

## **The change in the intensity of symptoms in children and adolescents with attention deficit hyperactivity disorder after “Workshops for Parents of Hyperactive Children”**

Agnieszka Pisula<sup>1</sup>, Anita Bryńska<sup>1</sup>, Stanisław Wójtowicz<sup>2</sup>,  
Tomasz Srebnicki<sup>1</sup>, Tomasz Wolańczyk<sup>1</sup>

<sup>1</sup> Medical University of Warsaw, Department of Child and Adolescent Psychiatry  
<sup>2</sup> Medical University of Warsaw, Department of Psychology and Medical Communication

### **Summary**

**Aim.** To evaluate changes in the intensity of ADHD symptoms and size effects after the completion of the twelve-week “Workshops for Parents of Hyperactive Children”.

**Material.** Intervention group included parents ( $N = 199$ ) of children and adolescents diagnosed with ADHD, who completed the twelve-week parental training. The reference group included parents ( $N = 24$ ) of children and adolescents diagnosed with ADHD, who received 1–2 standard psychiatric visits within twelve weeks (treatment-as-usual).

**Method.** The following questionnaires were completed by the participants at the beginning and at the end of the training: CBCL and Conners-IOWA-10 (parent’s assessment of the child), TRF and Conners-RCTRS-28 (assessment of the child by the teacher/educator), and YSR (in children of 11 years and over). The same diagnostic regime was used in the reference group – the patients were assessed during the first visit and after twelve weeks.

**Results.** The majority of attendees were parents of boys diagnosed with: ADHD mixed type with or without ODD and ADHD predominantly inattentive type. The intervention resulted in significant reduction of inattentive-impulsive-hyperactive and oppositional-defiant symptoms in Conners-IOWA-10 and significant reduction of symptoms in the following CBCL scales: “Social problems”, “Attention problems”, “Aggressive behavior”, “Externalizing problems”, as well as the overall score, as rated by mothers. The improvement was age, diagnosis and pharmacotherapy independent.

**Conclusions.** The therapeutic program used in our study resulted in small to moderate reduction of symptoms in children and adolescents with attention deficit hyperactivity disorder irrespective of subtype, comorbid disorders or pharmacotherapy (if implemented).

**Key words:** ADHD, workshops for parents, psychoeducation

## Introduction

Attention deficit hyperactivity disorder (ADHD) is a mental disorder of the neurodevelopmental type with onset in early childhood characterized by the presence of symptoms of hyperactivity, impulsivity and inattention which cause problem is social, school and professional functioning [1]. The estimated prevalence in general population is 3.4% [2]. Psychiatric comorbidities are common in patients with ADHD: over 50% are diagnosed with at least one comorbid disorder (the most common being oppositional defiant conduct disorder), while another 25% are diagnosed with at least two co-existing psychiatric conditions [3]. The evidence-based management of ADHD involves pharmacotherapy which is the part of multimodal treatment model [4]. The presence of multifarious problems in the functioning of affected children as well as their families justifies the development and implementation of other treatment options – including psychotherapeutic methods and psychosocial interventions [4, 5] such as parental trainings [6]. In our study, we attempted to evaluate the impact of “Workshops for Parents of Hyperactive Children” [7] on the intensity of ADHD symptoms.

The content of our workshops was inspired by the clinical experience gained in the Clinic for Hyperactive Children merged with elements of interventions used worldwide, including: *Defiant Children. A clinician's Manual for Assessment and Parent Training* [8], THOP (*Therapieprogramm für Kinder mit hyperkinetischem und oppositionellem Problemverhalten*) [9] and “How To Talk So Kids Will Listen and Listen So Kids Will Talk” [10].

## Aim of the study

The aim of the study was to evaluate changes in the intensity of ADHD symptoms in children and adolescents whose parents completed twelve-week “Workshops for Parents of Hyperactive Children” [7].

## Material

All parents who came to the outpatient clinic with children who presented symptoms of ADHD between 2002 and 2014 and were diagnosed with attention deficit hyperactivity disorder by a child psychiatrist were invited to participate in the workshops. The proceedings were in line with the European Guidelines and NICE recommendations [4] concerning the complex treatment of ADHD. The total of  $N = 199$  parents of children and adolescents agreed to participate in workshops (group with intervention – Int. group). Parents who refused to participate continued their treatment in the outpatient clinic on regular basis – they were scheduled with 1–2 standard psychiatric appointments during 12-week period, in which a psychiatrist evaluated the current mental state of the patient, asked about current problems and offered psychoeducation-based interventions (treatment-as-usual – TAU.group).

