable is significant. Meanwhile, Pearson correlation value obtained was 0.817. By seeing the positive value on the relationship between the administrations of aromatherapy Temulawak rhizome (*Curcuma xanthorrohza Roxb*) *Zingiberaceae* family and (*Lavandula angustifolia Mill*) *Lamiaceae* family to the learning achievement of students of SDN 1 Rempoah, it means that giving aromatherapy can improve learning achievement. The analysis result above is in line with the theory stated by Dalyono [10], that high learning achievement is influenced by interest in learning that tends to be large, interest in learning increases if there are relaxed feelings so that the concentration of learning increases.

As stated by Syaiful Bahri Djamarah, that someone who has an interest in an activity, will pay attention to that activity consistently with pleasure. Consistency in carrying out learning activities undertaken by students and accompanied by high attention will help students increase knowledge and understanding of the material being studied [10-15].

CONCLUSION

Based on the research that has been done, it can be concluded that there is an influence of giving aromatherapy. Aromatherapy of Temulawak rhizome plant (*Curcuma xanthorrihza Roxb*) and Lavender flower (*Lavandula angustifolia Mill*.) can improve student learning achievement at SDN 1 Rempoah.

There was a significant effect of the extract of temulawak *(curcuma xanthorrhiza Roxb)* on prolactin hormone and breast milk production (breast milk volume, baby's urinary and defecation frequency and baby's sleep duration). It is suggested that temulawak *(curcuma xanthorrhiza Roxb)* extract can be an option for postpartum mothers to increase milk production.

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