

The Effects of Herb Aroma Components on the Reduction of Depression - Focused on University Students -

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(Manuscript received 4 January, 2011; revised 15 February, 2011; accepted 15 March, 2011)

Abstract

In this study, to investigate the effects of herb aroma components, the BDI test was performed with the 124 students of the Youngdong University and the subjects whose score was 16 or higher were selected and allocated to the herb-extracted aroma-treated group and the non-treated group, 27 and 10 students for each group. The BDI and SDS tests were carried out at each stage (before and after the treatment, 10 days later and 30 days later).

The result showed that the pre-treatment BDI test result was significantly different from all those of the post-treatment test, and the tests after 10 days and 30 days in the aroma-treated group. In the SDS test, the pre-treatment test result was significantly different from the results of the post-treatment test and the test after 10 days, while it was not significantly different from the result of the test after 30 days. Additionally, to verify whether the change within the group is larger than that by natural recovery or not, ANCOVA was performed with respect to the difference in the pre-treatment test score between the groups depending on whether the treatment was given or not, having the SDS pre-treatment score as the covariate, and the result showed that the post-treatment test scores were significantly different. Thus, it was verified that, if the SDS test score is considered as the depression indicator, the effect of aromatherapy was greater than the change by natural recovery. The difference in the post-treatment test score was analyzed depending on whether the treatment was given or not, having the BDI pre-treatment test score as the control variable, and the result showed that the post-treatment test scores were not significantly different. Based on such a theoretical verification, it is assumed that the nature-friendly treatment method using herb aroma components can be a great help in suppressing depression. Therefore, it is expected that herb aroma components can provide systematic therapeutic effect on the suppression of depression.

Key Words : Herb, Aromatherapy, Depression, BDI(Beck Depression Inventory), SDS(Self-Rating Depression Scale)

1. Introduction

As the science and technology have developed, the natural environment and lifestyle have changed greatly, and the social structure has been complicated, it has become common to experience depression due

to the mental and social stress caused by the drastic changes, though the degree may vary. According to WHO (World Health Organization), the number of patients with depression is about 121 million and they generally feel sadness, helplessness and worthlessness, are apathy to everyday affair, and experience changes in the diet and sleeping habit, even accompanying the emotional symptoms such as suicidal feeling (Dongailbo, 2003). In addition, it was reported that depressive disorder is threatening the

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people, young and old, men and women, as it is assumed that depressive disorder will be the second health risk factor in 2020 (Joongangilbo, 2007).

In addition to the emotional characteristic that the overall sadness continues, depressive disorder also accompanies cognitive, motivational and physical characteristics (Kauffman and Landrum, 2009). Among these, the disorder in the cognitive aspect is considered as the most important depressive symptom (Beck, 1967; Seligman, 1975). The emotional characteristics include the overall depressive feeling and impatient mood, apathy to almost all activities, worthlessness, guilty feeling, and frustration. The cognitive characteristics are self-hatred, self-condemnation, helplessness, despair and suicidal ideation. The motivational characteristics are to avoid the interaction with others for being socially daunted and to show low performance in studying for losing the motive to concentrate on the work by the defects in the ability to think, concentrate and decide.

Recently, the onset age of depression is becoming earlier and the depressive symptoms appearing at the early stage of life can continue to or recur in the adulthood, which can forewarn a more serious disease in the adult life. It is very crucial to diagnose and treat depression of infants and youths so as to prevent social, emotional, behavioral and functional damages and develop the full potential of infants (NIMH, 1999). Particularly, the depressive symptoms of the university students can cause maladjustment to the university life including the study, personal relations and employment and thus make them experience psychological confusions such as isolation and emptiness. However, Blatt and Quinlan (1976) carried out the study with the general university students, indicating that only a small portion of the studies regarding depression had been conducted about normal depressive state because many of the studies had been focused on the patients. They showed that the desire to gain love and support from others and the self-condemnation about their own

helplessness were related to the depressive feeling that the depressed university students experienced.

