

## Effect of Baekgaeja Acupressure Therapy on Smoking College Students

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### Abstract

College students who smoke are increasing. Smoking is not good for your health. Baekgaeja ear acupressure therapy is effective for smoking cessation. The purpose of this study was to identify the effect of baekgaeja ear acupressure therapy on nicotine dependence, exhaled carbon monoxide and urine cotinine in college students. The subjects of this study composed of 30 for the experimental group and 30 for the control group who were smoking college students at B and C city. Baekgaeja ear acupressure therapy was conducted for 2 times per week and lasted for 4 weeks on the experimental group. Data were analyzed with SPSS WIN 20.0. The experimental group showed significantly lower nicotine dependence ( $t=5.924$ ,  $p<.001$ ), exhaled carbon monoxide ( $t=4.024$ ,  $p<.001$ ), urine cotinine ( $\chi^2=7.177$ ,  $p=.015$ ) than that of the control group after intervention. Therefore, it was considered that Baekgaeja ear acupressure therapy was likely be useful as a therapeutic intervention for smoking cessation in college students.

**Keywords:** College, Students, Nicotine, Cessation, Acupressure, Therapy, Smoking

### 1. Introduction

Nonsmoking has been considered as important for improving health by the World Health Organization and most countries including the United States are undertaking to lower the smoking rate [1]. Smoking causes cardiovascular diseases such as memory loss, difficulty concentrating, headache, lung cancer and chronic lung diseases and occupies the biggest percentage of death and smokers are more likely to have a high death rate by 3-19 times higher than nonsmokers [2]. As nursing intervention method for smoking cessation, ear acupressure therapy or auricular acupuncture therapy has recently been conducted as an alternative complementary therapy. Auricular acupuncture therapy is an intervention that 2mm needle penetrates the skin using intradermal injection and thus requires attention as the skin in auricular part is likely to be infected [3]. Therefore, this study was attempted to identify the effects of nicotine dependence, exhaled mono dioxide, and urine cotinine level on smoking cessation in college students using Baekgaeja-based ear acupressure therapy by applying acupuncture twice a week for both ears, alternately (eight times in total), which was proven to be effective in the existing studies as nursing intervention for smoking cessation in college students who smoke by referring to the preceding studies on the effects of ear acupressure therapy on smoking cessation [4].

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## **2. Body**

### **2.1. Purpose**

The purpose of this study is to identify the effects of Baekgaeja acupressure therapy on smoking cessation by checking the levels and changes in nicotine dependence, exhaled carbon monoxide and urine cotinine in college students who smoke.

### **2.2. Hypothesis**

Hypothesis 1: The nicotine dependence of experimental group applied with Baekgaeja acupressure therapy will be different from that of control group applied with Sham therapy.

Hypothesis 2: The exhaled carbon monoxide level of experimental group applied with Baekgaeja acupressure therapy will be different from that of control group applied with Sham therapy.

Hypothesis 3: The urine cotinine level of experimental group applied with Baekgaeja acupressure therapy will be different from that of control group applied with Sham therapy.

### **2.3. Design**

This is an experimental pretest-posttest control group study designed to verify the changes and differences between nicotine dependence, exhaled carbon monoxide, and urine cotinine level using Baekgaeja acupressure therapy for smoking cessation for subjects who smoke.

### **2.4. Subjects**

The subjects of this study are college students who smoked in City B and City C and agreed to participate in this experiment after understanding the purpose of this study. The number of samples was calculated in G-power 3.1, and when significance level is .05, effect size .70, and power of test  $(1-\beta)$  .80 according to the preceding studies [5], the minimum number of subjects required for testing the difference in mean between the two groups was 26, but a total of 60 subjects were randomly assigned: 30 individuals for experimental group and 30 individuals for control group, by considering student wastage rates.

### **2.5. Instruments**

Nicotine dependence: Nicotine dependence is a degree of expressing the desire for smoking. This study used Korean version of nicotine dependence survey tool whose reliability and validity were tested according to the translated version of Fagerstorm Test for Nicotine Dependence (FTND)[6] developed by Heatherton et al. This instrument's Cronbach's  $\alpha$ =.61; and in this study, reliability Cronbach's  $\alpha$ =.80.

Exhaled Carbon Monoxide: Exhaled carbon monoxide is a measured value of exhaled carbon monoxide concentration in ppm by using Micro CO Tester (Micro Medical Ltd., Rochester, Kent, UK).

Urine Cotinine Level: In urine cotinine concentration, the nicotine ingredients absorbed into the body after smoking change to cotinine in 1-2 hours after going through the metabolic process and excreted in the urine. By applying this principle, urine samples are collected from the subjects. Using NicoSign (MaxHealth), the smoking and nonsmoking of subjects are judged. As a testing method, collection of urine of 2mL is measured in a NicoSign tester by mixing the collection of urine and reagent, and after 1-5 minutes, the following measurement

results can be obtained. If pink lines appear on both test kits C (Control line) and T (Test line), it is proven negative and thus classified as a nonsmoker and if pink lines appear in C (Control line) only, it is classified as a smoker.

## 2.6. Baekgaeja acupressure therapy

Treatment: Guidance and experimental treatment takes about 30 min. and the specific procedure is as follows.

(1) Subjects are explained about the reason why pressing pye point (in the ear), sinmun point, and internal secretion point and the efficacy of Baekgaeja.

