



Treating Anxiety and Social Deficits in Children with Autism Spectrum Disorder in Two Schools in Nairobi, Kenya

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Abstract

Anxiety in children with Autism Spectrum Disorder (ASD) contributes to their functional impairment. We evaluated a cognitive-behavioral program for anxiety and social deficits in children with ASD in two schools in Nairobi City, Kenya. Parents and teachers of 40 children and adolescents with ASD (5–21 years) participated, randomized by school. The two schools were randomly assigned to either intervention ($n=20$) or control ($n=20$). There was a significant improvement in ASD severity as well as anxiety within the treatment group, which was not seen in the control group. These findings support the expansion of treatments for ASD core deficits and secondary problems in youth with ASD in developing countries.

Keywords Autism · Anxiety · Social skills · Intervention · Comorbidity

School-Based Treatment of Anxiety and Social Deficits in Children and Adolescents with Autism Spectrum Disorder in Kenya

Several interventions have been developed for ASD, to improve core and secondary symptom such as anxiety (Huerta et al. 2012). Although ASD is rarely treated to remission, there are several pharmacological and psychosocial interventions with evidence to suggest efficacy for a range of behaviors such as social-communication deficits and irritability (National Autism Center 2009; Shaker-Naeni et al. 2014). Cognitive-behavioral therapy (CBT) is a psychosocial intervention, which has considerable research support for the treatment of anxiety in ASD (Reaven 2009;

White et al. 2009; Wood et al. 2009a, b). To the authors' knowledge, all published treatment research on CBT for ASD has been conducted in Europe and Western countries (e.g., Reaven 2009; White et al. 2009). This study, therefore, sought to evaluate the effectiveness of CBT in the treatment of anxiety and social skills in ASD among children in schools in Kenya.

Kenya lacks a comprehensive policy on, or guidelines for, assessment of developmental disabilities as well as the personnel and equipped facilities for treating this growing population (Cohen 2012). The first classroom dedicated to educating children with ASD in Kenya was opened by parents in the year 2003, leading to the formation of Autism Society of Kenya (ASK) (Weru 2005), a class started with 24 children, led by parents with very little assistance or financial support from the government. Their main focus or approach of treatment was sensory and diet therapy and no evaluation of impact was conducted. Other centers have since been started, based largely on Applied Behavior Analysis (ABA) principles (e.g., Riccio 2011). While efforts to improve outcomes for children with ASD in Kenya are promising, there is a need to focus on co-occurring conditions, such as anxiety, as well as core symptoms and delays.

The Multimodal Anxiety and Social Skills Intervention (MASSI) is grounded in CBT (White et al. 2010). The primary supposition of CBT is that thoughts, feelings, and behavior are inter-related. Thus changing dysfunctional thoughts can diminish emotional distress and improved

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social performance (Beck 1972; Dobson and Dobson 2009; Lazarus and Folkman 1984). The initial randomized controlled trial (RCT) of MASSI found significant improvement in social skills and non-significant decreases in anxiety, despite a moderate effect size (White et al. 2013). Research has affirmed the feasibility of CBT to treat anxiety in young people with ASD, concluding that further evaluation of the clinical impact of CBT is warranted (Shaker-Naeeni et al. 2014). Three separate meta-analyses, however, have indicated that CBT demonstrates at least moderate effects on anxiety in adolescents with ASD, when relying on parent-report of symptom change (Kreslins et al. 2015; Sukhodolsky et al. 2013; Ung et al. 2015), though very little research has examined the secondary effects of CBT on social competence (e.g., White et al. 2013).

Thus far, the MASSI program has been used only in clinical research settings, although its developer suggested expanded use to educational settings (White et al. 2013). Given the considerable body of literature indicating that behavior problems in school predict poorer academic performance (Breslau et al. 2011), directly targeting anxiety reduction and social skills development with MASSI may positively influence broader student outcomes. MASSI was developed for cognitively able adolescents with ASD, with a dual treatment focus on anxiety (conceptualized dimensionally, regardless of subtype) and social deficit remediation. MASSI draws from the active ingredients of CBT for anxiety (e.g., psychoeducation, graded exposure) in an individual format, combine with small group sessions to practice social skills and interaction with peers (White et al. 2009). This study sought to evaluate the effectiveness of MASSI, implemented in a school setting, in the treatment of anxiety and social skills in school children and adolescents.

