Effectiveness of a Collaborative Home-School Behavior Management Program for Parents and Teachers of Children with Attention Deficit Hyperactivity Disorder

Walailak Pumpuang, Rutja Phuphaibul, Pisamai Orathai, Wimolnun Putdivarnichapong

Abstract : This study aimed to examine, using a comparison group design, with repeated measures, the effects of a collaborative home-school behavior management program, for children with attention deficit hyperactivity disorder (ADHD), based on the integration of Barkley's model of executive functions and self-regulation, and Patterson's coercion theory. Participants were a respective parent and respective teacher of 57, first to fourth grade, children with ADHD who were receiving treatment at one of two psychiatric clinics for children in greater Bangkok. Prior to assignment to either the intervention group or control group, participants were matched based on each child's: gender; parental perception of the severity of their child's behavior; and, parental sense of competence for handling their child's behavior. Those assigned to the intervention group participated in an 8 week home-school behavior management program, while those in the control group did not take part in the program.

The findings suggested that, immediately following completion of the behavioral management program and one month later, the parents and teachers in the intervention group, compared to the parents and teachers in the control group, demonstrated an increase in knowledge regarding ADHD. Although, over time, a significant reduction in coercive behavior was demonstrated by the parents in the intervention group and only a slight reduction in coercive behavior was demonstrated by the parents in the control group, the average difference of the parents' coercive behavior between the two groups was not significant. No improvement in either group was found regarding the disruptive behaviors of the children or the teachers' classroom management behaviors. The results suggest the intervention program was successful in dealing with parental and teacher knowledge about ADHD.

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Introduction

Attention deficit hyperactivity disorder (ADHD) is one of the most prevalent behavioral disorders, affecting 5-12 % of children worldwide and 3% to 6.5 % of school-age children in Bangkok, Thailand.[1, 2] ADHD is a chronic neurobiological disorder characterized by developmentally inappropriate levels of attention,

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hyperactivity and impulsivity. Empirical evidence supports the assertion that the underlying cause of ADHD is impairment in the prefrontal area and executive functions of the brain (i.e. nonverbal working memory, verbal working memory, self-regulation of affect, motivation and arousal, and reconstitution).[3, 4] These impairments can be attributed to inadequate response inhibition, as well as an inability to act and learn from experience.[5] As a result, children with ADHD commonly display disruptive behaviors and experience problems with academic and social functioning, especially at home and in school.[6] Handling the disruptive behaviors of children with ADHD often leads to parents and teachers being stressed, having a low sense of competence when contending with the children's behaviors, and, ultimately, responding with ineffective management strategies.[7, 8] Thus, appropriate interventions are needed to address the needs of children with ADHD, as well as their respective parents and teachers.

Literature Review

ADHD is a manageable disorder, although it is not curable.[5] Prior research has shown that medication and behavioral interventions, especially behavioral parent-training and behavioral classroom-management, to be effective treatments, due to the dysfunctions in the prefrontal area and executive functions of the brains of those with ADHD.[9-11] The National Institute of Mental Health Multimodal Treatment Study of Children with ADHD (MTA study), the largest outcome study, to date, to evaluate the long term effects of ADHD treatments, recognized that a combination of medication and behavioral treatments was an effective way to manage ADHD.[12] Barkley has proposed treatment of ADHD should be carried out through: an understanding of the nature of the disorder; provision of a therapeutic environment; and, use of behavioral management strategies.[3] In particular, parents and teachers, who have an improved awareness about ADHD, have been found to increase their use of positive management strategies.[13, 14] However, previous research has shown that parents and teachers, in general, have insufficient knowledge about ADHD and its treatment.[15, 16]

In addition, adult interactions with children with ADHD have been found to take on a negative pattern.[17] Disruptive behaviors of children with ADHD often are seen, by parents and teachers, as aversive. As a result, adults try to terminate or manage the unacceptable behavior via use of coercive behavior. Unfortunately, such actions tend to result in conflict between adults and children with ADHD.[17, 18] Patterson's coercion theory emphasizes the impact of inappropriate interactions between parents and their children.[18] According to coercion theory, when frequent punitive forms of discipline are used by parents, the outcome is the creation of a coercive pattern of family interaction. Both the children and their parents may contribute to unacceptable or ineffective behavior during family interchanges. When discipline is used, it often tends not to be directed at the child's misbehavior. There also tends to be a limited use of praise and support, on the part of parents, for the child's pro-social behavior. As a result, family interactions become aversive interchanges in which ineffective behavior becomes a primary learned response to adverse situations. Interchanges can include physical attacks, negative commands, critical remarks, yelling and humiliation. It is through these negative-reactive interactions that a child can develop deviant behavior.

Prior studies have found that parents of children with ADHD frequently respond to their child's behavior with more disapproval, more negative commands and controlling behavior, while teachers confront these children with a negative-reactive pattern.[7, 8] Therefore, it appears that parents, as well as teachers, need to learn to respond to the children's aversive behaviors with strategies that increase the

frequency of appropriate and socially acceptable behavior.

