

The effect of self-selected soothing music on fistula puncture-related pain in hemodialysis patients



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ARTICLE INFO

Article history:

Received 28 July 2017

Accepted 17 August 2017

Keywords:

Hemodialysis

Pain related to needle insertion into a fistula

Soothing music

ABSTRACT

Objective: This study was intended to examine the effect of selective soothing music on fistula puncture-related pain in hemodialysis patients.

Materials and methods: This is a randomized clinical trial in which 114 participants were selected from two hemodialysis units by means of a non-random, convenience sampling method. The participants were then allocated in three groups of music (N = 38), headphone (N = 38), and control (N = 38). The fistula puncture-related pain was measured 1 min after venipuncture procedure in all three groups. The music group listened to their self-selected and preferred music 6 min before needle insertion into a fistula until the end of procedure. The headphone group wore a headphone alone without listening to music 6 min before needle insertion into a fistula until the end of procedure. The control group did not receive any intervention from the research team during needle insertion into a fistula. The pain intensity was measured immediately after the intervention in all three groups.

Results: This study showed a significant difference between the music and control groups, and the music and headphone groups in terms of the mean pain score after the intervention. However, the analysis did not indicate any significant difference between the headphone and control groups with regard to the mean pain score after the intervention.

Conclusion: It is concluded that music can be used effectively for pain related to needle insertion into a fistula in hemodialysis patients. Future research should investigate the comparative effects of pharmacological and non-pharmacological interventions on fistula puncture-related pain.

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1. Introduction

End-stage renal disease (ESRD) is one of the most common life-threatening conditions [1]. A kidney transplant is the treatment of choice for patients with ESRD. However, patients are on dialysis before they get a kidney transplant [2]. Hemodialysis is the most common treatment for ESRD [3]. Over two million patients with chronic renal failure in the world are undergoing hemodialysis [4], with an annual increase of 15% [5]. The expected number of patients with ESRD in the United States will be almost 2240000 by 2030 [6].

Regular long-term hemodialysis requires a permanent vascular access, preferably arteriovenous fistulas [7]. In hemodialysis, patient's blood is taken to a dialysis machine through a needle inserted into an arterial vessel and the blood is filtered to remove wastes and extra fluid and then the filtered blood is pumped back into the body through another tube connected to a second needle placed in a vein [8]. Most patients undergo hemodialysis two or three times per week with 3-to-4 hour session [9]. They repeatedly experience stress and pain related to needle insertion into a fistula, estimated 320 times in total per year. The pain perceived by hemodialysis patients is mostly associated with fistula puncture [10] and these pain episodes can bring about depression and reduced quality of life in these patients [11]. On average, 48% of patients have fear of fistula puncture-related pain [12], and more than one-fifth of them find the pain intolerable [13]. Therefore, the relief of pain might increase patients' acceptance

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of procedure as well as their quality of life [14]. Although the pain is decreased after the first three months, there is no significant decline in the reported pain [15]. The management of fistula puncture-related pain should therefore be an integral part of patients' treatment plan.

A review of literature revealed that several pharmacological and non-pharmacological options can help relieve fistula puncture-related pain. The pharmacological options include EMLA topical cream [16], vapocoolant spray [14] and lidocaine spray [17]. Non-pharmacological approaches encompass rhythmic breathing [11], local cryotherapy [18], Shiatsu massage [19], transcutaneous electrical nerve stimulation [20] and lavender aromatherapy [21]. Pharmacological interventions have unpleasant side effects and incur costs to clients. The possible vasoconstrictive effects of vapocoolant can cause obstruction in the arteriovenous fistula [14]. The adverse effects of lidocaine include allergic reactions, systemic toxicity, and cardiac dysrhythmias [22]. The anesthetic effect of eutectic mixture of EMLA is achieved after approximately 60 min [23]. As inappropriate pain management gives rise to physiological, psychological, social and financial consequences for patients, family and society [24], simple, non-invasive and low-cost interventions with fewer side effects than pharmacological methods [19] should be sought for patients' comfort [25]. Research studies show that distraction is an effective way of relieving pain following needle insertion into a fistula [11,26]. Attention is directed away from a painful stimulus when a person is distracted, thereby reducing fear, stress, and pain related to medical procedures [27]. Listening to music is an effective tool in distraction [28]. A pleasant distraction can lead to the release of endorphins [29]. Furthermore, listening to music can engender hemodynamic changes (including decreased heart rate and blood pressure) [30], the release of endorphins, and the activation of dopaminergic system [31] and autonomic nervous system (parasympathetic nervous system) [32]. Soothing music has 60–80 beats per minute or less [33]. Soothing music enhances parasympathetic activities that results in a reduction in the respiration rate and heart rate, while exciting music stimulates the sympathetic nervous system with an increase in the heart rate and respiration rate [34]. A review of literature revealed that music therapy is effective for patients with painful muscle cramps induced by

