TECHNICAL COMMENTARY

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Music therapy

Introduction

Music therapy utilises musical experiences and interactions designed to assist people with disorders such as schizophrenia to address issues they may have difficulty with, such as communication and self-regulation. It may be offered through group or individual programmes and does not require a client to have musical skills. Therapists are trained to respond to challenging behaviour using both musical and non-musical strategies. Music therapy can be active (including improvisation, producing music) or receptive (listening to either live or recorded music). The musical therapist can manipulate the rhythmic or harmonic structure to alter therapy intensity. The therapist can also direct the focus of the session to be concentrating on the processes within the music itself, or to focus more on the client's emotional responses to the music.

Method

We have included only systematic reviews (systematic literature search, detailed methodology with inclusion/exclusion criteria) published in full text, in English, from the year 2000 that report results separately for people with a diagnosis of schizophrenia, schizoaffective disorder, schizophreniform disorder or first episode schizophrenia. Reviews were identified by searching MEDLINE, EMBASE, CINAHL, Current Contents, PsycINFO and the Cochrane Library databases. Hand searching reference lists of identified reviews was also conducted. When multiple copies of reviews were found, only the most recent version was included. Reviews with pooled data are prioritised for inclusion.

Review reporting assessment was guided by the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) checklist that describes a preferred way to present a meta-analysis[1]. Reviews rated as having less than 50% of items checked have been excluded from the library. The PRISMA flow diagram is a suggested way of providing information about studies included and excluded with reasons for exclusion. Where no flow diagram has been presented by individual reviews, but identified studies have been described in the text, reviews have been checked for this item. Note that early reviews may have been guided by less stringent reporting checklists than the PRISMA, and that some reviews may have been limited by journal guidelines.

Evidence was graded using the Grading of Recommendations Assessment, Development and Evaluation (GRADE) Working Group approach where high quality evidence such as that gained from randomised controlled trials (RCTs) may be downgraded to moderate or low if review and study quality is limited, if there is inconsistency in results, indirect comparisons, imprecise or sparse data and high probability of reporting bias. It may also be downgraded if risks associated with the intervention or other matter under review are high. Conversely, low quality evidence such as that gained from observational studies may be upgraded if effect sizes are large or if there is a dose dependent response. We have also taken into account sample size and whether results are consistent, precise and direct with low associated risks (see end of table for an explanation of these terms)[2]. The resulting table represents an objective summary of the available evidence, although the conclusions are solely the opinion of staff of NeuRA (Neuroscience Research Australia).

Results

We found three systematic reviews that met our inclusion criteria[3-5].

- Moderate to high quality evidence suggests music therapy may improve social and overall functioning (medium to large effects)

Margarete Ainsworth Building, Barker Street, Randwick NSW 2031. Phone: 02 9399 1000. Email: info@neura.edu.au

as rated on the IADL and SDSS scales, but not on the GAF.

- Moderate to low quality evidence suggests music therapy resulted in medium to large effects of improved negative, depression and anxiety symptoms, quality of life, perceived social support, attention (medium-term PASAT scale only), memory (short-term CMT scale only) and abstract thinking (medium-term BCST and WCST-Cc scales). No benefits were found over standard care for study retention or behaviour.
- Moderate quality evidence suggests music therapy may have a medium-sized effect for reduced catatonic behaviour.

Margarete Ainsworth Building, Barker Street, Randwick NSW 2031. Phone: 02 9399 1000. Email: info@neura.edu.au

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Music therapy

Geretsegger M, Mossler KA, Bieleninik L, Chen XJ, Heldal TO, Gold C

Music therapy for people with schizophrenia and schizophrenia-like disorders

Cochrane Database of Systematic Reviews 2017; 5: CD004025

View review abstract online

Comparison	**Music therapy (either individual or group) plus standard care vs. standard care.** **Treatment duration ranged 1-6 months.**
Summary of evidence	**Moderate to high quality evidence (small samples, consistent, precise, direct) suggests music therapy may improve social and overall functioning (medium to large effects) as rated on the IADL and SDSS scales, but not on the GAF.** **Moderate to low quality evidence (small samples, inconsistent and/or imprecise, direct) suggests music therapy resulted in medium to large effects of improved negative, depression and anxiety symptoms, quality of life, perceived social support, attention (medium-term PASAT scale only), memory (short-term CMT scale only) and abstract thinking (medium-term BCST and WCST-Cc scales). No benefits were found over standard care for study retention or behaviour.**

