The Effect of Inhaling Aromas on the Quality of Sleep and Fatigue of three Shift Working Nurses

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Abstract: In this study, the purpose is to apply aromatic inhalation therapy to nurses working three shifts who experienced work overload as well as sleep lack and chronic fatigue in order to inspect the outcomes of aroma on the fatigue and irregular sleep pattern of the registered nurses. As quasi-experiment study on the non-equivalent control group, this study were collected from June 1st, 2013 to July 15th, 2013 on the experimental group of 30 registered nurses and the control group of 30 registered nurses who research shifts at C University hospital in Seoul. This study analyzed using descriptive statistics, χ^2-test and Independent t-test by use of SPSS WIN 18.0, a statistics program. This study recognizes the impacts of aromatic inhalation therapy on level of fatigue and the quality of sleep of working three shifts nurses; the experimental group getting aromatic inhalation therapy enjoyed quality sleep while feeling less fatigue. It is assumed that the aromatic inhalation therapy can be requested as interventions to working three-shifts nurses to improve their sleep while reducing fatigue. In addition, this study makes a recommendation for further studies on the selecting of aroma oil on the way of interventions based on the individual general characteristics of the working three shifts nurses and the various wards they research at. It is also recommended that sleep programs is developed that can help manage the variables identified in this study and that follow-up studies are conducted to verify the model.

Key words: Aromatic inhalation therapy, nurses, three shifts, sleep, fatigue

INTRODUCTION

Change in sudden life cycles due to the shift system can be a threatening factor to the individual life and health of nurses under the medical situations where tension and risks exist which are characteristics of nursing profession (Kho *et al.*, 2004). In addition, nurses need to have enough sleep to work properly at night. However, it is difficult for them to sleep well due to the change in biological rhythms, caused by the shift work (Park *et al.*, 2012).

Sleep is the easiest thing that can be done to gain a positive effect for relieving the fatigue of nurses (Gaba and Haward, 2002). The specific purposes were as follows. In this regard, this study analyzes the effect of aroma oil inhalation therapy including orange, lavender, roman and chamomile on the fatigue the sleep quality of nurses who are bound to do three shifts. In this regard, this study analyzes the effect of aroma oil inhalation therapy, including orange, lavender, roman and chamomile on the fatigue of nurses who are bound to do three shifts.

MATERIALS AND METHODS

Design: This study employed a nonequivalent control group pre-test and post-test design: Quasi-experimental design.

Participants and general procedures: This study data were collected from June 1st to 15th, 2013. Participants were selected from nurses who work shifts at C University hospital in Seoul. The subjects of this study were on the experimental group of 30 registered nurses and the control group of 30 registered nurses. Self-reported questionnaires were used. To maintain consistency, researchers and assistants were required to understand the research method, the research procedure and the questions being used before starting the study. Subjects were capable of three shifts working and communicating at a level where they could participate in a survey and understand the purpose of this study. For the study, we selected nurses who did not have olfactory dysfunction and respiratory diseases, not taking certain medications like sleeping pills as the subjects.

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In pre-test, the experimental and control groups were researched in the method way concerning their general characteristics, the level of fatigue and the quality of sleep; the experimental group began aromatic inhalation therapy when they start working night shift on their pillows by dropping aroma oil every day for 2 weeks before going to bed. In post-test, the level of fatigue and the quality of sleep were measured on the experimental and control groups.

Ethical considerations: This study conformed to the ethical principles of the declaration of Helsinki. This study was approved by the ethics review committee and the approval number is IRB-C2013059 (1019). All participants were given some small token of thanks.

Data analysis: Using a significance level of 0.5, an 80% power and an effect size of 0.8, the size of the sample using G-power 3.1.2 revealed that the sample needed is 26. Thus, we took the sample of 30 subjects and 60 subjects were analyzed. This study analyzed using SPSS version 18.0 programs. The χ^2-test and independent t-test were used to determine the significance of differences before and after group therapy. The significance level was Cronbach as $\alpha = 0.05$.

Instrument
Quality of sleep: Quality of sleep is a self-reported scale developed by Lee Hye Ryun. It contains 28 items measuring 6 factor of dimensions: Insufficient sleep (12 items) after recovery sleep (4 items) Difficulty in falling asleep (4 items) difficulty in lying awake (3 items) the Sleep satisfaction (3 items) difficulty in maintaining sleep (2 items).