hemodialysis [35], cancer pain [36], breast biopsy pain [37], musculoskeletal pain [38] and postoperative pain following open heart surgery [39].

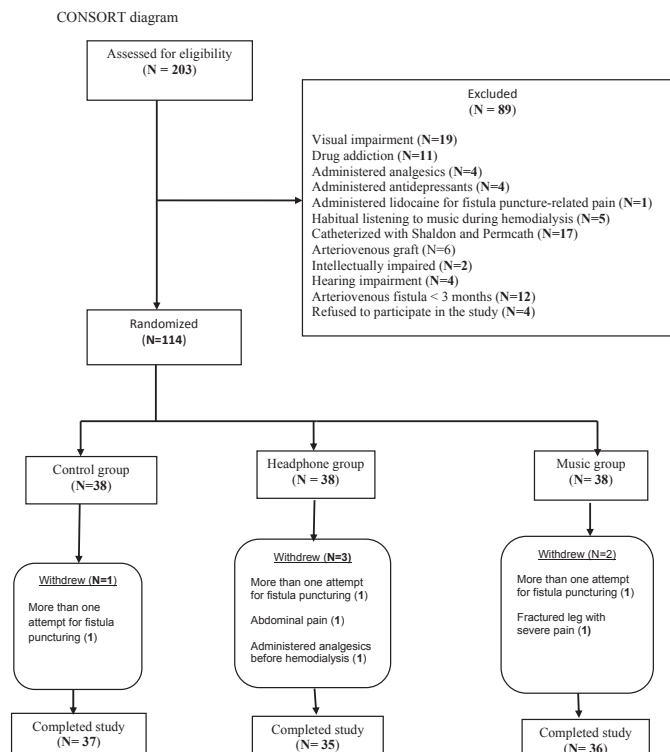
To the best of our knowledge, no published study has explored the effect of self-selected soothing music on pain following needle insertion into a fistula in hemodialysis patients. Therefore, this study was intended to examine the effect of selective soothing music on fistula puncture-related pain in hemodialysis patients.

2. Materials and methods

2.1. Sample and sampling method

This is a randomized clinical trial in which recruitment was limited to patients with end-stage renal disease admitted to the dialysis units of two academic hospitals affiliated to the Mazandaran University of Medical Sciences, Sari, Iran. The sample size was calculated as, at least, 35 patients per group according to a difference above one unit on the pain scale as a significant change and standard deviation of 1.5 found in the study conducted by Esmaeili et al. [29]. With consideration of the likelihood of patient exclusion during the study, the final sample consisted of 38 patients in each group. A convenience sampling method was used to recruit participants.

Inclusion criteria for participation in this study were as follows: a desire to listen to the music, age of 18 years and older, not diagnosed with neuropathic disorders [11], no history of depression [40], treated with hemodialysis for at least 3 months [15], not administered tranquilizers, analgesics and sedatives 3 h before the study, not recently taken antipsychotic medications and tranquilizers, not being cognitively impaired [41], no hearing and visual impairments (for marking the VAS-pain), and not habitually listening to music during hemodialysis. Exclusion criteria were acute pain in other parts of the body [17], more than one attempt for fistula puncturing, any changes in the physical status during the study (occurrence of such acute conditions as hypertension and vomiting) [33], withdrawal from the study, and death (See CONSORT diagram).



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