Mental state

Significant improvements with music therapy for;

Clinically important improvement in the medium term (medium-sized effect);

2 RCTs, N = 133, RR = 0.38, 95%CI 0.24 to 0.59, $p = 0.000017$, $I^2 = 92\%$, $p = 0.00031$

Average endpoint score on the PANSS in the short, medium and long term (medium to large effects);

Short term: 1 RCT, N = 75, SMD = -0.69, 95%CI -1.16 to -0.23, $p = 0.0036$

Medium term: 2 RCTs, N = 159, SMD = -0.97, 95%CI -1.31 to -0.63, $p < 0.00001$, $I^2 = 92\%$, $p = 0.0006$

Long term (>6 months): 1 RCT, N = 90, SMD = -3.41, 95%CI -4.07 to -2.76, $p < 0.00001$

Average endpoint score on the BPRS in the medium term (large effect);

Medium term: 1 RCT, N = 70, SMD = -1.25, 95%CI -1.77 to -0.73, $p < 0.00001$

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Negative symptoms endpoint score on the SANS in the short and medium term (medium-sized effects); Short term: 5 RCTs, N = 319, SMD = -0.50, 95%CI -0.73 to -0.27, p = 0.00002, I^2 = 67%, p = 0.02 Medium term: 3 RCTs, N = 177, SMD -0.55, 95%CI -0.87 to -0.24, p = 0.00047, I^2 = 89%, p = 0.0015 *Depression symptoms on the SDS in the short term (medium-sized effect);* 2 RCTs, N = 90, SMD = -0.63, 95%CI -1.06 to -0.21, p = 0.0036, I^2 = 0%, p = 0.73 *Depression symptoms on the CDSS in the short term (medium to large effect);* 1 RCT, N = 75, SMD = -0.73, 95%CI -1.20 to -0.26, p = 0.002 *Anxiety symptoms on the SAS in the short term (medium-sized effect);* 1 RCT, N = 60, SMD = -0.61, 95%CI -1.13 to -0.09, p = 0.02 There were no significant differences for; *Clinically important improvement in the short term;* 1 RCT, N = 61, RR = 0.82, 95%CI 0.55 to 1.24, p = 0.35 *Average endpoint score on the BPRS in the short term;* Short term: 1 RCT, N = 30, SMD = 0.27, 95%CI -0.45 to 0.99, p = 0.47 *Positive symptoms endpoint score on the SAPS in the short term;* 1 RCT, N = 96, SMD = -0.18, 95%CI -0.60 to 0.24, p = 0.39 *Depression symptoms on the Ham-D in the short term;* 1 RCT, N = 30, SMD = -0.52, 95%CI -1.25 to 0.21, p = 0.16
Functioning and behaviour
Significant improvements with music therapy for; *Overall functioning on the IADL in the medium and long term (large effects);* Medium term: 1 RCT, N = 90, SMD = -1.20, 95%CI -1.65 to -0.75, p < 0.00001 Long term: 1 RCT, N = 90, SMD = -1.80, 95%CI -2.29 to -1.30, p < 0.00001 *Social functioning on the SDSS in the short, medium and long term (medium to large effects);* Short term: 1 RCT, N = 40, SMD = -1.25, 95%CI -1.94 to -0.57, p = 0.00033 Medium term: 2 RCTs, N = 160, SMD = -0.72, 95%CI -1.04 to -0.40, p = 0.000013, I^2 = 0%, p = 0.76 Long term: 1 RCT, N = 90, SMD = -0.56, 95%CI -0.98 to -0.14, p = 0.009 *General behaviour on the NOSIE in the short and medium term (medium to large effects);* Short term: 2 RCTs, N = 100, SMD = 1.38, 95%CI 0.93 to 1.84, p < 0.00001, I^2 = 89%, p = 0.002