Like this, efforts have been steadily taken to clarify the cognitive characteristics of depression and to investigate the therapeutic effect of cognitive therapy or cognitive behavioral therapy in the field of clinical psychology (Lee and Song, 1991). However, it has been proved that the traditional approach of psychotherapy is definitely ineffective in treating the patients with depression (Friedman, 1975) as well as in preventing the recurrence (Klerman et al., 1974). Additionally, although drug treatment can considerably improve the symptoms of serious depression, drug treatment is limited to solve all the problems.

The natural environment is drawing attention as a good alternative for this problem. Studies are actively carried out regarding the physiological and mental changes in the body taking place while inhaling the natural components including the active pharmaceutical ingredients and the aroma of plant extracts (Passant, 1990; Tobin, 1995; Lennox, 1997). Nature plays an active role in the healing process. Inferring the therapeutic factors from the cognitive, emotional, psychological and physiological benefits that the passive contact with plants and nature has on humans, they are reduced to the natural light, natural landscape, natural sound, aroma from plants, and the existence of plant itself (Choi et al., 2010). Particularly, Relf (1992) emphasized the importance of healing landscape in the medical facilities such as hospitals, hospices, and nursery homes in relation to the human psychophysiological reaction.

The aromatic molecules given off from the plants in the natural environment reach the lungs through the olfactory sense and transported to the entire body through the blood vessels. In addition, the aroma components are also absorbed to the capillary vessels through the skin pores and spread to the individual organs and tissues in the body along with the flow of the body fluid. Thus, they enhance the immune system

function in the body, affect the actions of the internal organs and hormones, increase the resistance to virus, bacteria and fungi, and improve and normalize the mental and physical imbalance by affecting the nervous system and the endocrine system (Jo, 2008). Psychologically, aroma can make one feel better, have stable state of the heart, or recall good memory related with the aroma (Buckle, 1998). "Aromatherapy" is the method to make the mind and body healthy and improve the quality of life by producing better environment using good aroma (Buchbauer, 1993; Lawless, 1997).

Aromatherapy is one treatment method of alternative medicine that is drawing attention. As the aromatic essential oils are various, the range to which aromatherapy can be applied is very wide. Most of the raw, natural materials used for the aromatic essential oils are obtained from flowers, fruits and seeds which correspond to the sexual organs of plants (Corio, 1993). It has been known that the herb aroma components themselves from the nature-friendly environment can help to keep the body and mind healthy. It can be assumed that they can be effective not only on the health promotion and healing but also on the chronic diseases, stress diseases and life habit diseases. Such effects are directly linked with the healthy mind and happy life of university students, it is urgently needed to understand the herb aroma components and the pharmaceutical effects.

Therefore, we investigated the effects of herb aroma components on the suppression of depression in this study. We accurately investigated whether the aroma components affect the cognitive aspects or physiological aspects to safely contribute to the suppression of depression and mental and psychological stability among university students without any side effect. The purpose of this study was to increase the social relations in quantity and quality by improving self-concept, self-confidence, self-esteem and the attitude toward studying.

2. Materials and Methods

2.1. Subjects

Among the 124 students of Youngdong University who agreed to the participation in the experiment and submitted the consents, those who responded insincerely and failed to participate in the experiments were excluded from the subjects. The subjects whose BDI test score was 16 or higher were allocated to the herb-extracted aroma-treated group and the non-treated group, 27 and 10 students for each group. The subjects were not undergoing other treatment for depression and they were asked not to receive any other treatment for depression during the experiment. There was no significant difference in the sex and age of the subjects between the two groups.

2.2. Procedure

The subjects who participated in the experiment after being judged to have depression with the BDI test score of 16 or higher were asked not to undergo any intensive exercise from 24 hours before starting the measurement and not to take caffeine and medicine 12 hours before the experiment. They were asked to come for the measurement after sufficient sleep. Sufficient explanation was given to the subjects on the days when the program began and the measurement was performed about the purpose of the measurement, the measurement items and order, and the cautions for the measurement. For the inhalation of aroma, the subjects were asked to take rest for 15 minutes on the chair in a comfortable position in the order of arriving at the experimental site. Then, dry inhalation was performed as one or two drops of the prepared aroma essential oil applied to handkerchief or tissue paper and inhaled for about 3 to 5 minutes.

