

# 향요법 발반사 마사지가 치매노인의 인지, 불안, 공격행동 및 배회행동에 미치는 효과

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## The Effects on Aromatherapy and Foot Reflex Massage on the Cognition, Anxiety, Aggressive Behavior and Wandering Behavior of Elderly with Dementia

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**요약** 본 연구는 치매노인에 대한 간호중재로 향요법 발반사 마사지 프로그램을 적용하여 인지, 불안, 공격행동 및 배회행동에 미치는 효과를 알아보고자 하였다. 연구 설계는 비동등성 대조군 전후 시차 설계의 유사 실험설계이다. 연구대상자는 실험군 21명, 대조군 22명으로 실험군에는 향요법 발반사 마사지를 2주간 적용하였고 대조군은 2주간 무처치 하여 전체 실험기간은 총 4주간이었다. 자료의 처리는 SPSS WIN 18.0 프로그램을 이용하였다. 대상자의 일반적 특성과 집단간 동질성 검정은 Chi검정과 t검정, 종속 변수에 대한 검정은 t검정, 대조군과 실험군의 사전, 처치 1주, 처치 2주의 효과 변수의 변화에 대한 분석은 반복측정분산분석(Repeated measure ANOVA), 사후분석은 Bonferroni로 검정하였고 유의수준은  $p < .05$ 로 하였다. 향요법 발반사 마사지를 받은 실험군에서 불안, 공격행동 및 배회행동의 감소를 가져와 치매노인 삶의 질 향상에 도움을 줄 수 있는 간호중재로 사료된다.

**주제어** : 향요법, 발반사, 마사지, 인지, 불안

**Abstract** This study aims to evaluate the effects of aromatherapy and a foot reflex massage program on the cognition, anxiety, aggressive behavior, and wandering behavior of elderly with dementia. The research design was a non-equivalent control group, quasi-experimental study where 43 subjects were divided into two groups. Aromatherapy and foot reflex massage was administered to the experimental group (N=21), and no treatment was administered to the control group (N=22). The data was analyzed using the  $\chi^2$ -test, t-test, while the repeated measures of ANOVA were utilized with the SPSS/Win 18.0 program. The experimental group did not show significant differences in cognitive function; however, it showed significant differences in anxiety, aggressive behavior, and wandering behavior in relation to the control group. Thus this research suggests aromatherapy and a foot reflex massage program as nursing intervention to improve the quality of life of elderly with dementia.

**Key Words** : Aromatherapy, Foot reflex, Massage, Cognition, Anxiety

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## 1. Introduction

### 1.1 Requirements of the Research

Dementia, which is on constant increase with the aging population, is the most typical and serious geriatric disease that accompanies behavioral conditions along with a decline in various cognitive functions, including memory. As a syndrome with those symptoms related to multiple disorders in the functions of the cerebral cortex, dementia shows disorders in cognitive functions of memory, judgement, and orientation in the entire functional change and is characterized by psychological problems, such as irritation and anxiety due to cognitive dysfunction and behavioral problems like wandering and aggressive behaviors[1]. In particular, behavioral symptoms of dementia continue to exhibit a vicious cycle of wandering and aggressive behavior following irritation and anxiety due to cognitive dysfunction[2].

The symptoms of wandering and aggressive behaviors have not generally been regarded as threatening others' safety and health despite lots of difficulties in one's personal control. However, it has been contended that such behavioral symptoms lower the quality of living for nursing providers as well as for the elderly themselves beyond such problems as amnesia or confusion, which are common among the elderly with dementia. Although knowledge of and concerns about dementia have recently increased, the stage at which it is possible to identify its definite causes or provide substantial help in treatment has not been reached. Since the research has suggested that dementia is caused by irreversibly impaired brain cells and cannot be cured, diverse drugs, including sedatives, such as neuroleptics, are used for symptoms other than making a positive therapeutical approach centered on the affected elderly; however, while these drugs help control symptoms, they have limited effects and make the elderly sensitive to their side-effects and, thus, these drugs could accelerate cognitive deterioration,

including the resultant severe disorders[3]. It is therefore necessary to try non-pharmaceutical methods which can delay or relieve the symptoms among dementia patients and make them, their families, and caregivers more satisfied.

