International Journal of Nursing Studies 63 (2016) 82–100

Contents lists available at ScienceDirect

International Journal of Nursing Studies

journal homepage: www.elsevier.com/ijns

Review

Exploring the effect of sound and music on health in hospital settings: A narrative review

Timothy Onosahwo Iyendo

Department of Architecture, Eastern Mediterranean University, Gazimağusa, North Cyprus, Via Mersin 10, Turkey

ARTICLE INFO

Article history:
Received 2 February 2016
Received in revised form 13 August 2016
Accepted 14 August 2016

Keywords:
Emotion
Environment
Health
Hospital
Music medicine
Music psychology
Noise
Sound perception
Positive soundscape
Stress reduction

ABSTRACT

Background: Sound in hospital space has traditionally been considered in negative terms as both intrusive and unwanted, and based mainly on sound levels. However, sound level is only one aspect of the soundscape. There is strong evidence that exploring the positive aspect of sound in a hospital context can evoke positive feelings in both patients and nurses. Music psychology studies have also shown that music intervention in health care can have a positive effect on patient's emotions and recuperating processes. In this way, hospital spaces have the potential to reduce anxiety and stress, and make patients feel comfortable and secure. This paper describes a review of the literature exploring sound perception and its effect on health care.

Data sources and review methods: This review sorted the literature and main issues into themes concerning sound in health care spaces; sound, stress and health; positive soundscape; psychological perspective of music and emotion; music as a complementary medicine for improving health care; contradicting arguments concerning the use of music in health care; and implications for clinical practice. Using Web of Science, PubMed, Scopus, ProQuest Central, MEDLINE, and Google, a literature search on sound levels, sound sources and the impression of a soundscape was conducted. The review focused on the role and use of music on health care in clinical environments. In addition, other pertinent related materials in shaping the understanding of the field were retrieved, scanned and added into this review.

Results: The result indicated that not all noises give a negative impression within healthcare soundscapes. Listening to soothing music was shown to reduce stress, blood pressure and post-operative trauma when compared to silence. Much of the sound conveys meaningful information that is positive for both patients and nurses, in terms of soft wind, bird twitter, and ocean sounds.

Conclusions: Music perception was demonstrated to bring about positive change in patient-reported outcomes such as eliciting positive emotion, and decreasing the levels of stressful conditions. Whilst sound holds both negative and positive aspects of the hospital ecosystem and may be stressful, it also possesses a soothing quality that induces positive feelings in patients. Conceptualizing the nature of sound in the hospital context as a soundscape, rather than merely noise can permit a subtler and socially useful understanding of the role of sound and music in the hospital setting, thereby creating a means for improving the hospital experience for patients and nurses.

What is already known about the topic?

- Music as a medicine has been used for thousands of years, and has been demonstrated to elicit positive emotional expression and encouraging recovery from illness.
- Hospital sound has been well documented through acoustic analysis and the categorization of its deleterious effects, such as potentially affecting behavior and sleep during treatment, impeding recovery rate and inducing stress outcomes.

What this paper adds

- Whilst sound holds both negative and positive aspects of the hospital ecosystem and may be stressful, it also possesses a soothing quality that induces positive feelings in patients and patient care teams.

E-mail address: t.iyendo@gmail.com (T.O. Iyendo).

http://dx.doi.org/10.1016/j.ijnurstu.2016.08.008
0020-7489/

- Conceptualizing the nature of sound in the hospital context as a soundscape, rather than merely noise can permit a subtler and socially useful understanding of the role of sound and music in the hospital setting.

1. Introduction and background

In recent decades, research on healthcare design and planning has highlighted a strong relationship between environmental characteristics and human health (Monti et al., 2012). This supports Ulrich's theory of positive distraction, which advocated that incorporating soothing sounds (e.g., music, bird song, and water sounds) into hospital design would alleviate stress related outcomes (Ulrich et al., 2004; Ulrich, 1991). Similarly, the role of sound masking, for example, using music, ocean sounds and random sounds has been suggested to improve the aural quality of hospital ward design (Rubert et al., 2007; Salandin et al., 2011).

There has been an interest in research on hospital sound environments and their effects on patients' recuperating process since the 1860s (McCarthy et al., 1999). An early research by Nightingale advocated that patients had quick recovery rates from illnesses when cared for in a hospital designed with reduced sound levels (Nightingale, 1860). Research has also linked poor design to psychological and physiological discomfort (Ulrich, 1991). These negative effects however can be counteracted through good design. As such, hospital spaces should reduce anxiety and stress, as well as make patients feel comfortable and secure (Douglas and Douglas, 2004). Indeed, patients experience positive satisfaction and better recovery rates in an environment that integrates desirable sounds (Gross et al., 1998; Rubin et al., 1997). This conforms to the view that certain sorts of sound such as music can produce reductions in stress, blood pressure and post-operative trauma when matched to silence (Chafin et al., 2004; Hirokawa, 2004; Nilsson et al., 2005). Similarly, the United Kingdom Department of Health has also highlighted the positive impact of music in terms of treating depression, reaching autistic children, calming and relaxing agitated psychiatric patients, painkilling effect, reducing blood pressure, and respiration rates, though it cautions that some individuals might negatively regard music as noise (Brown et al., 2015; Department of Health, 2007). Conversely, noise is generally defined as any unwanted sound (see Plack, 2013), and is often considered to be a stress stimulus that can produce negative psychological and physiological outcomes on individual health (Choiniere, 2010; Hagerman et al., 2005; Stansfeld and Matheson, 2003). Noise-induced subjective stress among staff and patients has been well documented, and has identified the potential for it to cause subjective or physiological stress, increase work pressure, annoyance, fatigue, and burnout among staff (Joseph and Ulrich, 2007; Topf, 2000).

