EFFECTS OF MUSIC IMPROVISATION IN MUSIC THERAPY: SYSTEMATIC REVIEW

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Abstract - The effects of different music experiences have been presented in several systematic reviews. On the other hand, musical improvisation, one of the major musical experiences in music therapy has not yet been addressed in systematic reviews. The aim of this article is to conduct a systematic review to evaluate the effectiveness of musical improvisation in music therapy randomized controlled trials (RCTs). Altogether, it was found 10 studies, 85 outcomes and 50 of these (58.82 %) were statistically significant (P<0.05) The studies reviewed presented a good (not perfect) standard of excellence in terms of methodological quality (average of 3.9 on a scale of 1 to 5) evaluated by Jadad Scale (instrument of methodological quality). Owing to the absence of similar research questions, it was not possible to calculate the meta-analysis estimative. Therefore, further studies with higher methodological quality, greater quality of data and similar research questions are needed to define the role of musical improvisation in music therapy according to RCTs.

Keywords: music therapy, music improvisation, randomized controlled trials

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INTRODUCTION

The effects of different music experiences have been presented in several systematic reviews (CHAN et al., 2011; IRONS et al., 2010; MOSSLER et al., 2011). Some of these reviews present results of specific interventions such as singing and listening to music, for example (CHAN et al., 2011; Irons et al., 2010). Irons et al. evaluated the effect of singing in children and adults with cystic fibrosis (IRONS et al., 2010). However, this study did not present enough evidence about the benefits of such intervention. The studies of musical listening show more compelling results. Chan et al found that listening to music reduces depressive behaviors (CHAN et al., 2011).

On the other hand, musical improvisation, one of the major musical Interventions in music therapy (AIGEN, 2009;), has not yet been addressed in systematic reviews. Musical improvisation can be defined as the free music-making using the voice, movements, or musical instruments (BERKOWITZ & ANSARI, 2010).

In cognitive terms, improvisation is characterized as a process of spontaneous generation, selection and implementation of new auditory-motor sequences (BERKOWITZ & ANSARI, 2010). Improvisation is linked to creativity because in order to create music it is necessary to explore and experiment with different sounds (BIASUTTI & FREZZA, 2009). At the same time, improvisation involves analytical processes as it uses logical reasoning for combining sounds (BIASUTTI & FREZZA, 2009). In this sense, musical improvisation is characterized by a complex activity that utilizes elements of creativity, spontaneity, and also logical reasoning and planning.

There are several ways of using improvisation in music therapy and they can be broadly divided into two categories: structured improvisation and free improvisation (BERKOWITZ & ANSARI, 2010). In structured improvisation, the individual receives some guidance for his musical play (use of specific notes or

rhythms, for example). In free improvisation, the individual structures the rhythmic, melodic or harmonic elements in a free way.

Music therapy uses musical improvisation as the center of many approaches (WIGRAM, 2004). For this reason, music therapists are the professionals that make most empirical use of musical improvisation in their therapeutic practice. This musical experience is the focus of Nordoff-Robbins approach (also known as creative music therapy), and of Analytical approach (also known as Juliette Alvin approach) (WIGRAM, 2004).

Most articles dealing with the effects of musical improvisation in music therapy are theoretical studies, case studies and quasi-experimental studies (KIM et al., 2008). However, there are a limited number of randomized controlled trials (RCTs) on this subject (KIM et al., 2008). Moreover, there is none systematic review about music improvisation in music therapy. For this reason, the objective of this article is to conduct a systematic review to evaluate the effectiveness of musical improvisation in music therapy RCTs. It is believed that musical improvisation in music therapy can have beneficial results in the same way as systematic reviews about musical listening.

METHOD

This research is a systematic review without meta-analysis. The investigation was structured based on PRISMA statement for reporting systematic reviews and meta-analyses of studies that evaluate healthcare interventions (LIBERATI et al., 2009).