The study group consisted of children and adolescents diagnosed with ADHD including: (1) mixed subtype, (2) inattentive subtype, (3) mixed subtype and oppositional

defiant disorder (ODD). The diagnoses were established by a child and adolescent psychiatrist in accordance with DSM-IV-TR criteria prior to the inclusion to the study [11]. The only exclusion criteria was the presence of mental disorders of children and adolescents other than conduct disorders. The experimental group included 177 boys and 22 girls (mean age = 10.1 years;  $SD = \pm 2.4$ ). The final diagnoses were established for  $N = 197$  children (in two children the data were blinded by parents). The data about pharmacological treatment were collected for  $N = 169$  children. In the reference group, due to the lack of data, statistical analyses could be made for  $N = 24$  patients only (19 boys and 5 girls). The mean age in the group was 10.0 years ( $SD = \pm 0.8$ ). The detailed data on diagnoses and pharmacological treatments in both groups are provided in Table 1.

Table 1. **Distribution of diagnoses and pharmacological treatment in the Int.group and TAU.group**

		Int.group N (%)	TAU.group N (%)
Diagnosis	ADHD	116 (58.3)	15 (62.5)
	ADHD inattentive	19 (9.5)	4 (16.7)
	ADHD+ODD	64 (32.1)	5 (20.8)
	No data	2 (1.0)	0 (0.0)
Pharmacological treatment	No treatment	58 (29.1)	7 (29.2)
	Continuous	101 (50.8)	15 (62.5)
	Introduced during workshops	10 (5.0)	2 (8.3)
	No data	30 (15.1)	0 (0.0)

ADHD – ADHD mixed subtype; ADHD inattentive – ADHD inattentive subtype; ADHD+ODD – ADHD mixed subtype and oppositional defiant conduct disorder.

## Method

The following tools were used in the study:

1. The Polish adaptation [13] of the CBCL (*Child Behavior Checklist*) [12] including: CBCL/4–18 form completed by parents, the Teacher's Report Form (TRF) completed by teachers and the Youth Self Report (YSR) completed by children and adolescents from the age of eleven. The tools provide multidimensional behavioral-emotional profile. Based on analyzes conducted for sex and different age groups, the symptoms were grouped into eight problem behavior scales that form symptom constructs underlying the prototypes of disorders: "Withdrawn", "Somatic complaints", "Anxious/depressed", "Social problems", "Thought problems", "Attention problems", "Delinquent behavior", "Aggressive behavior". Additionally the scale "Internalizing problems" sums the "Anxious/depressed", "Withdrawn" and "Somatic complaints" scores; while the scale "Externalizing problems" combines "Delinquent behavior" and "Aggressive behavior" scores.

The answers correspond to behavior and mood within the last six months. The sum of points for each scale form a raw score which is next scaled to a modified sten scale (*T*-score) for the normative group. The procedure allows to qualify a participant into (1) group of healthy people ( $< 61 T$ ), (2) clinical group ( $> 71 T$ ) or (3) borderline group. The cut-off points are specific to each questionnaire and their values have been identified in population studies.

2. The Polish version [15] of the *Abbreviated Parent-Teacher Questionnaire – IOWA-Conners (IOWA-10)* [14] for the assessment of children with attention deficit hyperactivity disorder. The ten item version comprises two subscales: IO (Inattention/Overactivity) and OD (Oppositional/Defiant). The OD subscale focuses on oppositional behaviors such as quarrelsomeness, boldness, impetuosity and temper outbursts, defiance and refusal to cooperate. The child functioning is assessed for either school or home setting. The cut-off values are 11 pts for IO scale and 9 pts for OD scale. The score of 18 pts and over is classified as high. The score of 15 pts and less is classified as normal.
3. The Polish version [17] of the *Revised Conners Teacher Rating Scale* [16]. The scale measures three symptom dimensions: “Conduct problems”, “Hyperactivity” and “Passivity problems”. The score of more than 51 points carries an increased risk of problem behaviors [17].

#### Procedure and proceedings of the study

All parents were informed about the aim and proceedings of the study. In case the consent was obtained, the parents were qualified to the Int.group and given the following questionnaires in the first workshop session: (1) CBCL and Conners-IOWA-10 (completed by parents), (2) TRF and Conners-RCTRS-28 (completed by teachers), (3) Youth Self-Report (YRS) (self-report scale completed by children older than 11 years). The re-assessment was done at the 12<sup>th</sup> closing session of each workshop cycle. The TAU.group was assessed twice with the same methods – after the first appointment and reassessed after 12 weeks.

The “Workshops for Parents of Hyperactive Children” program [7], addressed for parental group work (couples or one parent), included elements of psychoeducation as well as the practice of behavioral and cognitive techniques. The main goals included: (1) the increase of knowledge about ADHD, (2) the introduction of changes in parenting system – familiarizing parents with the principles of behavioral therapy, ABC model (*Antecedents-Behavior-Consequence*) and instrumental conditioning followed by the training of ignorance of minor undesired behaviors, rule setting, praising of desired behaviors, the introduction of consequences for challenging behaviors, (3) the training of methods to improve parent-child relationships, including the reinforcement of positive behaviors and competencies, spending time together, (4) the training of anger outburst coping strategies, (5) the training of automatic thoughts analysis and parental stress reduction methods, the acceptance of needs, free time planning, (6) the introduction of effective methods of cooperation with school.