Disruptive behaviors of children with ADHD are pervasive and exhibited within different settings.[4, 9] Barkley explains that children with ADHD have problems of performance, not knowledge, suggesting that parents and teachers need to collaborate in the management of children with ADHD.[3] Barkley's model posits that, in children with ADHD, deficits in delayed response lead to the presenting symptoms of the illness and affect the development of rule-governing behaviors.[3, 19] As a result of inadequate rule-governing behaviors, difficulties arise in the children's cognitive, academic and social functioning. To address these difficulties, interventions that include medications and/or changes in stimuli at the point of performance are recommended.[3, 19] Changes in stimuli, at the point of performance, involve provision of a therapeutic environment by parents and teachers that may include use of external cues, limit setting and supervision. These measures can assist the children in practicing their self-control responses in the immediate setting, as well as in other settings in the future.[20] Benefits have been noted for home-school collaboration in the management of children with ADHD, particularly regarding provision of continuous and consistent intervention strategies that focus on fostering academic skills, productivity and behavior.[17, 21, 22]

Although various interventions have been developed, in Thailand, they most often are provided in clinic settings and do not focus on home-school collaboration.[23-25] Although effective interventions have been developed in Western countries,[7, 9, 17] they may not be appropriate for use, because of cultural differences, within the Thai culture. Therefore, using Barkley's model of executive functions and self-regulation,[3] and Patterson's coercion theory,[18] as a framework, the purposes of this study were to examine the effects of the researcher-designed Collaborative Home-School Behavior Management Program (CHSBMP) for children with ADHD regarding the: children's disruptive behaviors; parents' and teachers' knowledge related to ADHD; and, parents' coercive behaviors and teachers' management behaviors in response to the children's disruptive behaviors. Since prior research revealed the use of a home-school collaboration program was an effective measure for improving children's desired behavioral outcomes,[21] the following hypotheses were tested:

1. Parents involved in the CHSBMP, compared to parents not involved in the program, will show significantly greater improvement in knowledge about ADHD, immediately following and one-month after completion of the program.

2. Teachers involved in the CHSBMP, compared to teachers not involved in the program, will show significantly greater improvement in knowledge about ADHD and management behaviors related to ADHD children, immediately following and one-month after completion of the program.

3. Parents involved in the CHSBMP, compared to parents not involved in the program, will show a reduction in the use of coercive behaviors with their ADHD children, immediately following and one-month after completion of the program.

4. Parents and teachers involved in the CHSBMP, compared to parents and teachers not involved in the program, will identify a reduction in disruptive behaviors of their respective children with ADHD, immediately following and one-month after completion of the program.

Method

Design: A comparison group design, with repeated measures, was used with one intervention group and one control group.

Ethical Considerations: Approval to conduct the study was obtained from the Institutional Review Board Committee of the Faculty of Medicine Ramathibodi

Hospital, the Institutional Review Board Committee of the Queen Sirikit National Institute of Child Health and the administrators of the schools where the teacher subjects were employed. All potential subjects were told about: the nature of the study; what was involved to take part in the study; confidentiality and anonymity issues; and, the right to withdraw from the study at anytime without negative repercussion. Subjects consenting to take part in the study were asked to sign a consent form.

Sample: A power analysis, using the effect size from a meta-analysis of behavior interventions for ADHD[26] and dropout rates from prior research,[27] was conducted to determine the required sample size. The power analysis indicated a need for 30 children, to provide 30 parent subjects and 30 teacher subjects, for both the intervention group and the control group. Potential children were identified from a review of medical records of children with ADHD who were being treated in either of the two selected child psychiatric clinics. Each potentially selected child had to be: diagnosed with ADHD; without co-morbid disorders, i.e. learning disorders, mental retardation or pervasive developmental disorder; and, a 1^{st} - 4^{th} fourth grade student in a greater Bangkok school. Inclusion criteria for parent subjects included: living with the selected child with ADHD; not having a psychiatric diagnosis; not undergoing a major stressful event, i.e. lost of employment and/or death of a close relative; and, being able to read and write Thai. The sole inclusion criteria for teacher subjects were that they taught the identified ADHD child daily for at least two periods.

The parent and teacher subjects were matched, for placement into either the intervention group (would receive the CHSBMP) or the control group (would not receive the CHSBMP), based on the respective child's gender, parental perception of the severity of the child's behavior, and parental sense of competence in handling the child's behavior. One of the teachers in the intervention group, due to resigning from her job, failed to complete the study, while two parents in the control group, due to their work schedules, did not complete the study. Because matched pairs were required for the analysis, the final sample consisted of 29 parents and 29 teachers in the intervention group, and 28 parents and 28 teachers in the control group. As shown in **Table 1**, the demographics, between the intervention group and the control group, with the exception of the teachers' perception of the severity of the children's behaviors did not demonstrate, via Chi-square or independent t-test (depending on level of data), significant differences. It has been proposed that teachers' ratings are typically based upon seeing ADHD children in a medicated state and, thus, may not fully appreciate the children's difficulties.[19]

