Music as a Public Health Intervention in a Public Setting: 
A Review Of The Literature

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Abstract:

Music therapy has been part of the human condition dating back to the time of Pythagoras. Music inspires and gives pleasure to us all in both domestic and in public settings ranging from our homes to shopping malls, train stations and airports, office settings, department stores and amusement parks. Listening to music may provide relaxation, reduce pain sensation, or reduce symptoms of depression or schizophrenia. Could music listening be used to improve the public’s health in a public setting? This article examines the current uses of music therapy and discusses the uses of music as a public health intervention in a public setting. Further, it suggests that much more research should be conducted to discover the many different ways in which ambient music could be utilized in a public setting to improve the physical and mental health of the general public.
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Music therapy can be defined as a process in which a trained therapist uses music to “improve, restore or maintain health” (Bruscia, 1991). Music therapy can be categorized as “active” where patients re-create, compose or improvise music or as “receptive” where they listen to music (Bruscia, 1998). Methods which are receptive are more often used in the United States whereas active approaches are used more widely in Europe (Maratos, 2008). Bruscia (1991) suggests the active mechanism of treatment for music therapy is that the different types of musical stimuli effect physical and emotional changes in the patient. Receptive music therapy is often accompanied by secondary activities such as meditation, drawing and physical movement which results in reduction of stress, reduction in pain and an energizing of the body (Bruscia, 1998).

Music therapy is believed to have originated in ancient times and was used specifically to influence health (Nilsson, 2008). The Greek philosopher Pythagoras, considered the founder of modern geometry, is also considered to be a founder of music therapy. Pythagoras prescribed music and a “specific diet to restore and maintain the harmony of the body and soul” (Nilsson 2008). Florence Nightingale recognized that music in hospital wards seem to have beneficial effects on soldiers injured in the Crimean War. Nightingale observed that wind instruments with a continuous sound “generally had a beneficial effect on patients. She also observed that instruments that do not produce continuous sounds had the opposite effect” (Nilsson, 2008). It was not until after the invention of the phonograph in the late 1800’s that recorded music could be played in a hospital setting. Music was used in hospitals during the 1900’s along with anesthesia and analgesia according to Taylor (1981). Kane (1914) was the first professional to
provide music in the operating setting in order to distract patients from “the horror of surgery”.

In 1949 a group of surgeons studied the psychosomatic effects from physical illness and how listening to music affected patients. These professionals performed procedures in a surgical environment, introduced music and observed that the music had a calming effect on patients who were otherwise unaffected by the use of routine medications (Light, 1949).

**Music therapy as a public health intervention:** Today music therapy interventions are used in pre- and post-operative settings, to treat depression, autism and schizophrenia-like illnesses, as well as treat patients for breathlessness in advanced stages of disease and provide comfort in end-of-life hospice settings. This article will examine the reviews of different settings in which music therapy is being used as well as discuss the limited use of music as a general public health intervention and suggest alternatives for the receptive use of music as a health intervention in public settings.

In a 2009 systematic review of studies related to music therapy to reduce pain, Cepeda, Carr, Lau and Alvarez found that music was effective in the reduction of pain and the requirements for analgesic. The authors looked at fifty-one studies involving 1867 subjects exposed to music and 1796 controls. The goal was to evaluate the “effect of music on acute, chronic or cancer pain intensity, pain relief, and analgesic requirements.” They included randomized controlled trials which investigated the effect music had on any type of pain in children or adults. In choosing the clinical trials to evaluate the effects of music a search of MEDLINE, EMBASE, PsycINFO, LILACS and the references in retrieved manuscripts was conducted. The reviewers eliminated any studies which investigated additional concurrent methods of pain reduction in addition to music.

Researchers calculated the mean difference in pain intensity levels, percentage of
patients with at least 50% pain relief, and opioid requirements to reduce pain and anxiety. Opioid consumption was converted to morphine equivalents and the study evaluated adults, children, acute, chronic, malignant, labor, procedural, or experimental pain separately, as well as those studies in which patients chose the type of music themselves. In 31 studies where mean pain intensity was evaluated there was a considerable variation in the effect of music, however, in one group, patients exposed to music had pain intensity that was 0.5 units lower than baseline and control. Listening to music for the treatment of pain offers the advantages of “low cost, ease of provision, and safety.” The authors found that music “reduced pain, increased the number of patients who reported at least 50% pain relief, and reduced requirements for morphine-like analgesics.” However, as the magnitude of the positive effects is small, the authors reported that the clinical relevance of music for pain relief in clinical practice is unclear.

