



Parent training in non-violent resistance for children with attention deficit hyperactivity disorder: a controlled outcome study

Irit Schorr-Sapir^{1,2} · Naama Gershy³ · Alan Apter^{1,4} · Haim Omer¹

Received: 10 September 2020 / Accepted: 15 January 2021
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Abstract

Current forms of parent training for childhood attention deficit hyperactivity disorder (ADHD) are often insufficient. Many families drop out of the training, and treatment gains are often not maintained. Nonviolent resistance parent training (NVR) focuses on helping parents resist the child's negative behaviors without escalating the problem. NVR helps parents to fulfill an anchoring function, supporting the child through presence, self-regulation, structure, and support network. This study is a randomized controlled trial designed to assess the efficacy of NVR in the treatment of childhood ADHD. Participants were Israeli parents of children with primary ADHD diagnosis ($N = 101$; 5–13 years old; 79% male participants) randomly assigned to either 12-session NVR ($N = 50$) or waiting list ($N = 51$). Measures were administered before and after treatment and at a 4-month follow-up. ADHD outcomes included the Conners and Child Behavior Checklist. Parenting outcomes included parental helplessness, emotional regulation, anchoring function, and family chaos. Participants in the NVR condition reported significant improvements in the child's internalizing, externalizing, and ADHD symptoms, as well as improvement in paternal and maternal helplessness and anchoring. Participants in the control condition did not report changes in the child's symptoms or the parents' condition. The results at follow-up revealed maintenance of change in the child's externalizing and internalizing symptoms, but failure to maintain gains in ADHD core symptoms. Maternal helplessness and anchoring, as well as family chaos continued to improve at follow-up. Dropout rates in the treatment group were low (5%), and fathers' engagement was close to 100%. NVR is an efficient treatment for childhood ADHD, with benefits extending beyond the child's symptoms to the entire family. NVR's special focus on parental distress may have contributed to low dropout, high paternal engagement, and maintenance of change.

Keywords ADHD · Parent training · Nonviolent resistance · Externalizing symptoms · Parental helplessness

Introduction

ADHD is the major cause of children's mental health referrals [1]. In the US, one in five children in high school and one in ten in elementary school are diagnosed with ADHD,

leading to concerns about over-diagnosis and possible over-medication [2]. Although the disorder is considered to have a neurophysiological basis, environmental factors influence its gravity and course. Consequently, non-medical treatments for ADHD are now recommended either as first-line treatments or as adjuncts to more selective use of medication [3, 4].

Over and beyond their attention deficits, children with ADHD have a wide range of behavioral problems [5]. They face more difficulties at school; have more problematic relationships with peers and family; and a higher risk of violence, delinquency, substance abuse, early sex, and dangerous driving [6, 7]. ADHD shows considerable comorbidity with anxiety and depression [8, 9]. These wider aspects of ADHD have been discussed in the literature, and should be given as much consideration as the core deficits. An effective

✉ Irit Schorr-Sapir
iritsh@clalit.org.il

¹ School of Psychological Sciences, Tel Aviv University in Israel, Tel Aviv, Israel

² Department of Child and Adolescent Psychiatric, Schneider Children's Medical Center of Israel, 14 Kaplan Street, PO Box 559, 4920235 Petah Tikva, Israel

³ School of Education, The Hebrew University of Jerusalem in Israel, Jerusalem, Israel

⁴ The Sackler Faculty of Medicine, Tel Aviv University in Israel, Tel Aviv, Israel

intervention should, therefore, address the broader emotional and behavioral aspects of the condition.

Parents of children with ADHD suffer from particularly high levels of frustration and stress [10, 11], conflicts with the child [6, 10], family chaos [10, 12], depression and anxiety [13]. Many of these parents experience a deep lack of support [14, 15]. The relationship between these factors and the child's problems is probably circular, for instance, parental frustration exacerbating child irritability and vice versa.

With a few exceptions (e.g., [16–18]) most parent-training programs focus almost exclusively on improving the child's condition, with only a few targeting also the parents' difficulties and distress [16–18]. We believe this limitation may contribute to the high dropout rates observed in most parent-training programs [19, 20]. NVR-training is one of the few approaches that put the wellbeing of parents (and siblings) at the center of attention, no less than the child's difficulties [21, 22]. Moreover, it is unique in that it strongly emphasizes the engagement of fathers [23].