For non-pharmaceutical therapy, diverse programs, including phototherapy, horticulture therapy, music therapy, art therapy, physical activities, and aromatherapy, are being implemented. Of these, aromatherapy with few side-effects is considered to have positive effects on the management of dementia patients[4]. Aromatherapy is a natural type of therapy to give whole therapeutic effects in mental, physical, and spiritual aspects due to biochemical ingredients contained in the aromatic ingredients of essential oil, which is a volatile perfumed oil extracted from the flowers, fruits, stocks, and roots of diverse plants. Further, biochemical ingredients contained in perfumed oil are delivered by diverse applications through olfactory nerves to the limbic system, to the hypothalamus, and, ultimately, to the pituitary gland, consequently exerting positive effects on the body and the mind[5]. Treatment mostly involves inhalation and massage. Massage is applied on the hands, foot, or the whole body. Foot reflex massage, in particular, is a type of therapy that can help subjects maintain homeostasis and manage physical and mental relaxation, fatigue recovery, anxiety, depression, tension, and mood after they receive pressure from a point in their foot corresponding to each region of their whole body[6]. Contrary to the typical type of massage using a lubricant, the combination of perfumed oil and massage can allow the oil to be absorbed rapidly by massage and circulated in the whole body through blood flow to chemically react to hormones and enzymes within the body and, ultimately, maximize the effect of physical and mental relaxation[7]. This massage is easy to apply, is safe, has no spatial or temporal restriction, and can be done regardless of the subject's capability to participate. Thus, aromatherapy

and foot reflex massage can serve as a good nursing intervention in the cognition, anxiety, and aggressive and wandering behaviors of the elderly with dementia. Few studies have been conducted on nursing interventions using aromatherapy and foot reflex massage for the elderly with dementia, unlike their effects on sleep and depression[8] and the effects of stress, depression, and erratic sleep to institutionalized elders[9]. Thus, empirical research on the effects of aromatherapy and foot reflex massage needs to be conducted, and it is necessary to lay the ground for the clinical use of aromatherapy and foot reflex massage.

This study aims to apply aromatherapy and a foot reflex massage program as a form of nursing intervention for dementia patients residing in nursing homes to test its effects on their cognitive functions, anxiety, and aggressive and wandering behaviors with the objective of contributing to the development of nursing intervention that can improve the quality of their living.

### 1.2 Objectives and Hypotheses

This study aims to apply aromatherapy and a foot reflex massage program to elderly with dementia for two weeks and identify their effects on the elderly's cognitive functions, anxiety, and aggressive and wandering behaviors. To do this, the following specific hypotheses were formulated. Comparison was made between the experimental group to which aromatherapy and foot reflex massage were administered (hereinafter referred to as "experimental group") and the group which did not receive treatment (control group). These were the hypotheses formed:

- H1: The score for cognitive functions would differ between the experimental group and the control group.
- H2: The tendency of the change in the score for anxiety would differ between the experimental group and the control group.

H3: The tendency of the change in the score for wandering behavior would differ between the experimental group and the control group.

H4: The tendency of the change in the score for aggressive behavior would differ between the experimental group and the control group.

## 2. Methods

### 2.1 Subjects

The participants in this study were elders aged 65 years or older, who were diagnosed with dementia and who agreed to participate in the research or for whom their family or the head of an institution gave consent for their participation. The study was conducted in hospitals and two nursing homes for the elderly (S and C nursing homes) with similar socio-economic conditions in K City.

For the sample size, 22 participants were selected per group through random sampling since 18 were required per group when estimated with the effect size of 0.40, the significance level of 0.05, and power of 0.80 for three sessions of repeated measures ANOVA in both groups by using Gpower 3.0[10]. One subject in the experimental group was dropped out due to refusal to get a massage in the course of research; consequently, there were a total of 43 participants 21 in the experimental group (10 in S nursing home, 11 in C nursing home) and 22 in the control group (11 in S and C nursing homes, respectively).