Depression is a disorder associated with reduced social functioning, impaired quality of life, and increased mortality (Maratos, Gold, Wang and Crawford 2008). “Music therapy has been used in the treatment of a variety of mental disorders, but its impact on those with depression is unclear.” In a systematic review to examine the efficacy of music therapy with standard care compared to standard care alone among people with depression, the authors compared the effects of music therapy for people with depression against other psychological and pharmacological therapies. A search strategy for MEDLINE, PsycINFO, EMBASE, PsycLit, PSYindex as well as other scientific literature databases was conducted in November 2006. All randomized controlled trials comparing music therapy with standard care or other interventions for depression were considered. The primary outcome identified was reduction in symptoms of depression based on a continuous scale.
Five studies met the inclusion criteria of the review and there were considerable variations in the interventions offered. Four of the five studies evaluated individually reported greater reduction in symptoms of depression among those patients randomized to participate in music therapy than to those in standard care conditions alone. The fifth study, in which music therapy was used as an active control treatment, reported no significant change in mental state for music therapy compared with standard care alone. Dropout rates from music therapy conditions were measured and appeared to be low in all studies.

The authors suggest that music therapy is accepted by individuals diagnosed with depression and is associated with improvements in mood. However, they point out, “the small number and low methodological quality of studies mean that it is not possible to be confident about its effectiveness. High quality trials evaluating the effects of music therapy on depression are required.”

Socialization and communication are well-established challenges for individuals diagnosed with autism. Gold, Wigrim and Elefant (2006) found three small studies involving music therapies and individuals with autism spectrum disorder (ASD). People with ASD have difficulties with communication, behavior and other social interaction. According to the authors, music therapy is intended to address some of the core problems of people with ASD. Of the three small studies which were included in the review each examined the short-term effect of brief music therapy interventions for autistic children. “Music therapy was superior to “placebo” therapy with respect to verbal and gestural communicative skills, but it was uncertain whether there was an effect on behavioral outcomes.” The studies were encouraging, but of limited applicability to clinical practice, according to the reviewers, and more research with better
design, larger sample size, “in more typical clinical settings is needed to strengthen the clinical applicability of the results and to examine how enduring the effects of music therapy are.”

Another review of the literature was conducted by Gold, Heldal, Dahle and Wigram (2005) in which the authors looked at four studies involving music therapy for patients with schizophrenia or schizophrenia-like illness. “Music therapy is a therapeutic method that uses musical interaction to help people with serious mental illness to develop relationships and to address issues they may not be able to using words alone.” The goal was to review the effects of music therapy, or music therapy added to standard care, music therapy compared to placebo, standard care or no treatment for people with serious mental illnesses such as schizophrenia. Studies to date have examined the effects of music therapy as an add-on treatment to standard care. The results of these studies suggest that music therapy as an addition to standard care helps people with schizophrenia to improve their “global state” and “may also improve mental state and functioning if a sufficient number of music therapy sessions are provided.” The authors suggest further research should address the dose-effect relationship and the long-term effects of music therapy.

Another systematic review assessed the benefits of music during caesarean section under regional anesthesia to improve clinical and psychological outcomes for mothers and infants. Only one randomized controlled trial met the search criteria and that study included 76 women who had all planned to deliver by caesarean section. Data were available for only 64 of the women and, according to the review authors, the trial “was of low quality with unclear allocation concealment and only a few main clinical outcomes reported for the women (Laopaiboon, Lumbiganon, Martis, Vatanasapt and Somjaivong, 2009). The trial did not report any infant outcomes. It appears that music added to standard care during caesarean section under regional
anesthesia had some impact on pulse rate at the end of maternal contact with the neonate in the intra-operative period and after completion of skin suture for the caesarean section. There was also an improvement in the birth satisfaction score given by mothers. Effects on other outcomes were either not significant or not reported in the one included trial.

The authors concluded that music during planned caesarean section under regional anesthesia may improve pulse rate and birth satisfaction score. “However, the magnitude of these benefits is small and the methodological quality of the one included trial is questionable. Therefore, the clinical significance of music is unclear. More research is needed to investigate the effects of music during caesarean section under regional anesthesia on both maternal and infant outcomes, in various ethnic pregnant women, and with adequate sample sizes.”

Finally, music has been used widely in end-of-life care and hospice settings to reduce pain and anxiety, provide comfort, “to facilitate relaxation, to enable reminiscence and life review, to provide a framework for spiritual exploration and validation, and to encourage the identification and expression of feelings of anticipatory mourning and grief” (Krout, 2001). Krout reported behavioral observation and self-reported levels of pain, comfort and relaxation among 80 hospice patients during single-session music therapy interventions. The patients were exposed to music therapy in both active and passive scenarios. Each patient was independently observed by a therapist as well as self-reported pain control, physical comfort and relaxation both before and after a music therapy session. The study suggests single session music therapies are highly successful in increasing the self-reported and observed pain control, comfort and relaxation. The authors pointed out that further research should be conducted on differences in passive music listening versus active therapies such as singing or playing an instrument. It was
also noted that the longevity of the effects of a single session could be measured as well as determine an ideal number of music therapy sessions or “music therapy dosage.”