The twelve-week workshops were based on the manual, which included a detailed description of the structure, agenda and exercises of each 2-hour, weekly session. Parents were also provided with summarizing handouts and homework assignment. Each workshop group included up to 15 participants-couples, mothers or fathers. The content was transmitted orally, in the form of multimedia presentations or written on the board. Active work methods (role playing, discussion, skills training) were used. Two instructors (leading instructor and co-instructor) from the group of six psychologists and five doctors were randomly assigned to each group. The leading instructor (therapist) was a person who had previously participated in a 10-hour training course and had workshop experience (he/she had previously finished at least 3 cycles of workshops as the main therapist). The co-therapist was a person who had previously participated in 10-hour training and in a minimum of one series of meetings as an observer. The therapists' work was supervised every three sessions (in total 4 times throughout the entire cycle). In addition, therapists were provided with the possibility of constant contact with the supervisor assigned to a given cycle of meetings.

### Statistical methods

The Chi-square and Student's *t*-test were used to analyze nominal variables. Due to small sample size and the fact that the prerequisites about the normality of distribution and variance homogeneity were unmet we decided to use the non-parametric Wilcoxon signed-rank test. The Student's *t*-test was used for linked variables. The Mann-Whitney test was used to test for group equivalence. The results with *p*-values of  $p < 0.05$ ,  $p < 0.01$  or  $p < 0.001$  were considered as significant. Cohen's *d* was used to test the effect size for parametric variables (using the difference in means), while the effect size for non-parametric variables was calculated with the following equation:  $R = Z/\sqrt{N}$ . The results were then interpreted according to Cohen's classification: 0.0–0.1 insignificant, 0.1–0.3 small, 0.3–0.5 moderate, 0.5–1.0 large, significant [18].

## Results

### The equivalence of the study groups

The assessment of equivalence between the Int.group and TAU.group before workshops was made by the comparison of the CBCL and Conner-IOWA-10 mean scores (assessment made by mothers and fathers). No differences in CBCL scores were observed in assessment made by mothers. In the perception of fathers, significant differences were observed for the scale "Anxious/depressed" ( $p = 0.97$ ) and total score ( $p = 0.048$ ) (TAU.group fathers assessed the severity of their children's symptoms lower than Int.group fathers). Significant differences were found in the I/O subscale of the Conners-Iowa-10 in the perception of mothers – Int.group mothers reported significantly greater severity of symptoms in their children ( $p = 0.014$ ).

The Conners-IOWA-10 and Conners-RCTRS-28: assessment 1 and 2

In the Int.group, significant differences in the severity of symptoms between assessment 1 and assessment 2 were found in the Conners-IOWA-10 total score as well as IO and OD subscales in the perception of mothers, and in IO subscale in the perception of fathers. No differences between assessments were observed in the Conners-IOWA-10 in the TAU.group. In the Conners-RCTRS-28 (assessment made by teachers), a statistically significant decrease in results by an average of 5.6 points between assessment 1 and assessment 2 in the Int.group was observed as well as a statistically significant decrease in results by an average of 6.7 points between assessments in the TAU.group – to very low values (mean 28.3 points) (Table 2).

Table 2. **The change in the severity of symptoms in the Conners-IOWA-10 and Conners-RCTRS-28 in the Int.group and TAU.group**

Int.group			Assessment 1 Med. (SD)	Assessment 2 Med. (SD)	p
Conners-IOWA-10	Mothers (N = 103)	Total score	17.8 (3,9)	15.9 (4.0)	< 0.000
		I/O subscale	9.6 (1,9)	8.7 (2.1)	< 0.000
		OD subscale	8.1 (2,5)	7.2 (2.4)	< 0.000
	Fathers (N = 42)	Total score	17.1 (3,9)	16.1 (3.5)	0.032
		I/O subscale	9.5 (1,7)	8.8 (1.8)	0.016
		OD subscale	7.6 (2,7)	7.3 (2.5)	0.234
Conners-RCTRS-28	Teachers (N = 31)		42.7 (14,4)	37.1 (14.8)	0.026
TAU.group			Assessment 1 Med. (SD)	Assessment 2 Med. (SD)	p
Conners-IOWA-10	Mothers (N = 21)	Total score	16.1 (4.0)	15.8 (3.8)	0.794
		I/O subscale	8.5 (2.0)	8.7 (2.3)	0.528
		OD subscale	7.5 (2.8)	7.1 (2.5)	0.602
	Fathers (N = 10)	Total score	14.3 (4.8)	15.0 (4.2)	0.466
		I/O subscale	8.0 (2.7)	7.8 (2.1)	0.483
		OD subscale	6.3 (3.0)	7.2 (2.9)	0.168
Conners-RCTRS-28	Teachers (N = 10)		35.0 (11.4)	28.3 (14.6)	0.031

Additional analyzes in the Int.group were carried out in relation to high scores (> 18 points) (assessments made by mothers) and normal scores (< 15 points) in the Conners-IOWA-10). A division was made into (1) groups with established diagnoses and (2) groups including pharmacological treatment (Table 3).

