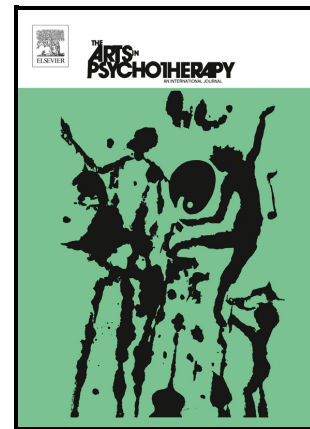


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**Child-focused outcome and process evaluation of a school-based art therapy intervention:
A pilot randomised controlled study**

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Abstract: This pilot cross-over randomised controlled study aimed to investigate the implementation of a school-based art therapy intervention, and to test whether all elements of the study design (e.g., recruitment, randomisation, follow-up) can work together in a larger study. The process and outcomes were evaluated by children through interviews, standardised questionnaires of quality of life, wellbeing and life functioning, emotional and behavioural difficulties, and biomarkers assessing children's sleep. Adherence to the therapeutic protocol was rated by the researcher and the art therapist. The greatest impact of art therapy was observed in children's exploration of safe space, stress relief, emotional expression, and empowerment. The improvements reported through the standardised questionnaires did not reach statistical significance but were maintained one year later. All sessions were given an average rating of 9/10, indicating that children's session quality ratings were high and consistent across sessions. Sample size calculations for future large-scales studies were performed and recommendations were provided regarding how to improve the impact of art therapy from children's perspectives.

Keywords: art therapy; child; school; pilot; randomised controlled trial

Highlights:

- Sixty-two children participated in arts therapies (sixteen in art therapy).
- Outcome measures were quality of life, wellbeing, life functioning and sleep.
- Outcome improvements did not reach statistical significance.
- Outcome improvements maintained up to one-year post-intervention.
- Adherence to the therapeutic protocol differed between raters.

1. Introduction

1.1. Children's health and wellbeing in the post-pandemic era

'Mental health conversations need to be normalised and brought into schools'; this is what 93% of children and young people agreed on a national survey with 3,298 young participants (Anna Freud Centre, 2021). This may not be surprising considering the concerning increase in mental health disorders among children and young people, from 1 in 9 in 2017, to 1 in 6 in 2020 (NHS Digital, 2020), with a sharp rise in self-harm, eating disorders, sleep disturbance, depression, and anxiety (Place2Be, 2021). Especially after the Covid-19 pandemic, 1 in 5 children in the UK have reported feeling unhappy with their lives (Children's Commissioner, 2021), while a 50% increase in clinically significant mental health conditions in childhood was also reported (Children's Society, 2020). In a survey based on 2,438 children and young people, nearly 70% said that the pandemic will have a long-term negative effect on their mental health (Young Minds, 2021).

Challenges facing children and adolescents are further identified in the increased use of social media and exposure to inappropriate online content (ONS, 2015; House of Commons, 2019; Smith et al., 2017), economic uncertainty exacerbated by the pandemic (WEO, 2021), and feelings of powerlessness and hopelessness around the future due to the climate crisis (Gislason et al., 2021; Hickman et al., 2021). Child and adolescent needs are now believed to have drastically exceeded the capabilities of the NHS and CAMHS services, and there is a call to broaden and radically rethink the scope of support for this population (NHS Digital, 2021; Children's Commissioner, 2021).

The World Health Organisation (WHO, 2004) proposes that mental health promotion and provision should be integrated into the school curriculum, reaching children who might not otherwise obtain help. The centrality of prevention and early intervention has been a consistent theme within governmental policy revisions and green papers (NHS England, 2016; DoH & DfE, 2017). However, many of these initiatives continue to fall short of meeting ground-level needs in an appropriate and meaningful way (House of Commons, 2021; NHS Confederation, 2021; Children's Commissioner, 2021). Schools across the UK still receive limited financial resources to support children's needs, and as such, the school mental health services have focused primarily on the treatment of severe difficulties or disorders, rather than early detection and prevention (Goldie et al., 2016). When opportunities for prevention are missed, chances are increasing for children to drop out of school, self-harm, become aggressive, violent, or even suicidal (Children's Commissioner, 2017). Even before the Covid-19 pandemic, more than 70% of children were lacking supportive services at a sufficiently early age (Children's Society, 2018), 30% of referrals were turned away immediately, while the waiting lists could take up to a year (Children's Commissioner, 2017). Considering that the waiting lists will be longer following the pandemic, these delays may have long-lasting and potentially irreversible negative effects for children's mental health.

When children do make it to specialist mental health services, support remains limited to traditional and empirically recognised approaches such as counselling, CBT-based and talking therapies. Despite growing evidence on therapies that do not rely solely on verbal communication, such as art therapy, the statutory and policy-driven view of such therapies remains relatively ambivalent (McDonald, Holttum & Drey, 2019; Deboys et al., 2017; Cohen-Yatziv & Regev, 2019; Snir et al., 2018).

1.2. Art therapy for children in schools

Art therapy has been defined as '*an established form of psychological therapy delivered by trained art therapists / art psychotherapists. It's designed to help anyone, including those whose life has been affected by adverse experiences, illness or disability, by supporting their social, emotional and mental health needs*' (BAAT, 2022). In the UK, schools have been increasingly employing art therapists to support children express and understand their emotions, cope with stress and worries, develop self-awareness and self-esteem (Moula, 2020a). The latest workforce survey conducted by the British Association of Art Therapists (BAAT, 2019) showed that 68% of members (n=630) were working with children and young people, with 35% based in school-based settings.

Having daily contact with children and their families, schools are a key entry point to community-based mental health provision (Stephan et al., 2007). Their remit as educational institutions helps to reduce stigma, increase inclusivity, while accessing supportive networks of peers, teachers, healthcare professionals, and parents (Snir et al., 2018; Kavanagh et al., 2009; Greenberg, 2010). Furthermore, school-based therapists can streamline the referral process and target children experiencing barriers, such as lack of transportation, parent work schedules or funding. Such collaborations are therefore hoped to bridge the gap between health and education.

1.3. Evidence-based art therapy for children and young people

To date, three reviews have been conducted to synthesise the evidence from studies in art therapy for children and young people (Cohen-Yatziv & Regev, 2019; McDonald & Drey, 2018; Moula, 2020a). A wealth of research has been focused on children with social, emotional, and behavioural difficulties. In a mixed-methods study in the UK, teachers reported reductions in children's stress, conduct, hyperactivity, prosocial behaviour (McDonald et al., 2019), as well as increased concentration in class (McDonald & Holtum, 2020). Two Randomised Controlled Trials (RCTs) conducted in Iran with children with intellectual disabilities found art therapy effective in reducing aggressive behaviours (Hashemian & Jarahi, 2014) and alleviating externalising behaviours (Beh-Pajooch et al., 2018). Furthermore, two controlled before-and-after studies in the USA found art therapy effective in improving children's adaptive classroom behaviour and positive attitudes towards school (Rosal, 1993) as well as increased resilience and socioemotional functioning (Sitzer & Stockwell, 2015). Finally, in a grounded theory study in the UK, children attending art therapy reported improvements in their self-expression, mood, confidence, communication, understanding, resilience, and learning (Deboys et al., 2017).