2.3. Measurement Tools

For the measurement of the depression, BDI (Beck Depression Inventory) was used to measure the psychological and cognitive factors and SDS (Self-Rating Depression Scale) to measure the physiological

and physical symptom factors. The tests were carried out before and after the program and, additionally, at the time 10 days and 30 days after the program ended.

2.3.1. BDI (Beck Depression Inventory)

BDI is the self-measuring scale to assess clinical depressive symptoms and composed of 21 questions including the areas of emotion, cognition, motivation and physiological symptoms of depression. The test consists of the 4-score scale and the total score can range from 0 to 63. The total score from 0-9 is considered as non-depressive state, 10-15 as mild depressive state, 16-23 as middle depressive state, and 24-63 as severe depressive state. We used the Korean version of BDI which was prepared by translating the original questions of Beck(1967) to Korean and verifying the reliability and validity by Lee (1991).

2.3.2. SDS (Self-Rating Depression Scale)

SDS was developed by Zung (1965) and is composed of 20 questions describing the emotional, physiological and psychological symptoms of depression. It is 4-score Likert type and rated by the degree of the symptom, from 1 to 4. 10 questions out of the 20 questions are aligned in the opposite direction and those questions are to be rated in the opposite direction. The score is higher as depression is more serious, ranging from 20 to 80.

2.3.3. Aroma Oils

The aroma essential oil used for the experiment was a volatile oil extracted from herb plants which can be applied to various diseases and symptoms. The oil was prepared by blending Bergamot, Lavender, Geranium and Chamomile Roman oils at the ratio of 2:2:1:1 and the inhaled by the dry inhalation method.

2.4. Data Processing

Analysis of all the measured data in this article was

performed by using the SPSS 18.0 statistical software and the descriptive statistics were presented for the measures of each item. Repeated measures ANOVA was performed to verify the change of the effect of the aromatherapy over time and ANCOVA was to examine the difference in the post-treatment test score between the groups, having the pre-treatment test score as the covariate depending on whether the treatment was given or not. The significance level was set to be less than 0.05 for all the statistical analysis.

3. Results

The homogeneity test of the subjects was performed in this study before the experiment with respect to SDS and BDI and the result is as followings. The rest result showed that the two groups were homeogenous because the difference was not significant even under the significance level 5%.

Cronbach's α test was performed to analyze the reliability of SDS and BDI, the test scales of this study, and the result is shown in Table 2. The Cronbach's α for the test tool SDS was 0.73~0.82 and that for BDI was 0.65~0.78, indicating good reliability.

Table 3 shows the calculated descriptive statistics of the SDS and BDI test scores of the groups. In the case of SDS, the difference between the pre-treatment score (46.80) and the post-treatment score (46.20) was not very large in the non-treated group (control group), but the SDS score was decreased and then increased later in

Table 2. Cronbach's α of SDS and BDI

Variables	Pre	Post	10-day	30-day
SDS	0.73	0.75	0.81	0.82
BDI	0.65	0.65	0.77	0.78

Table 1. Homogeneity test of the subjects

Variables	(Mean \pm SD)			
	C-G	E-G	t-value	p-value
SDS	46.80 \pm 5.18	48.70 \pm 8.92	0.63	0.531
BDI	13.30 \pm 4.74	17.81 \pm 8.79	1.39	0.173

the aroma-treated group (the experimental group). In the case of BDI, the pre-treatment test score was 13.3 and the post-treatment test score was 12.4 in the non-treated group, showing a little decrease. In the aroma-treated group, the BDI score was 17.81 in the pre-treatment test, 13.44 in the post-treatment test, 12.85 in the test after 10 days, and 12.30 in the test after 30 days, indicating continuous decrease.

