Music therapy in cancer patients: fact or fiction?

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Cancer is a complex disease and the diagnosis of this commonly life-threatening illness is associated with fundamentally physical and psychological strains. In the last decade, there has been major progress in understanding the molecular and cellular pathways that are altered in several types of cancer. Currently, there are strong technological efforts to elucidate the role of diverse pathophysiological factors including but not restricted to cancer stem cells [1], miRNAs [2], mutations or single nucleotide polymorphism [3], and whole genome sequencing of circulating tumor DNA [4]. Overall, most oncologists and clinical researchers follow the encouraged major aims: to improve the diagnosis, prognosis and therapy of cancer. There are almost no cancer conferences and almost no clinical trials or papers published in high impact factor journals where novel molecular mechanisms, biomarkers or drug targets are not presented or tested. In this current era of molecular-centered cancer medicine, one should not ignore the fact that cancer medicine is much more than just fighting against cancer cells and molecules or prolonging the life spans for patients for a couple of months. In addition, besides physical quality of life, which is commonly measured in clinical trials by standardized questionnaires – more or less covering and reflecting real life situations – there is a lot of room to provide cancer patients with more harmonious and holistic care [5]. Several nonpharmacological interventions have been proposed for cancer patients, including (but not restricted to) art therapy, music therapy, dance/movement therapy and creative arts. One of the nonpharmacological interventions in cancer patients is the sensation of music. The influence of music as a potential tool for improving the quality of life in cancer patients was already recognized several decades ago. The systematic evaluation of its efficacy and impact on physical parameters applying modern scientific benchmarks was initiated [6]. In one of these early studies, the authors defined music therapy as ‘the controlled use of music, its elements and their influences on human being to aid in the physiological, psychological and emotional integration of the individual during the treatment of an illness or disability’ [6]. Since the publication of these first reports,

“...music therapy in cancer patients seems to provide some positive effects on reduction of anxiety and stress, factors that substantially influence a patient’s quality of life.”

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several studies have been published on this topic. However, the heterogeneity of these studies in terms of cancer types, time of intervention, endpoint, evaluated outcome parameters, study design and size of studies, makes a definitive answer on the true value of this intervention difficult to ascertain. First of all, the point of time dramatically varies between several studies with regard to the disease stage where music therapy intervention was applied. On the one hand, some studies reported about the ‘early’ use of music therapy including cancer prophylaxis or a process of a particularly diagnostic workflow in nearly healthy or early disease stages. For instance, Zavotsky and colleagues evaluated the impact of music therapy on parameters associated with anxiety and stress in a cohort of healthy women with planned mammography screening. Although this study did not show that music therapy during screening mammograms decreased the amount of pain experienced by the subjects, it did suggest that music therapy has the potential to decrease the amount of anxiety. The authors concluded that assisting patients in decreasing anxiety also reduces barriers for screening mammography, which might be helpful in increasing the rates of such uncomfortable screening tools [7]. Interestingly, similar findings have been reported for patients receiving routine colonoscopies. Chlan et al. studied 64 subjects who underwent screening flexible sigmoidoscopy and divided patients into music intervention and nonintervention groups. They demonstrated that the patient group receiving music therapy had less anxiety and discomfort than subjects in the control group [8]. In this context, another study showed that music therapy during a colonoscopy markedly reduced fear-related stress, as indicated by changes in salivary cortisol levels, a well-established marker for physical stress [9]. In addition to those concerning mammographies and colonoscopies, a study conducted with 88 men who underwent prostate biopsy due to abnormal prostate-specific antigen levels or palpation of the prostate evaluated the influence of music therapy on peri-intervention pain, anxiety and physiological parameters. Pain scores increased from baseline in all patients, but patients in the music intervention group presented the lowest mean score [10]. On the other hand, and even more prominent, there are many studies investigating the role of music intervention in terminally ill cancer patients. Due to the heterogeneity, small samples sizes and weaknesses in study design, some level of evidence can be generated by systematically reviewing previously reported intervention studies. For instance, a very recently published systematic review article summarized eight nonpharmacological intervention studies including three studies that have been conducted with music therapy. The authors found that improvements in anxiety, depression, quality of life, coping, stress, anger and mood were found. However, few physical benefits of this therapy were reported, including no significant impact on physical aspects of quality of life, vigor activity, fatigue inertia or physical functioning [11]. Another systematic review used the data of 30 randomized and quasi-randomized trials including 1891 patients. The authors proposed that ‘music interventions may have beneficial effects on anxiety, pain, mood, and QoL in people with cancer. Furthermore, music may have a small effect on heart rate, respiratory rate, and blood pressure’ [12]. Both of these systematic reviews concluded that most trials were at high risk of bias and that more and higher quality research needs to be conducted [11,12].

From the physiological perspective, music is provoking the mechano-sensory hair cells in the ear to transduce the sound-induced mechanical vibrations into neural impulses, which are interpreted by the brain, evoking emotional effects. From the physiological perspective, music is provoking the mechano-sensory hair cells in the ear to transduce the sound-induced mechanical vibrations into neural impulses, which are interpreted by the brain, evoking emotional effects.
studies to make them more comparable, reproducible and adapted to current standards for clinical interventions.

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References