There is also a wealth of evidence focusing on children who have experienced traumatic events, such as migration and natural disasters. For example, following the '94 earthquake in Los Angeles, art therapy offered an avenue for children to express their traumatic experience and navigate their emotions toward the resolution of the trauma (Roje, 1995). In a tsunami disaster in Sri Lanka, art therapy allowed young survivors to reveal their experiences, voice their trauma with other survivors, grief over the loss of loved ones, and regain emotional control (Chilcote, 2007). Two studies have also found art therapy valuable for refugee children by creating a safe space to rebuild trust, share common experiences with other refugee children, and explore a new sense of identity (Atkhar & Lovell, 2018; Sullivan & Simonson, 2016). Art therapy has been also used with autistic children (Gold et al., 2006) and for more specific health-related problems, such as asthma (Beebe et al., 2010). In

most cases, however, study findings rely extensively on the therapists' observations and adults' perspectives, whereas children's perspectives remain underrepresented.

1.4. Aims and objectives

This study was part of a pilot cross-over randomized controlled study delivering arts therapies across primary schools in the Northwest of England, specifically, art therapy, music therapy, dramatherapy, and dance movement psychotherapy. The design of the pilot was grounded on a systematic review (Moula et al., 2020a), which informed the development of the sessions, selection of outcome measures. The primary aim of the pilot was to test whether all components of the study design (e.g., recruitment, randomization, outcome measures, follow-up) can work together and run smoothly in a full-scale randomised controlled trial, and to determine the required sample size for full-scale RCT. The present article presents a sub-study of this pilot and is focused on the process and outcome evaluation of the art therapy intervention.

The primary research questions were:

a) What are the outcomes of art therapy as evaluated through:

- verbal and non-verbal expressions relating to children's feelings and thoughts on their wellbeing?
- self-reported standardized outcome measures relating to quality of life, wellbeing, and life functioning?
- biomarkers relating to children's duration of sleep?

b) To what extent the art therapy intervention adhered to the therapeutic model?

2. Methodology

2.1. Research design

A mixed-methods research design was employed (Creswell, 2014), including quantitative, qualitative and arts-based methods, to investigate the process and outcomes of arts therapies both from children's experiences and standardised measures. This methodological approach is philosophically underpinned by pragmatism (Howe, 1988), which embraces both positivist/postpositivist and constructive paradigms to produce socially useful knowledge from quantitative data (measured facts) and qualitative methods (personal experiences) (Brierley, 2017; Onwuegbuzie & Johnson, 2006; Yvonne Feilzer, 2010). The use of mixed methods was for complementary, rather than for cross-validation and triangulation purposes. For example, the aim was not to validate what the children said in the interviews through the standardized questionnaires (or vice versa), but to answer specific questions that required different types of information, and collectively better understand the impact of arts therapies on children's wellbeing.

A pilot cross-over randomized controlled design was employed. Participants were allocated to the intervention or control groups through a random number generator software. Half of the participants were assigned to the intervention immediately after the randomization, whereas the other half acted as control group in the beginning (waiting-list) and received the intervention three months later.

2.2. Participants

Sixty-two children (aged 7-10) with experiences of mild emotional and behavioural difficulties were recruited from four different primary schools across the Northwest region of England to participate in this pilot trial. Each school administered a different arts therapies intervention programme: art therapy, music therapy, dance movement therapy, and dramatherapy. From the total sample (n=62), 16 children participated in art therapy; this article is focused only on these children. Children who formed the art therapy groups were from two different classes (UK Year 3 and 4) within the same school. The teachers from these two classes were also participants involved in this study, who were invited to complete a pre-and-post questionnaire (see section 2.5. *Data collection and analysis; Outcome measures / Questionnaires; Strengths and Difficulties Questionnaire (SDQ)*). The eligibility criteria, sample size calculations and recruitment methods are presented in the published study protocol (Moula et al., 2019).

2.3. Intervention description

Art therapy was delivered for one hour weekly, across eight consecutive weeks. Each session focused on a specific topic and therapeutic goal, described in detail in the author's PhD thesis (Moula, 2020b) (Figure 1). The intervention design was based upon existing evidence of previous interventions in arts therapies (Moula et al., 2020a), the Arts for the Blues model developed for adults with depression (Omylinska-Thurston et al., 2020) and the wider literature in school-based arts therapies (Karkou, 2010).

Figure 1 near here

2.4. Procedure

Ethical approval was obtained by the Faculty of Health & Social Care Research Ethics Committee at Edge Hill University on the 16th of July 2018 (Ref no.: FOHS 215). The primary ethical considerations were regarding obtaining fully informed children's consent, which we achieved by organising participant information workshops where both the art therapist (TNK) and lead research (ZM) were present. The art therapist designed age-appropriate and child-friendly activities to explain to children what art therapy is and how they could benefit from it. The researcher was responsible for explaining how children's participation would remain confidential and anonymous, risks and benefits of the study, and details regarding what children's participation involves, such as how to use their Fitbits and how often they would be asked to complete the pre-post and follow-up questionnaires. Children were also informed that during data collection, they would be given a safe and private space to complete their questionnaires. The researcher would be available for any questions, but she would always keep a physical distance from children to avoid coercion. Parents/gatekeepers were also invited by the head teacher to an in-person participant information session. However, they were under no pressure to respond immediately after this session; instead, they were encouraged to reflect on the information given before agreeing for their children to take part in the study. Both children and parents/gatekeepers were given three weeks to respond back, but they were also informed that, even if they decide to participate, they had the right to withdraw at any time without giving a reason to do so.

Through the public catalogue of public schools in a Northwest region of England, we randomly selected and contacted schools until four schools agreed to participate (following an information session with the head teacher(s)). The research team and the art therapist had no prior relationship with these schools. Head teachers were asked to identify two classes having greater need for

psychological support. The teachers of these classes completed the Strengths and Difficulties Questionnaire (Goodman, 2001) for each child; this questionnaire was used as a screening tool. Children who were rated as having mild emotional and behavioural difficulties were the targeted participant cohort.

Sixteen children were randomly selected, eight of which were randomly allocated to the intervention and eight to the control group/waiting list (who also received art therapy after three months). The parents or legal guardians of these children received the participant information sheet by the school. A workshop was also delivered to children, which entailed explanations about what is art therapy. The arts therapist was present in these informative sessions, offering examples of activities that would take place during the sessions. The final sample is consisted of 14 children, as there were two dropouts for reasons explained in the section 'Findings: Context'. The procedure flowchart is presented in Figure 2.

Figure 2 near here

2.5. Data collection and analysis

The outcome evaluation was completed by interviews, questionnaires, and biomarkers (FitBits). The process evaluation was completed by participant observations, ratings of adherence to the therapeutic protocol, and children's session ratings.

Interviews

Individual semi-structured interviews were conducted to understand children's experiences of participating in art therapy. Interviews took place one week after the end of art therapy for approximately half an hour. Follow-up interviews were conducted at three-, six-, and twelve-months post-intervention to explore any further insights or changes in children's perspectives. Interviews focused on: (i) what children found helpful or unhelpful, (ii) what they did or did not enjoy; (iii) most outstanding memories. To facilitate memory retrieval, 1-2 photographs from each session were selected and children were invited to share their reflections on them.