### 2.2 Research Design

The research design was a quasi-experimental research with a non-equivalent control group, non-synchronized design, and each experimental treatment lasted for two weeks.

Pretest was conducted in both experimental and control groups before the experimental treatment. Since a problem of experimental spread, such as possibility

that the experimental effects of perfumed oil for experimental treatment could contaminate the control group, was expected, the control group was first given no treatment and then the experimental group was given the experimental treatment in a total of ten sessions, one session a day, five sessions a week, over two weeks.

## 2.3 Instruments

### 2.3.1 Cognitive Functions

MMSE-K, which is a revision by Park and Kwon[11] in consideration of the Korean elders' characteristics on the basis of Mini Mental State Examination (MMSE) developed by Folstein and Folstein[12] to measure cognitive abilities, was used to add up scores from each item constructed of sub-scales, including orientation (5 points), memory registration (3), attention and calculation skills (5), recall (3), linguistic functions (7), and understanding and judgement (1, respectively), with lower scores indicating further damage to cognitive functions. Cronbach's  $\alpha$  was .89 in this study.

### 2.3.2 Anxiety

Rating Anxiety in Dementia (RAID) developed by Shankar et al[13] was used to measure anxiety from a report made by supporters in 18 items ranging from 0 (lacking) to 3 (severe). The total scores ranged from 0 to 54, with 11 or more representing significant clinical anxiety. Cronbach's  $\alpha$  was .92 at the time of translation of RAID into Korea and .80 in this study.

### 2.3.3 Aggressive Behavior

Through revision and complementation of the Ryden Aggression Scale[14] for the purpose of this study, a total of 28 items were constructed: 18 about physically aggressive behavior (PAB), 6 about verbally aggressive behavior (VAB), and 4 about sexually aggressive behavior (SAB). Observation was made for the presence of each type of aggressive behavior per

day: 1 was given for the presence of aggressive behavior, and for the absence of aggressive behavior. The higher the total score was, the more severe the aggressive behavior was. Cronbach's  $\alpha$  was .94 in this study.

### 2.3.4 Wandering Behavior

The Algase Wandering Scale V2 developed by Algase et al[15] was used with a total of 23 items: 9 about persistent walking (PW), 6 about spatial disorientation (SD), 4 about eloping behavior (EB), 2 about shadowing (SH), and 2 about routinized walking (RW). Each item had 1 point for least wandering and 4 for the severest wandering. The higher the total score was, the more severe the wandering behavior was. Cronbach's  $\alpha$  was .86 for this instrument and .88 in this study.

## 2.4 Procedure of Research

### 2.4.1 Period of Data Collection

The subjects were selected from January 2 to 6, 2012. A pretest was conducted from January 9 to 13, 2012, and the research was conducted for four weeks from January 16 to February 10, 2012.

### 2.4.2 Data Collection Methods

#### 1) Pretest

To reinforce the feasibility of the research and research design, five elders with dementia close to the population were selected and given aromatherapy and foot reflex massage from December 26 to 30, 2011. For the selection of perfumed oil for aromatherapy and foot reflex massage, a 2 : 2 : 1 mix of two or three types of perfumed oil containing the following maximized the synergy effect of the oil: lavender, preferred by the elderly and widely used to ease the nervous system and reduce anxiety through the harmony between sympathetic and parasympathetic nervous systems; geranium, remarkably effective in soothing and relaxing the mind and reducing anger; and clary sage,

which strongly sedates an anxious mind[5]. A sense of refusal and discomfort with massage was determined in the study according to the types of carrier oil. Consequently, jojoba oil which is absorbed into the skin of the elderly with relative rapidity was selected to complement the research.

#### 2) Researcher and Research Assistant Training

The researcher received a professional aromatherapist's certificate from the Korean Society of Aromatherapy. There were also a total of eight research assistants involved in this study: two mental health nurses who had a professional aromatherapist's certificate, four caregivers, and two hospital nurses. To improve the consistency and validity of the data collected after education concerning the needs and objective of the research and specific data collection time and methods given, five elders with dementia were selected and each pair of nurses and caregivers were asked to observe one elder in terms of anxiety and aggressive and wandering behaviors, to record the observation according to the guidelines for judgement, and to compare the results and make discussions in pursuit of the coincidence of opinions. Cronbach's  $\alpha$  was .97 among data collectors.

