

The Use of Music Therapy to Improve Mental Health in
Forensic Patients: a Review of Controlled Studies

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Abstract

The discovery of an effective non-pharmaceutical therapy applicable to a broad patient population has remained elusive in the field of forensic mental health. With the number of forensic patients increasing year by year, the need for an alternative to pharmaceuticals is apparent. Music therapy has become a prominent candidate to fill this therapeutic void, and research into its potential use to improve the mental health of forensic patients is underway. This review summarizes the findings of controlled effectiveness studies which compare the effects of music therapy to those of some standard of care with regards to forensic mental health, as well as studies which examined the various effects of different music therapy interventions in the same context. Nine separate databases were searched in January 2019 utilizing a systematic search strategy to obtain relevant studies. Studies were included if they were controlled, took place in a forensic setting, identified forensic patients as the population of interest, and utilized interventions facilitated by an accredited music therapist. Three studies were ultimately included in the final review. Evidence from related effectiveness studies suggests that music therapy holds the potential to improve self-esteem, behaviour management, social skills, and mood-related constructs in forensic patients. However, the quality of current evidence is low due to a lack of methodologically-rigorous protocols. Thus, higher-quality research needs to be conducted before any recommendations can be made regarding the use of music therapy interventions to achieve clinical goals in the context of forensic mental health.

Keywords: music therapy, forensic, mental health

Introduction

The forensic mental health system is where the institutions of criminal justice and mental health care meet.¹ Forensic patients differ from typical offenders since they have been deemed to be incompetent to live civilly or stand trial due to their illness or disability, or are found not guilty by reason of insanity in a court of law.² The percentage of forensic patients as a proportion of all members of the correctional system has been increasing steadily over the past twenty years, as have the raw number of patients, causing considerable strain to multiple healthcare systems.³ The primary cause behind the increase is hypothesized to be the rising rate in which judges commit low-level offenders into the forensic mental health system.⁴ However, as forensic mental health systems are reaching capacity, the discovery of effective treatment options aimed to improve the mental health of a broad range of forensics patients, beyond specific pharmacological agents, has remained elusive.⁵ Several psychological and psychosocial interventions have been examined in effectiveness studies, but none have produced significant results.⁵ Thus, the need for a highly-compatible treatment alternative remains.

Music therapy is a prospect to fill that therapeutic hole. Music therapy refers to the “professional use of music and its elements as an intervention in medical, educational, and everyday environments with individuals, groups, families, or communities who seek to optimize their quality of life and improve their physical, social, communicative, emotional, intellectual, and spiritual health and wellbeing.”⁶ In the past decade, music therapy has become increasingly prominent in multiple areas of health care, as a plethora of effectiveness studies have shown that music therapy can have a beneficial effect on both mental and physical attributes.⁷⁻⁹ More specifically, music therapy has been suggested to improve various aspects of mental health in offenders.¹⁰ It is theorized that particular approaches to music therapy, such as group music

therapy and improvisation, provide offenders with an opportunity to act on their limited autonomy in an environment which is conducive to social interaction, thereby enhancing the production of positive emotions and improving such things as self-esteem and behavioural management.¹⁰ Because of these impressive results, music therapy is gaining attention in the field of correctional health care, including forensic mental health.^{1,10} As a result, several reports and effectiveness studies have been published concerning the use of music therapy to improve the mental health of forensic patients.¹¹⁻¹⁵ Yet, a focused review of these publications has not been completed.

Objectives

Several cases and effectiveness studies have examined the effects of music therapy on the mental health of forensic patients.¹¹⁻¹⁵ Additionally, a systematic review of the use of music therapy to improve the mental health of offenders in correctional settings has been completed.¹⁶ However, a review focused solely on forensic patients has yet to be conducted. This paper will build upon the methodologies of existing reviews in the sub-field to clarify the potential use of music therapy as a tool to improve the mental health of forensic patients. Further, recommendations regarding its future use in the forensic context will be made.

Methods

Selection criteria

Design.

Studies included in the review were controlled trials, including randomized controlled trials (RCTs) and pseudo-randomized controlled trials (pRCTs: controlled trials in which allocation is determined by any method other than true randomization).¹⁷ All relevant studies

were included in the final review, regardless of language, sample size, or other methodological characteristics.

