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Sound as a supportive design intervention for improving health care experience in the clinical ecosystem: A qualitative study

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ABSTRACT

Purpose: Most prior hospital noise research usually deals with sound in its noise facet and is based merely on sound level abatement, rather than as an informative or orientational element. This paper stimulates scientific research into the effect of sound interventions on physical and mental health care in the clinical environment.

Methods: Data sources comprised relevant World Health Organization guidelines and the results of a literature search of ISI Web of Science, ProQuest Central, MEDLINE, PubMed, Scopus, JSTOR and Google Scholar.

Results: Noise induces stress and impedes the recovery process. Pleasant natural sound intervention which includes singing birds, gentle wind and ocean waves, revealed benefits that contribute to perceived restoration of attention and stress recovery in patients and staff.

Conclusions: Clinicians should consider pleasant natural sounds perception as a low-risk non-pharmacological and unobtrusive intervention that should be implemented in their routine care for speedier recovery of patients undergoing medical procedures.

Contents

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1. Introduction and background

The physical environment of healthcare can contribute to preventing or reducing stress in patients, their families and staff members if it is designed to enhance physical and psychological well-being, including productivity, privacy and security [11,14,66]. It should likewise help patients refocus from undesirable stimuli to something desirable and familiar [13]. Research has demonstrated a connection between such restorative environments and hospital recovery rates, stress reduction, longevity, pain alleviation and even how the brain processes auditory signals [250]. However, complex care interventions, noise reduction and sound measurements in clinical environments are rather challenging to assess, due to the ever-increasing number of mechanical devices and advanced treatment measures [118]. Medical procedures in these settings have often been associated with discomfort, pain, and anxiety that may call for the use of analgesics and sedatives [67,68,175], which may have various side effects such as emesis, drowsiness, dizziness, upset stomach, or headache. Thus, there is a need for clinical environments to fortify and encourage positive distraction that contributes to stress reduction [13,18,41,113,116].

Similarly, Mackrill et al [159] suggest that improving patients and staff experience of health care services and environments with positive design have a profound impact on their physical and mental status. These improvements have involved various less expensive or non-pharmacological interventions [1,29,55,86,101,103,108,164,200,225], and has been shown to improve the discomfort associated with post-traumatic stress disorder and the duration of stay in hospital intensive care units (ICU) [108]. Non-pharmacological interventions have not been fully adopted into the routine care of patients, due to discrepancies and deficiencies in the reporting of these interventions, including limited education in this field together with a lack of professional frameworks to guide clinicians, stakeholders and researchers [23,42,93,102]. It may well prove safe in promoting patients' health and wellbeing [165], as well as effective in alleviating agitation and anxiety in patients undergoing medical procedures [5,209].

Listening to the sounds of nature as a non-pharmacological intervention in clinical applications has been shown to reduce the level of pain, agitation, and anxiety [200,208], as well as creating an outward directed focus of attention, thus helping the brain to recover from stress [90]. Similarly, a review on the effect of sound and music on health outcomes, revealed that the sounds of singing birds, gentle wind, ocean waves, and soothing music could enhance the recuperation of patients, including negative emotions in both patients and clinical staff [112]. Previous research by Ref. [210] suggests that using music, ocean and random sounds can decrease the impact of environmental noise on patients' sleep and enhance the overall sound quality of the health care setting. Brown et al [37] supported that conceptualizing sound in the clinical environment as a soundscape, may lead to socially meaningful information about that environment as well as encourage a degree of privacy and wellness in mental health care.

There is relatively limited evidence-based research to support the impact of positive sounds/soundscape on health care experience. This aspect is often overlooked, with a focus on sound in its noise facet and based merely on sound level reduction [154,156], rather than developing a critical listening technique to interpret the meaning that sounds evoke [80]. Several studies conducted within the hospital settings merely consider the reduction of sound sources with reference to internationally accepted guidelines [56,62,182,226,228,253], yet obtained results have been inconsistent, as most research shows that the average sound level is 20–40 dB(A) higher than that set out by the World Health Organization (WHO) [38]. Though reporting features such as dB(A) and possibly moving on to psychoacoustic metrics, can add objectivity to the human sense of perception [154]. Additionally, Hsu et al [106] reported that sound level evaluations are important to predict the unwantedness, disturbance, objectionableness, undesirability, unacceptability and perceived noisiness, of the sound environment. Yet considering this aspect exclusively may perhaps overlook the subjective interpretation of the sounds [111], such as the personal experience of the sound, the communication to the individual and subsequent meaning [154]. This indicates that simply reducing sound levels in a context does not invariably lead to a more positive perception or experience [40]. Conversely, Blomkvist et al [32] suggest that an approach for improving healthcare acoustics will be inadequate if it narrowly focuses on reducing sound pressure levels only.

Therefore, exploring the possible cost-effective interventions that involve both abatement of inordinate sounds and the implementation of natural sounds to improve stress associated outcomes, or distract attention away from undesirable stimuli, may present a more feasible means to enhance patients and staff experience in the hospital ecosystem. As health care workers had little theoretical knowledge about sound and noise in health care units [117], it is pertinent to explore this view with a focus on the effect of positive sound/natural sound interventions in the clinical environment.

1.1. Aim and article structure

This paper explores the role of sound interventions and its effects on physical and mental health in the clinical environment. It also extends beyond just diminishing sound levels and explored the extent to which investigators have hypothesized the positive interpretations of sound sources that contribute to achieving positive outcomes for patients and staff in the health care ecological system. As set out in (Fig. 1), this paper sorts the literature and main issues into themes describing the sound in the clinical environment; sound interventions for improving wellness in the hospital ecosystem; auditory landscape interventions; soundscape interventions in hospital environments; and suggestions for clinical practice to guide clinicians and researchers.

2. Literature review search methods

2.1. Searching procedure and keywords

This paper aims at stimulating scientific inquiry into health