#### 3) Experimental Treatment

Foot reflex massage was administered to the subjects in a comfortable supine position, with the environment-causing error maintained at a minimum level. Foot reflex massage gave stimuli to diverse reflexive regions on one's feet, soles, ankles, and legs using thumbs, fingers, fists, and hands after a combination of basic methods, including sweeping, turning, pulling, pressing, vibrating, shaking, pushing, rubbing, and twisting[6]. Slow massage was administered to induce deep relaxation in consideration of the elderly's physical conditions in a total of 10 sessions, 20 minutes per session, one session a day, five sessions a week, over a span of two weeks. Both

the researcher and trained mental health nurses used 10 ml perfumed oil (per session) made of 100 ml jojoba oil with 16 drops of lavender, 16 drops of geranium, and 8 drops of clary sage diluted to a 2% level to administer the aromatherapy and foot reflex massage program to both feet approximately 10 cm above the knees for 20 minutes at 10 minutes for each foot.

#### 4) Data Collection Procedure

For pretest, anxiety and aggressive and wandering behaviors were measured in five sessions, one session a day, for a week (Mon. to Fri.), while cognitive functions were measured on the final day of pretest in the experimental and control groups.

The experimental treatment was given in five sessions, one session a day, for two weeks in the experimental group. The treatment was given at 2 to 5 o'clock in the afternoon over two weeks (five sessions per week). After each session of experimental treatment, anxiety and aggressive and wandering behaviors were observed and recorded by four caregivers of the subjects in the nursing home and two ward nurses. Cognitive functions were measured by their doctor in a single session on the final day of treatment. The control group was measured in the same way as the experimental group during the no-treatment period. The researcher gave assistance to observers suffering from the diversity of opinions.

#### 5) Data Analysis Methods

An SPSS WIN 18.0 program was used to process the data. The subjects' general characteristics and inter-group homogeneity were tested by Chi-test and t-test, while the dependent variables were tested by t-test. In the control and experimental groups, the analysis of the changes of the effect variables in the pretest and one week and two weeks after treatment were tested by t-test and repeated measures ANOVA. Meanwhile, follow-up analysis was tested by Bonferroni at the  $p < .05$  significance level.

6) Ethical Consideration

In consideration of the ethical aspect of this study, explanation of the research objective and methods was given to the subjects and their families during their visit or by phone. It was also confirmed that all materials should be used for the sole purpose of the research and confidentiality should be maintained. They were informed that they could cease to participate in the research at any time during their participation and a written consent was only necessary from the subjects or their family. After completing data collection, foot reflex massage was administered to the control group, and there was time to offer a gift to all the subjects as a token of gratitude for their participation in the research.

3. Results

3.1 Subjects' General Characteristics and Inter-group Homogeneity Test

Inter-group homogeneity test for general characteristics showed that two groups were homogeneous in terms of gender, age, religion, education, and the duration of conditions (Table 1).

<Table 1> Homogeneity Test of General Characteristics among Two Groups (n=43)

Variables		Exp G (n=21)	Con G (n=22)	χ <sup>2</sup> or t	p
		n(%)	n(%)		
Gender	Male	8(38.1)	8(36.4)	0.06	.931
	Female	13(61.9)	14(63.6)		
Age	≤69	5(23.8)	5(22.7)	0.42	.810
	70-79	8(38.1)	9(40.9)		
	≥80	8(38.1)	8(36.4)		
	Mean	78.01	77.42	0.13	.868
Religion	Yes	13(61.9)	12(54.5)	1.39	.240
	No	8(38.1)	10(45.5)		
Education	No school	13(61.9)	15(68.2)	0.429	.669
	Elementary	8(38.1)	7(38.1)		
Duration of disease (month)	≤24	2(9.5)	2(9.1)	0.307	.740
	25-48	10(47.6)	11(50.0)		
	≥49	9(42.9)	9(40.9)		

Exp G = Experimental Group; Con G = Control Group

3.2 Inter-group Homogeneity Test for Dependents

After t-test was carried out to determine homogeneity in cognitive functions, anxiety, and aggressive and wandering behaviors between experimental and control groups before administering aromatherapy and foot reflex massage, all of them were found to be homogeneous before intervention (Table 2).