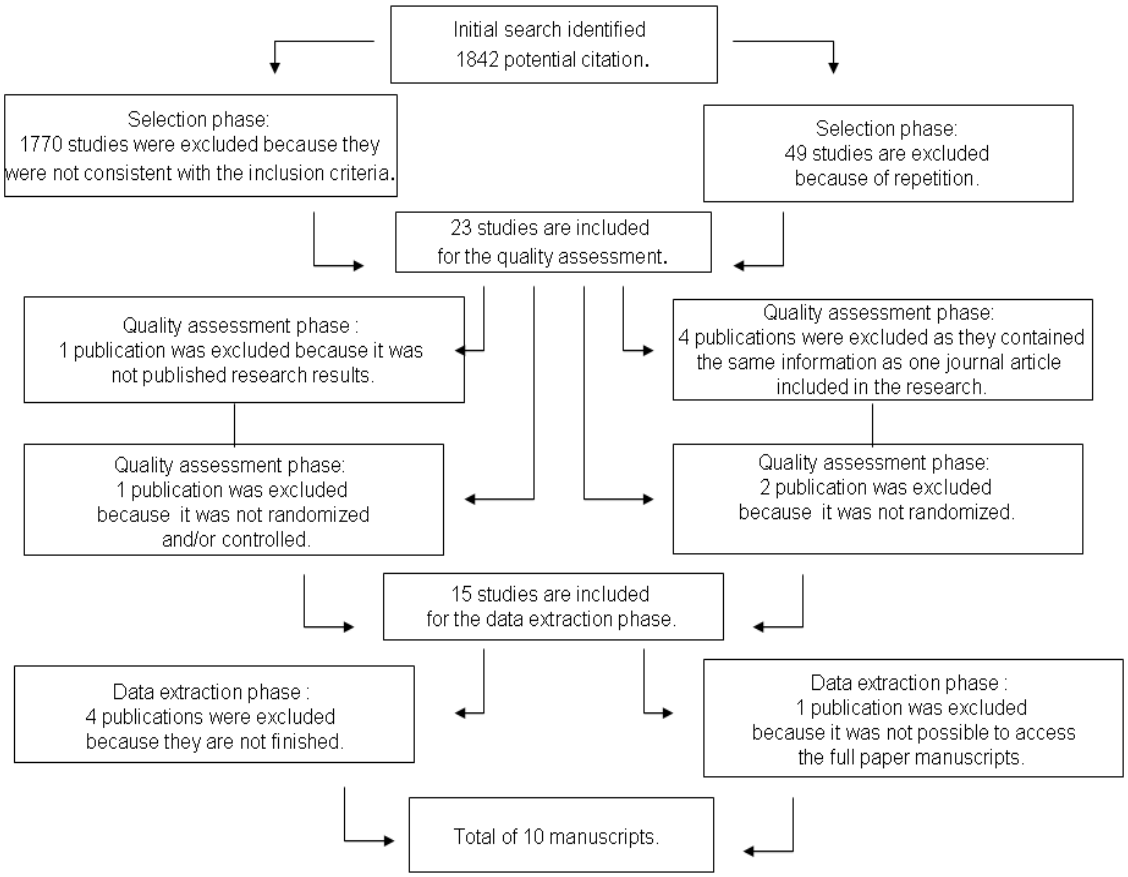
Inclusion criteria and filtering process

It was sought randomized controlled trials where musical improvisation was used as a primary or secondary model of intervention in music therapy compared with a control group. There was no restriction on age, outcomes or type of pathology in the inclusion criteria. Publications were chosen between the

years 1989 through September 2013 in the following databases: CAIRSS for Music, CINAHL, ClinicalTrials.gov, the Cochrane Central Register of Controlled Trials (CENTRAL), Current Controlled Trials, LILACS, MEDLINE, National Research Register, NIH CRISP, Proquest Digital Dissertations, PsycINFO, Science Citation Index, and SCOPUS. The search in these 12 databases was restricted to the English language. The descriptors in the databases used were: "music therapy" and “improvisation”, “music therapy” and "improvisational" or “music therapy” and “randomized controlled trials”.

The organization of this systematic review was divided into the following phases: references search, selection of manuscript, quality assessment of publications, and extraction of research data. Figure 1 shows the process of filtering articles:

Figure 1.Filtering process of manuscripts



Selection data, quality assessment and data analysis

Randomized controlled trials were selected independently by two authors and included those which used improvisation as a main or secondary form of intervention. For quality assessment, the same authors independently assessed the methodological quality of the manuscripts. Disagreements were solved through discussion. The Jadad Scale instrument of methodological quality (OLIVO et al., 2008) was used in order to evaluate all randomized controlled trials included here. Data extraction was carried out by a reviewer, using a standardized coding and these were validated by a second reviewer. The information obtained from each study were: study characteristics (eg, language of publication, country, funding), the characteristics of the study population, description of intervention and comparisons (type of music, method of administration, for example), statistical analysis, outcome measures, assessment instruments and results.

Statistical analysis

The selected data was presented by mean difference, effect size, relative risk and odds ratio. The statistics of effect size, relative risk and odds ratio was described as measures of association (evaluating clinical relevance). The number necessary to treat (NNT) was the impact measure evaluated. Statistical significance considered for all outcomes was $P<0.05$.

RESULTS

Table 1 describes results of the data analysis. The selected descriptors found a total of 1842 references, and only 15 manuscripts remained after reading the title and abstracts of these publications. These manuscripts were read in their totality and analyzed according to the inclusion criteria. We selected thus a total of 10 publications (ALBORNOZ, 2011; CARR et al., 2012;

ERKKILA et al., 2011; FACHNER et al., 2013; GOLD et al., 2013; GOODING, 2011; KIM et al., 2008; 2009; RICKSON, 2006; VIANNA et al., 2011) : Studies came from: Brazil (n=1) (VIANNA et al., 2011), Finland and Norway (n=2) (ERKKILA et al., 2011; FACHNER, 2013), South Korea, Norway and Denmark (KIM et al., 2008, 2009) (n=2), New Zealand (n=1) (RICKSON, 2006), United Kingdon (n=1) (CARR et al., 2012), United States (n=1) (GOODING, 2011), Venezuela (n=1) (ALBORNOZ, 2011) and one multicenter study (GOLD et al., 2013). Five out of the ten publications were conducted through international collaboration (ERKKILA et al., 2011; FARCHNER, 2011; GOLD et al., 2013; KIM et al., 2008; 2009).