A number of studies showed the efficacy of NVR-based therapies with children with a variety of externalizing symptoms [24–26], anxiety disorders [27, 28], high functioning autism spectrum disorders [29], and children in the care of foster families [30, 31]. Although these studies did not specifically focus on ADHD, they also showed improvements in ADHD symptoms [26]. The findings that appeared consistently across studies were: reduction of the child's symptoms, improvements in parental helplessness, wellbeing and self-regulation, and increase in the parents' experience of support. These findings suggest that NVR protects both parents and the child against impulsive and erratic tendencies. The concept of *parental anchoring function*, which relates to the parents' ability to stabilize the child through presence, self-control, support and structure, reflects the parents' ability to fulfill this role [32].

The concept of the anchoring function and the assumption that NVR helps parents apply it seemed especially suited for children with ADHD. These parents often report being continuously “tossed-about” [33]. To help parents regain their stability and serve as anchors for their child, we developed a special NVR protocol for ADHD [34]. The goal of the present study was to evaluate the efficacy of this intervention. We expected it to promote the following outcomes: (1) Reduce the symptoms of ADHD, as well as other externalizing and internalizing symptoms. (2) Reduce parental helplessness and family chaos. (3) Enhance parental anchoring and self-regulation. (4) Decrease dropout and increase father engagement.

Methods

Study design

The study was approved by the Helsinki Committee of SCMC.¹ A total of 103 families were assigned to either NVR or waitlist in a 1:1 ratio using a computerized randomization algorithm. Parents of children assigned to NVR received 12 treatment sessions following a manualized treatment protocol [34]. Families assigned to the waitlist group began treatment after 12 weeks. Parents in the NVR group completed questionnaires at baseline, end of the treatment, and 4-month follow-up. Parents in the waitlist group completed questionnaires at baseline, end of the 12-week waiting period, end of the treatment, and 4-month follow-up.

Participants

Parents' range in age from 33 to 71 years (M mothers = 41.64, SD = 4.42; M fathers = 43.42, SD = 5.82) and children range in age from 5 to 13 years (M = 8.8, SD = 1.77; 79.2% males). Parents either self-referred or were referred by their psychologists, psychiatrists, neurologists, and school psychologists. All families were Jewish and mostly Israel-born (88%). Eighty-nine percent of parents were married or in a domestic partnership and had an average of three children. Parents' average education level was 14 years (M mothers = 14.89, SD = 2.35; M fathers = 14.28, SD = 2.57). Sixty percent of the children received medication for ADHD (stimulants or risperidone). Comorbidity was highly prevalent. Almost all children had symptoms of conduct, oppositional defiant, or anxiety disorder.

Inclusion criteria were: children having a primary DSM-5 ADHD diagnosis and scores above 55 on the Conners' Scale for ADHD; children being aged 5–13 years; parents being fluent in Hebrew; parents agreeing to refrain from any changes in medication during the study; and parents giving informed permission and consent. Exclusion criteria were psychotic symptoms of the parent or child and concurrent psychotherapy. Randomization success was confirmed using χ^2 and t tests. The groups did not differ significantly in ADHD, additional conditions, demographics, or other study variables (see Table 1).

Of the 103 families that enrolled in the study, two families were excluded because the child scored under 55 on the Conners' ADHD Scale. The families were randomly assigned to NVR [50] or waitlist [51] groups. In the NVR group, two families did not begin treatment (4%), and two families dropped out after treatment began (4%). In the waitlist

¹ The study was conducted at the ADHD Clinic at the Schneider Children's Medical Center, Petah Tikvah, Israel.

Table 1 Child and parents' characteristics at baseline by treatment group

Measure	Group	<i>n</i>	<i>M</i>	<i>SD</i>	Sig (2-tailed)	<i>df</i>	<i>t</i>																																																																																												
Conners parents	Control	51	6.67	0.99	0.45	99	0.76																																																																																												
	Experiment	50	6.5	1.22				CBCL—Internalizing	Control	50	6.26	0.83	0.91	98	– 0.11	Experiment	50	6.28	0.93	CBCL—Externalizing	Control	50	5.88	1.12	0.19	98	– 1.32	Experiment	50	6.16	1	Fathers' emotion dysregulation	Control	43	73.81	20.18	0.97	88	0.04	Experiment	47	73.66	19.84	Fathers' parental anchoring	Control	44	3.39	0.58	0.69	88	– 0.4	Experiment	46	3.44	0.58	Fathers' parental helplessness	Control	43	2.72	0.73	0.77	86	0.3	Experiment	45	2.67	0.95	Mothers' emotion dysregulation	Control	50	79.36	21.37	0.12	98	– 1.56	Experiment	50	86.56	24.87	Mothers' parental anchoring	Control	51	3.53	0.54	0.41	99	0.83	Experiment	50	3.44	0.54	Mothers' parental helplessness	Control	49	3.04	0.98	0.27	97	1.11
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CBCL Child Behavior Checklist

group, 18 families (35%) were excluded from the study because they started another treatment rather than waiting for the end of the waiting period. Thirty families in the waitlist group completed the program (participants' flow chart is presented in Fig. 1).