Settings.

Studies were included if they were conducted in forensic health care settings, such as a forensic hospital or the psychiatric-wing of a detention centre, to ensure that forensic patients were the population of interest. Studies conducted or broadly described to have taken place in other locations, such as prisons, were excluded due to the fact that they do not primarily house forensic patients, but rather criminals found guilty in a court of law.¹

Participants.

Papers utilizing a sample of forensic patients were included in this review.

Interventions.

All interventions that aligned with the definition of music therapy were eligible for inclusion. Specifically, reviewed studies had to explicitly define that any and all interventions used were applied by an accredited music therapist seeking to achieve health care goals.

Outcomes of interest

Outcomes of interest were defined prior to the start of the study based on a survey of music therapists working in correctional settings.¹⁸ Of the studies included, the following four outcomes were examined:

Self-esteem.

Self-esteem is a term which refers to the various mental states defining how an individual views themselves, often informed by their self-identity.¹⁹ Almost all (94%) music therapists working in correctional settings see improving self-esteem as an important therapeutic

objective.¹⁷ A moderately high level of self-esteem has been deemed to be optimal, due to issues that can arise when an individual's self-esteem reaches extreme highs and lows.¹⁹⁻²¹ For this review, related constructs such as self-efficacy and self-conceptualization will be used interchangeably with self-esteem, as is the standard practice.²²

Social Skills

The term "social skills" refers to one's ability to act in a normal way in a social setting.²⁷ Although closely related to behaviour management, social skills are ingrained in the capacity of an individual to actively display positive affect, rather than the restraint to not act on impulsive or aggressive thoughts.²⁷ Thus, improving outcomes related to social skills are an item of high importance in forensic settings, as 81-85% of music therapists working in such environments agree.^{18, 28}

Behaviour management.

"Behaviour management" refers to such things as coping skills and the management of impulsive or aggressive tendencies.²³⁻²⁴ Related behavioural outcomes were deemed to be of critical importance by 82-91% of music therapists as reported by Coddington.¹⁸ Further, behaviour management is commonly used to determine a forensic patient's fitness for release as it is an observable construct with a strong correlation with recidivism.²⁵⁻²⁶

Mood-related constructs.

Related constructs include mood, relaxation, and the development of thoughts.^{13, 29} 88-100% of music therapists defined the improvement of mood-related constructs as an essential goal when working with offenders.¹⁸ Since the presence of positive feelings and low stress (referring to a state of relaxation) is associated with a decreased tendency to act on assaultive

impulses, the focus of music therapists on mood-related constructs in a forensic setting is warranted.³⁰⁻³¹

Search Protocol

In January 2019, a search was conducted using nine databases (CENTRAL, EMBASE, ClinicalTrials.gov, ICTRP, MEDLINE, PsycINFO, WorldCat, Rutgers School of Law Gray Literature Database, Conference Proceedings Citation Index). The search strategy was adapted from a previous review in the sub-field.¹⁶ Terms relevant to music and music therapy (e.g. music therapy, NMT, BMGIM, GIM, Nordoff-Robbins) were cross-searched with terms related to forensics (e.g. forensic, prisoner, offender, inmate, convict, delinquent, criminal, lawbreaker, malefactor, culprit, felon). Next, abstracts were reviewed to determine fitness for inclusion, followed by a detailed review if the abstract review met all inclusion criteria. The search protocol was repeated in March 2019 and yielded no new studies of interest.

Results

Study selection

A total of 3674 potentially relevant papers were screened. In sum, 3659 papers were deemed to not meet the inclusion criteria based on an abstract review. The remaining 15 papers were retrieved for further evaluation.^{11-15, 28-39} Following a detailed review, 12 studies were further excluded, two since they were uncontrolled³⁸⁻³⁹, and 10 since they were not conducted in a forensic setting.^{14-15, 28-37} Three studies remained for inclusion in the final review (see Figure 1).