The total number of participants in all studies was n=489, with an average of n= 48,9 participants per study. Four studies had only male participants (ALBORNOZ, 2011; KIM et al., 2008, 2009; RICKSON, 2006) and one only women participants (VIANNA et al., 2011). As presented in table 1, clinical context was the most prevalent care setting. This factor is directly related to the population served in the studies.

OUTCOME MEASURES

Emotional symptoms: depression symptoms, anxiety symptoms, self-esteem, motivation and vitality behaviors

Depression studies were examined in four studies (ALBORNOZ, 2011; CARR et al., 2012; ERKKILA et al.,2011; FACHNER et al., 2013). Both studies presented positive results in different scales for depression and negative symptoms. Anxiety symptoms were evaluated in two studies (ERKKILA et al., 2011 and FACHNER et al., 2013) People with unipolar depression receiving music therapy plus standard care (ERKKILA et al., 2011) showed greater improvement than those receiving standard care only in anxiety symptoms in HADS-A scores. In other study of this same project, Fachner et al. (2013) found

that pre/post increased Frontal Midline Theta (FMT) and decreased HADS-A scores (r = .42, P<0,05) indicate reduced anxiety after music therapy. Self-esteem behaviors were studied in one study (GOLD et al., 2013), but without positive results. Gold et al. (2013) found positive results for motivation and vitality.

Social skills: social-emotional aspects, social behaviors and social communication behaviors

Social-emotional aspects were examined in two studies (GOLD et al., 2013; KIM et al., 2009). Gold et al. (2013) analyzed in adults with non-organic mental disorders and low therapy motivation social avoidance through music and affect regulation (SANS), but a positive result was not found. Kim et al. (2009) studied in children with autism spectrum disorders in events of 'joy, emotional synchronicity, compliant response, initiation of engagement and no response behaviors. All outcomes were statistically significant. Social behaviors were evaluated in 3 studies (GOLD et al., 2013; GOODING, 2011; KIM et al., 2009). In all studies it was found positive results in social behaviors and competences. The study of Kim et al. (2008) evaluated social-communication skills in children with autism and found that music therapy was more effective joint attention behaviors and non-verbal social communication skills in children than play with toys.

Clinical global impressions

Two studies analyzed general functioning symptoms according to General Assessment of Functioning Scale (GAF) , by the Brief Symptoms Inventory (BSI-18) and by the Clinical Global Impressions Scale (CGI-S) (ERKKILA et al., 2011 and GOLD et al., 2013). Both studies found positive results (in CGI-S and GAF scale).

Post-traumatic stress symptoms

The study of Carr et al. (2012) evaluated post-traumatic symptoms by the Impact of Events Scale Revised (IES-R). Treatment-group patients experienced a significant reduction in severity of Post-traumatic Stress disorder symptoms.

Motor Skills

Rickson (2006) examined hyperactive motor behaviors in children with attention deficit hyperactivity disorder. No statistical difference was found between the impact of the contrasting approaches as measured by a Synchronized Tapping Task (STH) and the parent and teacher versions of Conners' Rating Scales Restless-Impulsive (R-I) and Hyperactive-Impulsive (H-I) subscales.

Breastfeeding rates

Vianna et al. (2011) examined breastfeeding rates in mothers of premature infants. Breastfeeding was significantly more frequent in the music therapy group at the first follow-up visit.

Quality of included studies

Study quality was measured by the instrument of methodological analysis Jadad Scale (OLIVO et al., 2008). This instrument has a range of scores between 1 (worst) to 5 (best) for randomized controlled trials. The parameters evaluated were: randomization (2 points), blinding (2 points) and counting of drop-outs.(1 point). The randomization and blinding items have two points because an extra point is added in the scoring if these methods are described

adequately. There are 7 items that are analyzed in Jadad scale. The last 2 attract a negative score, which means that the range of possible scores is 0 (bad) to 5 (good). The 7 items are: 1. Was the study described as randomized (this includes words such as randomly, random, and randomization)? (+1 Point) 2. Was the method used to generate the sequence of randomization described and appropriate (table of random numbers, computer-generated, etc)? (+1 Point) 3. Was the study described as double blind? (+1 Point) 4. Was the method of double blinding described and appropriate (identical placebo, active placebo, dummy, etc)? (+1 Point) 5. Was there a description of withdrawals and dropouts? (+1 Point) 6. Deduct one point if the method used to generate the sequence of randomization was described and it was inappropriate (patients were allocated alternately, or according to date of birth, hospital number, etc) 7. Deduct one point if the study was described as double blind but the method of blinding was inappropriate (e.g., comparison of tablet vs. injection with no double dummy). The results of Jadad score are presented in table 2.