Interviews were analysed through reflexive thematic analysis (Braun & Clarke, 2006), following the six key steps: familiarization of data; generation of codes; combining codes into themes; reviewing themes; determining significance of themes; and reporting of findings. As such, the process of coding was fluid and flexible so that codes could evolve and change. Through the open coding process, reflexive thematic analysis allowed us to reflect on how the research team was conceptualizing the data, and how these conceptualizations were evolving, growing, or deepening alongside increased understanding of the 'data'.

Adherence to therapeutic protocol

Adherence to the therapeutic protocol was assessed by the lead researcher (ZM) and the art therapist (TNK). The lead researcher was present in all sessions as participant observer to assess the degree of adherence to the therapeutic principles and protocol and to record any changes or variations for fidelity and replication purposes. As a member of the group, the researcher gained insight into changes over time, and recorded important conversations and interactions through her fieldnotes. Participant observations were supported by video recordings of all sessions to capture simultaneous complex interactions and observe events retrospectively (Asan & Montague, 2014). After each session, a rating was given for each of the ten therapeutic principles by the art therapist (Rater A) and the researcher (Rater B), yielding a total of 20 scores for each rater in each session. The

ten therapeutic principles which were key to the therapeutic protocol were the following: Approaching children with warmth; developing an empathetic attitude; establishing trusting relationships; working with children where they are / in the here and now; revisiting past experiences with direct impact on the here and now; working with the group as a whole; encouraging self-awareness; facilitating the development of agency and the capacity to grow; developing useful coping mechanisms; finding the balance between verbal and non-verbal communication. The raters' agreement was assessed using a Bland-Altman plot (Bland & Altman, 1986) to identify systematic differences between raters, which were classed as "fixed bias" or outliers. The mean score was calculated $(A + B/2)$ along with the difference between rater scores $(A - B)$. The overall degree of adherence estimated the inter-rater reliability, which was used to explore the level of consistency between the rates in terms of whether, and to what extent, the sessions adhered to the therapeutic protocol and principles, thereby improving the dependability of the findings (Higgins and Green, 2011).

Biomarkers

Biomarkers (FitBits) were used to capture changes in children's duration of sleep. Children wore Fitbits for 3 days, 1 week before and 1 week after the end of art therapy. The number of minutes asleep was calculated as the total number of minutes asleep minus the number of active minutes during the night. This calculation provided an overall measure of sleep duration, recorded in minutes. Duration of sleep was averaged across the 3 days pre-intervention and 3 days post-intervention.

Outcome measures / Questionnaires

The child-reported questionnaires were the: Quality of Life for Children (EQ-5D-Y) (Wille et al., 2010); Child Outcome Rating Scale (CORS) (Low et al., 2012); Child Session Rating Scale (CSRS) (Low et al., 2012). The teacher-reported questionnaire was the Strengths and Difficulties Questionnaire with impact supplement (SDQ) (Goodman, 2001). A brief summary of all measures is presented below, while the study protocol (Moula et al., 2019) and the author's PhD thesis (Moula, 2020b) provides a more detailed description of each measure.

The *Quality-of-Life scale for Children (EQ-5D-Y)* (Wille et al., 2010) reflects children's judgments of their health-related quality-of-life. It includes dimensions of activity level, self-care, experiencing pain or discomfort, and feeling worried, sad, or unhappy. In a series of statements, the respondent must indicate to what extent they feel that way most of the time on a scale from 'never' to 'all the time'. An overall score was calculated for the five items in the questionnaire, which range from 0-50; higher scores imply higher perceived quality of life. Test-retest reliability ranges between 69.8 and 99.7% (Ravens-Sieberer et al., 2010). Kappa coefficients reach up to 0.67, while the correlation coefficients with other measures of self-rated health indicate convergent validity up to $r = -0.56$ (Ravens-Sieberer et al., 2010).

The *Child Outcome Rating Scale (CORS)* (Low et al., 2012) evaluates areas of life functioning that might change as an outcome of a therapeutic intervention. These areas relate to personal or symptom distress (measuring individual well-being); interpersonal well-being (measuring how well the child is getting along in intimate relationships); social role (measuring satisfaction with work/school and relationships outside of the home) and overall well-being. An overall score was calculated for the four items included in the questionnaire on a range from 0 to 40, with higher scores indicating an increase in life functioning. Research found moderate to high reliability (Bringhurst et al., 2006), moderate test-retest reliability (Bringhurst et al., 2006), and moderately

strong concurrent validity with longer, more established measures of treatment outcome and therapeutic alliance (Miller et al., 2003; Bringham et al., 2006).

The *Child Session Rating Scale (CSRS)* (Low et al., 2012) is a session-by-session four-item scale assessing key dimensions of effective therapeutic relationships and children's feedback on progress; particularly, whether children during the session felt that a) others listened to them, b) what was said and done was important to them, c) they liked what they did, d) they would hope to do the same kind of things next time. Similar to EQ-5D-Y and CORS, an overall score was calculated for the four items ranging from 0 to 40, with higher scores indicating better therapeutic alliance. The CSRS was administered at the end of each session to get real time feedback from children so that any alliance difficulties could be identified early and addressed in the next session. Existing research has demonstrated good reliability, test re-test reliability, and concurrent validity (Miller et al., 2000; Campbell & Hemsley, 2009).

The *Strengths and Difficulties Questionnaire (SDQ)* (Goodman, 2001) with impact supplement for teachers is an emotional and behavioral screening tool. The impact supplement examines the nature of a young person's difficulties, such as burden to others, social impairment, chronicity, and distress related to a reported problem. Higher scores reflect a higher degree of emotional and behavioural difficulties. Research suggests that this tool exhibits strong internal consistency (Yao et al., 2009); moderate test-retest reliability (Yao et al., 2009); good concurrent validity (Muris et al., 2003); and good discriminant validity (Lundh et al., 2008).

ANCOVA's were used to test for differences in post-intervention scores between intervention and control groups following cross-over for HRQOL and CORS, while controlling for pre-intervention scores, which were entered into the models as covariates. Repeated-measures ANOVAs were used to test for changes in pre-and post- intervention measures for sleep and SDQ following cross-over. Repeated-measures ANOVA's were performed on the follow-up data to test for changes in HRQOL and CORS scores over time, specifically 3 months, 6 months and 12 months post-intervention. A repeated-measures ANOVA was also performed to test for differences in children's SRS across the eight sessions. Statistical analyses of ANCOVA's and ANOVA's were performed using IBM's SPSS (version 25). Statistical significance was determined using an alpha level of 0.05.