**Table 3. The numerical and percentage distribution of high and normal scores in the Conners-IOWA-10 in the Int.group grouped by diagnosis and by pharmacological treatment**

Int.group	Conners-IOWA-10	Assessment 1 N (%)	Assessment 2 N (%)
Diagnosis			
ADHD	> 18 pts	30 (50.8)	19 (32.2)
	< 15 pts	13 (22.0)	22 (37.3)
ADHD inattentive	> 18 pts	6 (46.2)	5 (38.5)
	< 15 pts	3 (23.1)	6 (46.2)
ADHD+ODD	> 18 pts	17 (56.7)	14 (46.7)
	< 15 pts	2 (6.7)	8 (26.7)
Pharmacological treatment			
No treatment	> 18 pts	14 (43.8)	13 (40.6)
	< 15 pts	5 (15.6)	9 (28.1)
Continuous	> 18 pts	30 (55.6)	20 (37.0)
	< 15 pts	10 (18.5)	22 (40.7)
Introduced during workshops	> 18 pts	3 (75.0)	1 (25.0)
	< 15 pts	0 (0.0)	1 (25.0)

#### CBCL results: assessment 1 and assessment 2

In the Int.group, significant differences in the severity of symptoms between assessment 1 and 2 were observed in the scales “Social problems”, “Attention problems”, “Aggressive behavior”, “Externalizing problems”, as well as the CBCL total scores (assessment made by parents and mothers). The only significant difference in the TAU.group was observed in “Attention problems” in the perception of mothers (Table 4).

**Table 4. The change in the severity of symptoms in CBCL results in the Int.group and TAU.group**

Int.group	Assessment 1	Assessment 2	
CBCL: assessment made by mothers and fathers (N = 114)	Mean score (SD)	Mean score (SD)	p
Withdrawal	4.6 (3.0)	4.4 (2.8)	0.278
Somatic complaints	2.7 (2.9)	2.7 (2.4)	0.520
Anxious/depressed	8.5 (4.8)	8.2 (4.4)	0.372
Social problems	5.6 (3.2)	5.2 (3.1)	0.006
Thought problems	2.2 (2.3)	2.1 (2.0)	0.848

*table continued on the next page*

Attention problems	11.7 (3.7)	10.6 (3.5)	< 0.000
Delinquent behavior	5.3 (3.3)	5.1 (3.2)	0.250
Aggressive behavior	20.2 (7.3)	17.2 (6.8)	< 0.000
Externalizing problems	25.5 (9.7)	22.3 (9.3)	< 0.000
Internalizing problems	15.8 (8.9)	15.2 (7.8)	0.478
Total score	66.4 (24.4)	61.7 (23.8)	0.001
CBCL: assessment made by mothers (N = 79)			
Withdrawal	4.6 (3.0)	4.1 (2.7)	0.192
Somatic complaints	2.8 (3.2)	2.9 (2.5)	0.632
Anxious/depressed	8.4 (4.9)	7.9 (4.3)	0.225
Social problems	5.6 (3.2)	4.9 (3.0)	0.003
Thought problems	2.2 (2.3)	2.0 (1.8)	0.688
Attention problems	11.9 (3.6)	10.2 (3.3)	< 0.000
Delinquent behavior	5.1 (3.0)	4.7 (2.9)	0.163
Aggressive behavior	20.4 (7.4)	16.0 (6.5)	< 0.000
Externalizing problems	25.5 (9.7)	20.7 (8.8)	< 0.000
Internalizing problems	15.8 (9.3)	14.7 (7.7)	0.180
Total score	66.2 (24.9)	58.5 (23.7)	< 0.000
TAU.group	Assessment 1	Assessment 2	
CBCL: assessment made by mothers (N = 18)			
	Mean score (SD)	Mean score (SD)	p
Withdrawal	4.1 (2.4)	3.9 (2.7)	0.541
Somatic complaints	2.3 (2.1)	2.3 (2.3)	0.821
Anxious/depressed	7.2 (4.2)	6.7 (2.9)	0.529
Social problems	4.6 (2.8)	3.7 (2.5)	0.181
Thought problems	2.1 (2.0)	1.8 (1.4)	0.334
Attention problems	12.4 (3.9)	10.9 (3.5)	0.077
Delinquent behavior	4.8 (3.8)	4.3 (3.3)	0.346
Aggressive behavior	16.0 (8.3)	14.9 (7.7)	0.421
Externalizing problems	20.8 (10.8)	19.2 (10.1)	0.324
Internalizing problems	13.6 (7.4)	12.9 (5.9)	0.264
Total score	59.2 (24.6)	54.0 (20.5)	0.164

Additional analyzes in the Int.group were carried out in relation to the results within the clinical range ( $> 71 T$ ) on the CBCL “Externalizing problems” scale (assessment



made by mothers) and the results within the normal range ( $< 61 T$ ). A division was made into (1) groups with established diagnoses and (2) groups including pharmacological treatment (Table 5).