Medium term: 1 RCT, N = 62, SMD = 0.69, 95%CI 0.18 to 1.20, *p* = 0.0084
There were no significant differences for;
Overall functioning on the GAF in the short and medium term;
Short term: 1 RCT, N = 53, SMD = 0.08, 95%CI -0.47 to 0.62, *p* = 0.78
Medium term: 2 RCTs, N = 118, SMD = -0.19, 95%CI -0.56 to 0.18, *p* = 0.31, I^2 = 0%, *p* = 0.36
Quality of life
Significant improvements with music therapy for;
Quality of life on the GWB in the short term (large effect);
1 RCT, N = 72, SMD = 1.82, 95%CI 1.27 to 2.38, *p* < 0.00001
Perceived social support on the SSQ in the short term (medium to large effect);
1 RCT, N = 72, SMD = 0.73, 95%CI 0.26 to 1.21, *p* = 0.0026
Cognition
Significant improvements with music therapy for;
Attention on the PASAT in the medium term (medium to large effect);
1 RCT, N = 67, SMD = 0.72, 95%CI 0.22 to 1.21, *p* = 0.0048
Memory on the CMT in the short term (medium-sized effect);
1 RCT, N = 60, SMD = 0.58, 95%CI 0.06 to 1.09, *p* = 0.029
Abstract thinking on the WCST-Cc in the medium term;
1 RCT, N = 30, MD = 1.18, 95%CI 0.33 to 2.03, *p* = 0.0064
There were no significant differences for;
Vigilance and attention on the CCPT in the medium term;
1 RCT, N = 67, SMD = 0.25, 95%CI -0.23 to 0.74, *p* = 0.30
Memory on the WMS in the medium term;
1 RCT, N = 67, SMD = 0.43, 95%CI -0.06 to 0.92, *p* = 0.083
Abstract thinking on the WCST-Cc in the short term;
2 RCTs, N = 90, MD = -0.02, 95%CI -0.07 to 0.03, *p* = 0.40, I^2 = 0%, *p* = 0.88
Abstract thinking on the BCST in the medium term;
1 RCT, N = 67, SMD = 0.09, 95%CI -0.39 to 0.58, *p* = 0.70
Study retention
There were no significant differences in study retention;

Margarete Ainsworth Building, Barker Street, Randwick NSW 2031. Phone: 02 9399 1000. Email: info@neura.edu.au

Short term: 11 RCTs, N = 692, RR = 0.14, 95%CI 0.02 to 1.06, $p = 0.057$, I^2 not estimable Medium term: 8 RCTs, N = 531, RR = 0.62, 95%CI 0.30 to 1.30, $p = 0.21$, $I^2 = 7\%$, $p = 0.34$ Long term: 2 RCTs, N = 151, RR = 0.97, 95%CI 0.50 to 1.89, $p = 0.92$, I^2 not estimable	
Consistency in results	Consistent for functioning in the medium and long term, and abstract thinking in the short term; otherwise inconsistent or N/A (1 RCT).
Precision in results	Precise for functioning, clinical improvement, and positive and negative symptoms only.
Directness of results	Direct

Silverman MJ

The influence of music on the symptoms of psychosis: a meta-analysis

Journal of Music Therapy 2003; 40(1): 27-40

View review abstract online

Comparison	**Music therapy (either individual or group) including active and receptive components plus routine care vs. routine care.**
Summary of evidence	**Moderate quality evidence (unclear sample size, inconsistent, precise, direct) suggests music therapy may have a medium-sized effect for reduced catatonic behaviour.**
Symptoms and catatonic behaviour	
A significant, medium-sized effect of reduced catatonic behaviour; 8 studies, N not reported, $d = 0.57$, 95%CI 0.40 to 0.88, $p < 0.05$ *No significant differences for;* General symptoms: 4 studies, N not reported, $d = 0.59$, 95%CI 0.30 to 0.88, $p = 0.79$ Cognitive symptoms: 7 studies, N not reported, $d = 0.92$, 95%CI 0.73 to 1.12, $p = 0.16$ Authors report no moderating effects according to type of therapy received (passive listening, live or recorded music, music genre) or according to patient's sex.	
Consistency in results	Authors report results are mostly inconsistent.
Precision in results	Precise