As the main aim of the quantitative analysis from this pilot study is to determine the required sample size for undertaking a future RCT, effect sizes were first calculated from the above analysis, which was used to determine sample size. Cohen's *d* (1988, 1992) was calculated for CORS and QoL using the formula $d = (m_A - m_B) / \sigma$, where m_A is the mean post-intervention score for controls and m_B is the mean post-intervention score for the intervention group, and σ is the pooled standard deviation post-intervention score (equation taken from Cohen, 1992). Eta squared was calculated to determine effect size for sleep and SDQ measures from ANOVA's and then converted to Cohen's *d* using Psychometrica (Lenhard & Lenhard, 2016). Using the derived Cohen's *d* as the effect size, sample size calculations were determined using G*Power (Faul et al., 2007, 2009) for an ANCOVA using a power of 0.95 and an alpha level of 0.05.

2.6. Validity and reliability

All outcome measures were carefully selected and have been previously standardised with children in this age group. Based on existing evidence, all questionnaires have had moderate to high test-retest reliability and concurrent validity. The adherence to the therapeutic principles and protocol was rated both from the researcher and the art therapist in order to explore the level of inter-observer reliability and to improve the dependability of the findings (Higgins & Green, 2011).

Furthermore, to avoid misinterpretations of children's views and to minimise power imbalance between the adult/researcher and children/participants, member cross-checking was employed (Brooks et al., 2017). All tentative interpretations were made available to children to express their opinions as to whether they represent their own viewpoints, to evaluate their accuracy, and to identify any potentially missing themes or findings. The supervisory team also reviewed the interpretations of the data to provide further insights. Both methods were expected to advance the credibility of the study (Higgins & Green, 2011).

3. Results

3.1. Context

In the first group, eight children were recruited from two classes (aged eight to ten). Although the school was welcoming, a private and safe environment could not be provided as other children and teachers often interrupted the sessions. Some children in this group did not get along with each other, therefore, arguments arose in some sessions. To attract children's attention and excitement, the art therapist used to bring several interesting and unusual materials. Although this practice gained children's excitement, it made the materials the centre of attention. The art therapist also planned several activities for each session, and several sessions lasted more than an hour. Most children preferred to work individually, rather than as a group, while eight sessions did not appear to be enough to build group coherence. In the last session, however, children were more collaborative and willing to resolve their arguments through dialogue.

In the second group, eight children were recruited from two classes (aged eight to ten). One child was hospitalized while one child spent an extended amount of time abroad, resulting in two dropouts. Containing the therapeutic space was more feasible working with six, instead of eight children. Following discussions with the school staff on how to improve privacy, a safe space was secured in the library. Children got along better, and all therapeutic principles were achieved in most sessions. Following our experience with the first group, we decided that 'less is more', and reduced the amount of art materials and activities per session. Having one main activity helped children to experiment with all available materials while also remaining attuned to the therapeutic process.

3.2. Quantitative findings

Sixteen children participated in art therapy, half of whom originally participated in the control group and participated in art therapy three months later (i.e., control N=8, intervention N=16, total N=24). This partial cross-over design means that we have data from a total of 24 datasets within ANCOVA. HRQOL, CORS and SDQ data were collected pre- and post-intervention from all children. However, sleep duration data was collected from 13 participants because of two dropouts and one child not wearing their FitBit. Session quality ratings were also collected from 13 children, due to two dropouts and one child being absent in several sessions, which resulted in their data being excluded from the analysis.

Table 1 shows the means and standard deviations pre- and post-intervention for CORS and QoL for those that took part in the art therapy intervention (N=16), from the control (N=8), and the total sample (N=24). Means and standard deviations (bracketed) for CORS and QoL measures for all follow-up time points (i.e., 3-, 6- and 12-months post-intervention) are also presented in Table 1.

Table 1 near here**Child Outcome Rating Scale (CORS)**

ANCOVA showed that CORS pre-intervention scores were not significantly associated with CORS post-intervention scores ($F_{1,23}=0.643$, $P=0.4$, partial $\eta^2=0.03$). No significant effect was found for control/intervention group ($F_{1,23}=2.476$, $P=0.13$, partial $\eta^2=0.105$) indicating that post-intervention scores did not differ significantly between groups. However, post-intervention mean CORS score was higher for the intervention group (i.e., 37 ± 5.1 vs. 33.75 ± 4.74) despite lower pre-intervention CORS scores (i.e., 33.62 ± 6.48 vs. 35 ± 4.5). Figure 3 shows differences in post-intervention CORS score for control and intervention groups.

Follow-up: ANOVAs showed no significant change from post-intervention score and follow-up for CORS ($F_{3,45}=0.729$, $P=0.5$, partial $\eta^2=0.046$), indicating that the minor improvements observed sustained over time (Table 1).

Figure 3 near here**Quality of Life (QoL)**

ANCOVA showed that QoL pre-intervention scores were not significantly associated with QoL post-intervention scores ($F_{1,23}=1.268$, $P=0.27$, partial $\eta^2=0.06$). No significant effect was found for control/intervention group ($F_{1,23}=0.8$, $P=0.4$, partial $\eta^2=0.04$) indicating that post-intervention scores did not differ significantly between groups. However, post-intervention mean QoL score was higher for the intervention group (i.e., 38.32 ± 9.35 vs. 34.43 ± 11.65). Figure 4 shows differences in post-intervention QoL score for control and intervention groups.

Follow-up: ANOVAs showed no significant change from post-intervention score and follow-up for QoL ($F_{3,45}=0.075$, $P=0.9$, partial $\eta^2=0.005$), indicating that the minor improvements observed sustained over time (Table 1).

Figure 4 near here**Effect size and sample size calculations**

For CORS score Cohen's $d=0.661$ represents a medium to large effect size, while for QoL Cohen's $d=0.386$ represents a small to medium effect size. Sample size calculation using G*Power (Table 2) indicates that a sample size of 121 participants would be needed to detect a significant effect for CORS, while a sample size of 351 would be needed to detect a significant effect size for QoL for a power of 0.95 and an alpha level of 0.05. All effect sizes and sample size calculations are shown in Table 2.

Table 2 near here**Sleep duration**

Descriptives for sleep duration show that post-intervention (mean= 476.77 ± 56.46) children slept approximately 18 minutes longer than pre-intervention (mean= 459.00 ± 101.13). ANOVA showed

that this change was not significant ($F_{1,12}=0.618$, $P=0.45$, partial $\eta^2=0.05$). The sample size calculation showed that 54 participants would be required to detect a significant effect (Table 2).

Strengths and Difficulties Questionnaire (SDQ)

SDQ scores were higher post-intervention (mean= 13.00 ± 6.41) than pre-intervention (mean= 12.25 ± 7.07), though this change was not significant ($F_{1,15}=0.600$, $P=0.45$, partial $\eta^2=0.04$). A sample of 29 participants would be required to detect a significant effect for SDQ (Table 2).

Session Ratings Scale (SRS)

All sessions were given an average rating of above 9 indicating that children's session quality ratings were very high and consistent across art therapy sessions (Figure 5). ANOVA showed changes were not significant ($F_{7,84}=0.443$, $P=0.9$, partial $\eta^2=0.04$) as there was consistency among all sessions.