**Table 5. The numerical and percentage distribution of high and normal results on CBCL “Externalizing problems” scale in the Int. group grouped by diagnosis and by pharmacological treatment**

Int.group	CBCL Externalizing problems	Assessment 1 N (%)	Assessment 2 N (%)
Diagnosis			
ADHD	$< 61 T$	23 (45.1)	34 (66.7)
	$> 71 T$	2 (3.9)	2 (3.9)
ADHD inattentive	$< 61 T$	6 (66.7)	6 (66.7)
	$> 71 T$	0 (0.0)	0 (0.0)
ADHD+ODD	$< 61 T$	7 (38.9)	9 (50.0)
	$> 71 T$	1 (5.6)	0 (0.0)
Pharmacological treatment			
No treatment	$< 61 T$	12 (44.4)	12 (44.4)
	$> 71 T$	1 (3.7)	1 (3.7)
Continuous	$< 61 T$	14 (38.9)	18 (50.0)
	$> 71 T$	2 (5.6)	1 (2.8)
Introduced during workshops	$< 61 T$	18 (50.0)	4 (100.0)
	$> 71 T$	0 (0.0)	0 (0.0)

#### TRF results: assessment 1 and assessment 2

In the Int.group, significant change between assessment 1 and assessment 2 was observed in “Attention Problems” scale ( $18.5 \pm 7.5$  vs.  $15.9 \pm 8.5$ ;  $p = 0.004$ ) and the TRF total score ( $62.4 \pm 28.5$  vs.  $53.5 \pm 31.0$ ;  $p = 0.021$ ), while no changes were observed in the TAU.group.

#### YSR results assessment 1 and assessment 2

In the Int.group, significant differences in the severity of symptoms between assessment 1 and assessment 2 were noted in the following YSR subscales: “Social problems”, “Attention problems”, “Anxious/depressed”, “Aggressive behavior”, “Thought problems”, “Internalizing problems”, “Externalizing problems” and the YSR total score. In the TAU.group, significant changes in the YSR were observed in the following scales: “Externalizing problems”, “Aggressive behavior” and “Delinquent behavior” (Table 6).

**Table. 6. The change in the severity of symptoms measured using the YSR in the Int.group and TAU.group**

Int.group	Assessment 1	Assessment 2	
YRS: adolescents (N = 32)	Mean score (SD)	Mean score (SD)	p
Withdrawal	4.0 (2.5)	3.4 (2.5)	0.155
Somatic complaints	4.0 (3.2)	3.3 (2.8)	0.028
Anxious/depressed	9.2 (4.4)	7.6 (4.5)	0.016
Social problems	5.7 (2.8)	4.0 (2.5)	0.001
Thought problems	3.0 (3.0)	2.3 (2.8)	0.063
Attention problems	9.2 (2.9)	7.3 (2.8)	0.001
Delinquent behavior	5.0 (3.2)	4.4 (3.0)	0.135
Aggressive behavior	15.9 (6.9)	13.9 (7.6)	0.056
Externalizing problems	20.8 (9.3)	18.4 (10.1)	0.036
Internalizing problems	17.3 (8.6)	14.3 (8.4)	0.007
Total score	61.9 (23.9)	51.6 (24.9)	0.001
TAU.group	Assessment 1	Assessment 2	
YRS: adolescents (N = 11)	Mean score (SD)	Mean score (SD)	p
Withdrawal	3.6 (2.3)	2.8 (2.6)	0.531
Somatic complaints	2.9 (2.8)	2.3 (2.2)	0.399
Anxious/depressed	7.3 (5.7)	4.0 (2.8)	0.124
Social problems	2.9 (2.2)	2.8 (1.8)	0.905
Thought problems	2.2 (2.0)	1.9 (1.9)	0.673
Attention problems	6.9 (2.3)	6.3 (3.0)	0.260
Delinquent behavior	4.0 (2.8)	2.4 (1.9)	0.017
Aggressive behavior	11.5 (6.0)	7.7 (4.5)	0.021
Externalizing problems	15.5 (8.6)	10.1 (5.7)	0.014
Internalizing problems	13.8 (7.9)	9.1 (6.6)	0.258
Total score	45.8 (20.1)	35.1 (16.4)	0.168

### The assessment of the intervention impact

The assessment of the intervention impact was made for the Conners-IOWA-10 and CBCL in relation to the variables for which we observed statistically significant changes. According to mothers, the participation in “Workshops for Hyperactive Children” brought in statistically significant effect – most often moderate. The effect of treatment-as-usual was small or insignificant (Table 7).