Directness of results	Direct

Tseng PT, Chen YW, Lin PY, Tu KY, Wang HY, Cheng YS, Chang YC, Chang CH, Chung W, Wu CK

Significant treatment effect of adjunct music therapy to standard treatment on the positive, negative, and mood symptoms of schizophrenic patients: A meta-analysis

BMC Psychiatry 2016; 16: 16

View review abstract online

Comparison	**Music therapy (individual or group) plus routine care vs. routine care.**
Summary of evidence	**Moderate to low quality evidence (large sample, inconsistent, imprecise, possible publication bias, direct) suggests a large effect for improved overall symptoms, including positive, negative and mood symptoms with music therapy.**

Symptoms

A significant, large effect of improved overall symptoms with music therapy;

12 studies, N = 804, g = 3.25, 95%CI 2.08 to 4.42, $p < 0.001$, I^2 = 97.6%, $p < 0.001$

Moderator analyses revealed longer duration of illness was related to greater improvement in symptoms, while increased number of hospitalisations was related to a less improvement in symptoms.

There were no significant moderating effects of trial design (RCTs vs. non-RCTs), age, sex, frequency and duration of music therapy, or antipsychotic dose.

Subgroup analyses of symptoms revealed music therapy improved positive symptoms (g = 1.63, 95%CI 0.30 to 2.96, p = 0.017), negative symptoms (g = 4.14, 95%CI 2.54 to 5.74, $p < 0.001$), and mood symptoms (g = 1.00, 95%CI 0.56 to 1.43, $p < 0.001$), but not subscales of general psychopathology (g = 9.30, 95%CI -0.68 to 19.28, p = 0.068). There were also no differences in dropout rates.

Authors report possible publication bias.

Consistency in results	Inconsistent
Precision in results	Imprecise

Music therapy

Directness of results	Direct

Explanation of acronyms

BCST = Berg's Card-Sorting Task, BPRS = Brief Psychiatric Rating Scale, CCPT = Conners Continuous Performance Task, CDSS = Calgary Depression Scale for Schizophrenia, CI = Confidence Interval, CMT = Clinical Memory Test, GAF = Global Assessment of Functioning scale, GWB = General Well-Being Schedule, Ham-D = Hamilton Depression rating scale, IADL = Lawton Instrumental Activities of Daily Living Scale, I^2 = the percentage of the variability in effect estimates that is due to heterogeneity rather than sampling error (chance), MD = mean difference, N = number of participants, NOSIE = Nurses Observation Scale for Inpatient Evaluation, *p* = statistical probability of obtaining that result ($p < 0.05$ generally regarded as significant), PANSS = Positive and Negative Syndrome Scale, PASAT = Paced Auditory Serial Addition Task, Q = Q statistic for the test of heterogeneity, RCT = randomised controlled trial, RR = relative risk, SANS = Scale for the Assessment of Negative Symptoms, SAPS = Scale for the Assessment of Positive Symptoms, SAS = Self-rating Anxiety scale, SDS = Self-rating Depression Scale, SDSS = Social Disability Screening Schedule, SMD = standardised mean difference, SSQ = Social Support Questionnaire, vs. = versus, WCST-Cc = Wisconsin Card Sorting Test correctly completed categories, WMS = Wechsler Memory Scale

Margarete Ainsworth Building, Barker Street, Randwick NSW 2031. Phone: 02 9399 1000. Email: info@neura.edu.au

Explanation of technical terms

* Bias has the potential to affect reviews of both RCT and observational studies. Forms of bias include; reporting bias – selective reporting of results; publication bias - trials that are not formally published tend to show less effect than published trials, further if there are statistically significant differences between groups in a trial, these trial results tend to get published before those of trials without significant differences; language bias – only including English language reports; funding bias - source of funding for the primary research with selective reporting of results within primary studies; outcome variable selection bias; database bias - including reports from some databases and not others; citation bias - preferential citation of authors. Trials can also be subject to bias when evaluators are not blind to treatment condition and selection bias of participants if trial samples are small[6].

† Different effect measures are reported by different reviews.