Table 1 Characteristics of the subjects and respective children with ADHD

Variables	*Intervention group*	*Control group*
Children		
Gender (Male/ Female)	23 (79.30%) / 6 (20.70%)	23 (82.10%) / 5 (17.90%)
Age (mean, SD)	8.27 (1.16)	8.14 (1.18)
Sibling (% yes)	17 (58.60%)	13 (46.40%)
Year of diagnosis (% before 2010)	22 (75.80%)	22 (78.60%)
Medication (% yes)	27 (93.10%)	25 (89.30%)
On medication regularly (% yes)	19 (65.50%)	18 (64.30%)
Parents		
Gender (Female/Male)	27 (93.10%) / 2 (6.90%)	24 (85.70%) / 4 (14.30%)
Age range (% Up to 39 yrs)	15 (51.70%)	18 (64.30%)
Married	26 (89.70%)	20 (71.40%)
Education (% Undergraduate level)	16 (55.20%)	18 (64.30%)
Employment status		
Civil/private officer	9 (31.00%)	16 (57.10%)
Entrepreneur	9 (31.00%)	8 (28.60%)
Housewife	11 (37.90%)	4 (14.30%)
Monthly household income		
≤ 15,000 baht	9 (31.00%)	13 (46.40%)
15,001-35,000 baht	13 (44.80%)	7 (25.00%)
≥ 35,000 baht	7 (24.10%)	8 (28.60%)
Sufficiency of family income	27 (93.10%)	23 (82.10%)
Support for parenting (%yes)	19 (65.50%)	19 (67.90%)
Severity of child's behaviors (Mean, SD)	4.72 (1.67)	4.18 (1.42)
Competence in managing (Mean, SD)	6.07 (2.09)	5.18 (1.81)
Sources of ADHD information**		
Provider	40.70%	51.10%
Media	33.30%	25.50%
Internet	22.20%	17.00%
Others	3.70%	6.40%
Time of child's inappropriate behavior**		
Morning	30.00%	38.60%
Afternoon	15.00%	15.90%
Evening	50.00%	29.50%
Bedtime	5.00%	15.90%
Situations involving inappropriate behavior**		
Completing daily routines	33.30%	52.50%
Doing homework	40.50%	27.50%
Going to bed	11.90%	17.50%
Interacting with others	14.30%	2.50%
Teachers		
Gender (Female/Male)	27 (93.10%) / 2 (6.90%)	27 (96.40%) / 1 (3.60%)
Age range		
Up to 39 yrs	15 (51.70%)	12 (42.90%)
40-49 yrs	3 (10.30%)	8 (28.60%)
Over 50 yrs	11 (37.90%)	8 (28.60%)
Years of teaching		
≤ 9 yrs	11 (37.90%)	9 (32.10%)
10-19 yrs	7 (24.10%)	6 (21.40%)
≥20 yrs	11 (37.90%)	13 (46.40%)
Education (% Bachelor's degree)	26 (89.70%)	27 (96.40%)
Experience of managing ADHD (% yes)	19 (65.50%)	18 (64.30%)
Prior use of ADHD information (% yes)	22 (75.90%)	17 (60.70%)
Classroom sizes (Mean, SD)	34.14 (6.49)	31.29 (7.40)
Severity of child's behaviors (Mean, SD)	3.07 (1.93)	4.25 (1.92)
Competence in managing child's behavior (Mean, SD)	5.62 (2.02)	6.07 (1.82)
Difficult time during school day**		
Morning	3.30%	17.90%
Afternoon	56.70%	46.40%
Lunch or recess	13.30%	0.00%
Others (e.g. no specific time)	26.70%	35.70%
Teaching strategies used for children with ADHD**		
No alteration in strategies used	42.20%	25.40%
Adjusted teaching methods	11.10%	20.30%
Adjusted materials	8.90%	16.90%
Rearranged classroom seating	29.80%	23.70%
Adjusted evaluation	8.90%	13.60%

** Participants responded to multi-response items

Measurements: Data were collected through the use of five instruments, including the: Demographic/ Background Questionnaire (DBQ); SNAP-IV Rating Scale for Parents and Teachers (SNAP-IV);[28] ADHD Knowledge Questionnaire (ADHDKQ);[29] Parenting Scale (PS);[30] and, Classroom Management Intervention Strategies Scale (CMISS).[31] The SNAP-IV[28] is on the open market and available via the Internet (www.adhd.net). Permission to use all of the other instruments was obtained from the instrument developers and translators. The PS[30] and the CMISS[31] were not originally written in or translated into Thai. Thus, they were translated from English into Thai and then back translated to assure no changes in meaning occurred in the items. All of the other instruments were either originally written in Thai or had been translated into Thai. It took the parents and the teachers approximately 35 and 30 minutes, respectfully, to complete all of the measurements.

The researcher-developed DBQ requested information about each of the children with ADHD, and their respective parents and teachers. This instrument consisted of two forms: a) one for the parents to fill out regarding their children and themselves; and, b) one for the teachers to complete about themselves. The parents' DBQ form sought information regarding each child's: age; gender; presence of siblings; year of ADHD diagnosis; medications usage for ADHD; and, regularity of ADHD medication consumption. The parents' DBQ form also sought information regarding each parent's: gender; age; marital status; level of education; employment status; monthly household income; family income sufficiency; presence of support for parenting; perception of the child's behavior severity; sense of competency managing the child's inappropriate behavior; source of ADHD information; perception of the time of the child's inappropriate behavior; and, perception of situations involving the child's inappropriate behavior. The DBQ form for teachers to complete sought data regarding each teacher's: gender; age; number of years of teaching; level of education; experience managing ADHD; prior use of ADHD information; classroom size; perception of the severity of the respective child's behavior; sense of competency in managing the child's behavior; perception of the child's difficult times during the school day; and, teaching strategies used for the child.