Sound, in its different manifestations, can have a profound impact on patients, staff, and visitors in hospitals, although, this can range from soothing and therapeutic to stressful and disturbing (Joseph and Ulrich, 2007). Despite the above notion, music has been used for hundreds of years to treat illnesses and restore both physical and mental harmony, and has been shown to evoke positive effects on individuals, psychologically, physiologically and socially (Arnett, 1991; Sendelbach et al., 2006; Staum and Brotons, 2000). Although, the underlying mechanism as to why an individual respond in a certain way when exposed to music or why music could be either beneficial or harmful, is difficult to debate (Mazer, 2010). More recently, studies attempting to measure the potential benefits of music in hospital environments have supported the theory that certain music could be used as an effective stress management tool to enhance physical relaxation, assist in stress relief and reduce negative emotions (Labbé et al., 2007; Talley, 2013). Studies have also indicated that high priority should be given to music because of its potential ability of invoking emotions in its listeners, referring to intense responses such as excitement and weeping (Juslin and Västfjäll, 2008; Stephanie et al., 2002). Music functions as a means of shifting our emotional state, be it relaxation, excitement, arousal, or tranquility, and it has been reported to interact with brain substrates that are associated with rewards and emotions (Blood and Zatorre, 2001; Levitin, 2006) that might alter the way the brain processes speech or distinguish speech sounds (Reed et al., 2014).

Interestingly, not all types of music have favorable effects due to influencing factors such as life experience, different musical tastes, and preferences. Liu and Tan (2000) remark that listening tastes of music on the radio differed between patients and staff, which raised the notion that responses to music could be perceived as positive to staff and negative to patients/elderly patients (Mackrill et al., 2013b). Furthermore, it has been suggested that music generates healing spaces within a hospital setting (Dijkstra et al., 2006), and can subsequently induce positive changes on patient outcomes (Drahota et al., 2012). Indeed, music can either distract or facilitate the performance of cognitive tasks contingent on the type of music listened to (Cockerton et al., 1997). However, sounds of above 85 dB(A) could cause detrimental effects on humans, equivalent to the noise of heavy truck traffic on a busy road (Berglund et al., 1999), but is also dependent on the duration of exposure. This supports the notion that loud music could lead to hearing loss (Breinbauer et al., 2012; Bulbul et al., 2009; Petrescu, 2008), and can negatively affect concentration levels (Dobbs et al., 2011; Thompson et al., 2012).

Many of the existing epidemiological and psychological studies have shown that the use of music in hospitals can facilitate patient's healing processes (Brown et al., 2001), and improve mental illnesses (Silverman and Leonard, 2012), social cognitive performance, and communication skills (Ulfarsdottir and Erwin, 1999). Moreover, music enhances sleep quality (Chang et al., 2012), decreases preoperative patient's pain and anxiety levels (Chaput-McGovern and Silverman, 2012; Lee et al., 2011), and lowers tension/heart rate (Jiang et al., 2013). Studies have shown that listening to music improves patients' postoperative experience by increasing environmental noise satisfaction (Byers and Smyth, 1997; Comeaux and Steele-Moses, 2013), supports cancer and cardiac patients (Bruscia et al., 2009), reduces anger and psychological problems (Castillo-Pérez et al., 2010), and enhances positive feelings in patients with severe traumatic brain injury (Glassman, 1991).

Although there is a great body of literature on the use of music and music medicine to help reach healing goals in hospital settings, there is comparatively limited evidence-based research supporting the impact of negative and positive sounds, and the feelings that the perception of soothing music evokes on health in hospital spaces. To address this, the paper primarily focuses on the role of sound and music and its effect on health outcomes in hospital settings.

1.1. Aim and article structure

This paper describes a review of the literature exploring sound perception and the effect sound and music has on health in hospital settings. This includes sound levels, sound sources and the notion of a soundscape. The second half of the review then moves to focus on the use of music in the hospital setting covering music medicine and the use of music in operating rooms in terms of stress management, psychological and physiological responses. The review also elucidates the negative divergent views of previous research that argued that music exacerbates noise-induced stress in hospitals. The possible mechanisms and a hypothetical