

The effect of nature sounds on physiological indicators among patients in the cardiac care unit



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ARTICLE INFO

Article history:

Received 13 August 2017

Accepted 12 September 2017

Keywords:

Physiological indicators

Nature sounds

Cardiac care unit

ABSTRACT

Background and objectives: Environmental noises may create physiological and psychological disorders in patients hospitalized in the CCU. Therefore, this study was conducted to investigate the effects of nature sounds on physiological indicators among patients in the CCU.

Materials & methods: This randomized clinical trial was conducted on 93 patients hospitalized in the cardiac care units of three teaching hospitals in 2016. The patients were selected using the convenient method with three randomized blocks. The patients were assigned into three groups as nature sounds, silence that received a set of headphones without playing sounds, and control groups. In addition to routine care, the patients in the intervention group listened to nature sounds for 30 min using a set of headphones for two days. The patients in the control group only received routine care. In addition to routine care, the patients in the silence group used a set of headphones for 30 min to block noises and no sound was played for them. Physiological indicators such as heartbeat rate, systolic and diastolic blood pressures, respiration rate, and arterial O₂ saturation were assessed using monitoring devices. Descriptive and inferential statistics were used for data analysis via the SPSS software.

Findings: Nature sounds and silence had no statistically significant effects on physiological indicators. However, a statistically significant difference was reported in the heart rate in the nature sound group before and after the intervention in the first day of the intervention ($P = 0.046$). In the second day of the intervention, there were statistically significant differences in the diastolic blood pressure in the nature sounds group ($P = 0.028$), heart rate ($P = 0.001$) and diastolic blood pressure ($P = 0.013$) in the silence group, and heart rate ($P = 0.014$) in the control group before and after the intervention.

Conclusion: Listening to nature sounds or the use of headphones blocked environmental noises and could influence mean arterial pressure. Future studies can examine the effects of this intervention implemented for a longer term using nature sounds by patients.

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1. Introduction

Patients in the CCU are exposed to high levels of stress due to psychological factors such as fear, loneliness, and sense of being constrained and environmental factors such as noises from

monitoring devices. This high level of stress increases the risk of sensory overloads and irrevocable damages to patients [1,2]. Environmental noises may create physiological and psychological disorders in patients. Heart naturally responds to environmental stresses such as noises and fluctuations in moods [3]. Noises affect the function of the cardiovascular system and increase cardiac output (CO) and cardiac contractile strength (CCS) that lead to an increase in blood pressure (BP), heartbeat rate (HR), and respiration rate (RR) [4,5]. Long-term stimulation of stress responses in patients with a vulnerable cardiovascular system influences the recovery process and leads to hazardous arrhythmia, prolonged

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hospitalization, and even death [6]. In addition, the vital signs of patients hospitalized in the CCU are not stabilized and changes can be fatal. The assessment of patients' hemodynamic conditions by nurses is a routine task in CCUs and enables the healthcare team to deal with patient care [7].

Prescribing sedative drugs is the most common approach used to control stress symptoms, improve comfort in patients, and prevent physiological changes. However, an improper use of such drugs results in several side-effects such as hypotension, brain function disorders, and respiration distress [8]. Taking into account critical condition of patients in CCUs and the side-effects of sedative drugs, non-pharmacologic methods can be used to relieve patients' stress [9,10].

There are different theories about the role of nature on the improvement of physical and psychological health in the human being. As an example, the Ulrich's theory of stress reduction is notable. It says that the patient who sees a nature landscape from the window experiences a faster recovery process than the patient who does not see such a view [11]. In the introduction of the attention restoration theory (ART), Kaplan says that continuous concentration creates brain fatigue, higher rate of mental errors, and sensitivity. He continued that spending time in nature, parks and zoos can relieve mental fatigue, mental pressure, and anxiety [12]. According to Dijkstra et al. [13] and Monti et al. [14], patients feel more peaceful when they are exposed to natural environments. As an effective distracter, nature decreases anxiety and distracts the patient from pain, which leads to more peace and lower stress levels (13, 14). Being exposed to nature attenuates negative feelings and physical/mental responses induced by stress factors [15]. The effects of nature sounds on anxiety and restlessness [16], pain [17], and anxiety of patient under coronary artery surgery [18] have been studied before. However, a review study showed a paucity of studies on the effect of nature sounds on patients. It is notable that nurses can utilize the concepts of nature-based health improvement, if they are based on academic research works. The present study aimed at investigating the effects of nature sounds on physiological indicators among patients in the CCU.

