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Research Article

Effects of Autogenic Training on Stress Response and Heart Rate Variability in Nursing Students

Seung-Joo Lim, PhD, RN, [1] Chunmi Kim, PhD, RN [2,*]

[1] Department of Nursing, Hoseo University, Asan, South Korea
[2] Department of Nursing, Sunmoon University, Asan, South Korea

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SUMMARY

Purpose: This study was undertaken to confirm the effects of autogenic training (AT) on stress response and heart rate variability in nursing school students experiencing stress related to clinical training.
Methods: The study was carried out from September 2012 to April 2013 in a quasi-experimental nonequivalent control group using a pretest-posttest design. The participants were 40 nursing students in their third year at either of two nursing colleges. All consented to participate. Nineteen nursing students at one college were assigned to the experimental group and underwent the 8-week AT program, and the other 21 were assigned to the control group and did not undergo any training. Stress response was assessed by questionnaire and HRV was measured three times, that is, before the program, at the end of the program, and 6 months after the end of the AT program.
Results: A significant time/group interaction was found for stress response ($F = 4.68$, $p = .012$), a subjective indicator. However, no significant interaction was found for the objective indicators of heart rate variability, normalized low frequency ($F = 2.59$, $p = .090$), normalized high frequency ($F = 2.59$, $p = .090$), or low frequency to high frequency ratio ($F = 1.38$, $p = .257$).
Conclusion: The results suggest that AT provides an acceptable approach to stress reduction in nursing students.

Introduction

Nursing school students are under more stress than students studying other majors because of the burden imposed by taking courses while completing clinical training, which accounts for a large proportion of academic credits (Yoo, Chang, Choi, & Park, 2008). In particular, nursing students experience much more stress during initial clinical training. The sources of stress for these students are mainly the result of a lack of professional knowledge and skills in taking care of patients, the clinical environment, and teachers and nursing staff (Chan, So, & Fong, 2009; Shaban, Khater, & Akhu-Zaheya, 2012; Sheu, Lin, & Hwang, 2002). Furthermore, they have only knowledge of basic medicine and nursing prior to clinical training (Sheu et al., 2002). Accordingly, they do not know how to cope with the dynamic and complex clinical environments, how to establish good relationships with clinical staff and instructors or deal with sudden changes in patients' conditions (Elliot, 2002). This stress has a negative effect on adaptation to clinical training, and thus, on student health. Furthermore, if stress is excessive or prolonged, nursing students fail to adapt to clinical training (Park, Ha, & Choi, 2004) and experience psychological difficulties, such as anxiety, a sense of anger, indifference, frustration, and depression (Chang et al., 2007), and physical health problems, such as indigestion, anorexia, backache, headache, and insomnia (Choo et al., 2002; Park & Ha, 2003).

As social concerns regarding health have increased, the need for diverse teaching methods to provide qualified nursing care skills has been suggested (Whang, 2006). Thus, as the importance of clinical training increases, nursing students need appropriate stress coping strategies to reduce the risks of physical and mental health problems.

Relaxation training provides an excellent strategy for managing stress, and autogenic training (AT) is one type of this training (Kanji, White, & Ernst, 2006; Son, 2011). AT is a psychophysiological type of psychotherapy based on autosuggestion, first developed by the German physician and psychiatrist J.H. Schultz in the early 20th century. AT consists of the phased practice of six simple relaxation responses. The first exercise that addresses muscular relaxation is performed by reiterating a formula to promote a sensation of

* Correspondence to: Chunmi Kim, PhD, RN, Department of Nursing, Sunmoon University, 100 Galsan-ri, Tangjeon-myeon, Asan 336-708, South Korea.
E-mail address: spring4cmk@gmail.com

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heaviness in limbs, and subsequently, attention is focused inactively on sensing warmth, then on slow breathing, abdominal warmth, a calm heart beat, and a cool forehead. It has been recommended that the AT program be conducted over 8 weeks and that it be composed of one group session per week and self-training three times daily (Kanji et al., 2006; Rhee, 2008). While progressing through these exercises, most people experience passive concentration, which allows the individual to break out the vicious stress cycle (Carruthers, 1979). AT leads a high-arousal sympathetic nervous response to low-arousal parasympathetic nervous response via relaxation (Kanji et al., 2006; Rhee, 2008).

Some reports have claimed that AT has valuable effects on the mind and body, and is currently used to treat diseases related to or aggravated by stress, such as irritable bowel syndrome (Shinozaki et al., 2010), cancer (Wright, Courtney, & Crowther, 2002), and multiple sclerosis (Sutherland, Andersen, & Morris, 2005). AT is also used to treat stress. Three trials have been performed to study the effect of AT on stress in nursing students, which found that AT reduced anxiety (Charlesworth, Murphy, & Beutler, 1981; Kanji et al., 2006) and the absence rate due to illness (Bailey, 1984).