Procedures

Following an initial telephone screening, parents received a battery of assessment questionnaires, which they completed before their intake session (T1). At this session, parents underwent a diagnostic interview and received an explanation regarding the treatment protocol and study design. After providing informed consent, parents were randomly assigned to treatment or waitlist groups. Parents in the NVR group began treatment 1–2 weeks after the intake session and completed the assessment battery at the end of the treatment (T2) and at a 4-month follow-up period (T3). Parents in the waitlist group completed the assessment battery at the end of the waitlist period (T2), end of treatment (T3), and after a 4-month follow-up period (T4). All the questionnaires except the Conner's and CBCL were completed by each parent individually. The Conner's and CBCL were completed by both parents together.

Treatment

The treatment consisted of 12 sessions with the parents (one session involving the parents and members of the school staff was conducted in the child's school). In addition to the

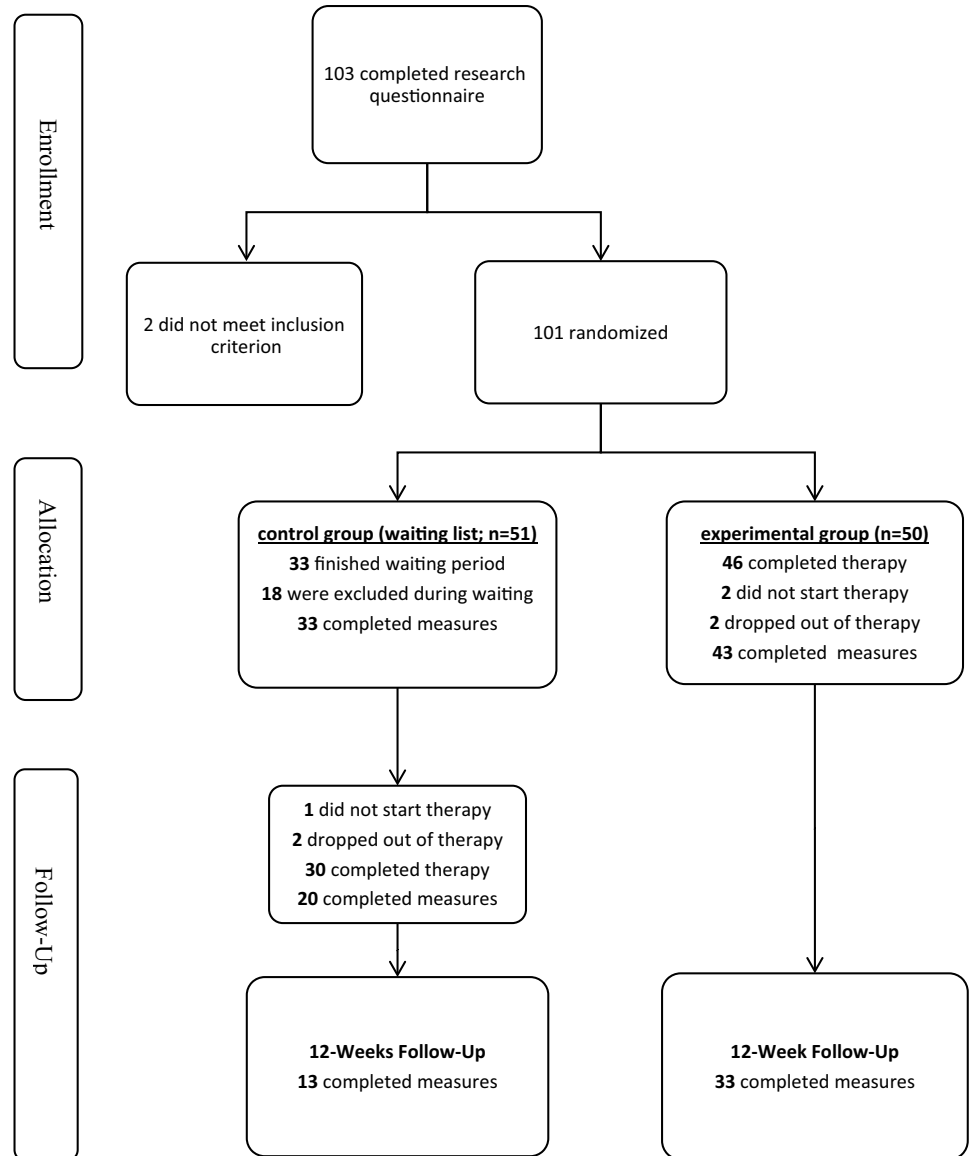
treatment sessions, the parents had two weekly telephone conversations with a supporter (an undergraduate student who received training in NVR). In adapting NVR to ADHD, special emphasis was given to psychoeducation on ADHD, parental emotion regulation and self-control, and the development of a collaborative relationship with the school.