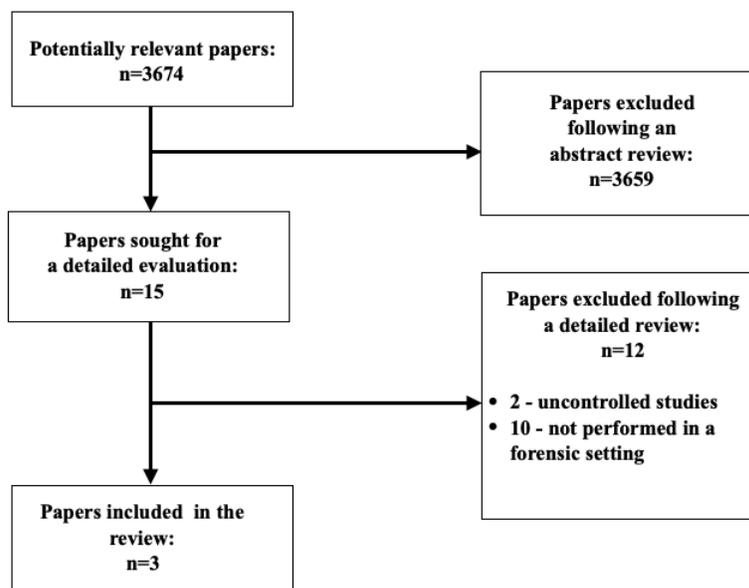


Figure 1: *Flow-chart of study selection*

Pool of studies

Three studies remained that met the inclusion criteria.¹¹⁻¹³ Two studies were randomized controlled trials¹¹⁻¹², and one was a pseudo-randomized controlled trial.¹³ One study did not utilize a control group, instead randomizing participants to different music therapy interventions.¹³ Just one was completed post-2000.¹¹ Each had a sample size less than 51.¹¹⁻¹³ One study examined a population which included both male and female offenders¹², whereas males were the population of interest in the other papers.^{11, 13} A single study also utilized a sample comprised of juvenile offenders instead of adults.¹² Two of the included studies examined psychiatric patients with a diagnosed mental illness^{11,13}, whereas one examined individuals with no diagnosis.¹² Additionally, one study measured effects before and after each music therapy session¹³, whereas the remaining papers measured effects before and after the completion of the entire trial.^{11, 12} A more detailed overview of the characteristics of the included studies is provided in Table 1. The variety of music therapy interventions applied are summarized in Table

2. Risk of bias was also assessed for the studies included utilizing a modified Cochrane assessment tool (see Table 3).⁴⁰ Henceforth, this review will refer to each study with the lead author's surname as follows: Hakvoort¹¹, Thaut¹³, and Johnson¹²

Characteristic/Study	Hakvoort¹¹	Thaut¹³	Johnson¹²
Year of Publication	2015	1989	1981
Type	RCT	pRCT	RCT
Focus	Music therapy versus the standard of care.	The different effects of various music therapy approaches.	Music therapy versus the standard of care.
Outcomes	Behaviour management, social skills	Mood-related constructs	Self-esteem
Population	n=13. Adult males, average age=35.6 (range of 24-49).	n=50. Adult males.	n=33. Male and female juvenile offenders.
Setting	Forensic hospital	Correctional psychiatric hospital	Treatment oriented detention facility for juvenile offenders with behavioural problems.
Presence of diagnosis	Yes - all participants were psychiatric patients	Yes - all participants were psychiatric patients.	No - none of the participants had a diagnosed mental illness.