Hillard (2003) also looked at hospice patients and conducted a case-control study consisting of 80 participants: 40 experimental and 40 control. Quality of life was measured by counselors and music therapists using the Hospice Quality of Life Index-Revised (HQLI-R) for patients in two groups, those who received music therapy intervention with counseling and those who received counseling only. “The HQLI-R is a self-report questionnaire using a Likert scale of 0 to 10 with a total of 28 items designed for hospice patients with cancer.” The questions pertain to various aspects of quality of life including physical, relationship, psychological, spiritual, and financial issues. Therapies varied from active singing and playing music to music listening, lyrics interpreting and music-assisted counseling. Each patient in the experimental group received at least two therapy sessions depending on the timing of life-ending event and one participant received 13 sessions total. Results of the investigation support the use of music therapy in hospice care for improving the quality of life of people diagnosed with terminal cancer. For participants in the music therapy group, quality of life scores were significantly higher after the initial music therapy session than those who received only routine hospice services. Additionally, scores increased again following the second music therapy session whereas scores in the control group were lower following the second counselor visit. Music therapy continued to provide increased quality of life scores with successive sessions in the experimental group.

Music as a public health intervention in a public setting: Within each of the clinical music therapy interventions discussed above the theme running throughout seems to be “more research is needed . . .” What data has been collected about the effects of music on the public in
every day activities, in the workplace, at home or in the community? Is it possible the basics of receptive music therapy could be used as a general public health intervention in a public setting? How could ambient music in the natural public environment be used to influence the health behavior of individuals?

Using search terms “intervention” and “public” returns 14,882 publications in a general search on the scientific research database PubMed (2009). A similar search using “music”, “therapy” and “intervention” returns a list of 356 publications while searching “music”, “intervention” and “public” returns a mere 21 references (PubMed, 2009). These search results indicate that music therapy as an intervention has been explored, however, nearly every published article relates to its use in a clinical setting and not in the community in the daily activities of people. Very few articles address music as an intervention in a public setting. In fact, through reviewing hundreds of articles which discuss the use of music as an intervention, only one found in the searches described above directly addresses the use of music as a public health intervention in a public setting. A more formalized and systematic search of other scientific literature databases may prove to yield similar results, revealing very little literature published on the subject of using music as a public health intervention in a public setting.

Of all the articles related to music contained in the searches above one article discusses the role of music in promoting physical activity in a public building stair well. Boutelle, Jeffery, Murray and Schmitz (2001) conducted a public health intervention using music, artwork and signs to promote the use of stairs in an eight-story building at Minnesota’s School of Public Health. The study consisted of observations of elevator and stair use in the building where observers made over 35,000 observations over a three month period. The building consisted of eight floors and housed approximately 700 full- and part-time employees. Observers recorded
the actions of people entering and exiting the stair well and elevator from inconspicuous points near both points of entry and exit on the ground floor. Individuals who carried more than a briefcase or who were pushing a cart were not counted.

A baseline measurement was conducted weeks prior to the introduction of the intervention. The intervention consisted of two parts: first signs encouraging the use of stairs “for your health” were placed in conspicuous places at points of decision near the elevator and outside the stairwell, as well as above the elevator buttons on each floor and on the interior stairwell doors. Observations with this intervention in place were conducted for a period of four weeks. At the end of that period, a second intervention was added. Artwork and music were used in the stairwell to make it “more attractive” to persons entering and exiting the building. A compact disc player was placed between floors two and three playing music throughout the day and artwork was hung on the walls throughout the stairwell. The music could be heard on all floors of the stairwell and the artwork was changed weekly and the music was changed each day.

The authors found that more participants used the stairs during the music and artwork intervention than during the use of signs alone and during no intervention. The study suggests that improving the aesthetics of the stairwell significantly influenced the decisions of participants to use stairs instead of the elevator. Though the authors stated that the increased physical activity could not be attributed to the artwork or music alone, the results of the improvement in physical activity during the use of music over signs alone was significant. They further suggest that making changes to building design [providing ambient music] can render stairwells more attractive to the general population and can improve physical activity.