Figure 5 near here

Adherence to therapeutic protocol

The Bland-Altman plot (Figure 6) represents the difference between raters (A minus B) against the mean of the two raters. The lack of agreement between raters was summarised by calculating the bias estimated by the mean differences (\bar{d}) and the standard deviation of the differences. We expected most of the differences to lie within $\bar{d}-1.96s$ and $\bar{d}+1.96s$ if the differences were normally distributed (Gaussian). In the present study, $\bar{d}=1.6$ and $s=1.85$ so that 95% of differences were within -5.23 and 2.03. These figures represented the lower and upper limits of agreement respectively. This showed that ratings made by rater A may be -5.23 units below or 2.03 units above rater B.

A one-sample t-test was used to determine whether the mean value of the difference between raters differed significantly from 0, with 0 representing no difference between raters. A significant result indicated the presence of a 'fixed bias'. Results from the one-sample t-test were significant ($t_{19}=-3.875$, $p=0.001$, mean difference=-1.6, 95%CI: -2.46, -0.74). The averages of the differences (\bar{d}) between raters was -1.6, indicating that, on average, rater A gave a rating of 1.6 units less than rater B. This suggested that if the therapist was the ideal candidate (or "gold standard") in determining adherence to the therapeutic protocol, the researcher would not be an adequate substitute.

Figure 6 near here

3.3. Qualitative findings

Interviews with children revealed that the impact of art therapy was noticed on their exploration of safe space; stress relief; emotional expression; and empowerment.

Safe space: Although providing a safe space was not achieved in every session, as described in the section '3.1.Context', activities exploring safe space were children's favourite because for most children it was their first time exploring what it means to be and feel safe (Figure 7).

Figure 7 near here

Stress relief: Several children were also experiencing high level of stress at school, and art therapy gave them an avenue to release this stress and feel calmer:

"It made feel less stressed than I used to be. I am still stressed in the inside but not on the outside anymore. Before I would be stressed in the inside and also the outside."

Some children shared that the calmness they experienced during the sessions was transferrable to the rest of their day and enabled them to have better quality of sleep, which was also evident through the sleep improvements reported in the section '3.2.Biomarkers'.

Emotional expression: Children mentioned that they had shared emotions and experiences that had never shared with anyone before. They were also aware from the ground rules that all feelings are welcome and can be shared confidentially. For example, every week children were invited to add something new to the group mandala (Figure 8). Children shared that this helped me realise how feelings and mood change constantly, and that this is a normal experience. Sharing through the group drawings also helped them realise that every child was experiencing difficulties with their emotions, especially under stressful and uncomfortable circumstances.

"When something goes bad you know you can talk about it in the group and feel better",

Figure 8 near here

Empowerment activities: Children expressed that activities which helped them focus on their strengths improved their wellbeing, self-esteem and self-confidence. For example, children were invited to create their own superheroes and reflect on their own superpowers (Image 9). When remembering this activity during the interviews, a child said:

"I had a vision of myself as a volcano which has superpowers. When I'm angry, I look like the fire. When I'm calm, I look like the water. When I'm in the middle, I look like the clouds. I notice non-stop different things in my mind; water, fire, clouds..."

Another child added that:

"I got to forget about all the bad things, or most of the bad things in my mind."

Figure 9 near here

In another activity, children were invited to create boats where they could place difficulties they were dealing with, and/or past experiences or memories they did not want to keep. All the boats eventually sailed away on the sea that children made. A child expressed that "it was a relief" seeing their difficulties sailing away and to realise that "everyone has difficulties" (Figure 9). In the last session, children created their own dreamcatchers reflecting on their dreams and hopes for the future (Figure 9). This facilitated positive emotions and optimism about what their future might hold.

"My dream is to become a head teacher, I hope this dream will come true one day [...] to help other children feel good, take good grades, have fun at school and be fair."

At the follow-up stages, children still remembered these activities and the impact they had on them:

"I remember everything, every single thing."

Suggestions for improvement: Children suggested that some aspects of art therapy could be improved for the sessions to be more beneficial in future replications of the therapeutic protocol.

For example, children preferred to focus on one or two activities per session, instead of rushing from one activity to another:

“I could spend hours, no, I could spend days in each craft. I didn’t want to feel in a rush.”

Furthermore, the randomisation process led to groups with members that did not get along well and did not feel comfortable to share things with each other:

“I didn’t feel comfortable to share around S, we fight a lot in the class and I can’t concentrate when he is around.”

Naturally this dynamic affected the group and children’s experiences of art therapy. To mitigate this risk, children suggested to increase the number of sessions and decrease the number of children per group. A maximum of six, instead of eight children per group, was the recommended number by most children. However, this would result in higher samples needed, as discussed in the next section.

4. Discussion

This pilot cross-over randomised controlled study aimed to investigate the implementation of a school-based art therapy intervention, and to test whether all elements of the study design (e.g., recruitment, randomisation, follow-up) can work together in a larger study. The process and outcomes were evaluated by children through interviews, standardised questionnaires of quality of life, wellbeing and life functioning, and biomarkers (FitBits) assessing children’s sleep. Changes to children’s emotional and behavioural difficulties were assessed by their teachers, and the degree of adherence to the therapeutic protocol and principles was assessed by the lead researcher (ZM) and the art therapist (TNK).

Following eight sessions of group art therapy, children expressed that art therapy allowed them to explore what it means to feel safe and which conditions can enable them to feel safe; they were able to express and normalise all emotions and feelings; they felt less stressed within the school environment; and more empowered to pursue their dreams and hopes for the future. All sessions were given an average rating of 9/10, indicating that children rated the quality of all sessions as high. Child-reported questionnaires of quality of life, wellbeing, and life functioning showed improvements which sustained over time up to 12 months post-intervention. However, these changes did not reach statistical significance. As this was a non-powered pilot study, a larger sample would be required to make valid and reliable assumptions regarding statistical significance. Finally, biomarkers showed that, on average, children slept 18 minutes longer after the end of art therapy.

The experiences shared by children echo a wealth of existing evidence on the importance of art therapy in communicating non-verbally and creatively (Jones, 2005; Sutherland et al., 2010; Harpazi et al., 2020). From a humanistic and person-centred perspective, children were also able to form relationships and express difficulties, which can have cathartic effects (Maslow, 1962; May, 1994). Psychodynamically, engagement with arts-making allowed for a safe processing of difficult material and gaining understanding that would be otherwise challenging relying only on verbal means (Colbert & Bent, 2017; Zubala & Karkou, 2018). In agreement with previous studies, some children experienced higher socioemotional functioning (Sitzer & Stockwell, 2015), confidence in their communication skills (Deboys et al., 2017), pleasure from artistic engagement (Csikszentmihalyi, 2002), and increased sense of empowerment (Zimmerman, 2000). These improvements were also observed by teachers, who reported reductions in children’s stress, conduct, hyperactivity and

prosocial behaviour, findings consistent to a recent school-based study using the SDQ questionnaire (McDonald et al., 2019).