Table 1: *Detailed description of the characteristics of the studies reviewed*

Trials/ Groups	Music therapy interventions	Control group
Hakvoort¹¹	<p>Description: Standardized cognitive-behavioural music therapy anger management program, delivered individually. Although the goals of the program were standardized, individualized interventions were applied across the sample. Specific descriptions of the interventions applied are available in a separate manuscript, but generally involved sing-alongs, dancing, and adding improvisation into a piece performed by the music therapist.^{10,13}</p> <p>Frequency: 60 minute sessions, 1 session per week, 20 sessions total.</p>	<p>Description: standard care combined with supplemental aggression management group therapy sessions.</p> <p>Frequency: undefined</p>
Thaut¹³	<p>Description: Each of eight groups participated in sessions with distinct music therapy approaches (music and listening, group music therapy, instrumental therapy) overseen by a music therapist on different days of the week. Detailed descriptions of the approaches are as follows:</p> <ul style="list-style-type: none"> • The music and relaxation group listened to sedative, patient-selected music to induce muscle relaxation. • The group music therapy participants would collectively decide on emotions they wished to display, and the music therapist would lead them in a sing-along to express the desired emotions. • The instrumental group would use instruments to create improvised pieces under the guidance of the music therapist to express musical and emotional themes. <p>Frequency: 3 months in duration. Individual session length was not described.</p> <p>The authors did not utilize a control group.</p>	
Johnson¹²	<p>Description: Music-related group activities facilitated by a music therapist. Activities followed this format:</p> <ol style="list-style-type: none"> 1. Lecture regarding a music-related topic, such as a genre or performer. 2. Completion of a project related to the introduced topic, such as arranging and performing a jazz song or writing a country/western song. The music therapist would facilitate the completion of these projects. 3. Feedback and grades would be delivered by the music therapist. <p>Frequency: 22 sessions total. The length of individual sessions was not described.</p>	<p>Description: Unspecific music-related activities not facilitated by a music therapist, with no grading or delivery of feedback.</p> <p>Frequency: 22 sessions total. The length of individual sessions was not described.</p>

Table 2: *Description of interventions utilized in the studies reviewed*

Methodological Feature/ Study	Hakvoort¹¹	Thaut¹³	Johnson¹²
Sequence generation	Unclear	Randomization was not utilized. - High	Unclear
Allocation concealment	Unclear	Not applicable	Unclear
Blinding	Researchers were blind to the treatment received by the participants they were assessing - Low	Blinding was not utilized - High	Blinding was not utilized - High
Reporting bias	All data was analyzed. It is unclear if an intention-to-treat analysis was conducted.	All data was analyzed. It is unclear if an intention-to-treat analysis was conducted.	Data from dropouts or cross-overs was not analyzed - High
Methods for dealing with incomplete data	All data was reported - Low	All data was reported - Low	All data was reported - Low
Validity of measures	All measures used (FP40; ASP 1,4, and 9; SDAS) have displayed validity.	None of the measures used (self-developed scales) have displayed validity.	All measures used (ICL) have displayed validity.
Attrition	0/13 (0%) - Low	0/50 (0%) - Low	7/33 (21%) - High
Other biases	Not applicable	Not applicable	Not applicable
Risk of bias	Moderate	High	High

Table 3: *Risk of bias assessment using the modified Cochrane tool*

Summary of results

Self-esteem.

Johnson (n=33) measured self-esteem utilizing the Interpersonal Checklist (ICL), a test which estimates the self-esteem of an individual by ranking them according to eight personality categories.¹² The results display that the intervention group had an average decrease of 6.0 points in terms of ICL score (signifying improved self-esteem), whereas the control group had a mean

increase of 1.3 points. However, this between-group difference is statistically insignificant (CI: 95%, $p>0.05$). Yet, statistically significant within-group differences (CI: 90%, $p<0.1$) in terms of one personality category—rebellion/distrust—were found by utilizing a lenient standard of confidence (90%), suggesting that music therapy can enhance singular aspects which, when culminated, define an individual's self-esteem.

Social skills.

Hakvoort ($n=13$) measured the presence of interpersonal skills utilizing the ASP 9.¹¹ Both the intervention and control groups displayed an improvement in this measure, with an increase in ASP 1 score of 17% and 2%, respectively. However, the between-group difference lacked statistical significance (CI: 95%, $p=0.38$). Still, the results serve as a positive indication that there is potential for music therapy to enhance the usage of interpersonal skills in forensic patients.

Behaviour management.