<Table 2> Homogeneity Test for MMSE-K, Anxiety, Aggressive Behavior and Wandering Behavior Among Two Groups (n=43)

Variables	Exp G (n=21)	Con G (n=22)	t	p
	Mean±SD	Mean±SD		
MMSE-K	14.20±5.08	15.07±5.12	-0.34	.717
Anxiety	16.68±9.20	15.04±8.21	1.04	.258
Aggressive Behavior	18.57±8.20	17.94±9.43	0.33	.740
Wandering Behavior	41.84±6.67	40.64±7.39	0.69	.506

MMSE- K = Mini-Mental State Examination Korean

3.3 Hypothesis Test

3.3.1 To test Hypothesis 1, "the experimental group would get a higher score for cognitive functions than the control group," the scores for cognitive functions in both groups were analyzed by t-test before treatment. The score for cognitive functions in the experimental and control groups was 14.20 and 15.07, respectively, before treatment and 16.05 and 15.00, respectively, after treatment. Therefore, Hypothesis 1 was rejected with insignificant inter-group differences (t=1.09, p=.107) (Table 3).

3.3.2 To test Hypothesis 2, "the tendency of the change in the score for anxiety would differ between the experimental group and the control group," the scores for anxiety in both groups were analyzed by repeated measures ANOVA before treatment. There was no significant inter-group difference (F=0.698, p=.410). There were significant differences in time for treatment (F=15.781, p=.000) and interaction between

(Table 3) The Comparison of Test for MMSE-K, Anxiety, Aggressive Behavior and Wandering Behavior Among Two Groups (n=43)

Variables	Groups	Pretest	Tx 1st wk	Tx 2nd wk	Source	t or F	p
		Mean±SD	Mean±SD	Mean±SD			
MMSE-K	Exp G (n=21)	14.20±5.08		16.05±5.82		1.09	.107
	Con G (n=22)	15.07±5.12		15.00±6.48			
Anxiety	Exp G (n=21)	16.68±9.20 <sup>A</sup>	11.13±13.21 <sup>B</sup>	11.22±12.27 <sup>B</sup>	Group	0.698	.410
	Con G (n=22)	15.04±8.21	15.56±10.75	16.33±12.57	Time	15.781	<.000
					G*T	7.627	.001
Aggressive Behavior	Exp G (n=21)	18.57±8.20 <sup>A</sup>	13.53±8.21 <sup>B</sup>	14.12±6.81 <sup>B</sup>	Group	1.478	.131
	Con G (n=22)	17.94±9.43	18.22±8.01	17.28±8.72	Time	11.87	.001
					G*T	5.800	.001
Wandering Behavior	Exp G (n=21)	41.84±6.67 <sup>A</sup>	33.20±8.63 <sup>B</sup>	34.08±8.99 <sup>B</sup>	Group	1.382	.245
	Con G (n=22)	40.64±7.39	42.01±10.04	42.72±7.22	Time	10.019	.001
					G*T	4.028	.010

A, B = Significant difference between the alphabetic letters;  
Exp G = Experimental Group; Con G = Control Group; G=Group; T=Time

groups and time ( $F=7.627, p=.001$ ). The main effect analysis was carried out by Bonferroni to examine the changes in the score for anxiety among time periods. The experimental group showed a highly significant decrease in the score for anxiety both one week and two weeks after treatment 16.68 before treatment, 11.13 one week after treatment, and 11.22 two weeks after treatment. Therefore, Hypothesis 2 was supported (Table 3).