Sleep improvements were also found with children sleeping approximately 18 min longer post-intervention, which is significant considering the impact of sleep on socioemotional (Raven et al., 2018), and physical wellbeing (Mondanaro et al., 2017). This may be because the mind remains active during sleep, unconsciously processing thoughts that have been put aside or dismissed (Feld & Born, 2017). Current evidence suggests that arts therapies can soothe and sedate (Loewy, 2020), increasing comfort and decreasing anxiety impeding sleep capacity (Lund et al., 2020). Although this is the first study to explore changes in children's sleep, it is possible that processing difficult issues through art making, may allow for unconscious work to happen while they are awake, easing off the work during vivid dreams. Although this remains a hypothesis, preliminary evidence shows that arts therapies improve sleep quality in adults (Wang et al., 2014; Kavurmaci et al., 2019), infants and toddlers (Loewy, 2020). Considering that sleep may act as a mechanism of change, further testing of this evidence in future mechanistic studies is needed.

Concerning the lack of statistically significant changes, one possible explanation could be that the quality of life and wellbeing questionnaires have been designed to be intrinsically holistic (e.g., to reflect on life as a whole), and to be applicable in various settings or populations, therefore the context-specific impact of interventions often remains unidentifiable (Action for children, 2009; Foster et al., 2018). These questionnaires have been also designed by adults' perceptions of what children value as important; that is particularly important for younger children who tend to be examined broadly as a group without accounting for age-specific needs (Cho & Yu, 2020). Furthermore, the questionnaires are connected to individual frames of reference (Action for children, 2009). For instance, children's need for love and care can manifest differently for children living in secure and stable families than for children living in less secure and stable families. Finally, as wellbeing and quality of life are multidimensional constructs, they go beyond hedonism and the pursuit of happiness; as such, they cannot be adequately assessed through a single questionnaire (Ruggeri et al., 2020). For these reasons, embedding qualitative methods was crucial, as they led to findings that otherwise would have been missed (Layard & Dunn, 2009).

Finally, an unexpected observation was the significant difference found in the ratings of adherence to the therapeutic principles between the researcher (ZM) and art therapist (TNK). It is possible that the art therapist was more self-critical and reluctant to rate her own sessions too high. Vice versa, the researcher was more likely to rate the sessions higher due to confirmation bias: the researcher's tendency to look for information that confirm their hypotheses. Nevertheless, the ratings offered insights into whether the key principles of the therapeutic protocol were achieved. The principle that was achieved in every session was 'working with empathy and warmth', while the most challenging principle was 'revisiting past experiences with direct impact on the here and now'. This was because the therapeutic environment often lacked the safety needed to revisit past experiences and to 'hold' the group. The following section will focus on how these challenges can be addressed in future research and practice. Another surprisingly difficult therapeutic principle to achieve was 'working with the group as a whole'. Children showed a tendency and preference towards working on their own (rather than collective) artwork. Further exploratory evidence would be useful to explore whether and why children preferred to work therapeutically on their own rather than as a group.

4.1 Practical implications

Despite the advantages of school-based art therapy, there are inherent barriers that impede to the therapeutic work, such as finding a private and safe environment. The feasibility of privacy and

confidentiality within schools has been frequently questioned (Regev et al., 2015), while the school calendar is also filled with events that affect the flow of art therapy (e.g., half-terms, school trips). For example, in the first term none of the available rooms were suitable for therapeutic use, a commonly reported issue in schools (Danieli et al., 2019). This does not mean that schools are unsuitable for therapeutic work, but the barriers need to be acknowledged and addressed insofar as possible.

The first recommendation to secure a safe space is to deliver an art therapy workshop to parents/legal guardians and to the school staff prior to the beginning of art therapy. Because we did not deliver a workshop of this nature, the importance of safe space was not fully understood, particularly by teachers who interrupted frequently. The second recommendation is setting clear boundaries between the beginning and end of art therapy through consistent rituals that provide children with time to transition from the class to the therapeutic room, and vice versa. All sessions started and ended in a similar way (e.g., group mandala at the beginning, group reflection at the end) to facilitate this transition. The third recommendation is to simply allow time for trusting relationships to evolve. Even within a few weeks, the relationship between the art therapist, researcher, and school staff had evolved, making easier to communicate each other's needs. Longer collaboration between art therapists and teachers/schools and a whole-school approach may be the key to maximise the impact of school-based art therapy (Regev, Green-Orlovish & Shir, 2015). A synthesis of trials in schools also found that establishing rapport and positive relationships between research teams and schools was among the most important retention facilitators that determined the feasibility of school-based trials (Lohan et al., 2017).

In terms of the group structure, children recommended that there should be no more than six children per group, so that everyone can have enough time for creating/sharing, and sufficient attention by the art therapist. They also recommended that two more sessions would be needed (i.e., ten instead of eight sessions in total), and weekly reminders about the remaining sessions would have been beneficial to be mentally prepared for the sessions to reach their endpoint.

Finally, the randomisation process shaped groups with members who did not get along well, or their energy level was conflicting, leading to arguments that were challenging to resolve and reluctance to share/participate in the group. As such, the group cohesion (or lack thereof) impacted on the therapeutic process and outcomes. A strategy worth considering in future studies is seeking advice from the teachers as to how children should be clustered into groups following randomisation. This method could bring together children who get along well, protecting the therapeutic environment for the whole group. Alternatively, a pre-intervention group assessment would be useful to determine whether groups have adequate levels of group cohesion. Another solution could be the delivery of a one-to-one session with each child pre-intervention. Although this strategy is not cost-effective, it could provide valuable insights as to whether groups are an appropriate form of therapy for some children and to minimise the risk of harm for the rest of the group.

4.2 Limitations

Due to time limitations associated with undertaking a PhD, public involvement was not conducted prior to the study design. If children's voices had been included at an earlier stage, both the study and the intervention itself would have been more focused on what really matters for children. Furthermore, the lead researcher co-facilitated all sessions and as such, the relationship between the researcher and children was evolving, with children showing gradually higher affection towards her. It is possible that children have been hesitant to openly share things that did not enjoy or find

helpful because of the relationship with the researcher. The effects of the researcher's dual role should be taken into consideration in the appraisal of the findings.

5. Conclusion

Children expressed that the greatest impact of art therapy was observed on their exploration of safe space, stress relief, emotional expression, and empowerment. The improvements reported in the questionnaires of quality of life, wellbeing, life functioning, and sleep did not reach statistical significance, but they maintained over time at 3-, 6-, and 12-months post-intervention. Children's duration of sleep increased by approximately 18 minutes post-intervention compared to pre-intervention. As this study was a pilot and therefore not powered, a larger sample is required to make valid and reliable assumptions regarding statistical significance. All sessions were given an average rating of above 9/10, indicating that children's session quality ratings were high and consistent across sessions.

The power calculations provide an indication of the required sample size to detect a significant effect size in each of the outcome measures used in this study. Furthermore, the implications for future research and practice include recommendations regarding how to address the challenges (e.g., lack of privacy and group cohesion) and make art therapy more effective from children's perspectives. The implementation of these recommendations could increase the benefits for children's health and wellbeing, and contribute towards the thriving of art therapy in educational systems worldwide.