Fatigue: Fatigue is a self-reported scale developed by Industrial Fatigue Research Society, Japan Speiety for Occupational Health (Aoyama, 1988). This tool is a self-report scale that consists of 30 multiple-choice items, each of which is scored on a 3-point likert-type scale ranging from never (0 point) to always (2 points) with higher score indicating better fatigue.

RESULTS AND DISCUSSION

Demographic characteristics of the participants: As for the age ranges those who under the age of 30 were the majority with 71.7% (N = 43) and those who over the age of 30 accounted for 28.3% (N = 17). In terms of work departments, Intensive Care Unit (ICU) was 63.3% (N = 38) and general ward was 36.7% (N = 22). The marriage status was that single status was 41.7% (N = 45)

and married status was 25% (N = 15) while the final education background was that 35% of subjects (N = 21) were 2 years college graduates, 41.7% (N = 25) were 4 years college or university graduates and 23.3% (N = 24) were graduates with over a master's degree or students in graduate course. A total of 43.3% subjects did not have any religion (N = 36), in terms of the clinical experience, over 5 years (N = 36, 60%) was the majority, while a total of 78.3% (N = 47) had sleep disturbance. The analytical results on the homogeneity in the verification of groups (experimental group and contrast group) according to the general characteristics, conducted at the significant level 5%, demonstrate that there was no significant difference in these two groups (Table 1).

Difference of sleep between two groups: There were statistically significant differences in the scores of experimental group (t = -3.937, p = 0.000). Experimental group will have a better sleep than the control group (Table 2 and 3).

Difference of fatigue between two groups: There were statistically significant differences in the scores of experimental group (t = -2.367, p = 0.021).

Table 1: Homogeneity test for general characteristics between two groups

| Characteristics/Categories | Group n = 30 (%) | | χ^2 | p-values |
	Experimental	Control		
Age				
>30	19 (63.3)	24 (80)	3.831	0.147
<=30	11 (36.7)	6 (20)		
Work departments				
ICU	14 (46.7)	24 (80)	7.182	0.028
General ward	16 (53.3)	6 (20)		
Marriage				
Single	21 (70)	24 (80)	0.800	0.371
Married	9 (30)	6 (20)		
Education background				
College	13 (43.3)	8 (26.7)	3.436	0.179
University over a master	9 (30)	16 (53.3)		
	8 (26.7)	6 (20)		
Religion				
Buddhism	7 (23.3)	5 (16.7)	1.221	0.748
Christian	5 (16.7)	7 (23.3)		
Catholic	4 (13.3)	6 (20)		
No	14 (46.7)	12 (40)		
Clinical experience (years)				
< 5	8 (26.7)	16 (53.3)	43.333	0.543
≤5	22 (73.3)	14 (46.7)		
Sleep disturbance				
Yes	8 (26.7)	5 (16.7)	0.884	0.347
No	22 (73.3)	25 (83.3)		

Table 2: Difference of sleep between two groups (N = 60)

Characteristics (group)	Pre-test	Post-test	Difference	t-value	p-value
Experimental	1.82±0.40	2.27±0.50	-0.46±0.12	-3.937	0.000
Control	2.08±0.47	2.09±0.87	-0.01±0.16		

Table 3: Difference of sleep in measured variables of experimental and control group (N = 60)

Characteristics	Categories	Group n = 30 (%) Experimental	Control	χ^2	p-values
Insufficient sleep	Pre-test	1.41±0.36	1.56±0.42	-3.113	0.003
	Post-test	1.79±0.56	1.61±0.46		
	Difference	-0.38±0.12	-0.05±0.11		
After recovery sleep	Pre-test	2.47±0.75	2.68±0.71	-1.859	0.068
	Post-test	2.79±0.59	2.73±0.62		
	Difference	-0.32±0.17	-0.05±0.17		
Difficulty in falling asleep	Pre-test	1.63±0.44	2.00±0.71	-4.447	0.000
	Post-test	2.24±0.61	2.03±0.71		
	Difference	-0.61±0.14	-0.03±0.18		
Difficulty in lying awake	Pre-test	2.03±0.57	2.60±0.71	-4.201	0.000
	Post-test	2.73±0.71	2.48±0.68		
	Difference	-0.70±0.17	0.12±0.18		
Sleep satisfaction	Pre-test	2.54±0.70	2.88±0.68	-2.261	0.028
	Post-test	2.92±0.59	2.84±0.52		
	Difference	-0.38±0.17	0.04±0.16		
Difficulty in maintaining sleep	Pre-test	1.88±0.58	2.20±0.83	-3.351	0.001
	Post-test	2.52±0.86	2.10±0.76		
	Difference	-0.64±0.19	0.10±0.20		