The SNAP-IV[28] is a revision of the Swanson, Nolan and Pelham (SNAP) questionnaire that was designed to assess the core symptoms of hyperactivity/ impulsivity and inattention, along with symptoms of oppositional defiant disorder. The SNAP-IV consisted of 26 items within three subscales: inattention (9 items); hyperactivity/impulsivity (9 items); and, oppositional defiant behavior (8 items). Examples of items for the three sub-scales were: "Often has difficulty sustaining attention in tasks or play activities (inattention);" "Often leaves seat in classroom or in other situations in which remaining seated is expected (hyperactivity/ impulsivity);" and, "Often actively defies or refuses adult requests or rules" (oppositional defiant behavior). Possible responses for all items were: 0 = not at all; 1 = just a little; 2 = quite a bit; and, 3 = very much. Scores for each of the three subscales were obtained by summing across relevant items. Possible score ranges, for the three subscales, were: 0 - 27 (inattention); 0 - 27 (hyperactivity/impulsivity); and, 0 - 24 (oppositional defiant behavior). For this study, a total score was calculated by summing the three subscale scores. Higher scores suggested higher levels of ADHD symptoms. The scale took an average of five minutes to complete. Prior research has found the SNAP-IV to have a reliability of 0.94 for parents and 0.97 for teachers.[32] The scale has been translated into Thai and reported to have a reliability for each item over 0.8.[33] In this study, the Thai translated version of the SNAP-IV had a reliability of 0.94 for parents and 0.93 for teachers.

The 23-item ADHD Knowledge Questionnaire (ADHDKQ)[29] was used to assess the parents' and teachers' knowledge regarding the prevalence, causes,

symptoms, prognosis, co-morbidity and treatments of ADHD. Each item was a statement in which the respondents were to indicate whether the statement was true or false. All correct false responses were scored as "1" and all correct true statements were given a score of "1." Incorrect responses (true and false items) received a value of "0." Examples of the items included: "This disorder is a disorder having some abnormality in brain function" (True statement). "Children with ADHD often come from disorganized families" (False statement). The questionnaire contained 14 true and 9 false statements. To obtain a total score, correct response scores were summed across all items, for a possible range of 0 – 23. Higher scores suggested higher levels of knowledge about ADHD. Prior research has shown the instrument to have a reliability of 0.82.[23] Reliability of the instrument, in this study, was 0.81.

The 30-item Parenting Scale (PS)[30] was used to assess each respective parent's specific parental discipline strategies in response to their respective child's misbehaviors. The PS consisted of three subscales: laxness (11 items); over-reactivity (10 items); and verbosity (7 items). A 1-7 point ranking, on a horizontal, polar-opposite, scale, was used with each item where a score of 1 suggested a high probability that an effective discipline strategy was used, while a score of 7 suggested a high probability that an ineffective discipline strategy was used. For example, for the item, "When my child misbehaves," the polar-opposite anchor responses, on the horizontal scale, were: "I do something right away" (score of 1); and, "I do something later about it" (score of 7). Respondents were asked to mark, 1 thru 7, on the horizontal scale, where they believed their level of discipline strategies fell regarding the specific item. Fourteen of the items had ineffective strategy responses on the left side of the horizontal scale, while 16 had ineffective strategy responses on the right side of the scale. To compute a score for each of the three subscales, numerical responses were summed, across relevant items. To compute a total score, numerical responses were summed across all items. The higher the total score or a subscale score, the higher the use of ineffective discipline strategies. Prior research has found the instrument to have good internal consistency (0.84) and test-retest reliability (0.84),[30] and goodness of fit across parents and children.[34] For this study, the reliability was found to be 0.75.

The 26-item Classroom Management Intervention Strategies Scale (CMISS), developed by Gordon and colleagues,[31] has been used to assess teachers' usage of positive and restrictive discipline strategies with students who display hyperactive and aggressive behaviors. Personal warmth, encouragement, rewards and motivational techniques are rated as positive strategies, while punishment and restrictive consequences are determined to be negative strategies. The instrument consisted of 26 items, randomly ordered, that measured three factors: rewards (13 items), negative consequences (9 items) and severe punishment (4 items). Examples of the items included: "I have let this student earn special rewards or privileges" (reward); "I have required this student to do extra class work or homework for behavior infractions" (negative consequence); "I have sent this student to the principal's office" (severe punishment). Possible responses were: never = 0; between never and sometimes = 1; sometimes = 2; between sometimes and often = 3; and often = 4. The total score was calculated by reverse scoring all negative consequences and severe punishment items and then summing all item responses. A high total score suggested use of positive management strategies. Prior research did not report the instrument's reliability, but rather represented the factor analysis resulting in the emergence of a three-factor solution, with eigenvalues greater than 1.[31] Reliability of the CMISS for this study was 0.78.

Intervention: The researcher-developed, eight session intervention (over eight weeks), *Collaborative Home-School Behavior Management Program*

(CHSBMP), consisted of three components: parent education; teacher education; and, collaborative problem-solving between the parents and teachers. The program was developed after thorough review of the literature on ADHD and incorporation of the premises of Barkley's model of executive functions and self-regulation,[3] and Patterson's coercion theory.[18] The purposes of the program were to: 1) improve parents' and teachers' knowledge about ADHD; and 2) help parents and teachers manage and deal, across settings, with the disruptive behaviors of children with ADHD. All aspects of the first four educational sessions, of the CHSBMP, were conducted by the PI in a group setting, while the collaborative problem-solving sessions (five through eight) were carried out, on an individual basis, in the presence of the PI. The educational sessions (one through four), for parents, lasted two hours a week, over four weeks, while those same sessions, for teachers, were conducted on one day, over a period of five hours, on the fourth week of the CHSBMP. The content of the four educational sessions, for parents, was presented by way of lecture, along with the use of discussion, printed handouts, case scenarios, written assignments, three games (complimenting, emotion control and anger control) and role playing. In order to offer the program content to teachers within five hours, the four educational sessions were presented via an abbreviated format, along with the use of discussion, case scenarios and one game (anger control). The collaborative problem-solving sessions of the program (five through eight) between parents and teachers took place for 30 minutes, once a week, over the last four weeks of the CHSBMP. The four educational sessions were conducted, on weekends, in a classroom at the PI's academic institution, while the four collaborative problem-solving sessions were carried out in a classroom at each child's respective school. If a parent missed an educational session, the PI briefed them on the content of the missed session prior to the next session. Since all of the teachers were instructed on one day, within a five hour time frame, they did not miss any of the educational sessions. If a parent or teacher was not able to meet face-to-face for one of the last three collaborative problem-solving sessions of the program, they made contact via telephone to carry out the purpose of the respective collaborative meeting.