Method

Design

This study used an experimental design, in which the two participating schools were randomly selected and then one school assigned to the condition MASSI (Shadish et al. 2002). This design is considered appropriate for such a study (e.g., Cresswell 2013). This design was used because of the nature of the school setting and the preliminary nature of evaluation of such a treatment in this setting.

The approval from Ethics board and Ministry of Education was obtained to proceed to the field. The two participating schools were randomly assigned to MASSI treatment and control (no treatment). The two schools were in different locations, to prevent possible treatment contagion, but had similar characteristics in terms of student composition (see Table 1). Both schools extend their primary education to high school which reduced attrition. The author invited all parents of the participants and explained the treatment and the procedure involved. With this understanding parents signed the consent forms and the students assented. In the absence of a parent, the school Principal consented.

Subjects

The study's sample was comprised of all children and adolescents between 5 and 21 at the school years old with a previous clinical diagnosis of ASD (DSM-5; APA 2013). The two schools of study are special education schools for children with special needs in education, ASD being one of them. This made it possible to have a study sample ($n = 40$)

Table 1 Demographic, diagnostic and pre- and post-treatment means differences and significance for control and experimental schools

Background variables	Value labels	Control school		Experiment school		Overall	
		Number	Percent	Number	Percent	Number	Percent
Children assessed							
Sex	Male	13	65.0	14	70.0	27	67.5
	Female	7	35.0	6	30.0	13	32.5
Level of schooling	Junior	11	55.0	8	40.0	19	47.5
	Middle	3	15.0	6	30.0	9	22.5
	Senior	6	30.0	6	30.0	12	30.0
Age group	5–9 Years	5	25.0	7	35.0	12	30.0
	10–14 Years	7	35.0	6	30.0	13	32.5
	15–19 Years	6	30.0	4	20.0	10	25.0
	20–24 Years	2	10.0	3	15.0	5	12.5
Parents							
Religion	Protestants	15	75.0	15	75.0	30	75.0
	Catholic	5	25.0	5	25.0	10	25.0
Marital status	Married	19	95.0	19	95.0	38	95.0
	Single	1	5.0	1	5.0	0.0	5.0

of children with ASD. Additionally the teachers working in these two schools have a training background of special education and just needed to understand the CBT principles. The teachers were therefore trained on CBT principles for 2 weeks by the lead author. Initial enrollment included 44 children with ASD who were recruited via one-on-one meetings in schools. Forty eligible children and adolescents were randomly assigned to treatment and control (four did not meet the DSM- 5 criteria). There was no test of cognitive abilities administered; since this was a school, an assumption was made that all participants were educable. None of the participants exhibited pathology that warranted more intensive treatment and all participants provided assent to participate as well as parents' consent (Fig. 1).