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Figure 1: Therapeutic model followed in the art therapy intervention protocol

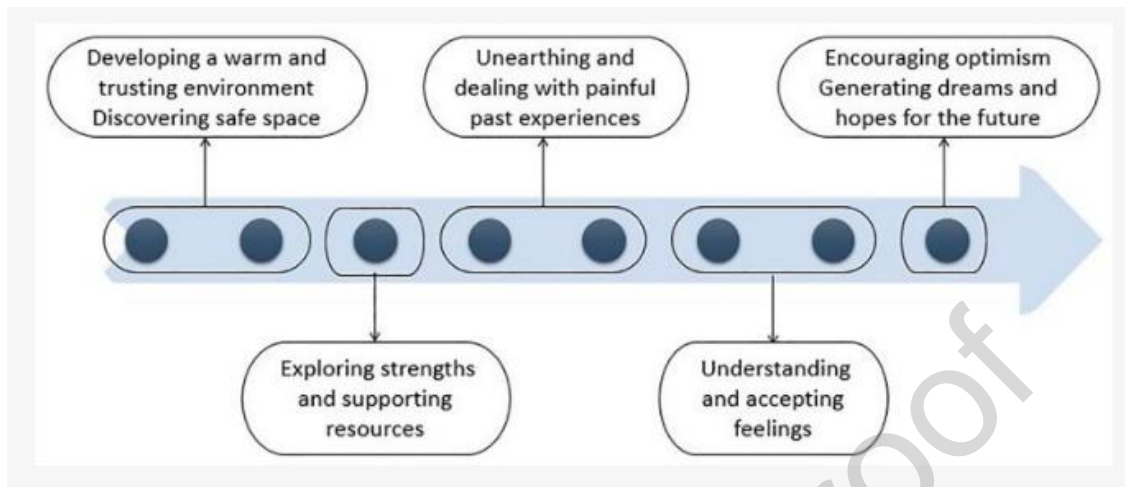


Figure 2: Procedure flowchart

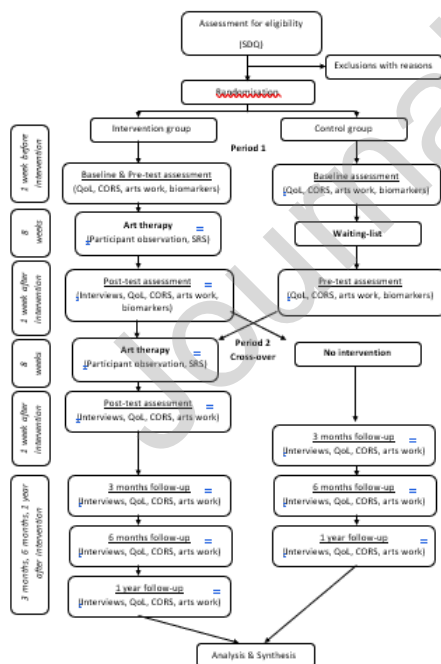


Figure 3. Graph showing mean CORS scores post-intervention for control and art therapy intervention groups. Bars presenting +/-2 standard deviations are also shown.

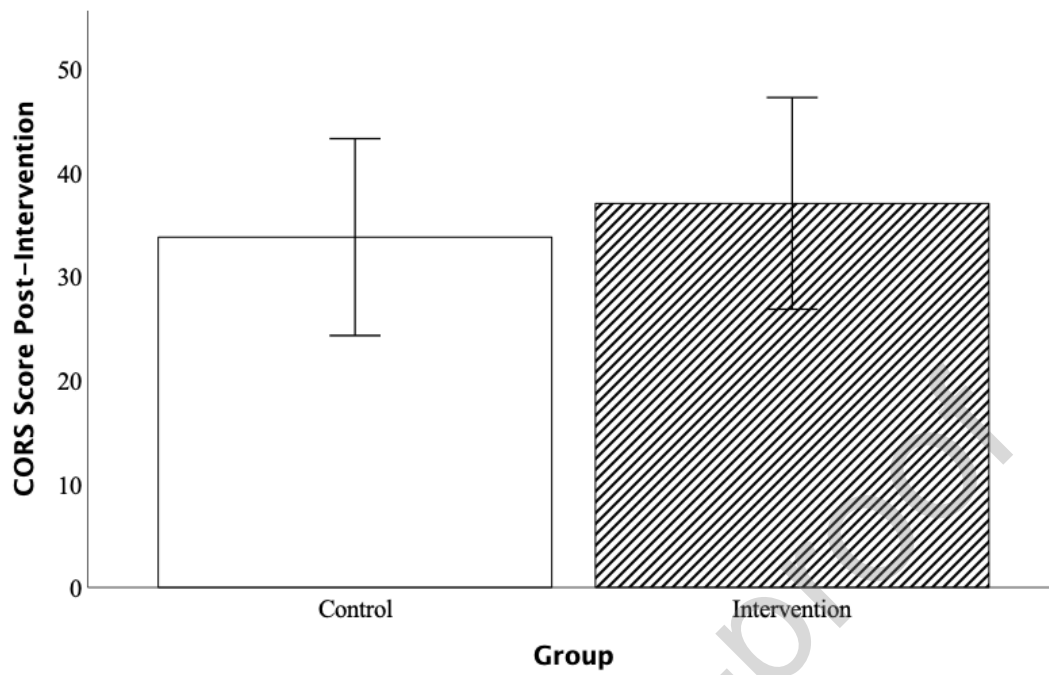


Figure 4. Graph showing mean QoL scores post-intervention for control and art therapy intervention groups. Bars presenting +/-2 standard deviations are also shown.

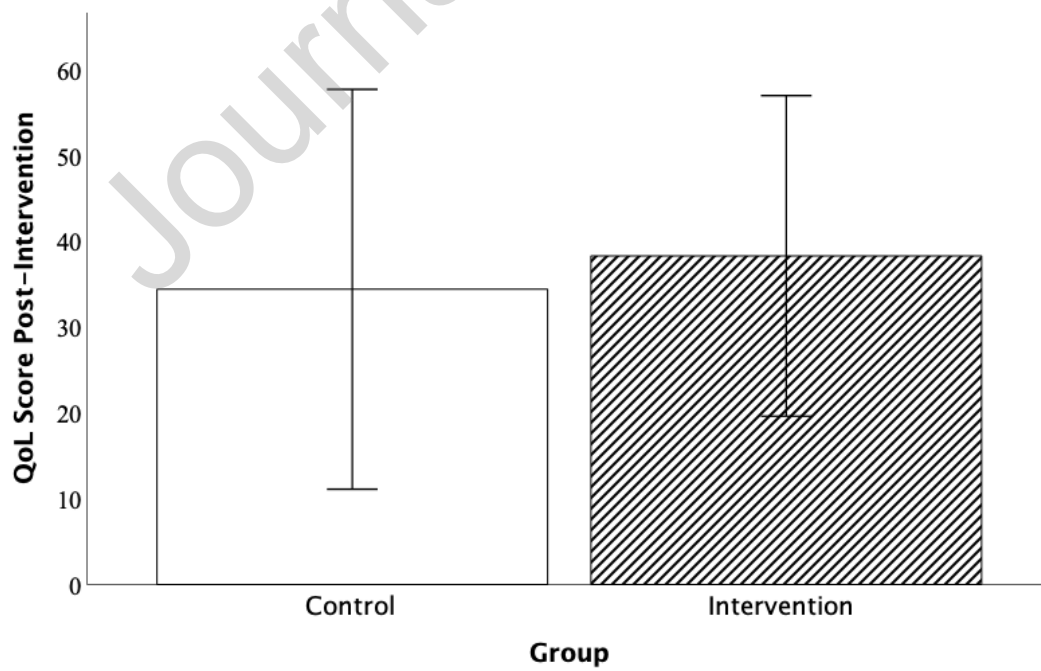


Figure 5. Bar chart showing estimated marginal mean scores for each of the 8 art therapy sessions. Error bars representing 95% CI are also shown along with mean scores (\bar{x}).