Stress is known to affect cardiovascular changes, which are usually related to autonomic nervous system activity changes (Rozanski et al., 1988). Heart rate variability (HRV) is one of the indicators of changes in the autonomic nervous system (Chandola, Heraclides, & Kumari, 2010), and has been used to measure general autonomic system function and physiological stress response degree because of its simplicity and noninvasive nature (Sztajzel, 2004; Task Force of the European Society of Cardiology and the North American Society of Pacing and Electrophysiology, 1996). Mitani, Fujita, Sakamoto, & Shirakawa (2006) measured changes in stress and autonomic nervous activity using HRV, and reported that sympathetic nervous activity increases but parasympathetic nervous activity decreases in stressful situations. Pomeranz et al. (1985) concluded that HRV is a credible and sensitive indicator of cardiac autonomic nervous activity through HRV power spectral analysis.

Studies on AT have been performed over many years overseas, but little work has been undertaken in Korea. In particular, few studies have been conducted on the AT Korean Standard developed by Ju-hee Rhee based on the original AT by Schultz (Rhee, 2006, 2008). Few HRV studies have evaluated the effects of AT.

Purpose of study and hypotheses

This study was undertaken to confirm the effects of AT on stress response and HRV in nursing school students experiencing stress related to clinical training. We hypothesized stress response in the experimental group, members of which were administered with AT, would be lower than that in the control group, and that normalized low frequency (LF) would be lower, normalized high frequency (HF) would be higher, and LF/HF ratio would be lower in the experimental group.

Methods

Study design

This study used a quasi-experimental, nonequivalent control group, pretest-posttest design (19 participants in the experimental group, 21 participants in the control group). Participants in the experimental group were administered the AT Korean Standard. Outcomes were measured three times: before the AT program, at the end of the standard 8-week program, and at 6 months after the end of the program.

Setting and samples

The participants were 40 nursing students in their third year at two nursing colleges. All consented to participate. Nineteen nursing students at one college were assigned to the experimental group and underwent the 8-week AT program, and the other 21 were assigned to the control group, members of which did not undergo any training. No participant dropped out of the study. The sample size for this study was calculated before the investigation. G*power program, version 3 (Faul, Erdfelder, Lang, & Buchner, 2007) showed that 16 students per group were required for an effect size of 0.3, at a power of 95%, and an alpha level of .05. The reasons why we decided on this small effect size were that no previous AT study has calculated sample size using the G*power program and the experimental and control groups were well matched. The selection criteria were as follows: (a) agreement to participate in the study; (b) no relaxation therapy during the previous 6 months; and (c) no cardiovascular or neurological problem.

Ethical considerations

This study was approved by the institutional review board of Hoseo University (approval no.: 20120009). Participants interested in this study voluntarily participated in the program. The study purposes and procedures were explained to participants. Participants were told that personal information would be protected and they could drop out of the study without prejudice at any time. Participants provided written informed consent and were briefed beforehand on study purposes and procedures, anticipated risks and benefits, privacy protection, compensation methods, and withdrawal from the study.

Due to their student statuses, honest answers of the participants were emphasized to avoid ethical problems during the study. In particular, the risk of making false or flattering responses by students were prevented by informing them that honest answers could enhance the quality of the study. Furthermore, participants were told that all collected data would be used for study purposes only.

Intervention

Autogenic training

AT was administered according to the AT Korean Standard (Table 1) in a lecture room by an AT facilitator certified by the Korean AT Association. AT involved the phased practice of 6 simple relaxation responses once weekly for 8 weeks. In a relaxed sitting position with eyes closed, the training involved the use of six short verbal standard formulae. The first exercise targeted muscular relaxation. The principle subject of the verbal formula used was heaviness. Right-handed students started passive concentration of “My right arm is heavy,” whereas left-handed participants started with the left arm. The second mandatory passive concentration addressed peripheral warmth using formula “My right/left arm is warm.” After learning to generate feelings of heaviness and warmth, participants were taught to concentrate on breathing, which was keyed by the instruction “My breathing is calm and regular,” and then to warm the abdominal region by using the formula “My solar plexus is warm.” The following exercise concerned the cranial region, which should be cooler than the rest of the body. Here, the formula used was “My forehead is cool.” Finally, the focus was placed on cardiac activity with the formula “My heart beat is calm and regular.” Each formula was practiced in group sessions and participants were asked to practice the learned autogenic exercises alone at least twice daily. In addition, they were asked to submit a report of their experiences and any questions