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Effect of nature-based sound therapy on agitation and anxiety in coronary artery bypass graft patients during the weaning of mechanical ventilation: A randomised clinical trial

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ABSTRACT

Background: Weaning from mechanical ventilation is a frequent nursing activity in critical care. Nature-based sound as a non-pharmacological and nursing intervention effective in other contexts may be an efficient approach to alleviating anxiety, agitation and adverse effects of sedative medication in patients undergoing weaning from mechanical ventilation.

Objectives: This study identified the effect of nature-based sound therapy on agitation and anxiety on coronary artery bypass graft patients during weaning from mechanical ventilation.

Methods: A randomised clinical trial design was used. 120 coronary artery bypass graft patients aged 45–65 years undergoing weaning from mechanical ventilation were randomly assigned to intervention and control groups. Patients in the intervention group listened to nature-based sounds through headphones; the control group had headphones with no sound. Haemodynamic variables, anxiety levels and agitation were assessed using the Faces Anxiety Scale and Richmond Agitation Sedation Scale, respectively. Patients in both groups had vital signs recorded after the first trigger, at 20 min intervals throughout the procedure, immediately after the procedure, 20 min after extubation, and 30 min after extubation. Data were collected over 5 months from December 2012 to April 2013.

Results: The intervention group had significantly lower anxiety and agitation levels than the control group. Regarding haemodynamic variables, a significant time trend and interaction was reported between time and group ($p < 0.001$). A significant difference was also found between the anxiety ($p < 0.002$) and agitation ($p < 0.001$) scores in two groups.

Conclusions: Nature-based sound can provide an effective method of decreasing potential adverse haemodynamic responses arising from anxiety and agitation in weaning from mechanical ventilation in coronary artery bypass graft patients. Nurses can incorporate this intervention as a non-pharmacological intervention into the daily care of patients undergoing weaning from mechanical ventilation in order to reduce their anxiety and agitation.

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What is already known about the topic?

- Anxiety and agitation is still poorly managed by critical care nurses during the process of weaning from mechanical ventilation.
- Weaning process is prolonged when pharmacological agents for the treatment of the patient's anxiety and agitation are used.

What this paper adds

- This study supported the effectiveness of the nature-based sounds listening intervention as a non-pharmacological therapy during provision of care to patients undergoing weaning from mechanical ventilation.
- Nature-based sounds listening intervention could be considered to be an effective approach for reducing potentially harmful physiological responses arising from anxiety and agitation during weaning from mechanical ventilation.
- Nature-based sound intervention as a complementary therapy nursing intervention alleviated patients' complaints of anxiety and agitation.

1. Introduction

Mechanical ventilation is one of the most common therapeutic modalities provided to patients in the intensive care unit. In the past two decades, great efforts have been devoted to define the most effective approach to weaning patients from mechanical ventilation in different intensive care unit designs and structures (Danckers et al., 2012). Mechanical ventilation is commonly used in critical care units to treat respiratory insufficiency derived from a variety of causes (Chlan, 2004; Lee et al., 2005). It is the most common technological intervention used in critical care and is often the primary reason for admission to these units (Eskandar and Apostolakos, 2007). Mechanical ventilation is associated with well-documented complications influencing patients' morbidity and mortality. Weaning from mechanical ventilation refers to the transition from mechanical ventilation support to spontaneous breathing or enabling the patient to assume a greater ventilation workload by reducing the support given by the ventilator (Rose and Nelson, 2006; Hess, 2002). Weaning covers the entire process of liberating the patient from both mechanical ventilation support and the endotracheal tube (Boles et al., 2007). While many patients are able to breathe independently immediately, others need extended mechanical ventilation. Patients may require a slow, graduated process of weaning, described as lengthening the time spent free from mechanical ventilator support until permanent liberation is achieved (Boles et al., 2007). Patients undergoing mechanical ventilation may experience fear, agitation, discomfort, thirst, immobility, dyspnoea, confusion, communication problems and inability to relax (Lee et al., 2005), with approximately 10–25% encountering difficulties during the weaning process (Hunter et al., 2010). While this creates adverse physiological and psychological experiences for the patient and their family members, a primary objective is to discontinue mechanical ventilation support as soon as the patient becomes able to sustain spontaneous and safe breathing (Dries, 2004). Reducing these effects may be enhanced by increasing patients' involvement in their care (Crocker and Scholes, 2009).

Patients demonstrating difficulty in the weaning process appear to have a longer than average hospitalization time with increased medical complications. Furthermore, longer periods of intubation are associated with higher rates of difficulties at weaning. Over time, the number of mechanically ventilated patients has increased together with the costs of healthcare and use of resources (Epstein et al., 2002). In addition, the longer a patient remains dependent upon mechanical ventilation, the higher the risk of complications and lengthened hospital stay (Lindgren and Ames, 2005).

Although mechanical ventilation is common, many patients experience stress and anxiety during the procedure (Ayalon, 2007; Lindgren and Ames, 2005; Thomas, 2003). Many patients also suffer higher anxiety during the process of weaning (Boles et al., 2007). Chlan's (1998) study in the US provided an overview of the experiences of patients undergoing mechanical ventilation, describing it as the worst experience in patients' lives. Patients describe their experiences using the following words: fear, thirst, sleeplessness, agitation, pain, frustration from being restrained, inability to speak, immobility, noise, confusion, inability to match breathing pattern with the ventilator, and suctioning of the endotracheal or tracheostomy tube (Thomas, 2003). Anxiety plays a major role in preventing patients from weaning, and can be compounded by difficulty in communication and the presence of delirium. If anxiety is not managed appropriately, it may interfere with patient recovery and impede liberation from mechanical ventilation. Anxiety may also trigger the sympathetic nervous system activation causing tachycardia, increased respiratory rate, increased blood pressure, and airway constriction, which interferes with breathing and causes fatigue. Consequently, the patient may fail to be liberated from the ventilator easily (Thomas, 2003; Wong et al., 2001).

Several strategies are reported to minimise agitation and anxiety during mechanical ventilation that can reduce the time spent to wean the patient (Boles et al., 2007). Pharmacological agents may have a profound effect on the process's outcome. For instance, weaning patients may require sedation during extubation and discharge from the intensive care unit (No authors listed, 2002). Meade et al. (2001) reviewed randomised controlled trials investigating interventions to assist the weaning process and concluded that further studies are required to explore strategies to reduce the complications accompanying the weaning process. Thomas (2003) suggested that multidisciplinary, patient-centred, holistic, and non-pulmonary approaches may be important in shortening the length of the weaning process. The effective use of hypnosis and relaxation, patient education and information sharing, music therapy, and supportive touch reduce common stressors of ventilation (Han et al., 2009). However, few studies have explored the effect of non-pharmacological interventions on the alleviation of patient-perceived stress and anxiety during the weaning process.