The repeated measured ANOVA of the SDS test score with the aroma-treated group showed that there was a significant difference in the SDS test score depending on the time of measurement. For the significant difference depending on the time of measurement, pairwise t-test was performed with the results of the pre-treatment test and the post-treatment, the results of the pre-treatment test and the test after 10 days, and the results of the pre-treatment test and the test after 30 days, and the result is shown in Table 5. The result showed that there was a significant difference in the SDS test score among the pre-treatment,

post-treatment and the test after 10 days, but the SDS test score in the test after 30 days was not significantly different. It means that the SDS test score was lower in the post-treatment test than that of the pre-treatment test and the effect continued, but not until the 30th day. For the next, repeated measured ANOVA was also performed with the BDI test scores, and the result showed that the BDI test score was significantly different depending on the time of measurement. Pairwise t-test was performed paring the result of the pre-treatment result with the tests of at each time and the result showed that the pre-treatment score was significantly different from the results of all the times of measurement. It means that the BDI score in the post-treatment test was lower than that of the pre-treatment test and the effect continued until the 10th day and the 30th day.

To verify whether the change within the group is larger than that by natural recovery or not, ANCOVA was performed with respect to the difference in the

Table 3. The descriptive statistics of the SDS and BDI test scores of the groups

		(Mean ± SD)			
Variables	Group	Pre	Post	10-day	30-day
SDS	C-G (<i>n</i> =10)	46.80±5.18	46.20±4.37	-	-
	E-G (<i>n</i> =27)	48.70±8.92	45.15±8.57	46.04±9.91	47.00±10.00
BDI	C-G (<i>n</i> =10)	13.30±4.74	12.40±2.55	-	-
	E-G (<i>n</i> =27)	17.81±9.79	13.44±9.70	12.85±11.09	12.30±11.24

Table 4. Difference analysis of SDS and BDI by repeated measured ANOVA

Source		SS	df	MS	F-value	<i>p</i> -value
SDS	Factor (Sphericity Assumed)	187.667	3	62.556	5.102**	0.003
	Error	956.333	78	12.261		
BDI	Factor (Sphericity Assumed)	514.102	3	171.367	13.167***	0.0001
	Error	1,015.148	78	13.015		

*** : $p < 0.001$, ** : $p < 0.01$, * : $p < 0.05$

Table 5. Result of the pairwise t-test for each measurement time

		(Mean ± SD)				
Variables	Post		10-days		30-days	
	Post-Pre	t-value	10days-Pre	t-value	30days-Pre	t-value
SDS	-2.76±3.86	-4.34***	-2.67±5.39	-2.57*	-1.70±5.22	-1.70
BDI	-3.43±5.18	-4.03***	-4.96±5.76	-4.48***	-5.52±6.24	-4.60***

*** : $p < 0.001$, ** : $p < 0.01$, * : $p < 0.05$

Table 6. Analysis of the difference in the SDS and BDI test scores between the groups by ANCOVA

	Source	SS	df	MS	F-value	p-value
SDS	Covariate(pretest)	1659.49	1	1659.49	134.49***	0.0001
	Group	51.27	1	51.27	4.15*	0.0494
	Error	419.52	34	12.34		
	Corrected total	2087.08	36			
BDI	Covariate(pretest)	1731.46	1	1731.46	76.29***	0.0001
	Group	45.90	1	45.90	2.02	0.1641
	Error	771.61	34	22.69		
	Corrected total	2511.03	36			

*** : $p < 0.001$, ** : $p < 0.01$, * : $p < 0.05$

post-treatment test result between the groups depending on whether the treatment was given or not, having the SDS pre-treatment score as the covariate, and the result showed that the post-treatment test scores were significantly different. In other words, the SDS post-treatment score in the non-treated group (the control group) was lower than that of the aroma-treated group (the experimental group), indicating that the effect of aromatherapy was greater than the change by natural recovery if the SDS test score is considered as the depression indicator.

To verify whether the change within the group is larger than that by natural recovery or not for the BDI test score, ANCOVA was performed with respect to the difference in the post-treatment test result between the groups depending on whether the treatment was given or not, having the BDI pre-treatment score as the covariate, and the result showed that the post-treatment test scores were not significantly different. Hence, follow-up study as well as comparison of further tests should be carried out about the effect of aromatherapy is greater than the change by natural recovery if the BDI test score is considered as the depression indicator.