3.3.3 To test Hypothesis 3, "the tendency of the change in the score for aggressive behavior would differ between the experimental group and the control group," the scores for aggressive behavior in both groups were analyzed by repeated measures ANOVA before treatment. There was no significant inter-group difference ( $F=1.478, p=.131$ ). There were significant differences in time for treatment ( $F=11.87, p=.001$ ) and interaction between groups and time ( $F=5.800, p=.001$ ). The main effect analysis was carried out by Bonferroni to examine the changes in the score for aggressive behavior among time periods for measurement. The experimental group showed a highly significant decrease in the score for aggressive behavior both one week and two weeks after treatment 18.57 before treatment, 13.53 one week after treatment, and 14.12

two weeks after treatment. Therefore, Hypothesis 3 was supported (Table 3).

3.3.4 To test Hypothesis 4, "the tendency of the change in the score for wandering behavior would differ between the experimental group and the control group," the scores for wandering behavior in both groups were analyzed by repeated measures ANOVA before treatment. There was no significant inter-group difference ( $F=1.382, p=.245$ ) but there were significant differences in time for treatment ( $F=10.019, p=.001$ ) and interaction between groups and time ( $F=4.028, p=.010$ ). The main effect analysis was carried out by Bonferroni to examine the changes in the score for wandering behavior among time periods for measurement. The experimental group showed a highly significant decrease in the score for wandering behavior both one week and two weeks after treatment 41.84 before treatment, 33.20 one week after treatment, and 34.08 two weeks after treatment. Therefore, Hypothesis 4 was supported (Table 3).

#### 4. Discussion

This study aims to administer the aromatherapy and

foot reflex massage program to the elderly with dementia in nursing homes to determine its effects on cognitive functions, anxiety, and aggressive and wandering behaviors and provide a nursing intervention method to improve the quality of their living. There was no significant difference in the score for cognitive functions between the experimental group to which aromatherapy and foot reflex massage was administered and the control group given no treatment. However, the mean score for cognitive functions in the experimental group increased from 14.20 before treatment to 16.05 two weeks after treatment. Direct comparison can hardly be made with this result, however, because there was no prior research in aromatherapy and foot reflex massage to examine the cognitive functions of the elderly with dementia. Some prior studies on the effects of aromatherapy on cognitive functions showed that the ingredients of perfumed oil absorbed through the olfactory sense and the skin rapidly flowed into the blood through the lungs and stimulated the olfactory receptor, and perfumed oil delivered to the limbic system increased the level of serotonin and stimulated stagnated memories[16]. In addition, perfumed oil induced the release of neurochemicals to reduce anxiety or a sense of irritation, consequently changing individuals' emotional condition and improving their cognitive functions[5]. Perfumed oil allows dementia patients to experience recall, emotional calm, and relaxation, which also improve cognitive functions[17], thus supporting the result of this study that the experimental group gets an improved score for cognitive functions.

As for the effects of aromatherapy and foot reflex massage on anxiety, the experimental group showed a significant decrease in the score for anxiety both one week and two weeks after treatment compared to prior treatment, with no difference in results between one week and two weeks after treatment. While direct comparison can hardly be made with this result because there was no prior research in aromatherapy

and foot reflex massage to examine the cognitive functions of the elderly with dementia, it was reported that aromatherapy and hand massage administered to the elderly with dementia led to psychological relaxation and comfort[18] and reduced their anxiety or sense of irritation[19], thus supporting this result, though it may have different subjects and application methods. Anxiety activates the autonomous nervous system and stimulates the secretion of epinephrine and norepinephrine. It also causes physiological reaction in the hypothalamus by inducing corticotrophin-releasing factors to stimulate the pituitary gland to secrete antidiuretic hormones and adrenocorticotropic hormones. In other words, anxiety activates sympathetic nerves or the autonomous nervous system[20]. Here, perfumed oil effectively controls actions in the hypothalamus to give balance and harmony to mental functions, stabilizes the adrenal cortex to give calm and relaxation[5], and stimulates the foot reflex zone in the middle of metatarsal bones, which is the center of the sole and corresponds to emotions in foot reflex massage[6], controlling the excitement and restriction of the sympathetic nervous system to create synergy effects by reducing physiological awakening and giving nervous relaxation along with psychological and physical relaxation caused by massage contact. Regarding the effects on aggressive and wandering behaviors, the experimental group showed a significant decrease in the score for aggressive and wandering behaviors both one week and two weeks after treatment compared to prior treatment, with no difference between one week and two weeks after treatment. While direct comparison can hardly be made with this result because there was no prior research on the effects of aromatherapy and foot reflex massage on the aggressive and wandering behaviors of the elderly with dementia, it was reported that hand massage using perfumed oil administered to dementia patients delayed, reduced, or prevented restless behavior[18], that lavender aromatherapy administered to long-term