**Table 7. The effect of intervention or treatment-as-usual – assessments made by mothers and fathers in the Conners-IOWA-10 and assessments made by mothers in the CBCL**

Assessment type	Factor	D	r	Cohen's d effect size
Conners-IOWA-10 Int.group	Total score (mothers)	0.47		Moderate
	Total score (fathers)	0.25		Small
	I/O subscale (mothers and fathers)	0.44	0.33*	Moderate
	OD subscale (mothers and fathers)	0.30	0.26*	Small
	I/O subscale (mothers)	0.46		Moderate
	OD subscale (mothers)	0.38		Moderate
Conners-IOWA-10 TAU.group	Total score (mothers)	0.06		Insignificant
	Total score (fathers)	-0.15		Insignificant
	I/O subscale (mothers)	-0.09		Insignificant
	OD subscale (mothers)	0.16		Small
CBCL (mothers) Int.group	Social problems	0.15		Small
	Attention problems	0.30		Small
	Aggressive behavior	0.42		Moderate
	Externalizing problems	0.33		Moderate
	Total score	0.20		Small
CBCL (mothers) TAU.group	Attention problems	0.40		Moderate
	Aggressive behavior	0.13		Small
	Externalizing problems	0.15		Small
	Total score	0.23		Small

## Discussion

### *Change in the severity of symptoms in the perception of parents*

The results obtained in the Conners IOWA-10 and CBCL in two assessments indicate changes in the severity of symptoms similar to those observed in the study by Webster-Stratton et al. [19], who reported the decrease in the severity of ADHD symptoms, externalizing problems and social functioning. These observations do not support the hypothesis about the limited impact of parental trainings on the reduction of the severity of hyperactivity symptoms while the improvement observed after the application of behavioral methods is the result of improved parental coping skills and increased tolerance [6]. Undoubtedly, the change in the way parents understand ADHD, which yields the decrease in the intensity of oppositional defiant behaviors, is one of the most important effects of therapeutic programs addressed to parents of children with ADHD. On the other hand, the modification of the upbringing

methods supports child's emotional and social development, which translates into the decrease in symptoms of inattention and impulsivity, as well as improvement in social functioning.

The change in the intensity of symptoms in the Int.group was diagnosis-independent. However, the interventions were less effective in children diagnosed with ADHD+ODD and ADHD mixed subtype. On the other hand, the results in the ADHD mixed subtype group showed that in this population, and not in the ADHD+ODD group, higher percentage of children scored within normal range at assessment 2 in the CBCL "Externalizing problems" scale. The above findings indirectly suggest the highest impact of workshops on ADHD-related challenging behaviors [20]. The findings are in line with the results of a meta-analysis by Lee et al. [21] which proved that children with ADHD are more susceptible to therapeutic interventions than children with ADHD and ODD. In the group with ADHD inattentive subtype, a significant decrease in the intensity of symptoms in the Conners-IOWA-10 was also observed. Due to small group size no valid conclusions can be drawn from this findings.

Although many researchers take the view that parental trainings have greatest impact on the reduction of oppositional behaviors [22, 23], other hypotheses provide alternative explanatory mechanisms. One of the explanatory mechanisms is related to inhibition deficit. Providing consistent and predictable consequences as well as positive reinforcements promotes the mechanisms of response inhibition, which improves attention and concentration skills [24]. Alternative explanation of the positive impact of workshops on the symptoms of inattention/hyperactivity is the improvement of child-parent interactions as a consequence of the reduction of oppositional-defiant behaviors. The presence of oppositional and aggressive behaviors can hinder the development of control processes, while the accompanying atmosphere of tension and conflict may result in reduced motivation of the child to follow and concentrate on parental instructions. The modification of parental skills supports the development of children's social skills, which are critical for the development of impulse control as well as attention concentration skills [23].

The aggregating effect of behavioral and pharmacological interventions has been unambiguously attested in the Int.group children who received pharmacological treatment. The improvement observed in the Int.group children who did not receive pharmacotherapy was the consequence of behavioral interventions. Daley et al.[25] assessed the effect size of workshops for parents in the reduction of symptoms of ADHD and ODD in children who did not receive pharmacotherapy, showing the significant impact of workshops on externalizing problems. In our study, the change in the severity of symptoms measured with the Conners-IOWA-10 was more apparent in children who received pharmacological treatment. It is possible that the introduction of behavioral interventions alone may not be effective enough in children presenting high intensity of ADHD symptoms.

*Changes in the intensity of symptoms in the perception of teachers and in self-reports.*

The number of results obtained from teachers was much smaller than in the case of parents. Nevertheless, they can be considered more objective than parental assessments, as the teachers did not participate in workshops, but assessed the child's behavior at two points in time. In the experimental group, the CBCL changes observed by teachers concurred with those reported by mothers in two assessments. It can therefore be assumed that the change observed by teachers can reflect a real improvement in functioning. Research on the effectiveness of workshops for parents using the TRF questionnaire is scarce [26], hence it is difficult to carry out more in-depth analyzes of the obtained results.

A number of positive changes was self-reported in the YSR by adolescents in both groups. The results may reflect the readiness of adolescents to get help but also the motivation for the change of life situation. They may also be the result of the change in parent-adolescent interactions or simply a reaction to the introduction of positive upbringing methods.