Table 1. Main results of selected publications

AUTHOR	METHOD	SETTING	PARTICIPANTS	INTERVENTION	OUTCOMES	RESULTS
1. Albornoz (2011)	RCT (2 Groups) Randomization was achieved using a computerized randomization table and variable block randomization	Clinical setting	Substance abuse patients in abstinence (24 male, aged 16-60)	Experimental group: free group improvisation and discussion sessions, once weekly for three months, 2 hours each one, total of 12 sessions and standard care. Control group: standard care. Individual psychotherapy, group psychotherapy (emotional and cognitive-behavioral groups), family and couple groups, and morning groups conducted by advanced patients, pharmacotherapy, recreational, social and sport activities, special activities, general medical care, and social work assistance.	Beck Depression Inventory (BDI) and Hamilton Rating Scale for Depression (HRSD) at baseline and after intervention.	Results showed that both groups were equally matched on all pre-test measures. As for post-test measures, significant differences were found between the groups on HRSD but not the BDI. The experimental group was significantly less depressed after treatment than the control group, as measured by the HRSD. Improvisational music therapy led to statistically significant greater improvements in psychologist-rated depression (HRSD) when compared with the regular treatment program alone. P<0.05 in 1 of 2 outcomes.
2. Carr et al. (2012)	RCT – (2 groups) Randomization method was not given	Clinical setting	Patients with post-traumatic stress disorder (PTSD, n=16,7 male, 9 women, aged 18-65)	Experimental group: structured group improvisation, 10 sessions in 10 weeks (1 hour per session) Control group: wait-list (10 weeks).	Impact of Events Scale Revised (IES-R) and Beck Depression Inventory-II (BDI-II)	Treatment-group patients experienced a significant reduction in severity of PTSD symptoms (−20.18; 95% confidence interval [CI]: [−31.23, −9.12]) and a marginally significant reduction in depression (−11.92; 95%CI: [−24.05, 0.21]) at 10 weeks from baseline. P<0.05 in 12 of 15 outcomes.

3. Erkkila et al. (2011)	RCT (2 Groups) Participants were randomized using simple randomization with a 10:7 ratio of standard care to music therapy	Clinical setting	Unipolar depression patients (n=79, 17 male, 62 women, aged 35.65 ± 9.75)	Experimental group: Free individual improvisation and discussion sessions, bi-weekly, 60 minutes each one, total of 20 sessions and standard care. Control intervention: standard care. Short-term psychotherapy intervention (5–6 individual sessions) conducted by nurses specially trained in depression, medication (antidepressants) and psychiatric counseling (appointments for advice, follow-up and support when needed). The use of medication was reported.	Montgomery–Asberg Depression Rating Scale(MADRS), Hospital Anxiety and Depression Scale – Anxiety (HADS-A), - Global Assessment of Functioning (GAF) scores, Ronto Alexithymia Scale (RAS) and Health-related quality of life survey –at baseline, 3 months (after intervention) and at 6 months.	Participants receiving music therapy plus standard care showed greater improvement than those receiving standard care only in depression symptoms (mean difference 4.65, 95% CI 0.59 to 8.70), anxiety symptoms (1.82, 95% CI 0.09 to 3.55) and general functioning (74.58, 95% CI 78.93 to 70.24) at 3-month follow-up. The response rate was significantly higher for the music therapy plus standard care group than for the standard care only group (odds ratio 2.96, 95% CI 1.01 to 9.02). P<0.05 in 3 of 8 outcomes.