Hakvoort ($n=13$) addressed four aspects of behaviour management utilizing four different measures: coping skills (Forensic Psychiatric Profile 40 Coping Skills List), self-management of assaultive behaviour (Atascadero Skill Profile: Scale 1 (ASP 1)), self-management of psychiatric symptoms (ASP 4), and the presence of dysfunctional or aggressive behaviours (Social Dysfunction and Aggression Scale).¹¹ Participants randomized to the intervention group displayed an average decrease in the use of harmful, avoidance coping mechanisms (18%) that is much greater in proportional magnitude than the average decrease for those in the control group (1%), but the difference is statistically insignificant (CI: 95%, $p=0.26$). However, those in the intervention group displayed an increased utilization of positive coping strategies (29%), whereas the control group showed no change. That between-group difference was statistically significant (CI: 95%, $p=0.02$). In terms of self-management of assaultive behaviour, both the

intervention and control groups showed equivalent, minimal improvement, with the between-group difference being insignificant (CI: 95%, $p=0.86$). Although the average percentage improvement in ASP 4 score for the intervention group and control group were 25% and 45%, respectively, the extremely low pre-test scores for each group are indicative of the “floor effect,” diminishing the potential significance of the results obtained with regards to the self-management of assaultive behaviour.¹⁰ Concerning the self-management of psychiatric symptoms, the intervention group displayed a 40% improvement in mean ASP 1 score, whereas the control group showed no change. Still, that result was statistically insignificant with regards to standard levels of confidence (CI: 95%, $p=0.08$). Moreover, in measuring the presence of dysfunctional or aggressive behaviours, a minimal increase in the presence of such behaviours (0.3%) was found in the intervention group, whereas there was no change measured in the control group. Yet, the between-group difference lacked precision and significance (CI: 95%, $p=0.34$). The evidence shows that music therapy can enhance the usage of positive coping skills in forensic patients, while also displaying its potential to improve skills related to the self-management of psychiatric symptoms while decreasing the usage of harmful coping methods.

Mood-related constructs.

The effects of various music therapy approaches (music and relaxation, group music therapy, and instrumental therapy) on the mood-related constructs (relaxation, mood, thought/insight) of forensic patients was examined by Thaut (n=50) utilizing self-developed scales.¹³ No statistically significant differences between each type of therapy was found (CI: 95%, $p>0.05$). However, each group consistently showed similar improvements in every outcome following the music therapy sessions, regardless of which approach was utilized. Thus, this evidence serves to

reinforce the suggestion that music therapy can be used to improve the mood, relaxation and thought/insight of forensic patients.

Discussion

Primary findings and limitations of the studies reviewed

Three controlled studies examining the effects of music therapy on the mental health of forensic patients were reviewed.¹¹⁻¹³ The results provide statistically significant evidence supporting the use of music therapy interventions in forensic settings to improve aspects of self-esteem and behaviour management, while also displaying that potential benefits may lie in its application to improve social skills and mood-related constructs. However, the lack of methodological rigour and statistically significant results in the studies reviewed diminishes the quality of the evidence presented.

Self-esteem was measured in one RCT with a relatively small sample size (n=33) compared to what is normally accepted as the standard for RCTs.¹⁶ Despite the lack of statistically significant figures, the results suggest that utilizing group music therapy activities, coupled with concrete goal-setting and objective outcome measures, may be a practical approach to improve the self-esteem of juvenile forensic patients. Notably, the study is at a high risk of bias due mainly to its unclear method of randomization, as well as the absence of both blinding and an intention-to-treat analysis (see Table 3). Thus, the conclusions reached must be met with generous amounts of caution. Still, the results are encouraging to the prospects of music therapy being used to improve self-esteem in the context of forensic mental health.

Aspects related to behaviour management were examined in a single RCT with a remarkably small sample size (n=13).¹¹ A standardized cognitive-behavioural anger management program was shown to improve the utilization of positive coping skills to a statistically

significant degree compared to the control group. Furthermore, the program was reported to decrease both the utilization of avoidance coping methods and the mismanagement of psychiatric symptoms, albeit to a statistically insignificant level when compared to the standard of care. Also, a negligible change in the management of assaultive behaviours was measured pre- and post-intervention for both of the groups, with the music therapy group regressing post-test. Ultimately, the results obtained show the potential that an informed, individualized cognitive-behavioural music therapy approach has to improve various elements of behaviour management in a forensic context. However, akin to the theme of self-esteem, the proposed relationship between music therapy and behaviour management must be met with extreme caution due to the methodological quality of the study reviewed. Specifically, the paper was rated as having a moderate risk of bias due to the absence of allocation concealment and a clearly defined randomization method (see Table 3). The small sample size ($n=13$) may have further reduced the precision of the results obtained.