Session one of the program focused on general information and behavior management related to ADHD. The specific content included the ADHD issues of: prevalence; diagnosis; deficits in executive function; coercive interactions; impact of the illness; treatments; principles of behavior management (i.e. contingencies, antecedents, and consequences); provision of a therapeutic environment; common problems parents and teachers face related to handling a child's behaviors; and, successes and failures parents and teachers have encountered in managing their respective child. Session two of the program involved addressing, practicing and implementing, strategies for increasing self-control of a child with ADHD. The specific content included: review of content taught in session one; techniques related to the compensation for a child's executive function deficits (e.g. external cues, setting a time schedule and setting rules); and, techniques for developing positive behaviors (e.g. rewards, compliments, and attention). Session three focused on strategies for handling non-compliance with rules. The specific content addressed: successes and problems encountered with implementation of techniques learned in session two; experiences encountered and strategies used when dealing with a child's non-compliant behavior regarding rules; strategies for increasing a child's compliance with rules (i.e. giving effective commands, ignoring, response cost and time-outs); and practice and implementation of the compliance strategy, 'time-out.' Session four focused on strategies for promoting emotion regulation. The session content addressed: review of successes and problems encountered during implementation of the techniques learned in session three; information

and practice with emotion coaching (i.e. active listening); information and practice with anger management (i.e. giving information and emotion control);and, encouragement to carry out, at home or school, the strategies for promoting emotion regulation.

The four collaborative problem-solving sessions (five through eight), between the parents and teachers, focused on the children's deficits in executive functions and unacceptable behaviors, and management of the behavior of the children with ADHD in multiple settings. The time and day of each weekly, 30-minute session were arranged based upon the availability of each child's respective parent and teacher. During the first collaborative session, which took place during the fifth week of the CHSBMP, the PI introduced the collaborative problem-solving process and encouraged each parent and teacher to share information about the respective child's current behavioral problems and to select one to three target behaviors (i.e. hitting friends or siblings when angry) to modify. Each parent and teacher then was directed to observe and record, for the following week, the antecedents and consequences related to each target behavior that occurred in the home or school. The second collaborative problem-solving session, which took place during the sixth week of the program, involved the parent and teacher sharing information about the respective child's identified target behavior(s) that occurred over the past week. A plan of action to decrease the triggers activating each target behavior was then developed and included actions such as giving compliments or rewards for demonstrated good behavior while interacting with others. Both the parent and teacher of each respective child was given a researcher-developed 'behavior report card,' to complete over the next two weeks, that had a point system for levels of reward for demonstration of good performance related to the identified target behaviors. The third collaborative problem-solving session, which took place during the seventh week of the CHSBMP, involved the parent and teacher of each respective child evaluating the results of the child's modified target behavior(s) over the past week. If the target behavior(s) did not change or improve by at least 50%, the parent and teacher assessed the rewards used in their respective child's plan of action and the consistency with which they applied their plan of action. Modifications in the plan of action were then made according to the outcome of their assessment. The fourth and final collaborative problem-solving session, which took place during the eight and final week of the CHSBMP, involved the parent and teacher evaluating the achievements made or not made in the modification of their respective child's target behavior(s). The evaluation included an assessment of the child's 'behavior report card' and modification in the target behavior that occurred over the past three weeks. Based upon the parent and teacher evaluation, a decision was made to modify the plan of action for future use or to continue with the existing plan.

Procedure: Once approval to conduct the study was obtained, the medical records of children with ADHD, who were being seen at the two psychiatric clinics for children used as study sites, were reviewed by the clinic staff nurses who were aware of the study's inclusion criteria. Once a child was identified as meeting the inclusion criteria, his/her parents were approached by the staff nurses, informed about the study and asked if the PI could approach them and further discuss the study. Those consenting were: screened, by the PI, to make certain they met the inclusion criteria for parents; given written information about the study; told about their ethical rights; and, asked to sign a consent form, if they agreed to take part in the study. The PI then obtained, from the parents, the name and contact information of the child's elementary school teacher and arranged to meet with each respective teacher.

Once consent was obtained from a child's parent, he/she was administered the parent's form of the Demographic/Background Questionnaire. Information regarding the child's gender, parent's perception of the severity of the child's ADHD, and

the parent's perception of his/her competence in dealing with the child's ADHD behavior was used for the purpose of identifying matched-pair subjects. Once a set of matched-pair parent subjects were identified they were randomly assigned to either the intervention or control group. As soon as a matched-pair of parent subjects were identified, the teachers of the parents' respective children with ADHD were contacted. Each teacher was: assessed to assure that he/she met the inclusion criteria; given written information about the study; told about his/her ethical rights; and, asked to sign a consent form to participate in the study.