4. Fachner et al. (2013)	RCT (2 Groups) Participants were randomized using simple randomization with a 10:7 ratio of standard care to music therapy	Clinical setting	Unipolar depression patients (n=79, 17 male, 62 women, aged 35.65 ± 9.75)	Experimental group: Free individual improvisation and discussion sessions, bi-weekly, 60 minutes each one, total of 20 sessions and standard care. Control intervention: standard care. Short-term psychotherapy intervention (5–6 individual sessions) conducted by nurses specially trained in depression, medication (antidepressants) and psychiatric counseling (appointments for advice, follow-up and support when needed). The use of medication was reported.	Correlations between Montgomery–Asberg Depression Rating Scale(MADRS), Hospital Anxiety and Depression Scale – Anxiety (HADS-A), and Frontal alpha asymmetry (FAA) and Frontal midline theta (FMT) measures. Pre/post topographic changes.	After 3 month of MT, lasting changes in resting EEG were observed, i.e., significant absolute power increases at left fronto-temporal alpha, but most distinct for theta (also at left fronto-central and right temporo-parietal leads). P<0.05 in 7 of 8 outcomes.
5. Gold et al (2013)	RCT (2 Groups) Participants were randomized by block size and stratification by diagnosis and treatment center	Clinical setting	Adults with non-organic mental disorders and low therapy motivation (n=144, 75 male, 52 women, aged 33.99±11.33)	Experimental group: 3 months of structured, biweekly individual, resource-oriented Music therapy plus treatment as usual (TAU) Control group: treatment as usual (TAU)	Negative symptoms (SANS), General symptoms (BSI-18) Functioning (GAF), Clinical global impressions (CGI-S), Activity and engagement in music (IiM A&E), Social avoidance through music (IiM SA), Motivation for change (URICA), Motivation (SANS) Self-efficacy (GSE), Self-esteem (RSE), Vitality (SF-36), Affect regulation (SANS), Relational competencies , Social relationships (self; Q-LES-Q), Social relationships (observer; SANS)	MT was superior to TAU for total negative symptoms (SANS, d = 0.54, p < 0.001) as well as functioning, clinical global impressions, social avoidance through music, and vitality (all p < 0.01). P<0.05 in 10 of 30 outcomes.

6. Gooding (2011)	RCT - (2 Groups) Randomization method was not given	After-school setting	Normal children and children with behavioral or social problems (n=20, 8 male, 12 women)	Experimental group: structured individual improvisation, once weekly,45 minutes each one, total of 5 sessions. Control group: wait-list (5 weeks).	Subject self-reported social functioning using the Social Skills Assessment-Elementary Age, Staff Social Competence Ratings via the Home and Community Social Behavior Scales, Behavior Scales-Social Competence and Antisocial Subscales at pre-test and post test. Behavioral observations of on-task social behavior of the experimental group during treatment.	Results indicated no significant differences for staff ratings of participants' social competence or antisocial behaviors pre and post music therapy intervention. However, a significant improvement from pre to post treatment in experimental subject self-ratings of social functioning was found, as well as a significant improvement in on-task behavior for the experimental group during music therapy sessions. P<0.05 in 2 of 4 outcomes.
7. Kim et al (2008)	RCT - 3 group repeated measures design Randomization method was not given	Clinical setting	Autistic children patients (n=10 male, aged 3-5)	Structured and free individual improvisation.	Pervasive Developmental Disorder Behavior Inventory-C, Early Social Communication Scales at pre-test and post-test. Applied behavior analysis of gaze and turn-taking at sessions 1, 4, 8 and 12.	The overall results indicated that improvisational music therapy was more effective at facilitating joint attention behaviors and non-verbal social communication skills in children than play. Session analysis showed significantly more and lengthier events of eye contact and turn-taking in improvisational music therapy than play sessions. P<0.05 in 3 of 4 outcomes.
8. Kim et al (2009)	RCT - 3 group repeated measures design Randomization method was not given	Clinical setting	Autistic children patients (n=10 male, aged 3-5)	Experimental group: structured and free individual improvisation, once weekly sessions, 30 minutes each one, total of 12 sessions. Control group: play sessions with toys, once weekly sessions, 30 minutes each one, total of 12 sessions.	Applied behavior analysis: events of 'joy, emotional synchronicity, compliant response, initiation of engagement and no response behaviors in the children at sessions 1, 4, 8 and 12.	In response to the therapist's interpersonal demands, compliant (positive) responses were observed more in music therapy than in toy play sessions, and 'no responses' were twice as frequent in toy play sessions as in music therapy sessions. P<0.05 in 6 of 6 outcomes.

9. Rickson (2006)	RCT - (3 Groups) Randomization method was not given	School setting	Attention deficit hyperactivity disorder patients (13 male, aged 11-16)	Experimental group 1: structured group improvisation, 8 sessions in 10 weeks (length of sessions was not described). Experimental group 2: instructional music therapy approach, 8 sessions in 10 weeks (length of sessions was not described). Control group: wait-list (10 weeks).	Synchronised Tapping Task (STH) and the parent and teacher versions of Conners' Rating Scales, Restless-Impulsive(R-I) and Hyperactive-Impulsive(H-I) subscales at pre-test and post-test intervention.	No statistical difference was found between the impact of the contrasting approaches as measured by a Synchronized Tapping Task (STH) and the parent and teacher versions of Conners' Rating Scales Restless-Impulsive (R-I) and Hyperactive-Impulsive (H-I) subscales. P<0.05 in 4 of 4 outcomes.
10. Vianna (2011)	RCT - (2 Groups) subjects were randomized in a 1:1 Block randomization was used, with eight subjects (four for each arm).	Clinical setting	Mothers of premature infants with a birth weight ≤ 1,750 g (n=94, aged 12-40)	Experimental group : group music therapy, three times a week (60 minutes per session), during 3 weeks. Control group : usual care during hospital admission and follow-up visits.	Any breastfeeding /Non-breastfeeding ratio at first follow-up visit, 30-day follow-up visit and 60-day follow-up visit.	Breastfeeding was significantly more frequent in the music therapy group at the first follow-up visit [relative risk (RR) = 1.26; 95% confidence interval (95%CI) = 1.01-1.57; p = 0.03; number needed to treat (NNT) = 5.6]. P<0.05 in 2 of 4 outcomes.