Social skills were simultaneously addressed in the same RCT ($n=13$).¹¹ The group to receive music therapy displayed a more substantial average improvement with regards to the usage of interpersonal skills compared to the group which received the standard of care, but the between-group difference was insignificant. The results indicate that potential may exist for the use of music therapy to improve social skills in forensic patients, but such conclusions should be treated with skepticism due to the aforementioned methodological errors.

Moreover, the effects of different music therapy approaches on mood-related constructs were examined in a single cross-over pRCT.¹³ Similar improvements in each outcome assessed (relaxation, mood/emotion, thoughts/insights) were consistently measured pre- and post-session regardless of the music therapy approach utilized. Further, the between-group differences were

statistically insignificant. Thus, this evidence serves to underscore that music therapy, irrespective of the method used, can enhance mood-related constructs in a forensic mental health context. Similar to the other outcomes and papers discussed, the relationship discussed remains questionable due to the poor methodology of the study, as despite being controlled, it did not incorporate randomization or blinding (see Table 3). Additionally, as the researchers employed the use of self-developed scales, the validity of the measures used is unknown.

On the topic of program duration, the only two studies to report statistically significant results conducted a minimum of 20 music therapy sessions. Thus, it appears that a minimum of 20 music therapy sessions, regardless of the approach utilized, need to be completed before clinically-important changes can be measured. Still, the relationship proposed remains unvalidated as the number of relevant studies with sufficient descriptions of session length and volume is minimal (see Table 2).

Additionally, it must be noted that some of the measures utilized in the studies reviewed were self-reported scales (e.g. ICL). Although all of the self-reporting measures used had displayed appropriate levels of validity and reliability, it is impossible to determine how truthfully the participants completed these assessments.¹¹⁻¹³ In that sense, participants may have over-rated the effects of music therapy or the standard of care to please their health care provider. Thus, the results of the studies reviewed may be skewed by social desirability bias.⁴¹

Limitations of the review

The results of this review should be taken with consideration of the lack of studies included (n=3) and their small sample sizes (n<51), as statistics reported may be imprecise. Additionally, as no statistical analysis was performed in this review, uncertainty remains regarding the pooled effect of music therapy interventions on the outcomes discussed. The weak

methodological nature of the studies reviewed acts as another hindrance, for two of the three were graded as having a high risk of bias using a modified Cochrane quality assessment, with the other study being rated as having a moderate risk of bias (see Table 2). Finally, the absence of any long-term outcome assessment in any of the studies reviewed makes it impossible to comment on the effects of music therapy following an individual's exit from the forensic mental health system.

Future implications

This review identified the major findings related to the use of music therapy in the context of forensic mental health. As shown, a variety of music therapy approaches have the potential to improve a broad range of mental health outcomes in forensic patients. However, the lack of research in this emerging field - let alone quality research - renders the task of making recommendations for future practice difficult. More methodologically-rigorous studies must be completed before such recommendations can be made. Further research into the topic, underlain by protocols which ensure methodological quality, is of great necessity. Avenues of exploration could include the effects of other music therapy approaches in the forensic context, such as guided imagery, or what the "dose-response" relationship is between music therapy (number and length of sessions) and the mental health of forensic patients. Additionally, the effects of music therapy on other elements of forensic mental health could be examined, as depression and anxiety have yet to be studied in this context.

Conclusion

Current evidence from effectiveness studies suggests that music therapy holds the potential to improve self-esteem, behaviour management, social skills, and mood-related constructs in forensic patients. However, the lack of methodologically-rigorous studies in this field diminishes the strength of any proposed relationships. Thus, further, higher-quality research needs to be completed before any recommendations can be made regarding the application of music therapy interventions to improve mental health in the forensic context.