Once a matched-pair of parent subjects and their children's respective teachers gave consent to take part in the study, the parents in both the intervention group and the control group were mailed the remaining questionnaires (SNAP-IV,[28] ADHDKQ,[29] and PS[30]) to complete. They were asked to return the completed questionnaires to the PI, within one week, via the enclosed, self-addressed, postage-paid envelope. Three days after the questionnaires were mailed, parents was telephoned by the PI to assure the questionnaires had arrived. If the completed questionnaires were not returned within one week, the PI again telephoned the parents and made arrangement for them to meet her at the schools of their respective children for the purpose of completing the questionnaires. To allow for privacy, the PI waited outside the rooms in which parents were completing the questionnaires. Upon completion of the questionnaires, the PI collected them.

Once a teacher gave consent to take part in the study, he/she was administered, by the PI in his/her respective classroom, the: teachers' form of the DBQ; SNAP-IV; [28] ADHDKQ;[29] and, CMISS.[31] The PI waited, outside the classroom of each teacher as he/she completed the questionnaires. Upon completion of the questionnaires, the PI collected them. For the purpose of identification, all sets of questionnaires, for both parents and teachers, in both the intervention and control groups, were given code numbers.

Once all questionnaires were administered to the parents and teachers assigned to the intervention and control groups, parents and teachers assigned to the intervention group were notified as to the time, date and location of when the various sessions of the CHSBMP would be held. The parents and teachers assigned to the control group were notified they were not assigned to the intervention group, but would be offered the program at a later time and date, if they desired to take part.

One week after the intervention group completed the CHSMP and one-month later, parent and teacher subjects in the intervention group and the control group were again re-administered their respective questionnaires, with the exception of the DBQ. The same procedure used in the initial administration of the questionnaires was used.

Data analysis: Descriptive statistics were used to analyze data from all five questionnaires. Chi-Square and the independent t-test were used to compare, at baseline, the similarity of the characteristics of the children, parents and teachers in the intervention group and the control group. Two-way, repeated measures multivariate analysis of variance (MANOVA) was used to determine the effectiveness of the CHSBMP immediately after program completion and one month later. The level of statistical significance was set at 0.05.

Results

As shown in **Table 2**, no significant differences were found in the pre-test scores, between subjects in the intervention group and subjects in the control group, for the six dependent variables (child's disruptive behaviors as rated by parent; child's disruptive behaviors as rated by teacher; parents' knowledge about ADHD; teachers' knowledge about ADHD; parents' use of coercive behavior; and, teachers' use of classroom management behaviors). Also shown in **Table 2** are results of the two-way,

Table 2 Dependent variable means, standard deviations, main effects and interactions of group and time

Variable/ Group		*Pre (T1)*	*Post (T2)*	*Follow up (T3)*	*F Group*	*F Time*	*FGroup-Time*
		Mean S.D.	*Mean S.D.*	*Mean S.D*	*(df = 1,55)*	*(df=2,110)*	*(df = 2,110)*
PCB	Intervention	44.93 (10.36)	40.48 (10.18)	36.79 (9.90)	.006	11.158_{1}^{**}	$.907_{1}$
	Control	43.57 (11.29)	40.21 (11.04)	39.00 (12.92)			
TCB	Intervention	31.03 (12.76)	28.90 (10.40)	30.79 (9.48)	1.039	2.455_{2}	$.416_{2}$
	Control	35.75 (15.82)	32.04 (16.18)	33.14 (16.90)			
PK	Intervention	17.83 (1.61)	19.88 (1.56)	19.24 (1.68)	12.707*	21.610**	7.302*
	Control	16.86 (2.43)	17.32 (2.16)	17.50 (2.59)			
TK	Intervention	15.38 (2.19)	18.07 (1.98)	18.03 (2.04)	7.481*	23.994**	8.468**
	Control	15.46 (2.56)	15.82 (2.07)	16.57 (1.55)			
PCB	Intervention	115.93 (13.92)	104.17 (12.58)	103.97 (13.16)	3.032	12.024**	6.466*
	Control	114.50 (14.29)	112.89 (9.38)	112.46 (16.13)			
TCMB	Intervention	70.28 (8.34)	72.00 (7.00)	71.21 (7.30)	3.467	.821	.852
	Control	74.68 (8.62)	74.61 (9.41)	75.57 (9.56)			

PCB = Parents' rating of child's disruptive behaviors; TCB = Teachers' rating of child's disruptive behaviors; PK = Parents' knowledge about ADHD; TK = Teachers' knowledge about ADHD; PCB = Parents use of coercive behaviors with ADHD children; TCMB = Teachers' classroom management behaviors with ADHD children; $_{1}$ = (df = 1.63, 89.47); $_{2}$ = (df = 1.68, 92.25); *p < .01; **p < .001.

repeated measures MANOVA for the six dependent variables across three times (pre-intervention-T1; immediately after completion of the intervention-T2; and, one month after completion of the intervention-T3). The findings suggested significant effects for group, [F (6, 50) = 3.49, p = .006]; time, [F (12,212) = 8.045, p = .000]; and, group-time interaction, [F (12, 212) = 3.854, p = .000].

The follow-up univariate analyses revealed significant group effects for two of the dependent variables (parents' knowledge about ADHD and teachers' knowledge about ADHD), which suggested improvements in knowledge about ADHD for the parents and teachers in the intervention group compared to the parents and teachers in the control group. The group-time interaction effects were significant for three of the dependent variables (parents' knowledge about ADHD; teachers' knowledge about ADHD; and parents' use of coercive behaviors). Parents and teachers in the intervention group improved their knowledge about ADHD significantly from pre-intervention to immediately after the intervention, which was maintained at one month post-intervention. By comparison, parents and teachers in the control group had only a slight increase, over time, in their knowledge about ADHD.