Table 4: Difference of sleep between two groups (N = 60)

Characteristics (group)	Pre-test	Post-test	Difference	t-value	p-value
Experimental	5.66±1.50	4.49±0.87	1.17±0.32	-2.366	0.021
Control	5.63±1.53	5.17±1.32	0.46±0.37		

Table 5: Difference of fatigue in measured variables between two groups (N = 60)

Characteristics	Categories	Group n = 30(%) Experimental	Control	χ^2	p-values
Physical symptom	Pre-test	5.66±1.50	2.15±0.47		0.009
	Post-test	4.49±0.87	2.03±0.52	-	
	Difference	1.17±0.32	0.12±0.13	2.718	
Sensory nerve symptom	Pre-test	1.63±0.50	1.64±0.57		0.013
	Post-test	1.28±0.22	1.51±0.44	-	
	Difference	0.35±0.10	0.13±0.13	-2.572	
Mentally symptom	Pre-test	1.91±0.52	1.84±0.62		0.271
	Post-test	1.49±0.43	1.63±0.50	-	
	Difference	0.42±0.12	0.21±0.15	-1.112	

Experimental group will feel less fatigue than the control group (Table 4 and 5). The aroma oil inhalation therapy was applied to the nurses who did three shifts for 2 weeks. The study results exhibit that the change in scores of the contrast group is appeared to be lower than those of the experimental group in comparison with the quality score of sleep, showing a statistically significant difference in two groups. This reveals that the aroma oil inhalation therapy is effective in improving the sleep quality of experiments.

The findings are consistent with those of previous studies regarding the effect of the aroma oil inhalation therapy on sleep. The inhalation of Aroma for night shift nurses enhanced the quality of sleep and reduced fatigue (Chang, 2008). Along the same line, oil blended with lemon, lavender and Sandalwood was put beneath the pillows of the subjects after having been soaked to the gauze which was applied to the night shift nurses. The results exhibit that the score and sleep quality increased and the observable symptoms of fatigue decreased (Park *et al.*, 2012).

The previous research by Yun 4 revealed the same effect of the aroma oil inhalation therapy as this study. However, this research increased the sample number from 17-30 and used the Roman Chamomile, instead of the Sandalwood which had been frequently used in existing studies to prove the new effect of Aroma. This study was conducted by the Quasi-experiment based on the nonequivalent control group pre-test and post-test design. The research, Sakamoto *et al.* (2005) examined the effect of Jasmine oil and lavender oil on the increase in efficiency at work. In this study, the study results demonstrate that the efficiency in Lavender oil which has the sedation effect was higher than in Jasmine oil. The research by Hirokawaet *et al.* (2012) applied the aroma oil inhalation therapy to the subjects by making them fall asleep while opening the bottle of the Lavender oil for 5 days. They reported that the quality of sleep had improved and difficulty in falling asleep had decreased in this experiment.

They reported that the quality of sleep had improved and difficulty in falling asleep had decreased in this experiment. As shown above, the overall results of previous studies reveal that the intervention by using the oil inhalation therapy would be effective in improving the quality of sleep, though it might be difficult to compare the effects of different aroma oils because the sorts of essential oils and blending methods and periods used in each study were different. Therefore, this study identified that the intervention of the oil inhalation therapy for the nurses who do three shifts is effective in improving sleep quality and relieving fatigue. It is expected that the findings of this study will help nurses with three shifts improve the quality of their sleep and relieve their fatigue through the development and application of the intervention.

CONCLUSION

This study is subject to the Quasi-experimental research based on the nonequivalent control group pre-test and post-test, attempted to verify the effect of the aroma oil inhalation therapy on sleep quality and fatigue targeting the nurses with three shifts. The study results reveal that aroma oil inhalation therapies that apply the mixed oils of orange, lavender and Roman Chamomile to the nurses with three shifts was effective in improving sleep and relieving fatigue. Therefore, we can give suggestion to conduct specific research on the

selection of aroma oils, intervention methods and periods in view of various nursing units where nurses do three shifts and individual characteristics as the case may be. In addition on account that self-report is liable to bring about Hawthorne effect, it is suggested that methods to measure objectively such as Polysomnography and liquid teak profile should be examined along with the self-report.

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