The training focused on the four elements that are hypothesized to constitute the parental anchoring function: *self-control*, *structure*, *presence*, and *support*.

Self-control and self-regulation By learning to prevent escalation, resist intimidation without surrendering, and resist contagion by the child's negative feelings, parents improve their self-control and become better able to fulfill an anchoring function. They are trained to delay their responses to avoid reacting in the heat of the moment (“Strike the iron while it is cold!”) and sending controlling and domineering messages (“You don't have to win, only to persist!”). **Structure** Parents are helped to define clear rules and protective boundaries (e.g., regarding their and their children's bodies, rooms, and use of time). The parents are helped to define a small number of red lines, declare them in a formal announcement, and stick to them in a decided and non-escalating manner.

Presence Parents are trained in various practical steps designed to increase their presence. Among those steps are “the sit-in,” “the telephone round” and the monitoring skills of “vigilant care” [21] Those tools are especially important in ADHD because these parents are often so exhausted that they tend to ignore the child's misbehavior, badly compromising their parental presence.

Fig. 1 Consolidated Standards of Reporting Trials (CONSORT) diagram



Support Parents are helped to gather and mobilize support. The support network is based on the marital unit, the extended family, friends, school staff, and community groups. Supporters are invited to attend a special session in the treatment. Support provides a wide and legitimate base for the parents' resistance, while also limiting the arbitrariness of their power, as the involvement of supporters engenders transparency. An important element of the parents' support network is the school. The treatment manual provides detailed instructions for improving relationships with teachers.

Therapist training and treatment integrity

The therapists were clinical psychologists. They were assisted by telephone supporters (mostly psychology

students). Therapists were trained to administer the manualized treatment within a 7-day training seminar, and they received weekly supervision. Treatment integrity was checked by intervention checklists that the therapists completed after each session.

Measures

Child Behavior Checklist (CBCL; [35])

The CBCL includes 113 items rated on a 3-point scale measuring eight syndrome scales grouped into higher-order externalizing and internalizing factors. The questionnaire was validated in Hebrew with Israeli norms [36].

Conners' Rating Scale for Parents (CPRS-long form; [37])

Conners is a widely used questionnaire designed to assess ADHD and related difficulties. The questionnaire was validated in Hebrew. The CPRS-long form consists of 80 items rated on a 4-point scale. For this study, we created an ADHD score by calculating the average from the ADHD factor and ADHD index T-scores.

The Difficulty in Emotion Regulation Scale (DERS; [38])

The DERS was used to assess parental difficulties in emotion regulation. The questionnaire consists of 36 items assessing responses to negative emotions. We used a Hebrew version of the questionnaire that was validated in a previous study [24].

Parental Helplessness Questionnaire (PHQ; [25])

The Parental Helplessness Questionnaire is a self-report measure assessing parents' sense of helplessness in dealing with their child. It includes 18 items rated separately by both mothers and fathers on a 6-point Likert scale.

Parental Anchoring Questionnaire (PAQ; [39])

The PAQ is a self-report measure comprising 20 items reflecting the four elements of the parental anchoring function (self-control, structure, presence, and support). The items are rated on a 5-point Likert scale.

The Chaos Questionnaire [40]

The Chaos questionnaire is a self-report measure containing 15 statements assessing the level of confusion and disorganization in the child's home environment. The items are rated on a 5-point Likert scale. The questionnaire was translated into Hebrew by the first author and validated using back-translation into English.