Treatment Procedure

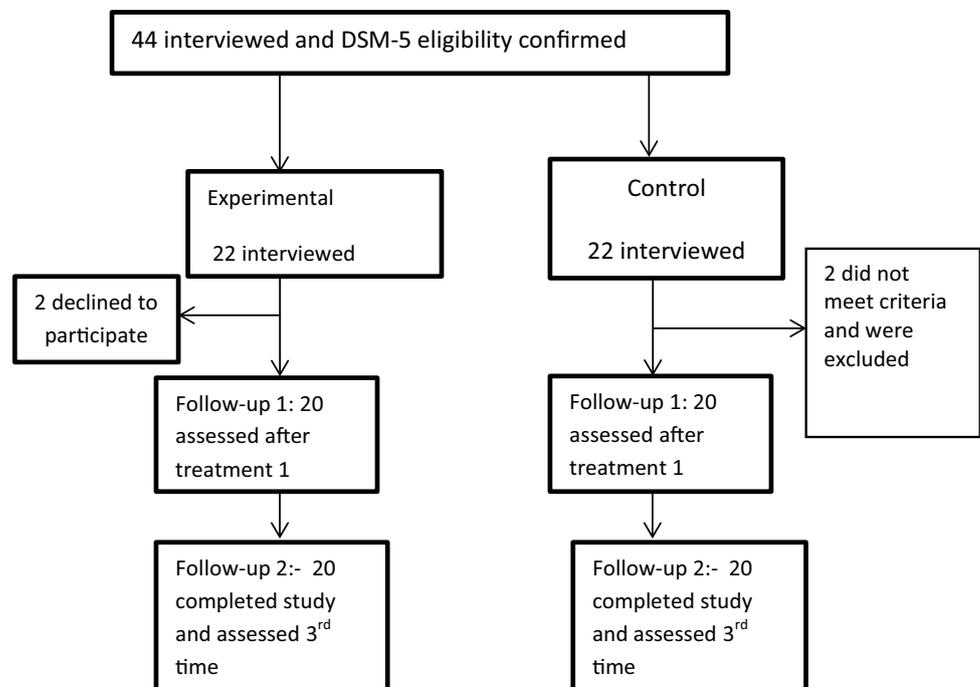
The MASSI program was designed for adolescents between 12 and 17 years of age, delivered across three modalities: individual therapy, group therapy (social skills training and practice) and family/school involvement. For a full description of the MASSI protocol, see White et al. (2010). MASSI was adapted in order to have all children and adolescents (5–21 years) at the school learn and practice the taught skills, to aid retention. Treatment in the current study was overseen by a PhD candidate in Clinical Psychology (masked for review), who served as therapist along with three masters students in Clinical Psychology. All the student therapists went through a 2 week training on MASSI program, where thorough review of activities alongside CBT

principles were revisited appropriate for a school set up. The principal investigator, a licensed psychologist, supervised all training. After each session, the supervising clinician met with the research assistants to review the session in order to ensure any emerging problem was corrected early and to ensure consistency.

Therapists were encouraged to be as flexible as possible to address the needs of each individual child, while adhering to protocol and session objectives. For each individual therapy session, each participant was assigned his or her own clinician. At the same time, this therapist also co-led the participant's group sessions. Each participant received at least 13 individual sessions, each of which lasted at least 60 min, as well as seven group sessions. The teacher's role was to reinforce learning and help the student practice the learned skills outside the therapy room. They also kept close communication with the parents, with the aid of a practice journal, to improve consistency in training and synchronize school- and home-based skills practice. The parents and teachers were trained by observing and joining the child in reviewing their individual lessons and group practice. Teachers were encouraged to follow up the practice of learned skills in school and recorded reminders and notes on practice for the parents. They were therefore psycho-educated on anxiety disorders and the basic principles of CBT.

Although the original MASSI protocol indicated 20 sessions total (13 individual plus 7 group sessions), participants in the present study received twice this many due to both clinical reasons (i.e., to maximize impact) and pragmatic reasons (i.e., to align with the schools' calendars).

Fig. 1 Flow chart of participants



MASSI curriculum was repeated twice for the purpose of internalization and mastery of content since this was not a clinical set up and with the intention of having an inclusive school curriculum in the future. Following the first phase of 13 individual and 7 group sessions, a break of 3 weeks was taken before phase 2, during which participants received 20 more sessions. Thus assessment was at baseline (pre-treatment), end of phase one of intervention (post-treatment one) at 3 months, and end of phase two of intervention (post treatment two), which occurred 6 months after baseline. During phase two, MASSI sessions were not simply repeated; rather, skills taught in phase one were reinforced and practiced within the school context. This was deemed important for the children and adolescents to learn and have the opportunity to practice the skills, to aid retention. The control group was not exposed to MASSI treatment or any other structured intervention programs during the study period.