Conclusively, for the suppression of depression among university students, increased opportunities to contact the environment-friendly plants, not drug administration, can have a very important therapeutic meaning to the individual personality growth, stable family life, efficient school life and productive

occupational life of university students.

4. Discussion

Aromatherapy to which a great attention is paid in the modern society is a holistic therapy that brings about healing and improvement in mental, physical, emotional and spiritual aspects. As the human characteristics of an individual is observed and approached as a whole, aromatherapy strengthens the self-healing mechanism and balance of energy flow in a body. Thus, aromatherapy is used as the holistic therapeutic method comprehensively considering not only the physical health but also the living environment, habit, living attitude, internal conflict, social relations, nutritional state, family environment and occupational conditions.

Tobin(1995) stated that aromatherapy using the volatile oils extracted from herbs can maintain the body and mind healthy, bringing about healing effect in the mental, physical and social aspects and lavender is effective to depression, stress, premenstrual syndrome and anxiety as it relieves tension. Lacroix(1999) reported that frankincense and basil are effective to psychological treatment and relief of depression, cypress to relief of psychological disorders and anger, orange to heightening one's spirit and relieving tension and stress, geranium to psychological stability, and marjorame to mental healing for the stabilizing effect on the nerve system. Hwang (2006) reported that aroma inhalation activated the left-brain and the stabilizing

effect was increased by the increased alpha wave and theta wave that are stabilizing waves. The report that aromatherapy using a specific essential oil was effective to the management of chronic diseases, depression, anxiety, cognitive disorder, insomnia and stress-related diseases show that the essential oils extracted from plants has a subjective effect on CNS/cerebral function. In particular, it was reported that aroma-rich environment increased the neurogenesis in adult mouse brain and the factors that can enhance the neurogenesis in human brain were also studied, considering that the aromatherapy that helps regeneration has a long-term potential for the prevention of depression (Perry and Perry, 2006).

Additionally, as more effective and economical therapeutic methods for depression have been developed by the recent development of psychopharmacology and cognitive behavioral treatment in many previous studies, a lot of attention is paid to the diagnosis such as early verification of the patients with depression and accurate measurement of the seriousness (Mannuzza et al., 1995). Hence, depression scales have been continuously developed to assess depressive symptoms objectively and conveniently. BDI and SDS are frequently used as the tools to select the subjects for the experiment regarding depression. Han et. al.(1986) investigated the depressive disposition of Korean adults using the subjective scale BDI and proposed the depression criterion for Koreans, 8 scores higher than that for Americans, 13 scores, since the depressive disposition was higher than that of the studies performed in Western countries. Kim (2002) investigated the recognition of depressive disposition and depression of university students through BDI and reported the BDI mean score of 49.40 as the minimum depressive score which requires therapeutic intervention by a professional. Thus, it was known that the scores rated by these scales were highly correlated with each other.

Summarizing the results of this study, although the aromatherapy to the group showed an immediate effect

of suppressing depression in the physiological and cognitive aspects, the continued effect could not be expected over time. This indicates the effect of the aroma oil which reflected the physical, mental and psychological state of the subjects and was expressed as a potential self-controlling method for health. The result may be used as the fundamental data for the practical and effective application for quality of life. In addition, it is expected that the scientific verification of the aroma oils used for aromatherapy will continue and the studies on the beneficial aromas that reduce depression will be conducted continuously and more actively in the future.

5. Conclusions

The subjects who were university students were selected by the preliminary study and they were allocated to the aroma-treated group and non-treated group, 27 students and 10 students, respectively. The BDI and SDS tests were performed at each time (pre-treatment, post-treatment, 10 days after and 30 days after) and the following results were obtained:

1. The BDI test result in the aroma essential oil-treated group showed that the pre-treatment test score was significantly different from the results of the post-treatment, the test after 10 days and the test after 30 days. In the SDS test, the pre-treatment test score was significantly different from the results of the post-treatment ($p < 0.1$) and the test after 10 days ($p < 0.5$), but not from the result of the test after 30 days.

2. In the case of the aroma oil non-treated group, the post-treatment SDS test result was significantly different from the pre-treatment test result ($p < 0.05$), while it was not in the BDI test.

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