Fidelity checklist

The therapists completed a treatment fidelity checklist after each session. The checklist included nine items representing the main NVR techniques. A session was considered as adhering to the manual when at least one item was positively checked. An assessment of all sessions revealed

that more than 90% of all sessions included at least one component of the manual.

Data analysis strategy**Intervention vs. waitlist**

Overall, 7.2% of the data collected at T1 and T2 were missing due to incomplete questionnaires and refusal of families that dropped out to complete study measures. Little's Missing Completely at Random test indicated the missing data were random ($\chi^2_{(181)} = 0.00, p = 1.00$). To overcome missing data due to dropout, an intention-to-treat analysis was carried out [41]. We used a mixed designed analysis of covariance to test the changes in parenting and child variables across treatment conditions and time (SPSS, version 25). We defined the independent between-subjects variable as Treatment Group (NVR vs. waitlist) and the independent within-subjects variable as Time (pre- to post-treatment). We controlled for medication use. For parenting-related dependent variables, we tested the effect of Time, Treatment Group, and Family Member (mother or father) and the interaction between Family Member and Time. Significant effects were further analyzed to assess the source of change using Sidak Analysis [42, 43].

Maintenance of change

We combined the outcome data of the NVR (T1, T2 and T3) and waitlist groups (T2, T3 and T4). This step was taken after verifying that there were no significant group differences at the beginning of the treatment. Twenty-seven percent (27%) of the data collected during follow-up was missing mostly due to incomplete questionnaires. Little's Missing Completely at Random test indicated the missing data were random ($\chi^2_{(181)} = 208.05, p = 0.08$). To overcome biases resulting from the missing data [44], we applied Bayesian multiple imputations [45]. To assess longitudinal treatment effects, we applied a Latent Growth Curve Modeling (LGCM) using MPlus (version 6.1). A Bayesian Posterior Predictive Checking was used to estimate each model's fit. The model's accuracy was determined when the Chi-Square value was not significant.

Results**Participants' flow and group comparisons at baseline**

Families in the NVR and control conditions did not differ at baseline in terms of demographic variables, child symptom

Table 2 Cchanges in the child and the parents' outcome measures across condition and time

	NVR group				Waitlist group			
	Before		After		Before		After	
	SD	<i>M</i>	SD	<i>M</i>	SD	<i>M</i>	SD	<i>M</i>
ADHD	10.61	68.58	12.78	65.81	10.02	70.19	9.62	70.29
Internalizing	8.18	66	8.77	61.22	10.71	62.9	11.28	62.73
Externalizing	8.14	67.84	9.96	64.46	6.89	69.33	7.92	68.1

	NVR group				Waitlist group											
	Mothers		Fathers		Mothers		Fathers									
	Before		After		Before		After									
	SD	<i>M</i>	SD	<i>M</i>	SD	<i>M</i>	SD	<i>M</i>								
Parental anchoring	0.39	3.41	0.5	3.72	0.43	3.37	0.34	3.47	0.52	3.52	0.51	3.63	0.43	3.37	0.38	3.17
Emotion dysregulation	22.08	84.84	16.98	75.84	19.97	74.33	18.92	72.1	20.42	77.96	19.2	74.26	14.66	70.28	16.8	71.44
Helplessness	0.99	2.8	0.92	2.2	0.97	2.52	0.75	2.07	0.95	3.22	0.81	3.08	0.66	2.75	0.65	2.68

level, and parenting measures (a *t*-test comparison of treatment conditions at intake is presented in the supplement). Forty-six families in the treatment group (95.8%) and 33 in the waitlist group (64.7%) completed the program (see Fig. 1 depicting participants' flow).

Child symptoms

We applied a mixed-design analysis of covariance with a controlled variable to assess the change in the child's ADHD (as measured by the Conners) as well as in Internalizing and Externalizing Symptoms (as measured by the CBCL). The between-subject independent variable was treatment condition (NVR vs. waitlist), and the independent within-subject variable was Time (before and after treatment). The dependent variables were ADHD, Externalizing Symptoms, and Internalizing Symptoms. Medication use and dosages during treatment was controlled. Patients who took medication before starting the research were asked not to change the dose until end of follow-up.