2. Methodology

2.1. Study design

This study was a randomized clinical trial as one part of a larger research project carried out in the CCUs of three educational hospitals affiliated to Iran University of Medical Sciences.

2.2. Sampling

All patients hospitalized in the CCUs constituted the study population and were selected through convenient sampling. Inclusion criteria were an age of 18 years, hospitalization for more than two nights in the CCU, the ability to communicate, no hearing disorders, orientation to time and place, and no use of narcotics 5-6 h before the intervention. Exclusion criteria were being hospitalized for less than three days due to discharge, death or surgery, and serious physical complications such as loss of consciousness, necessity of medical ventilation, and cardiopulmonary arrest.

Given a 95% confidence interval, power of 80%, standard deviation of pulse index = 2.8, assuming the effects of nature sounds on the physiological indicators of patients = 2 and using a sampling formula, 31 patients were adopted as the sample size for each group. Also, assuming a 10% subject attrition rate, 35 participants were selected for each group. During the study, two participants from the nature sounds group, three from the silence group, and three from the control group left the study. Moreover, one participant from the control group and two patients from the nature sounds group were excluded due to a surgery and discharged, respectively. Also, one patient from the silence group died. Finally, 31 participants remained in each group (Fig. 1).

2.3. Randomization

The participants were allocated to three groups as nature sounds, silence, and control through triple randomized blocks. All possible combinations of allocations for three participants were

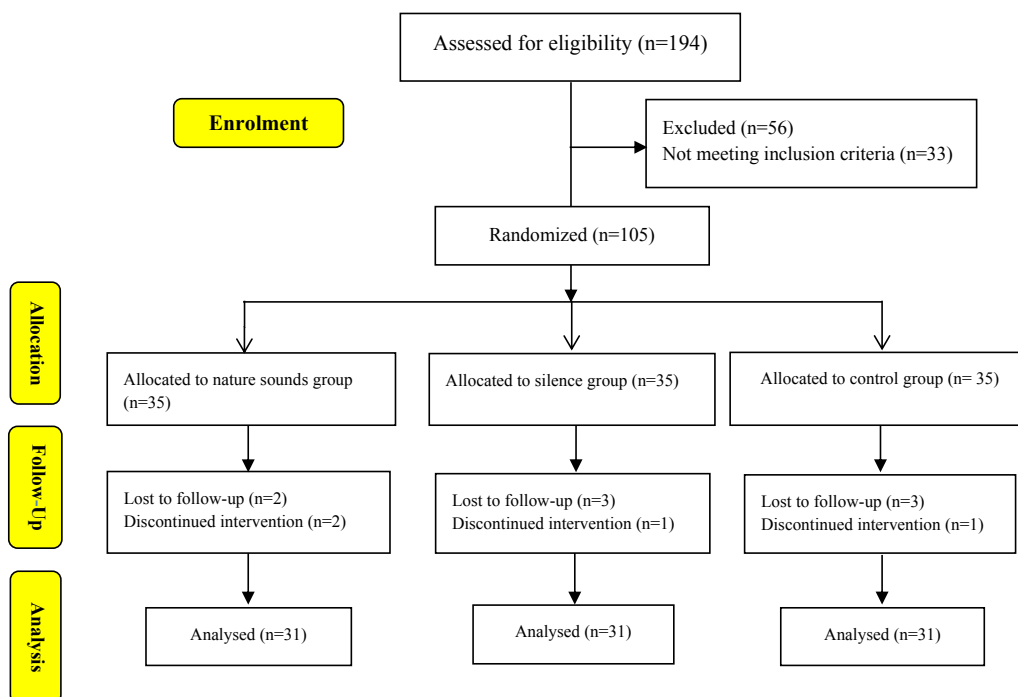


Fig. 1. Recruitment and allocation to study groups and research process.

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