Measures

ASD severity was assessed with the parent-reported Social Responsiveness Scale-second edition (SRS-2: Constantino and Gruber 2012). The 65 items of the SRS-2 are scored from 1 (not true) to 4 (almost always true) SRS has a good internal consistency (0.90; Constantino and Gruber 2012). Higher scores on the SRS-2 Total score reveal greater severity of social disability. In this study raw scores of SRS-2 were used in the analysis. Anxiety was measured via the Child and Adolescent Symptom Inventory-4 ASD Anxiety Scale (CASI-Anx; Sukhodolsky et al. 2008). The parent-reported CASI-Anx contains 26 items across 8 anxiety disorders drawn from the complete 132 item tool. The CASI-Anx has been shown to have adequate internal consistency (0.85; Sukhodolsky et al. 2008). The parents of children in the treatment and control groups completed the SRS-2 and CASI-Anx at baseline as well as at post-treatment 1 and post-treatment 2. In this study, raw scores were used in the analysis.

Analyses

The objective of this study was to test the effectiveness of MASSI on anxiety and ASD severity in children and adolescents living with ASD. Repeated measures ANCOVA was used to test for the influence of independent variables (time [3: baseline, endpoint 1, endpoint 2] and condition [2; MASSI, control] on the dependent variables while controlling for covariates (age and gender). A separate model was run for each dependent variable—anxiety (CASI-20) and ASD severity (SRS-2 total score).

Results

Descriptive results are shown in Table 2. For anxiety (CASI-20), the interaction between time and condition was significant, $F(2,78) = 5.614$, $p = 0.006$, $\eta^2 = 0.067$. The main effect of time was not significant, $F(2,156) = 2.87$, $p = 0.06$, $\eta^2 = 0.035$. Although the main effect of condition was significant, $F(1,78) = 16.105$, $p = 0.000$, $\eta^2 = 0.171$, meaning there was an overall difference between MASSI and control, this effect must be interpreted only in the context of the significant interaction. At the same time there was positive effect within the group from baseline to phase 3. As seen in Fig. 1, children in the treatment condition showed sharper decline in anxiety than did the control participants (Fig. 2).

In terms of ASD severity (SRS-2), again the interaction was significant, $F(2,77) = 3.96$, $p = 0.023$, $\eta^2 = 0.093$. The main effect of time was also significant, $F(2,77) = 5.879$, $p = 0.004$, $\eta^2 = 0.132$, as was the effect of condition, $F(1,78) = 61.649$, $p = 0.000$, $\eta^2 = 0.441$, meaning that there was an overall difference between MASSI and control (Fig. 3).