The results of the analysis showed significant and large Time \times Condition effect on the child's internalizing symptoms ($F_{(1,95)} = 11.24$, $p < 0.001$, $\eta^2 = 0.11$) and near-significant, medium effects on ADHD and externalizing symptoms (ADHD: $F_{(1,95)} = 3.18$, $p < 0.08$, $\eta^2 = 0.03$; Externalizing: $F_{(1,95)} = 3.03$, $p < 0.08$, $\eta^2 = 0.03$). A post hoc Šidák analysis [42, 43] indicated significant reduction in ADHD and both Internalizing and Externalizing symptoms ($p < 0.05$, $p < 0.001$, $p < 0.001$, respectively) only in the NVR group. Table 2 summarizes the change in the child's outcome measures over time and the results of the mixed design's analysis.

We applied a latent growth modeling to assess the maintenance of change during follow-up among all families that began treatment ($n = 80$). The results indicated mixed trends

regarding the maintenance of change. The parents' reports on the Conners across the three measurement points indicated a reduction in ADHD core symptoms by the end of treatment, but these gains were not maintained at follow-up ($b = -0.57$, $p = 0.63$). Parents reports on the CBCL indicated that the reduction in Externalizing and Internalizing Symptoms continued during follow-up ($b = -0.75$, $p < 0.001$ and $b = -0.79$, $p = 0.007$, respectively). Figure 2 illustrates the change in the child's ADHD, Externalizing Symptoms, and Internalizing Symptoms over time.

Parenting

We conducted a series of mixed-design analyses to assess changes in parents' Helplessness, Difficulties in Emotional Regulation, and Anchoring. The between-subjects independent variable was treatment condition (NVR vs. Waitlist), and the within-subjects independent variables were

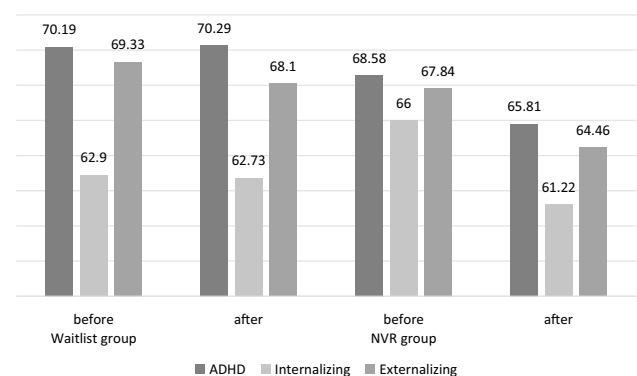


Fig. 2 Changes in the child's ADHD, Externalizing and Internalizing Symptoms over time and across treatment groups

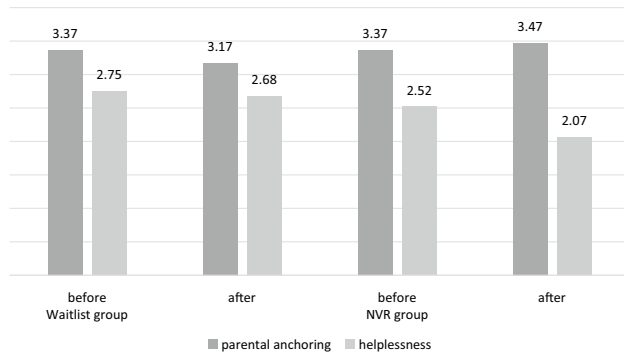


Fig. 3 Changes in the fathers' helplessness and anchoring over time across treatment groups

Time (pre- and post-treatment) and Parent (mothers vs. fathers). The dependent variables were Parental Anchoring, Difficulties in Emotion Regulation, and Helplessness. The results indicated significant and large Time \times Condition interaction effect on Parental Anchoring and Helplessness ($F_{(1,78)} = 9.06$; $p < 0.01$, $\eta^2 = 0.1$; $F_{(1,78)} = 15.4$, $p < 0.001$, $\eta^2 = 0.17$, respectively) and near-significant small interaction effect on Difficulties in Emotion Regulation ($F_{(1,78)} = 3.47$, $p < 0.1$, $\eta^2 = 0.04$). Sidak post hoc analysis indicated that the changes post-treatment took place only in the NVR group, indicating that only parents who completed the intervention experienced less helplessness and improved their capacity for emotion regulation and anchoring. The interaction of Time \times Condition \times Parent was non-significant, suggesting that both fathers and mothers benefited from treatment to a similar degree. Nonetheless, the main effect of parents indicated that across time, fathers reported higher levels of emotion regulation and lower helplessness, while mothers reported higher levels of anchoring.