(2) They are trained to locate the exact acupoints for Baekgaeja acupressure therapy and put three Baekgaeja pieces sparsely on the adhesive tape paper.



Figure 1. Treatment and sham treatment

(3) Select blood points in the ear twice in a week (Wed. & Sun.), alternatingly, for four weeks.

(4) They are trained to press gently everytime they have a desire for smoking, after Baekgaeja acupressure therapy.

(5) They are explained not to remove them until the next acupressure therapy.

(6) The subjects who belong to the control group are explained about the sham acupressure therapy in the manner of (2)-(5).

## 2.7. Data analysis metshod

In this study, real number and percentage were obtained as general characteristics of subjects using SPSS WIN 20.0, general and smoking related characteristics of two groups were identified using homogeneity test, and nicotine dependence, exhaled carbon monoxide concentration, and urine cotinine between experimental group and control group were determined using  $\chi^2$ -test and t-test.

## 3. Results

### 3.1. Hypothesis testing

Hypothesis 1: As a result of analysis to verify the hypothesis “The nicotine dependence of experimental group applied with Baekgaeja acupressure therapy will be different from that of control group applied with Sham therapy,” it appeared that the mean score between experimental group and nicotine dependence was reduced from  $6.7\pm 1.2$  point before participation into the program to  $5.4\pm 1.0$  point after participation into the program and such a difference was found to be statistically significant ( $t=-5.924$ ,  $p<.001$ ).

Hypothesis 2: As a result of analysis to verify the hypothesis “The exhaled carbon monoxide level of experimental group applied with Baekgaeja acupressure therapy will be different from that of control group applied with Sham therapy,” it appeared that the mean score of exhaled carbon monoxide in experimental group was reduced from  $16.8\pm 4.9$ ppm before participation into the program to  $8.4\pm 3.5$ ppm after participation into the program and such a difference appeared to be statistically significant ( $t=4.024$ ,  $p<.001$ ).

Hypothesis 3: As a result of analysis to verify the hypothesis “The urine cotinine level of experimental group applied with Baekgaeja acupressure therapy will be different from that of control group applied with Sham therapy,” it appeared that in presence/absence of urine cotinine in experimental group, cotinine appeared to be detected in all subjects before participation to the program, but after participation into the program, cotinine was not detected in urine test from 24 students (80.0%) and such a difference appeared to be statistically significant ( $\chi^2=7.177$ ,  $p=.015$ ).

Table 1. Comparison of Amount of nicotine dependence, exhaled carbon monoxide level and urine cotinine level (N=60)

Variables	Categories		Exp. (n=30)	Cont. (n=30)	t or $\chi^2$	p
			Mean $\pm$ SD or N(%)	Mean $\pm$ SD or N(%)		
Nicotine dependence	Pretest		6.7 $\pm$ 1.2	6.6 $\pm$ 1.2	.297	.768
	Posttest		5.4 $\pm$ 1.0	7.1 $\pm$ 1.1	-5.924	<.001
Exhaled Carbon monoxide	Pretest		16.8 $\pm$ 4.9	15.6 $\pm$ 4.8	.925	.359
	Posttest		8.4 $\pm$ 3.5	7.0 $\pm$ 2.9	4.024	<.001
Urine cotinine	Pretest	C	30(100)	30(100)	.000	1.000
		C/T	-	-		
	Posttest	C	6(20.0)	16(53.4)	7.177	.015
		C/T	24(80.0)	14(46.6)		

C=Control line(Cotinine positive); C/T=Control line/Test line(Cotinine negative)

#### 4. Discussion

As a result of verifying the first hypothesis “The nicotine dependence of experimental group applied with Baekgaeja acupressure therapy will be different from that of control group applied with Sham therapy,” it appeared that the mean score of nicotine dependence was reduced from  $6.7\pm 1.2$  point before participation to  $5.4\pm 1.0$  point after participation and there appeared a statistically significant difference. In the study where ear acupressure therapy was

applied to female college students 4 times in total for 2 weeks [7], there was a significant difference in reduction of nicotine dependence, which was consistent with this study.

As a result of analyzing the second hypothesis “The exhaled carbon monoxide level of experimental group applied with Baekgaeja acupressure therapy will be different from that of control group applied with Sham therapy,” it appeared that the mean value of exhaled carbon monoxide in experimental group was reduced from  $16.8 \pm 4.9$  ppm before participation to  $8.4 \pm 3.5$  ppm after participation and there appeared a statistically significant difference.

As a result of verifying the third hypothesis “The urine cotinine level of experimental group applied with Baekgaeja acupressure therapy will be different from that of control group applied with Sham therapy,” it appeared that in urine cotinine detection of experimental group, cotinine was detected from all subjects before participation, but after participation, not detected in urine test from 24 (80.0%) and such a difference was statistically significant. Like the preceding studies, this study used the test method to detect the presence/absence of cotinine only in urine test with NicoSign without using Smokesscreen Colorimeter that was used to detect the urine cotinine concentration of subjects. The test method with Smokesscreen Colorimeter is too expensive and takes much time [8].

## 5. Conclusion

It is suggested that smoking cessation program be developed for college students who smoked and in performing the program, Baekgaeja acupressure therapy be accompanied together.

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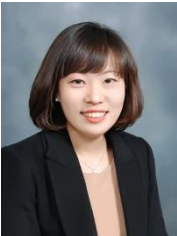
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