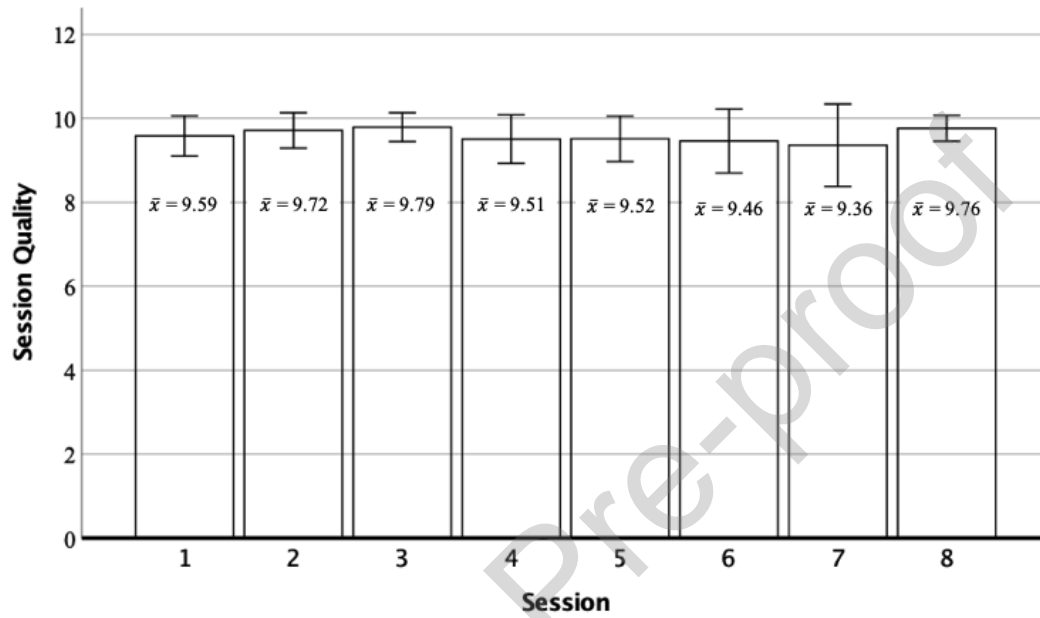


Figure 6. Bland-Altman plot showing the difference between raters (A minus B) plotted against the mean of the two raters.

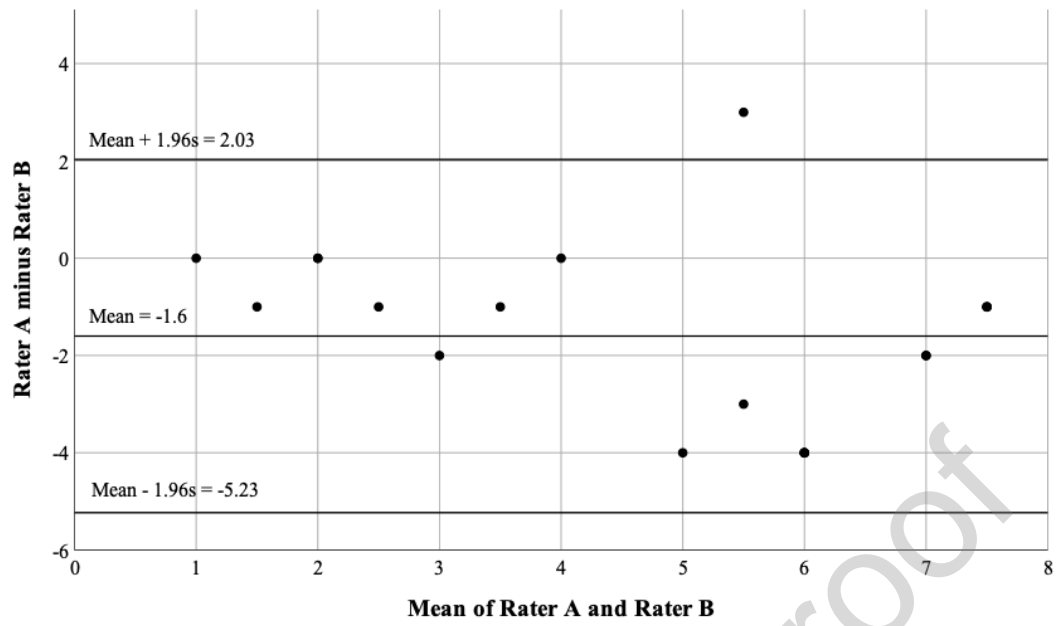


Figure 7: Children's 'safe space' activities



Figure 8: Group mandala



Figure 9: Empowerment activities



Table 1. Means and standard deviations (bracketed) for pre- and post-intervention scores for CORS and QoL, for total sample and separated by intervention group and at follow-up for those who took part in the art therapy intervention.

	Controls (N=8)	Intervention (N=16)	Total (N=24)
CORS pre-intervention	35.00 (4.50)	33.62 (6.48)	34.08 (5.83)
CORS post-intervention	33.75 (4.74)	37.00 (5.10)	35.92 (5.12)
CORS 3 months	-	34.81 (6.34)	-
CORS 6 months	-	34.13 (5.99)	-
CORS 12 months	-	34.94 (6.72)	-
QoL pre-intervention	34.98 (7.24)	34.94 (9.80)	34.95 (8.86)
QoL post-intervention	34.43 (11.65)	38.32 (9.35)	37.02 (10.09)
QoL 3 months	-	36.74 (7.44)	-
QoL 6 months	-	36.02 (9.55)	-
QoL 12 months	-	37.23 (10.05)	-

Table 2. Effect size and sample size calculations for CORS, QoL, Sleep and SDQ score. Sample size calculations were generated using G*Power for power 0.95 and an alpha level of 0.05.

Outcome variable	CORS	QoL	Sleep (duration in mins)	SDQ
<i>Effect size</i>				
Eta squared	0.0985	0.0359	0.049	0.0385
Cohen's d	0.661	0.386	0.454	0.4
f value	0.3305	0.193	0.227	0.2

Correlation among repeated measures	-	-	0.593	0.839
<i>Sample size calculation</i>				
Type of analysis	ANCOVA	ANCOVA	Repeated measures ANOVA	Repeated measures ANOVA
Critical F-value	4.023	4.196	3.9215	3.8683
Sample size (N)	54	29	121	351

Highlights

- Sixty-two children participated in arts therapies (sixteen in art therapy).
- Outcome measures were quality of life, wellbeing, life functioning and sleep.
- Quantitative outcome improvements did not reach statistical significance.
- Outcome improvements maintained up to one-year post-intervention.
- Adherence to the therapeutic protocol differed between raters.