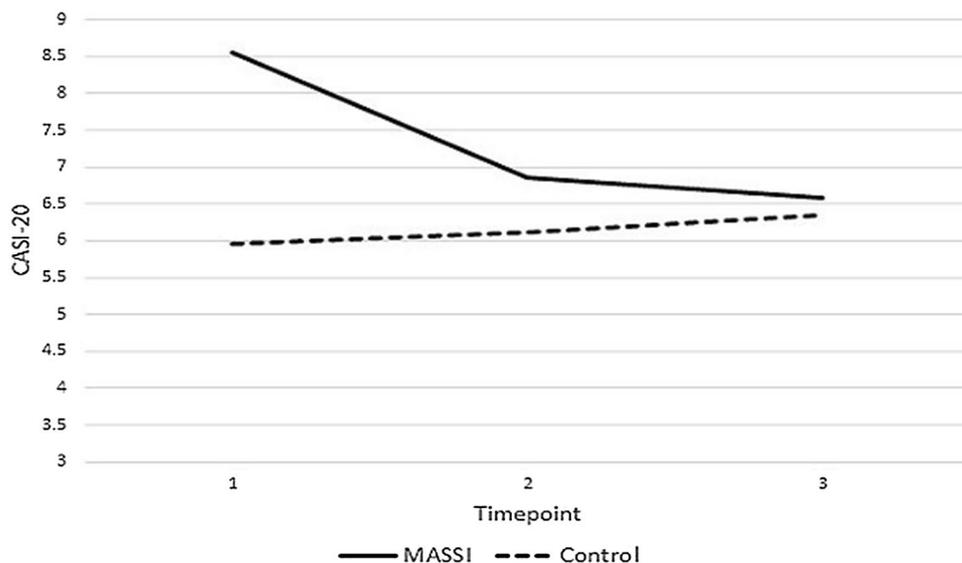
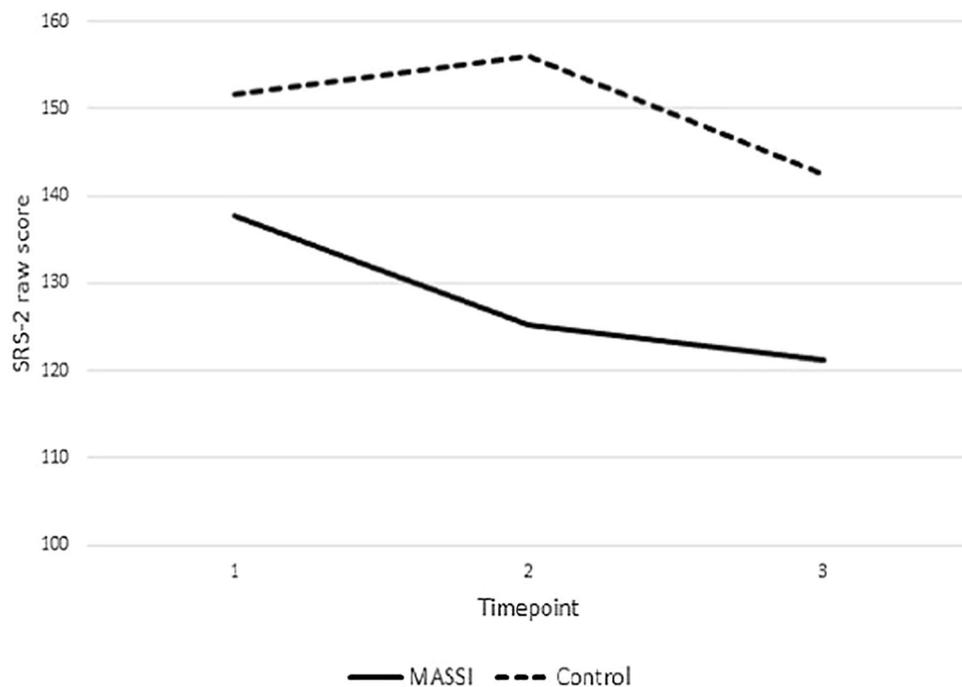
Discussion

We sought to evaluate the utility of a CBT-based program targeting anxiety reduction and social improvement in two schools in Kenya, where there has been little research on treatments of ASD related problems, such as anxiety. There was a significant improvement in ASD-related social impairment. There was significant improvement in anxiety, specifically a 23% decrease, in the treatment group. This is considerable, especially given that some of the subjects in this study did not have elevated anxiety at the start of the treatment program. Indeed, the parent-reported anxiety scores in the present study's sample were less than half those seen in youth with ASD with diagnosed anxiety disorders in prior treatment studies (e.g., Murphy et al. 2017; White et al. 2013).

Table 2 Descriptive data on key outcome variables

	Control M (SD)	MASSI M (SD)	t Values
CASI-20 Baseline	5.95 (2.75)	8.55 (3.18)	3.916*
CASI-20 Endpoint 1	6.13 (1.45)	6.85 (2.20)	1.738**
CASI-20 Endpoint 2	6.35 (1.86)	6.58 (2.17)	0.498
SRS-2 Baseline	151.75 (19.40)	137.78 (24.44)	-2.832*
SRS-2 Endpoint 1	155.98 (18.92)	125.23 (21.99)	-6.703*
SRS-2 Endpoint 2	142.43 (22.51)	121.3 (22.92)	-4.159*