*Patterns associated with music listening:* What is it about music that inspires and attracts us to listen? Listening to classical music has been shown to evoke strong emotions and feelings
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of pleasure (Krumhansi, 1997). There have been documented physiological responses to music such as chills, shivers and changes in heart rate (Goldstein, 1980). Menon and Levitin (2005) investigated the neuroscience underlying the emotional reaction to music listening. Through a series of tests involving music listening and brain imaging they discovered that “listening to music strongly modulates activity . . . involved in reward processing.” The areas of the brain affected by music listening are “thought to be involved in regulating . . . autonomic and physiological responses to rewarding . . . emotional stimuli.” The findings suggest a relationship between dopamine release (which is involved in the brain’s response to reward, Menon and Levitin, 2005) and the brain’s response to music, and further, that certain responses in areas of the brain were correlated across the different test subjects, “suggesting a mechanism by which listening to pleasant music evokes physiological reactions.” The authors concluded: “The enhanced functional and effective connectivity between brain regions mediating reward, autonomic, and cognitive processing provides insight into understanding why listening to music is one of the most rewarding and pleasurable human experiences.”

Suzuki, Okamura, Kawachi and Tashiro (2008) further recognized patterns of brain activity associated with listening to music using positron emission tomography imaging (PET). The authors found that not only does the aesthetic pleasure associated with music listening align with specific processing centers of the brain, but the reward functions are also not the same for all pleasant musical chords, three or more notes played simultaneously (Merriam-Webster, 2009). Music consists of Major (M) and minor (m) chords, where Major chords are associated with “happy” sounds and minor chords produce “sad” sounds. Both Major and minor chords contain subgroups of chords which are called “consonant” and “dissonant”. Consonant chords are considered “beautiful” sounding where as dissonant chords are considered “ugly” according
to the authors. The investigation demonstrated the major and minor “beautiful” chords activate different regions of the brain. Further, the areas of the brain which process the minor beautiful chords are associated with the right striatum, an area of the brain normally associated with reward and emotion processing, whereas the major beautiful chords activated the left-middle temporal gyrus which is related “to coherent and orderly information processing.”

Patterns found in the imaging studies discussed above suggest that music listening and perceived enjoyment produce similar physiological effects and reward function in different individuals. In other words, music listening of the same basic melody by different individuals could provide the same positive reward and enjoyment. Another pattern observed in musical preference and pleasure, which may be merely anecdotal with no current scientific support, was described in a March 4, 2009 story on National Public Radio. Entertainment writer Marc Hirsh of the Boston Globe dubbed his theory Sensitive Female Guitar Chord Progression in which he describes how many popular music melodies are based on a single musical phrase of four chords played in progression and then repeated throughout a song. Hirsh points out that the progression is circular and though the first chord can change, the progression is always the same. This author noticed a similar pattern in popular and rock-and-roll music for ten years prior to hearing the interview referenced above and the story became an inspiration for beginning this review. The specific pattern was the use of the melody from a classical composition entitled “Cannon in D” by Johann Pachelbel which was written around 1680 by the classical composer. Hirsh’s explanation suggests that the musical pattern which can be found in so many popular songs today may be of the same origin as my own. In the interview Hirsh references musician and comedian Rob Paravonian’s performance of Pachelbel Rant, a musical comedy routine performed around the country at many university and comedy club venues. In his performance Paravonian
comically compares the melodies of different popular songs to a musical phrase in Pachelbel’s “Cannon in D” and expresses his lifelong frustration in listening to popular music because of the classical piece.

These patterns suggest that there are universal melodies and chord progressions which may provide enjoyment, inspiration and pleasure to many individuals simply because of the neurological patterns of preference which have been identified in a laboratory setting. Also, scientific investigations could be conducted to establish that popular music melodies and chord progressions are in fact common and repeated in different songs and possibly different genres of popular music (country, easy listening, rock, etc.). Patterns in music could serve as a beginning point for future research in using music as a public health intervention in a public setting.

Discussion: Music listening could serve as the driving force in engaging a person in a positive health behavior and thus improving the overall health of an individual. Music already permeates our every personal space while at home, shopping in a department or grocery store, when visiting a health care provider office or simply enjoying ourselves at an amusement park. Certainly more research should be conducted in the area of music listening and its effects on individuals’ brain functioning and the neurologic systems of reward, music and physical activity, music and stress-reduction, the general pleasure experienced during music listening, as well as other areas where music intervention has not yet been applied. We all encounter music while shopping in large retail stores and disregard its effects. Research conducted in the retail environment could address the effects ambient music has on our physical health. Studies conducted in amusement parks, office settings, transportation hubs and retail shopping malls may reveal how ambient music listening might passively reduce levels of stress and anxiety, alter individuals’ bad moods, increase positive social interaction and reduce violence or may show
how music could inspire individuals to increase physical activity. The playing of music in settings which are typically stressful such as a state drivers license office or a U. S. Postal Service building could prove to be health-improving for public patrons and employees as well. Just as some authors working in the field of music therapy have called for more study and research in its many clinical applications, so too should the public health students, researchers, and professionals look to the many possibilities which exist where ambient music listening in a public setting may offer opportunities to improve the public’s health.

References