*The evaluation of the effect size*

The results of analyses suggest moderate to small effect size of interventions in the Int.group and small to insignificant effect in the TAU.group. The workshops had greater impact on a change in the intensity of "Inattention/Overactivity" factor in the Conners-Iowa-10 than on the "Oppositional/Defiant" factor. On the other hand, CBCL results demonstrated small influence of interventions on the symptoms of inattention as well as moderate influence on aggressive behavior and externalizing problems. The positive and considerable influence of parental workshops on externalizing problems has been confirmed in many studies [6, 27–30]. A meta-analysis by Lee et al. [21] showed moderate effect of workshops in children with ADHD and smaller effect in children diagnosed with ADHD and ODD. Results similar to our study were observed in other programs which used parental trainings [31, 32].

Limitations of the study

The basic limitation of the study is the small number of participants in the TAU. group as well as the lack of a reference group receiving other evidence-based treatments. Another limitation is the lack of randomization, which places our study in the domain of observational, ecological studies. Despite the fact that the methods used in our study were employed by other researchers [33, 34], the results must be treated with caution as the evaluation was made by the involved attendees.

## Conclusions

The therapeutic program presented in our study leads to moderate or small reduction of symptoms in children and adolescents with attention deficit hyperactivity disorder, regardless of the subtype of the disorder, comorbid oppositional defiant conduct disorders as well as pharmacotherapy (in those participants in whom it was implemented).

## References

1. American Psychiatric Association. *Diagnostic and statistical manual of mental disorders*, 5<sup>th</sup> ed. Washington, DC: Author; 2013.
2. Polanczyk GV, Salum GA, Sugaya LS, Caye A, Rohde LA. *Annual research review: A meta-analysis of the worldwide prevalence of mental disorders in children and adolescents*. *J. Child. Psychol. Psychiatry* 2015; 56(3): 345–365.
3. Jensen CM, Steinhausen HC. *Comorbid mental disorders in children and adolescents with attention-deficit/hyperactivity disorder in a large nationwide study*. *Atten. Defic. Hyperact. Disord.* 2015; 7(1): 27–38.
4. NICE (National Institute for Health and Clinical Excellence). *Attention Deficit Hyperactivity Disorder: Diagnosis and Management of ADHD in Children, Young People and Adult Clinical Guidelines*. London: NHS; 2008.
5. CADRAA (The Canadian Attention Deficit Hyperactivity Disorder Resource Alliance). *Canadian ADHD Practice Guidelines*. CAP-Guidelines; 2011.
6. Sonuga-Barke EJS, Brandeis D, Cortese S, Daley D, Ferrin M, Holtmann M et al.; European ADHD Guidelines Group. *Nonpharmacological interventions for ADHD: Systematic review and meta-analyses of randomized controlled trials of dietary and psychological treatment*. *Am. J. Psychiatry* 2013; 170(3): 275–289.
7. Wolańczyk T, Skotnicka M, Kołakowski A, Pisula A, Bryńska A. *Warsztaty dla rodziców dzieci nadpobudliwych*. Unpublished work. Warsaw; Medical University of Warsaw; 1998.
8. Barkley RA. *Defiant children: A clinician's manual for assessment and parent training*. New York: Guilford; 1987.
9. Döpfner M. *Therapieprogramm für Kinder mit hyperkinetischem und oppositionellem Problemverhalten*. Weinheim: Beltz, PsychologieVerlagsUnion; 1997.
10. Faber A, Mezlich E. *Jak mówić, żeby dzieci nas słuchały, jak słuchać, żeby dzieci do nas mówiły*. Poznań: Media Rodzina; 1998.
11. American Psychiatric Association. *Diagnostic and statistical manual of mental disorders*, 4<sup>th</sup> ed. Washington DC: Author; 1994.
12. Achenbach TM, Rescorla LA. *Multicultural understanding of child and adolescent psychopathology: Implications for mental health assessment*. New York: Guilford Press; 2007.
13. Wolańczyk T. *Zaburzenia emocjonalne i behawioralne u dzieci i młodzieży szkolnej w Polsce*. Warsaw: Medical University Press; 2000.
14. Loney J, Milich R. *Hyperactivity, inattention, and aggression in clinical practice*. In: Wolraich M, Routh DK, editors. *Advances in developmental and behavioral pediatrics*. Greenwich, CT: JAI; 1982.