Table 2. Jadad score of the ten publications included

Study	Randomization	Blinding	Counting of participants	Total Score
1. Albornoz (2011)	2	0	1	3
2. Carr et al. (2012)	1	1	1	3
3. Erkkila et al. (2011)	2	2	1	5
4. Fachner et al. (2013)	2	2	1	5
5. Gold et al. (2013)	2	2	1	5
6. Gooding (2011)	1	1	1	3
7. Kim et al (2008)	1	2	1	4
8. Kim et al (2009)	1	2	1	4
9.Rickson (2006)	1	0	1	2
10. Vianna et al. (2011)	2	2	1	5

Interventions effects (comparison: music therapy versus "placebo" therapy)

Altogether, it was found 10 studies, 85 outcomes and 50 of these were statistically significant (58.82%). Analyzing the effects of interventions, according to the association statistics, it found the following results:

Depression symptoms: treatment with music improvisation in music therapy presented better results than placebo therapy (ALBORNOZ, 2011; CARR et al., 2012; ERKKILA et al.,2011; FACHNER et al., 2013). Two studies presented effect size statistics for this outcome. Erkkila et al. (2011) found an effect size of d=0.65 (confidence interval was not informed by authors). In the same study the response rate was significantly higher for the music therapy plus standard care group than for the standard care only group (odds ratio 2.96, 95% CI 1.01 to 9.02). Gold et al. (2013) verified one effect size for negative symptoms (SANS) of d=- 0.54 (–0.84,–0.24) (excluding 10 participants) and d= –0.38 (–0.7,–0.06) (including all participants).

Motivation and vitality behaviors: Gold et al. (2013) verified that music improvisation in music therapy was more effective than standard care and found an effect size of d=–0.54 (–1.01,–0.06) for motivation (Scale for the Assessment of Negative Symptoms, SANS) and d= –0.67 (0.18, 1.16) for vitality (SF-36 scale).

Social skills: different social skills had positive effect in comparison with placebo therapy. The studies of Kim et al. (2008) and Gold et al. (2013) describe values of effect sizes. Gold et al. (2013) found an effect size for Social avoidance through music of d=0.53 (–0.92,–0.15), d=0.53 (–0.92,–0.15) for affect regulation (SANS) and d=–0.35 (–0.64,–0.06) for Social relationships (observer; SANS). Kim et al. (2008) found an effect size of d = 0.97 (95% CI ranging from 0.20 to 1.74) for joint attention in the Early Social Communication Scale.

Clinical global impressions: Erkkila et al. (2011) and Gold et al, (2013) verified that music improvisation in music therapy was more effective than standard care in Functioning (GAF) d=–0.64 (0.21, 1.06) (excluding 10 participants) and d=. –0.45 (0.03, 0.86) (including all participants), and in Clinical Global Impressions (CGI-S) d=–0.91 (–1.33,–0.5).

Breastfeeding rate: Vianna et al. (2011) verified that were breastfeeding was significantly more frequent in the music therapy group at the first follow-up visit [relative risk (RR) = 1.26; 95% confidence interval (95%CI) = 1.01-1.57; P = 0.03; number needed to treat (NNT) = 5.6]. Moreover, this group showed higher breastfeeding rates at the moment of infant discharge (RR = 1.22; 95%CI = 0.99-1.51; P = 0.06; NNT = 6.3), and at days 30 and 60 after discharge (RR = 1.21; 95%CI = 0.73-5.6; P = 0.13 and RR = 1.28; 95%CI = 0.95-1.71; P = 0.09, respectively), but those results were not statistically significant.

DISCUSSION

Of the ten studies included, the majority points to the greater benefits of improvisation in relation to the control treatment, 50 of the 87 outcomes

assessed (58.82%) were statistically significant. However, 37 of 85 outcomes (41.18%) were not significant and cannot be disregarded. All studies presented positive outcomes for improvisation in relation to the control treatment. This is an interesting factor, because studies ranged in population and age group. The proportion of positive outcomes is smaller than that presented in the study of musical listening in people with depression as pointed out by Chan et al. (2011), a non music therapy study,. However, the population of Chan's review is much more homogeneous than the present review. Musical improvisation showed favorable results in both the individual and group modality. The same was found with free improvisation and structured improvisation. Due to these findings, it is not possible to determine whether the type of improvisation or the type of care influences the treatment results.