* $p < 0.05$, ** $p < 0.01$

Fig. 2 Change in anxiety (CASI-20) across condition**Fig. 3** Change in ASD severity (SRS-2) across condition

Very little research has examined CBT-based programs within school settings. Most research in this area has relied on clinic-based implementation. Moreover, due to limited resources, evaluation, training, and technical assistance available in schools in developing countries, there has been little investigation into how to treat secondary psychiatric problems, such as anxiety, in students with ASD. As a result, there is a lag in the adoption of evidence-based practices within schools across all systems (Weist and Evans 2005). Furthermore, the traditional approach of schools providing limited assessment, consultation, and treatment services for

children and youths being referred into special education has not been adequate (Weist 1997). This is especially so in developing countries given that many children access services solely via school.

Integration of empirically supported interventions into schools, with an emphasis on continuous quality improvement, is of high importance (Weist and Evans 2005). This can be achieved through improving assessment and outcome evaluation, involvement of educators in the work, considering school environments, and tailoring programs through ongoing clinical research (Minahan and Rappaport 2013;

Weist and Evans 2005). The training of teachers is vital since the child will typically spend more time at school, in the classroom, than in therapy, regardless of whether it takes place at school or elsewhere. A specific emphasis was placed on the generalization of skills through training teachers as coaches under a natural school/learning environment. For adaptation of MASSI the skills learned in the therapy room were incorporated in the classroom as part of the daily learning activities to enhance learning. Thus, this study adds to the research base for carrying out social skills and anxiety training program within the natural environment.

The study demonstrated that the treatment significantly reduced ASD social impairment severity and anxiety. These effects are especially noteworthy given the relative brevity of the intervention. Additionally, these findings are comparable to studies carried out in the developed countries, which have used CBT-based approaches (Reaven 2009). Moreover, the results of this study are consistent with prior research that CBT has an effect on social competence (Reaven et al. 2012). This study adds to a growing body of research showing that young people with ASD benefit from modified CBT as part of a therapeutic package (Chalfant et al. 2007; McNally Keehn et al. 2012; Reaven et al. 2012; Sofronoff et al. 2005; Storch et al. 2012; Sung et al. 2011; White et al. 2013).

This study was limited to a small sample size of two schools in Kenya. Ideally, multiple schools would have been nested within each condition. The current design does not permit analytic consideration of how the schools themselves may have differed, regardless of condition assignment. Additionally the choice of non-active control condition does not allow us to evaluate the potential influence of non-specific factors on outcomes, such as social contact hours or adult attention.

The results may not generalize to other schools in the area. The subjects were not exposed to any characterization such as parent rating scale or IQ test for cognitive abilities as it was assumed that for these children and adolescents to be in school are cognitively able. Additionally, although interventionists were closely monitored to ensure intervention consistency across subjects, fidelity measure of would have been a good idea. Medication use was not monitored over the course of the treatment. In a previous study (Tse et al. 2007) no dissimilarities were found between outcome for subjects taking and not taking medications and, in Kenya, medications are rarely used for children with disabilities. However, the effect of medication cannot be ruled out as a confounding variable in this study.

The treatment was well-received and results are promising. The results, which show that school-based mental health programming can be helpful, even with a sample that is not clinically anxious, suggest that efforts to prevent secondary problems in students with ASD may be fruitful. More

school-based treatment research is needed in developing countries, targeting both urban and rural population.

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Author Contributions NWI conceived of the study, participated in its design, coordination and data collection and drafted the manuscript and performed the statistical analysis; SWW participated in the design of the study, assisted with statistical analysis and interpretation, and writing of manuscript; AWM participated in the design and interpretation of the data. All authors read and approved the final manuscript.

Compliance with Ethical Standards

Conflict of interest The authors report no potential conflicts of interest.

Research Involving Human Rights The research involved human participants.

Informed Consent Informed consent was obtained prior to data collection.

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