inpatients with dementia controlled their impulsive behavior during the administration[21], that inhalation and hand massage administered to the elderly with dementia reduced nighttime wandering behavior[22], and inhalation administered to the elderly with dementia relieved irritative and wandering behavior [23]. The abovementioned studies supported the results of this study during treatment, but with differences in application methods and symptoms for the elderly with dementia. Dementia is characterized by memory disorders, confusion, and orientation loss at its early stage and by aggressive and wandering behaviors as a consecutive process of cognitive and behavioral reactions along with increased anxiety and irritation as it progresses. Perfumed oil absorbed by foot reflex massage comes to circulate in the whole body through capillaries and lymph and then makes chemical reactions with hormones and enzymes in a certain organ with affinity, acts as a carrier for nourishing the skin cells to increase oxygen in the body, and stays for a few hours to a few days within the body to maintain a recovery process where neural tissues are stabilized[24]. If these actions of perfumed oil and stimuli from foot reflex delivered to the central nervous system through the centripetal nerve pathway reduce anxiety during the period of treatment and give physical relaxation, they allow energy to flow smoothly within the body and maximize the synergy effects of anxiety, tension relaxation, and improved relaxation[25] through improved blood circulation and evacuation, consequently creating a decrease in aggressive and wandering behaviors, which last for up to two weeks. It is expected of nursing intervention to prevent and control anxiety and aggressive and wandering behaviors among the elderly with dementia. Aromatherapy and foot reflex massage will help improve the quality of their living in this sense. However, few nursing studies have dealt with aromatherapy and foot reflex massage for the elderly with dementia; therefore, it is necessary to lay the

ground for clinically using diverse types of empirical research in aromatherapy and foot reflex massage and develop them as a new kind of nursing intervention.

## 5. Conclusion

This is a quasi-experimental research with a non-equivalent control group and non-synchronized design to determine the effects of aromatherapy and foot reflex massage on the cognitive functions, anxiety, and aggressive and wandering behaviors of elderly with dementia to whom the treatment was administered for two weeks. The experimental group which received aromatherapy and foot reflex massage treatments showed a significant decrease in anxiety and aggressive and wandering behaviors compared with the control group; thus, these treatments' effectiveness was confirmed.

Aromatherapy and foot reflex massage programs will have nursing significance in that as a nursing intervention to prevent and control anxiety and aggressive and wandering behaviors among the elderly with dementia, it can be used as a practical intervention program to help improve the quality of their living.

## References

- [1] L. J. Fitten, Editorial: management of behavioral and psychiatric symptoms in dementia. *The Journal of Nutrition Health & Aging*, Vol. 10, No. 5, pp. 409, 2006.
- [2] P. J. Seignourel, M. E. Kunik, L. Snow, N. Wilson, M. Stanley, Anxiety in dementia: A critical review. *Clinical Psychology Review*, 2008.
- [3] H. Lavretsky, D. Sultzer, A structured trial of risperidone for the treatment of agitation in dementia. *American Journal of Geriatric Psychiatry*, Vol. 6, pp. 127-135, 1998.