Parents in the intervention group showed a reduction in the use of coercive behaviors with their ADHD children from pre-intervention to immediately post-intervention, with the lowest level of coercive behavior use being noted at one month post-intervention. Parents in the control group had only a slight reduction in their use of coercive behavior with their ADHD children across time. However, the average difference of parents' use of coercive behaviors, between the two groups, was not found to be significant.

No differences were found, between the intervention group and the control group, regarding changes in parent and teachers identification of a reduction in the ADHD children's disruptive behavior. No differences

were found, between the intervention and control group, regarding improvement in the teachers' classroom management behaviors.

Based upon the results, support for the study's four hypotheses was as follows:

1. The first hypothesis was completely supported (i.e. parents' improved knowledge about ADHD).
2. The second hypothesis was partially supported (teachers' improved knowledge about ADHD). There was lack of support for the portion of the hypothesis that addressed an improvement in the teachers' classroom management behaviors related to ADHD children.
3. The third hypothesis was not supported (i.e. parents' reduction in the use of coercive behaviors with their ADHD children).
4. The fourth hypothesis was not supported (i.e. parents' and teachers' identification of a reduction in the disruptive behavior of the ADHD children).

Discussion

Improvements in parents and teachers knowledge about ADHD, after completion of the CHSBMP, was similar to prior research which aimed to examine the outcomes of intervention programs on improving knowledge about ADHD.[35, 36] The noted improvements in knowledge about ADHD could have been attributed to the several teaching strategies (i.e. lecture, handouts, games, group discussion, collaborative problem-solving activities) used in the program. Utilizing a variety of teaching methods helps address the presence of different learning styles that exist among people. Similar to prior studies, the sequencing of learning activities offered in the program also could have influenced the parents' and teachers' improvement in knowledge about ADHD.[37] The intervention program content moved from simple to complex by starting with the provision of information about ADHD and moving on to learning about and practicing the use of various behavior modification techniques. The use of group discussion and sharing, during the program, most likely, facilitated participants' comprehension and retention of program content. The literature has pointed out that group discussion and sharing can lead to improvements in knowledge and management skills related to parenting activities.[9] In addition, similar to prior research, the use of a three component design of the CHSBMP (parent education, teacher education and parent/teacher collaboration problem-solving) proved effective in bringing about change in the parents' and teachers' knowledge of ADHD.[37]

The fact teachers in the intervention group did not demonstrate a significant change in their classroom management behavior, compared to the teachers in the control group, could be attributed the length and depth of the content in the educational component of the CHSBMP. The teachers received only five hours, during one day, of condensed information and behavioral modification strategy practice related to ADHD. The parents received two hours a week, over four weeks, of the same material in greater depth. In addition, most of the teachers in the intervention group, compared to teachers in the control group, perceived the children with ADHD to have less severe behavioral problems. As a result, they may have been unaware of the need to implement strategies for modifying the children's behaviors or they continued to use the same behavior modification strategies, used in the past, without considering that a change in strategies needed to occur. Prior research[38] has noted that a teachers' involvement in behavior modification strategies increases when a child exhibits severe misbehavior. In addition, the fact the teachers had average classroom sizes of 31.29 (control group) and 34.14 (intervention group) may have had an impact on their ability to allow for time to manage the children's behavioral issues. As noted in prior research, classroom size influences a teacher's ability to manage children with ADHD.[39]

Children with ADHD tend to perform better in classrooms that have a limited number of occupants, because there are reduced distractions, compared to a classroom with many occupants.

A significant reduction in coercive behaviors of parents involved in the CHSBMP occurred, immediately post-intervention and one month later, while the parents not involved in the program had only a slight reduction in their level of coercive behavior across time. However, the average difference of the parents' coercive behaviors, between the two groups, was found not to be significant. This may have been due to the short length of the program (8 weeks). Eight weeks may not have been a sufficient amount of time for parents to change their behaviors when dealing with their children with ADHD.

Unlike previous research,[7,9] this study failed to note a significant reduction in the parents' and teachers' assessment of their respective ADHD children's disruptive behaviors immediately following and one month after completion of the CHSMBP. It is possible that no difference was noted in the children's disruptive behavior because the length of the intervention program was too short to detect significant changes. For example, Weinberg examined the effects of a six-week parent training program and found no improvement in symptoms of ADHD children.[40] Copper-Kahn and Dietzel have suggested parents and teachers need to work with ADHD children on their self-control until it becomes the children's automatic response.[20] However, to accomplishment of this task may require an extended period of time. Congruent with prior research, during the collaborative process, approximately one-half of the teachers in the intervention group failed to report, because of time constraints and demands for completing this activity, a consistent use of the children's 'behavioral report cards.' Prior research has revealed that teachers frequently do not use the 'behavioral report cards' or other individualized approaches due to time constraints.[41] Since there was no consistent teacher record, among the intervention group, of the children's behaviors, it proved difficult to determine if changes in the children's disruptive behaviors truly occurred or if the teachers were actually focusing on working with the children to alter their unacceptable behavior.