References

1. Bettridge S, Barbaree H, Psych C. The forensic mental health system in Ontario: An information guide. Toronto (ON): Centre for Addiction and Mental Health; 2004.
2. Bloom JD, Novosad D. The Forensic Mental Health Services Census of Forensic Populations in State Facilities. *The journal of the American Academy of Psychiatry and the Law*. 2017 Dec;45(4):447-51.
3. Schanda H, Stompe T, Ortwein-Swoboda G. Dangerous or merely ‘difficult’? The new population of forensic mental hospitals. *European Psychiatry*. 2009 Sep 1;24(6):365-72.
4. Wik A, Hollen V, Fisher WH. Forensic patients in state psychiatric hospitals: 1999–2016. Alexandria, VA: National Association of State Mental Health Program Directors (NASMHPD). 2017 Aug.
5. MacInnes D, Masino S. Psychological and psychosocial interventions offered to forensic mental health inpatients: a systematic review. *BMJ open*. 2019 Mar 1;9(3):e024351.
6. Kern P. Announcing WFMT’s new definitions of music therapy. Carolina del Norte: World Federation of Music Therapy. Recuperado de: <https://bit.ly/2JPXEiI>. 2011.
7. Leubner D, Hinterberger T. Reviewing the effectiveness of music interventions in treating depression. *Frontiers in psychology*. 2017 Jul 7;8:1109.
8. Gold C, Solli HP, Krüger V, Lie SA. Dose–response relationship in music therapy for people with serious mental disorders: Systematic review and meta-analysis. *Clinical psychology review*. 2009 Apr 1;29(3):193-207.
9. Weller CM, Baker FA. The role of music therapy in physical rehabilitation: a systematic literature review. *Nordic Journal of Music Therapy*. 2011 Feb 1;20(1):43-61.

10. Knabb JJ, Welsh RK, Graham-Howard ML. Treatment alternatives for mentally disordered offenders: A literature review. *Psychology*. 2011 Mar 29;2(02):122.
11. Hakvoort L, Bogaerts S, Thaut MH, Spreen M. Influence of music therapy on coping skills and anger management in forensic psychiatric patients: An exploratory study. *International journal of offender therapy and comparative criminology*. 2015 Jul;59(8):810-36.
12. Johnson ER. The role of objective and concrete feedback in self-concept treatment of juvenile delinquents in music therapy. *Journal of Music Therapy*. 1981 Oct 1;18(3):137-47.
13. Thaut MH. The influence of music therapy interventions on self-rated changes in relaxation, affect, and thought in psychiatric prisoner-patients. *Journal of Music Therapy*. 1989 Oct 1;26(3):155-66.
14. Hakvoort L. A music therapy anger management program for forensic offenders. *Music Therapy Perspectives*. 2002 Jan 1;20(2):123-32.
15. Nolan P. Insight therapy: Guided imagery and music in a forensic psychiatric setting. *Music therapy*. 1983 Jan 1;3(1):43-51.
16. Chen XJ, Leith H, Aarø LE, Manger T, Gold C. Music therapy for improving mental health problems of offenders in correctional settings: Systematic review and meta-analysis. *Journal of Experimental Criminology*. 2016 Jun 1;12(2):209-28.
17. Benson K, Hartz AJ. A comparison of observational studies and randomized, controlled trials. *New England Journal of Medicine*. 2000 Jun 22;342(25):1878-86.
18. Coddington, P.A. A comprehensive survey of music therapists practicing in correctional psychiatry: Demographics, conditions of employment, service provision, assessment,

- therapeutic objectives, and related values of the therapist. *Music therapy perspectives*,. 2002;20(2), pp.56-68.
19. Blascovich J, Tomaka J. Measures of self-esteem. *Measures of personality and social psychological attitudes*. 1991;1:115-60.
 20. Sowislo JF, Orth U. Does low self-esteem predict depression and anxiety? A meta-analysis of longitudinal studies. *Psychological bulletin*. 2013 Jan;139(1):213.
 21. Baumeister RF, Smart L, Boden JM. Relation of threatened egotism to violence and aggression: The dark side of high self-esteem. *Psychological review*. 1996 Jan;103(1):5.
 22. Greenwald AG, Banaji MR, Rudman LA, Farnham SD, Nosek BA, Mellott DS. A unified theory of implicit attitudes, stereotypes, self-esteem, and self-concept. *Psychological review*. 2002 Jan;109(1):3.
 23. Foster C, Bowers L, Nijman H. Aggressive behaviour on acute psychiatric wards: prevalence, severity and management. *Journal of advanced nursing*. 2007 Apr;58(2):140-9.
 24. Hutchings J, Appleton P, Smith M, Lane E, Nash S. Evaluation of two treatments for children with severe behaviour problems: child behaviour and maternal mental health outcomes. *Behavioural and cognitive psychotherapy*. 2002 Jul;30(3):279-95.
 25. Heilbrun AB, Knopf IJ, Bruner P. Criminal impulsivity and violence and subsequent parole outcome. *The British Journal of Criminology*. 1976 Oct 1;16(4):367-77.
 26. Nuffield J. *Parole decision-making in Canada: Research towards decision guidelines*. Ottawa, Canada: Communication Division, Solicitor General of Canada; 1982.