Prevalence refers to how many existing cases there are at a particular point in time. Incidence refers to how many new cases there are per population in a specified time period. Incidence is usually reported as the number of new cases per 100,000 people per year. Alternatively some studies present the number of new cases that have accumulated over several years against a person-years denominator. This denominator is the sum of individual units of time that the persons in the population are at risk of becoming a case. It takes into account the size of the underlying population sample and its age structure over the duration of observation.

Reliability and validity refers to how accurate the instrument is. Sensitivity is the proportion of actual positives that are correctly identified (100% sensitivity = correct identification of all actual positives) and specificity is the proportion of negatives that are correctly identified (100% specificity = not identifying anyone as positive if they are truly not).

Weighted mean difference scores refer to mean differences between treatment and comparison groups after treatment (or occasionally pre to post treatment) and in a randomised trial there is an assumption that both groups are comparable on this measure prior to treatment. Standardised mean differences are divided by the pooled standard deviation (or the standard deviation of one group when groups are homogenous) which allows results from different scales to be combined and compared. Each study's mean difference is then given a weighting depending on the size of the sample and the variability in the data. Less than 0.4 represents a small effect, around 0.5 a medium effect, and over 0.8 represents a large effect[6].

Odds ratio (OR) or relative risk (RR) refers to the probability of a reduction (< 1) or an increase (> 1) in a particular outcome in a treatment group, or a group exposed to a risk factor, relative to the comparison group. For example, a RR of 0.75 translates to a reduction in risk of an outcome of 25% relative to those not receiving the treatment or not exposed to the risk factor. Conversely, a RR of 1.25 translates to an increased risk of 25% relative to those not receiving treatment or not having been exposed to a risk factor. A RR or OR of 1.00 means there is no difference between groups. A medium effect is considered if RR > 2 or < 0.5 and a large effect if RR > 5 or < 0.2[7]. lnOR stands for logarithmic OR where a lnOR of 0 shows no difference between groups. Hazard ratios

Margarete Ainsworth Building, Barker Street, Randwick NSW 2031. Phone: 02 9399 1000. Email: info@neura.edu.au

measure the effect of an explanatory variable on the hazard or risk of an event.

Correlation coefficients (eg, r) indicate the strength of association or relationship between variables. They can provide an indirect indication of prediction, but do not confirm causality due to possible and often unforseen confounding variables. An r of 0.10 represents a weak association, 0.25 a medium association and 0.40 and over represents a strong association. Unstandardised (*b*) regression coefficients indicate the average change in the dependent variable associated with a 1 unit change in the independent variable, statistically controlling for the other independent variables. Standardised regression coefficients represent the change being in units of standard deviations to allow comparison across different scales.

‡ Inconsistency refers to differing estimates of effect across studies (i.e. heterogeneity or variability in results) that is not explained by subgroup analyses and therefore reduces confidence in the effect estimate. I^2 is the percentage of the variability in effect estimates that is due to heterogeneity rather than sampling error (chance) - 0% to 40%: heterogeneity might not be important, 30% to 60%: may represent moderate heterogeneity, 50% to 90%: may represent considerable heterogeneity and over this is considerable heterogeneity. I^2 can be calculated from Q (chi-square) for the test of heterogeneity with the following formula[6];

$$I^2 = \left(\frac{Q - df}{Q}\right) \times 100\%$$

§ Imprecision refers to wide confidence intervals indicating a lack of confidence in the effect estimate. Based on GRADE recommendations, a result for continuous data (standardised mean differences, not weighted mean differences) is considered imprecise if the upper or lower confidence limit crosses an effect size of 0.5 in either direction, and for binary and correlation data, an effect size of 0.25. GRADE also recommends downgrading the evidence when sample size is smaller than 300 (for binary data) and 400 (for continuous data), although for some topics, these criteria should be relaxed[8].

‖ Indirectness of comparison occurs when a comparison of intervention A versus B is not available but A was compared with C and B was compared with C that allows indirect comparisons of the magnitude of effect of A versus B. Indirectness of population, comparator and/or outcome can also occur when the available evidence regarding a particular population, intervention, comparator, or outcome is not available and is therefore inferred from available evidence. These inferred treatment effect sizes are of lower quality than those gained from head-to-head comparisons of A and B.

Margarete Ainsworth Building, Barker Street, Randwick NSW 2031. Phone: 02 9399 1000. Email: info@neura.edu.au

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