Improvisation in music therapy presented satisfactory results for two specific groups of pathologies: developmental disorders (KIM et al., 2008;2009; RICKSON, 2006) and for adult mental disorders (ALBORNOZ, 2011; ERKKILA et al., 2011, Carr et al., 2012, FACHNER et al., 2013; GOLD et al., 2013), especially with regard to symptoms of depression and social competences. Noteworthy is the high prevalence of improvement in social interaction and mood-related outcomes. This can be explained by the ability of improvisation to facilitate the interaction between different pairs, and enable self-expression. which helps especially in mood disorders (PAVLICEVIC, 2000). From the results obtained here, we cannot exclude that improvisation achieved these desired goals, since improvisation is more effective for most of these outcomes. In neither study did the evaluation of improvisation use physiological parameters, as noted in other reviews about the musical effect of different interventions.

The studies reviewed presented a good (not perfect) standard of excellence in terms of methodological quality (average of 3.9 on a scale of 1 to 5). The majority of manuscripts presented clear methodological procedures of randomization, blinding and counting of participants' quality which contributed to the results. One of the 10 studies (CARR et al., 2012) mentioned the use of the

CONSORT statement (international guideline to conduct RCTs) (MOHER et al., 2011).

Our present review assessed the influence of musical improvisation in music therapy from the gold standard of designs in quantitative studies that are the randomized controlled trials and focused more on the intervention music experience rather than on the pathology. This could be a limitation to this study. The diagnostic heterogeneity might interfere with the correct interpretation of results (CHAN et al., 2011).There is no way of knowing, for example, if the effect of musical improvisation is dependent on the specific pathology.

The unique common assessment used by different studies was the Global Assessment Functioning Scale (GAF) (ERKKILA et al., 2011 and GOLD et al., 2013). In both use of this assessment, improvisation in music therapy was effective in comparison with control group for adult mental disorders. It could be important finding, because can indicates that music improvisation in music therapy is a interesting musical experience for global changes in adult with mental disorders. However, this is association need more studies to be confirmed.

In future revisions it will be important to include not only studies that evaluated behavioral aspects, but also physiological parameters (DILEO, 2006). The effects of music on physiological parameters have been reported in other systematic reviews. Therefore, it is relevant to verify whether this effect is manifested in the same way in musical improvisation.

Within the 10 studies analyzed was not possible to conduct a meta-analysis, because the studies presented categorically different research questions for the 85 evaluated outcomes. Meta-analysis is important for systematic reviews, because allows that results can be generalized to a larger population, precision and accuracy of estimates can be improved as more data is used and estimate the intervention effectiveness for specific research questions. Thus, new RCTs with similar research questions (using music improvisation) will increase the possibilities of meta-analysis estimative in future systematic reviews (LIBERATI et al., 2009).

The results of this review reflect the current stage of transformation in the quantitative study of musical interventions in music therapy. Most of the included studies were published in the last 4 years. This shows that there is concern that recent results show the therapeutic use of music according to health standards based on evidence. For many years the descriptions of the effects were centered on case studies and empirical results. Therefore, it is expected that in coming years the number of RCTs with better methodological quality and with more homogeneous outcomes increases for a better assessment of the effects of this intervention.

CONCLUSIONS

Musical improvisation in music therapy proved to be effective in 58.82% of the outcomes when compared with a control situation. Although this result is significant, one must consider that more than 41.18% of results were not favorable. Due to the absence of meta-analysis calculation, it was not possible to estimate the effectiveness of this intervention for specific research questions. Thus, new RCTs with similar research questions (using music improvisation) will be necessary for meta-analysis estimative in the next systematic reviews. Therefore, further studies with higher methodological quality, greater quality of data and similar research questions are needed to define the role of musical improvisation in music therapy according to RCTs.

REFERENCES

AIGEN, K. Verticality and containment in song and improvisation: an application of schema theory to Nordoff-Robbins music therapy. **J Music Ther,** v. 46, n. 3, p. 238-67, Fall 2009. ISSN 0022-2917 (Print) 0022-2917 (Linking).

ALBORNOZ, Y. The effects of group improvisational music therapy on depression in adolescents andadults with substance abuse: a randomized controlled trial **Nordic Journal of Music Therapy,** v. 20, n. 3, p. 208-224, 2011.

BERKOWITZ, A. L.; ANSARI, D. Expertise-related deactivation of the right temporoparietal junction during musical improvisation. **Neuroimage,** v. 49, n. 1, p. 712-719, Jan 1 2010. ISSN 1053-8119. Disponível em: < <Go to ISI>://WOS:000272031700069 >.

BIASUTTI, M.; FREZZA, L. Dimensions of Music Improvisation. **Creativity Research Journal,** v. 21, n. 2-3, p. 232-242, 2009 2009. ISSN 1040-0419. Disponível em: < <Go to ISI>://WOS:000265647000008 >.

CARR, C. et al. Group music therapy for patients with persistent post-traumatic stress disorder--an exploratory randomized controlled trial with mixed methods evaluation. **Psychol Psychother,** v. 85, n. 2, p. 179-202, Jun 2012. ISSN 1476-0835.