Limitations and Recommendations

Like all studies, this study had limitations. First, although matched pairs were used to decrease the effects of extraneous variables, the matching process was not without problems. Some of the matched pairs could not be randomly assigned because of difficulty in finding suitable subjects to participate. The children with ADHD, being treated in the two psychiatric clinics used as data gathering sites, were from multiple areas within greater Bangkok. Thus, meeting the time and location demands of the CHSBMP became difficult for some parents and prevented them from consenting to take part in the study. Future studies need to examine the sites from which subjects may be obtained so as to facilitate ready access to viable participants. In addition, the CHSMBP involved only the parents and teachers of children with ADHD. The program did not include a direct intervention for the children themselves. This fact may have decreased the effectiveness of the program. Future studies need to include a program that provides a direct intervention for the children under examination. The length of the CHSMBP was limited to eight weeks, which appeared to be too short of a period of time to allow for changes in the children's disruptive behaviors and the parents' coercive behaviors when dealing with their ADHD children. Longer intervention programs need to be designed, in future studies, to allow for a sufficient period of time to note improvements in the children's behaviors and a decrease in the use of coercive parenting behaviors. Given that only children diagnosed with ADHD, without a co-morbid disorder, were used in this study, the findings are not relevant to children with ADHD who also have a co-morbid disorder. Thus, future studies need to include children

with ADHD that have co-morbid disorders. Since all of the instruments used in this study were self-report measures they may not have adequately captured broader changes in the children's target behaviors. Therefore, future studies need to include observations or interviews, rather than only self-report instruments. One should not overlook the fact that scheduling of some of the collaborative problem-solving sessions between the parents and teachers had to be changed, due to school examinations, extra-curricular activities and special events, thereby, potentially influencing the assessment and implementation of strategies used to manage the children's disruptive behavior. To address this issue, arrangements should be made, prior to implementation of an intervention program, in future studies to prevent the need for rescheduling problem-solving sessions between parents and teachers.

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ประสิทธิผลของโปรแกรมความร่วมมือระหว่างบ้าน และโรงเรียนในการจัดการพฤติกรรมสำหรับพ่อแม่ และครูของเด็กซนสมาธิสั้น

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บทคัดย่อ: การศึกษาครั้งนี้เป็นการวิจัยแบบวัดซ้ำ และเปรียบเทียบระหว่างกลุ่ม โดยมีวัตถุประสงค์เพื่อประเมินผลของโปรแกรมความร่วมมือระหว่างบ้าน และโรงเรียนในการจัดการพฤติกรรมสำหรับเด็กซนสมาธิสั้น โดยมีแนวคิดพื้นฐานมาจากการผสมผสานแนวคิดของบาร์คลีย์เกี่ยวกับการบริหารจัดการและการควบคุมตนเอง และทฤษฎีการใช้อำนาจบังคับของแพทเทอร์สัน กลุ่มตัวอย่างเป็นพ่อแม่และครูอย่างละ 1 คนของเด็ก 57 คนที่เป็นโรคซนสมาธิสั้นซึ่งได้รับการรักษาจากหนึ่งในสองแห่งของคลินิกจิตเวชเด็กในกรุงเทพมหานคร และศึกษาในระดับชั้นประถมศึกษาชั้นปีที่ 1 – 4 ก่อนคัดเลือกกลุ่มตัวอย่างเข้ากลุ่มทดลองและกลุ่มควบคุม กลุ่มตัวอย่างจะถูกจับคู่โดยประเมินจากเพศของเด็ก การรับรู้ของพ่อแม่ต่อความรุนแรงของพฤติกรรมเด็ก และการรับรู้ของพ่อแม่ต่อความสามารถของตนเองในการจัดการกับพฤติกรรมเด็ก โดยกลุ่มตัวอย่างที่เข้ากลุ่มทดลองได้เข้าร่วมโปรแกรมความร่วมมือระหว่างบ้าน และโรงเรียนในการจัดการพฤติกรรมเป็นเวลา 8 สัปดาห์ ขณะที่กลุ่มควบคุมไม่ได้เข้าร่วมโปรแกรมการทดลอง

ผลการศึกษาพบว่า หลังจากสิ้นสุดการทดลองทันที และเมื่อติดตามผล 1 เดือน พ่อแม่และครูที่เข้ากลุ่มทดลองมีความรู้เกี่ยวกับโรคซนสมาธิสั้นเพิ่มขึ้น เมื่อเปรียบเทียบกับพ่อแม่และครูที่เข้ากลุ่มควบคุม ถึงแม้ว่าเมื่อเวลาผ่านไป พ่อแม่ในกลุ่มทดลองมีพฤติกรรมการใช้อำนาจบังคับลดลงอย่างมีนัยสำคัญ และพ่อแม่ในกลุ่มควบคุมมีพฤติกรรมการใช้อำนาจบังคับลดลงเพียงเล็กน้อย แต่คะแนนเฉลี่ยของพฤติกรรมการใช้อำนาจบังคับของทั้งสองกลุ่มไม่พบความแตกต่างอย่างมีนัยสำคัญ และทั้งกลุ่มทดลองและกลุ่มควบคุมไม่พบการเปลี่ยนแปลงที่ดีขึ้นในพฤติกรรมก่อกวนของเด็ก และพฤติกรรมการจัดการในห้องเรียนของครู ผลการศึกษานี้แสดงให้เห็นว่าการเข้าร่วมโปรแกรมการทดลองมีประสิทธิผลในการจัดการกับความรู้เกี่ยวกับโรคซนสมาธิสั้นของพ่อแม่และครู

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คำสำคัญ: โรคซนสมาธิสั้น การจัดการพฤติกรรม โปรแกรมระหว่างบ้านและโรงเรียน และเด็กวัยเรียน

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