We applied a latent growth modeling to assess the maintenance of change during follow-up among treatment completers. The results of the analysis indicated that the changes observed in parenting were maintained or continued to improve over time. The mothers' reports indicated that the improvement in Anchoring and the reduction in Helplessness and Difficulties in Emotion Regulation continued at follow-up (Anchoring: $b = -0.12$, $p < 0.00$; Helplessness: $b = -1.43$, $p = 0.03$; Difficulties in Emotion Regulation: $b = -1.43$, $p = 0.03$). For fathers, additional improvements during follow-up did not reach significance. Figures 3 and 4 illustrate the change in the mothers' and fathers' helplessness and anchoring over time.

Home environment

We applied a mixed-design analysis with a control variable to assess changes in parents' reports about family chaos. The between-subjects independent variable was Treatment

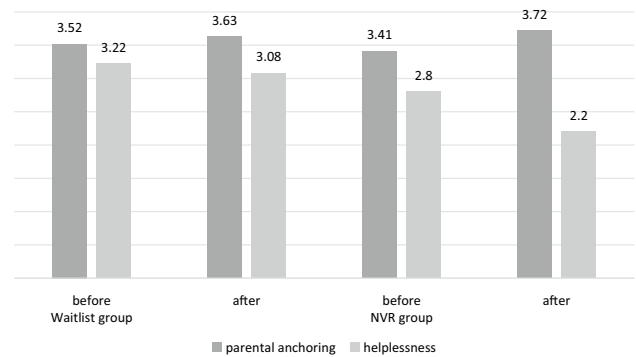


Fig. 4 Changes in the mothers' helplessness and anchoring over time across treatment groups

Condition (NVR vs. Waitlist), the within-subjects independent variables were Time (pre- and post-treatment) and Parent (mothers vs. fathers), and the dependent variable was Family Chaos. We controlled for medication use. Contrary to our hypothesis, no significant change was observed in Family Chaos following the treatment, as indicated by both fathers and mothers. Nonetheless, among treatment completers, the maintenance of change over time revealed a different trend. Mothers reported a significant reduction in Family Chaos at follow-up ($b = -0.37$, $p = 0.008$). Fathers reported no further improvement at follow-up ($b = -0.18$, $p = 0.21$).

To summarize, the results indicated significant improvement in Internalizing Symptoms and near-significant improvement in ADHD and Externalizing symptoms following treatment. Both mothers and fathers in the NVR condition reported significant improvement in Parental Helplessness and Anchoring. The analysis of parental reports at follow-up revealed continued improvement in the child's externalizing and internalizing symptoms and in maternal anchoring and helplessness, in addition to a slight increase in ADHD symptoms. Maternal report on Family Chaos showed a gradual improvement that reached significance at follow-up. For fathers, the changes reported in anchoring and helplessness by the end of treatment were maintained at follow-up.

Discussion

NVR, a novel parent-training treatment for children with ADHD, was found effective in comparison to the control-waitlist group in reducing symptoms of ADHD as well as other externalizing and internalizing symptoms. Treatment was also effective in improving parental helplessness, anchoring, and emotional regulation. All effects, except those regarding the ADHD core symptoms, were maintained or continued to improve at follow-up. Family chaos also diminished at follow-up (according to mothers). Effect

sizes following treatment were medium to high. The dropout rate was very low (5%), with father participation reaching 90%, suggesting a high treatment acceptance rate.

Child-related changes

Child improvement took place at three levels: ADHD core symptoms, behavior problems, and emotional states. When only the core symptoms of ADHD (as measured by the Conners' Scale) are considered, the improvements achieved at the end of treatment were not maintained at follow-up. In contrast, changes in externalizing and internalizing symptoms were maintained or continued to improve at follow-up. This result is consistent with the conclusions of Chronis-Tuscano et al. [46], who argued that the core symptoms of ADHD (which are believed to have a neurobiological basis), as opposed to externalizing and internalizing symptoms, are less affected by parent training in the long term. Targeting ADHD core symptoms may, therefore, require the integration of the child in treatment and the administration of treatment protocols that address the core symptoms directly (for example, intervention targeting executive function). Nonetheless, addressing the broader social and emotional characteristics of ADHD have high relevance for the child's difficulties in functioning not only at home but also in schools and other public places. Therefore, improvements in those areas may be crucial for the child's development.