CHAN, M. F.; WONG, Z. Y.; THAYALA, N. V. The effectiveness of music listening in reducing depressive symptoms in adults: a systematic review. In: (Ed.). **Complement Ther Med**. Scotland: 2011 Elsevier Ltd, v.19, 2011. p.332-48. ISBN 1873-6963 (Electronic) 0965-2299 (Linking).

DILEO, C. Effects of music and music therapy on medical patients: a meta-analysis of the research and implications for the future. **J Soc Integr Oncol,** v. 4, n. 2, p. 67-70, Spring 2006. ISSN 1715-894X (Print) 1715-894X (Linking)

ERKKILA, J. et al. Individual music therapy for depression: randomised controlled trial. **Br J Psychiatry,** v. 199, n. 2, p. 132-9, Aug 2011. ISSN 1472-1465 (Electronic) 0007-1250 (Linking).

FACHNER, J.; GOLD, C.; ERKKILA, J. Music therapy modulates fronto-temporal activity in rest-EEG in depressed clients. **Brain Topogr,** v. 26, n. 2, p. 338-54, Apr 2013. ISSN 0896-0267.

GOLD, C. et al. Individual music therapy for mental health care clients with low therapy motivation: multicentre randomised controlled trial. **Psychother Psychosom,** v. 82, n. 5, p. 319-31, 2013. ISSN 0033-3190.

GOODING, L. F. The effect of a music therapy social skills training program on improving social competence in children and adolescents with social skills deficits. **J Music Ther,** v. 48, n. 4, p. 440-62, Winter 2011. ISSN 0022-2917 (Print) 0022-2917.

IRONS, J. Y.; KENNY, D. T.; CHANG, A. B. Singing for children and adults with bronchiectasis. **Cochrane Database Syst Rev**, n. 2, p. CD007729, 2010a. ISSN 1469-493X (Electronic) 1361-6137 (Linking).

KIM, J.; WIGRAM, T.; GOLD, C. The effects of improvisational music therapy on joint attention behaviors in autistic children: a randomized controlled study. **J Autism Dev Disord,** v. 38, n. 9, p. 1758-66, Oct 2008. ISSN 0162-3257 (Print).

_____. Emotional, motivational and interpersonal responsiveness of children with autism in improvisational music therapy. **Autism,** v. 13, n. 4, p. 389-409, Jul 2009. ISSN 1362-3613 (Print) 1362-3613 (Linking).

LIBERATI, A.; ALTMAN, D.G;TETZLAFF,J.; MULROW, C.; GØTZSCHE, P. C.; IOANNIDIS,J. P. A.; CLARKE, M.; DEVEREAUX, P. J.; KLEIJNEN, J.; MOHER, D.. The PRISMA statement for reporting systematic reviews and meta-analyses of studies that evaluate healthcare interventions: explanation and elaboration. **British Medical Journal**, v.339 , Jul 2009.

LIMB, C. J.; BRAUN, A. R. Neural Substrates of Spontaneous Musical Performance: An fMRI Study of Jazz Improvisation. **Plos One,** v. 3, n. 2, Feb 27 2008. ISSN 1932-6203. Disponível em: < <Go to ISI>://WOS:000260586500023 >.

MOHER, D. et al. CONSORT 2010 explanation and elaboration: Updated guidelines for reporting parallel group randomised trials. **Int J Surg**, Oct 12 2011. ISSN 1743-9159 (Electronic) 1743-9159 (Linking).

MOSSLER, K. et al. Music therapy for people with schizophrenia and schizophrenia-like disorders. **Cochrane Database Syst Rev,** v. 12, p. CD004025, 2011. ISSN 1469-493X (Electronic) 1361-6137 (Linking).

OLIVO, S. A. et al. Scales to assess the quality of randomized controlled trials: a systematic review. **Phys Ther,** v. 88, n. 2, p. 156-75, Feb 2008. ISSN 0031-9023 (Print) 0031-9023 (Linking).

PAVLICEVIC, M. Improvisation in music therapy: human communication in sound. **J Music Ther,** v. 37, n. 4, p. 269-85, Winter 2000. ISSN 0022-2917 (Print) 0022-2917 (Linking).

RICKSON, D. J. Instructional and improvisational models of music therapy with adolescents who have attention deficit hyperactivity disorder (ADHD): a

comparison of the effects on motor impulsivity. **J Music Ther,** v. 43, n. 1, p. 39-62, Spring 2006. ISSN 0022-2917 (Print) 0022-2917 (Linking).

VIANNA, M. N. et al. Music therapy may increase breastfeeding rates among mothers of premature newborns: a randomized controlled trial. **J Pediatr (Rio J),** v. 87, n. 3, p. 206-12, May-Jun 8 2011. ISSN 0021-7557.

WIGRAM, T. **Improvisation:Methods and Techniques for Music Therapy Clinicians, Educators, and Students**. Jessica Kingsley Publishers, 2004. 240.

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