15. Wolańczyk T, Kołakowski A, Liwska M. *Polska wersja Kwestionariusza Connersa dla Rodziców i Nauczycieli – An Abbreviated Parent-Teacher Questionnaire (IOWA-Conners, IOWA). Badanie wśród rodziców. Doniesienie wstępne.* In: Namysłowska I, editor. *Zaburzenia psychiczne dzieci i młodzieży. Wybrane zagadnienia.* Krakow: Library of Polish Psychiatry; 2000. P. 47-54
16. Goyette CH, Conners CK, Ulrich RF. *Normative data on revised Conners Parent and Teacher Rating Scale.* J. Abnorm. Child. Psychol. 1978; 6(2): 221–236.
17. Kołakowski A, Wolańczyk T, Liwska M. *Polska wersja Kwestionariusza Connersa dla Nauczycieli – The Revised Conners Teacher Rating Scale (RCTRS). Doniesienie wstępne.* In: Namysłowska I, editor. *Zaburzenia psychiczne dzieci i młodzieży. Wybrane zagadnienia.* Krakow: Library of Polish Psychiatry; 2000. P. 55-64
18. Cohen J. *Statistical power analysis for the behavioral sciences*, 2<sup>nd</sup> ed. Hillsdale, NY: Lawrence Erlbaum Associates; 1988.
19. Webster-Stratton CH, Reid MJ, Beauchaine T. *Combining parent and child training for young children with ADHD.* J. Clin. Child. Adolesc. Psychol. 2011; 40(2):191–203.
20. Lundahl B, Risser HJ, Lovejoy MC. *A meta-analysis of parent training: Moderators and follow-up effect.* Clin. Psych. Review. 2006; 26(1): 86–104.
21. Lee P, Niew W, Yang H, Chen VC, Lin KC. *A meta-analysis of behavioral parent training for children with attention deficit hyperactivity disorder.* Res. Develop. Dis. 2012; 33(6): 2040–2049.
22. Hazell P. *Attention deficit hyperactivity disorder in pre-school aged children.* In: Kosky R, O’Hanlon A, Martin G, Davis C, editors. *Clinical approaches to early intervention in child and adolescent mental health.* Adelaide: Australian Early Intervention Network for Mental Health in Young People; 2000. P. 29-33
23. Bor W, Sanders MR, Markie-Dadds C. *The effects of the Triple P-Positive Parenting Program on preschool children with co-occurring disruptive behavior and attentional/hyperactive difficulties.* J. Abnormal. Child. Psych. 2002; 30(6): 571–587.
24. Johnston C, Mash EJ. *Families of children with attention-deficit/hyperactivity disorder: Review and recommendations for future research.* Clin. Child. Fam. Psych. Rev. 2001; 4(3): 183–207.
25. Daley D, Oord van der S, Ferrin M, Danckaerts M, Doepfner M, Cortese S et al. *European ADHD Guidelines Group. Behavioral interventions in attention-deficit/hyperactivity disorder: A meta-analysis of randomized controlled trials across multiple outcome domains.* J. Am. Acad. Child. Adolesc. Psychiatry 2014; 53(8): 835–847.
26. Fallone GP. *Treatment for maternal distress as an adjunct to parent training for children with attention-deficit/hyperactivity disorder.* Doctoral dissertation. Available from ProQuest Dissertations and Theses Database; 1999.
27. Michelson D, Davenport C, Dretzke J, Barlow J, Day C. *Do evidence-based interventions work when tested in the ‘real world?’ A systematic review and meta-analysis of parent management training for the treatment of child disruptive behavior.* Clin. Child. Fam. Psych. Rev. 2013; 16(1): 18–34.
28. Zwi M, Jones H, Thorgaard C, York A, Dennis JA. *Parent training interventions for attention deficit hyperactivity disorder (ADHD) in children aged 5 to 18 years.* Cochrane Database Syst. Rev. 2011; (12): CD003018.
29. Dretzke J, Frew E, Davenport C, Barlow J, Stewart-Brown S, Sandercock J et al. *The effectiveness and cost-effectiveness of parent training/education programmes for the treatment of conduct disorder, including oppositional defiant disorder, in children.* Health Technol. Assessment 2005; 9(50): 1–250.
30. Dretzke J, Davenport C, Frew E, Barlow J, Stewart-Brown S, Bayliss S et al. *The clinical effectiveness of different parenting programmes for children with conduct problems: A systematic*

- review of randomised controlled trials.* Child. Adolesc. Psych. Mental Health 2009; 3(1): article number 7.
31. Plücker J, Wiczorrek E, Wolff Metternich T, Döpfner M. *PEP-Screen-Screening von Expansivem Problemverhalten bei Kindern im Kindergartenalter für Eltern und Erzieherinnen [Präventionsprogramm für Expansives Problemverhalten]*. Kurznachwei Göttingen: Hogrefe; 2006.
  32. Hautmann C, Hanisch C, Mayer I, Plücker J, Döpfner M. *Effectiveness of the prevention program for externalizing problem behaviour (PEP) in children with symptoms of attention-deficit-hyperactivity disorder and oppositional defiant disorder generalization to the real world.* J. Neu Transmission. 2008; 115(2): 363–370.
  33. Hautmann C, Stein P, Eichelberger I, Hanisch C, Plücker J, Walter D et al. *The severely impaired do profit most: Differential effectiveness of a parent management training for children with externalizing behavior problems in a natural setting.* J. Child. Fam. Studies 2011; 20(4): 424–435.
  34. Lau AS, Fung JJ, Ho LY, Liu LL, Gudiño OG. *Parent training with high-risk immigrant Chinese families: A pilot group randomized trial yielding practice-based evidence.* Behav. Ther. 2011; 42(3): 413–426.

Address: Tomasz Srebnicki  
Department of Child and Adolescent Psychiatry  
Medical University of Warsaw  
02-091 Warszawa, Żwirki i Wigury Street 61  
e-mail: srebnicki@wp.pl