Improvements in internalizing symptoms were especially pronounced. Anxiety and depression are some of the prevalent comorbid conditions of ADHD. They are assumed to relate to the child's emotional dysregulation, poor relationships with others, and negative feedback from the surroundings [8, 47]. We believe that improved parents' emotional regulation, reduced negative feedback to the child, and increased positive presence in the child's life mediated the reduction in internalizing symptoms. The improvement in internalizing symptoms may also be linked to the change in externalizing symptoms. Probably, as the child behaves more adaptively and less aggressively, reactions by others become more positive, reducing the child's feelings of anxiety and depression.

Parent related changes

The improvement in the parents' condition is central to our intervention. In many approaches, parents are seen merely as change agents for the child. In NVR, reducing parental distress is a central treatment goal. Our results showed that this goal was achieved. Both mothers and fathers reported improvement in their emotional regulation, felt less helpless, and felt more supported. These findings echo those of other studies in NVR [25, 26, 30, 48]. The present study shows that while both fathers and mothers benefited from

treatment, the pattern of change was different. Compared to mothers, fathers at the beginning and the end of treatment reported lower levels of emotion dysregulation and parental helplessness. As the emotional difficulties reported by fathers were smaller to begin with, there seemed to be less room for improvement compared to mothers that seemed to experience higher adversity in response to the child. Paternal tendency to report lower levels of emotional difficulties compared to mothers is consistent with previous studies on paternal helplessness and emotion dysregulation in families of children with externalizing problems [23, 24, 48], and the literature on paternal involvement in parent training [17]. In many families, mothers still spend relatively more time attempting to manage the child, and hence, may experience a higher level of emotional reactivity and dysregulation.

Despite the lower adversity reported by fathers, fathers were highly engaged in treatment and reported significant treatment benefits. This success in fathers' recruitment and engagement result may be the outcome of the special emphasis in NVR on father engagement [23]. We believe that our focus on both parents' distress, and special attention to fathers' unique needs explain the low dropout rates as well as the changes observed at all levels in the family.

Family-related changes

Improvement in the Family Chaos Questionnaire was gradual and continuous, reaching significance at follow-up. This finding appears to imply that improvement spreads slowly, first affecting the parents, then the child, and finally the entire family. Some signs of family improvement were probably evident before the follow-up, as the parents developed better self-control and became more able to set limits and maintain routines. Other studies have shown that NVR reduces parent-child escalation [24, 48] and improves the situation of the symptomatic child's siblings [49]. The present study, however, was the first to assess the effects of NVR on the entire family.

Dropout

The low dropout rate (5%) is, in our view, one of the important achievements of the present project. It compares very favorably to the usual dropout rates of other programs for ADHD, which range from 20 to 60% [20, 50, 51]. The low dropout rate has special significance in considering the treatment's efficacy. Even if other programs achieve similar improvements in the child's symptoms, their higher dropout rates suggest that these programs are less effective than NVR, which achieves similar improvements with lower dropout rates. Moreover, if we consider that parents who drop out often have more problems or more difficult children, our results may gain additional significance.

Limitations and future research

The current study must be considered in light of several limitations. First, NVR was compared to the waitlist, but not to another active intervention. Second, the results were based on parents' reports alone. Third, the follow-up period of four months might be too short to determine the long-term maintenance of treatment gains. Fourth, to understand the complex interactions between child and parent reactions, a mix of qualitative and quantitative methodologies might be required. Future research comparing NVR to active interventions, using multiple respondents, lengthening the follow-up, and focusing on wider aspects of the parents' and child's behaviors will enable us better to understand and evaluate the efficacy of NVR for ADHD. Moreover, to improve treatment efficacy in addressing core ADHD symptoms, we developed a new NVR module that integrates the child in treatment. We are presently conducting a study comparing NVR to other interventions, utilizing measures other than parent reports and with longer follow-up periods, to address some of those limitations.

Conclusion

The results of the RCT described in the current paper are the first to demonstrate the efficacy of NVR in alleviating the symptoms of ADHD. The results of the study indicated that the effects of the treatment go beyond the symptoms of ADHD and include the child's behavioral and emotional experiences along with the parents' level of distress and that these gains are maintained over time. Moreover, the high engagement of parents and fathers in particular places NVR as an important addition to parenting-based interventions for ADHD.

Data availability statement The data that support the findings of this study are available on request from the corresponding author, ISS. The data are not publicly available in order not to compromise the privacy of the research participants.

Compliance with ethical standards

Conflict of interest The authors have no conflicts of interest to declare.

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