27. Eisenberg N, Fabes RA, Guthrie IK, Reiser M. Dispositional emotionality and regulation: their role in predicting quality of social functioning. *Journal of personality and social psychology*. 2000 Jan;78(1):136.
28. Murrie DC, Warren JI, Kristiansson M, Dietz PE. Asperger's syndrome in forensic settings. *International Journal of Forensic Mental Health*. 2002 Apr 1;1(1):59-70.
29. Brown TA. Temporal course and structural relationships among dimensions of temperament and DSM-IV anxiety and mood disorder constructs. *Journal of Abnormal Psychology*. 2007 May;116(2):313.
30. Friel A, White T, Hull A. Posttraumatic stress disorder and criminal responsibility. *The Journal of Forensic Psychiatry & Psychology*. 2008 Mar 1;19(1):64-85.
31. Paulson MJ, Coombs RH, Landsverk J. Youth who physically assault their parents. *Journal of family violence*. 1990 Jun 1;5(2):121-33.
32. Chen XJ, Hannibal N, Gold C. Randomized trial of group music therapy with Chinese prisoners: impact on anxiety, depression, and self-esteem. *International journal of offender therapy and comparative criminology*. 2016 Jul;60(9):1064-81.
33. Gold C, Assmus J, Hjørnevik K, Qvale LG, Brown FK, Hansen AL, Waage L, Stige B. Music therapy for prisoners: Pilot randomised controlled trial and implications for evaluating psychosocial interventions. *International Journal of Offender Therapy and Comparative Criminology*. 2014 Dec;58(12):1520-39.
34. Tyson EH. Hip hop therapy: An exploratory study of a rap music intervention with at-risk and delinquent youth. *Journal of Poetry Therapy*. 2002 Mar 1;15(3):131-44.

35. Gallagher LM, Steele AL. Music therapy with offenders in a substance abuse/mental illness treatment program. *Music Therapy Perspectives*. 2002 Jan 1;20(2):117-22.
36. Reed KJ. Music therapy treatment groups for mentally disordered offenders (MDO) in a state hospital setting. *Music Therapy Perspectives*. 2002 Jan 1;20(2):98-104.
37. Choi AN, Lee MS, Lim HJ. Effects of group music intervention on depression, anxiety, and relationships in psychiatric patients: a pilot study. *The Journal of alternative and complementary medicine*. 2008 Jun 1;14(5):567-70.
38. Allermann, E. Musiktherapeutische Arbeit mit verwahrlosten Jugendlichen: Ideen für ein Konzept. *Music therapy with juvenile delinquents. Musiktherapeutische Umschau*. 1989; 10(4), 267–274.
39. Zeuch, A., & Hillecke, T. Ergebnisse musiktherapeutischer Entspannung im sozialtherapeutischen Strafvollzug: Eine qualitativ-quantitative Orientierungsstudie [Results of music therapeutic relaxation in a social-therapeutic penal system: a qualitative-quantitative orientation study]. *Musik-, Tanz- und Kunsttherapie*. 2004;15(1), 16–23.
40. Higgins JP, Altman DG, Gøtzsche PC, Jüni P, Moher D, Oxman AD, Savović J, Schulz KF, Weeks L, Sterne JA. The Cochrane Collaboration's tool for assessing risk of bias in randomised trials. *Bmj*. 2011 Oct 18;343:d5928.
41. Fisher RJ. Social desirability bias and the validity of indirect questioning. *Journal of consumer research*. 1993 Sep 1;20(2):303-15.