- [4] C. Holmes, C. Ballard, Aromatherapy in dementia. *Advanced in Psychiatric Treatment*, Vol. 10, pp. 296-300, 2004.
- [5] H. K. Oh, J. Y. Choi, K. G. Jun, J. S. Lee, D. K. Park, S. D. Choi, et al, Studies of the scent of aroma synergy blending on the anti-stress and effects & a comparative study of three kinds of aroma synergy blending on their effects. *Journal of Korean Psychotress*, Vol. 8, No. 2, pp. 9-24, 2000.
- [6] W. Y. Oh, E. S. Jeon, H. S. Lee, Foot care reflexology. Paju: Kyongseowonchulpansa, 2007.
- [7] J. Buckle, Massage and aromatherapy massage: Nursing art and science. *International Journal of Palliative Nursing*, Vol. 8, No. 6, pp. 276-280, 2003.
- [8] H. J. Yang, H. Y. Kang, I. S. Kim, The effects of aroma foot reflex massage on sleep, depression and problem behaviors on elderly with dementia. *Korean Journal of Adult Nursing*, Vol. 23, No. 6, pp. 574-583. 2011.
- [9] J. R. Lee, Effects of aromatherapy and foot reflex massage on stress, depression and sleep pattern of the institutional elderly. *The Journal of Korean Biological Nursing Science*, Vol. 7, No. 2, pp. 17-30, 2005.
- [10] E. Erdfelder, F. Faul, A. Buchner, GPOWER: A general power analysis program. *Behavior Research Methods, Instruments, & Computer*, Vol. 28, pp. 1-11, 1996.
- [11] J. H. Park, Y. C. Kwon, Korean Version of Mini-Mental State Examination (MMSE\_K) Part1: Development oh the test for the elderly. *Journal of the Korean Neuropsychiatric Association*, Vol. 28, pp. 125-135, 1989.
- [12] M. E. Folstein, S. E. Folstein, "Minimental state", A practical method for grading the cognitive state of patients for the clinician. *Journal Psychiatry Res*, Vol. 12, pp. 189-198, 1975.
- [13] K. K. Shankar, M. Walker, D. Frost, M. W. Orrell, The development of a valid and reliable scale for rating anxiety in dementia(RAID). *Aging & Mental Health*, Vol. 3, pp. 39-49, 1999.
- [14] M. B. Ryden, Aggressive behavior in persons with dementia who live in the community. *Alzheimer's disease and associated disorders : Int J Gerontol*, Vol. 2, pp. 342-355, 1988.
- [15] D. L. Algase, E. R. Beattie, E. Bogue, L. Yao, The Algase Wandering Scale: Initial psychometrics of a new caregiver reporting tool. *American Journal of Alzheimer's disease*, 2001.
- [16] A. Wendy, The use of aromatherapy in assisted living, Wilmington College, Ph.D. dissertation, Landenberg, 2000.
- [17] V. A. Worwood, *The fragrant mind*. Novato, CA : New World Library, pp. 17-18, 1996.
- [18] P. Tobin, Aromatherapy and its application in the management of people with dementia. *Lamp New South Wales Nurs Assoc*, Vol. 52, No. 5, pp. 34, 1995.
- [19] C. Holmes, V. Hopkins, C. Hensford, V. MacLaughlin, D. Wilkinson, H. Rosenvinge, Lavender oil as a treatment for agitated behavior in severe dementia. *International Journal of Geriatric psychiatry*, Vol. 17, No. 4, pp. 305-308, 2000.
- [20] B. C. Ha, *Aromatherapy*. SooMoonSa, Seoul, 2000.
- [21] M. Hardy, M. D. Kirk-Smith, D. Stretch, Replacement of chronic drug treatment for insomnia in psychogeriatric patients by ambient odour. *Lancet*, Vol. 346, pp. 701-712, 1995.
- [22] S. W. Choi, Effect of aromatherapy on behavioral and psychological symptoms of dementia. *Korean Journal of Gerontology Society*, Vol. 28, No. 4, pp. 1609-1087, 2008.
- [23] B. Diamond, K. Johnson, T. Morodan, J. Prokop, D. Davidke, P. Kramer, Complementary and alternative medicines in the treatment of dementia: An evidence based review. *Drugs Aging*, Vol. 20, No. 13, pp. 981-998, 2003.
- [24] K. Schnaubelt, *Medical aromatherapy: Healing with essential oil*. USA: North AtlanticBooks, 1999.
- [25] B. T. Mackey, *Massage therapy and reflexology awareness*. *Nursing Clinic of North America*, Vol. 36, No. 1, pp. 159-170, 2001.

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