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Efficacy of a Group Psychoeducation Program Focusing on the Attitudes towards Medication of Children and Adolescents with ADHD and their Parents: a pilot study

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Introduction: The Group Psychoeducation Program focuses on improving the attitudes towards medication of parents and their children/adolescents (G-PAM) with attention deficit hyperactivity disorder (ADHD).
Aim: We evaluated the program's effectiveness at improving children's attitudes and identified what aspects required improvement.
Method: This non-randomized, pragmatic evaluation had a comparative before-after design. The G-PAM comprised five 90-minute sessions. We assessed knowledge of psychopharmacology and employed several instruments including the Southampton ADHD Medication Behavior and Attitude Scale (SAMBA), Child Adherence Questionnaire (CAQ), and a Client Satisfaction Questionnaire, among others.
Results: The intervention group consisted of 15 families (17 children) who participated in the program in 3 groups. The control group consisted of 24 families (24 children). Children in the intervention group showed improved treatment knowledge, a decreased SAMBA score for 'resistance to medication', and an increased CAQ score for 'attitude toward medication'. Parents showed an increased SAMBA score for 'perceived psychosocial benefits of medication'. Both children and parents reported high satisfaction levels.
Discussion: The current psychoeducation program provides a new approach to improve the attitudes and behaviors towards medication of children/adolescents with ADHD and their parents in clinical settings.

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Introduction

Attention deficit hyperactivity disorder (ADHD) is a developmental disorder that's principal symptoms comprise inattention, hyperactivity, and impulsivity.[1] Estimates of ADHD prevalence in children and adolescents range from 3.4 to 7.2%, and the disorder has been associated with serious cognitive and psychosocial functioning impairments.[2-3] A comprehensive approach to treatment using both pharmacotherapy and psychosocial interventions is recommended for

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ADHD; although, pharmacotherapy alone has been shown to be highly effective.[4-5] Per Japan's guidelines on ADHD treatment, established by a research group commissioned by the Ministry of Health, Labour and Welfare, psychosocial support is the first choice and drug therapy is supplementary;[6] however, in patients with severe ADHD symptoms or daily life difficulties, more than 80% are using therapy.[7] Despite the evidence-based effectiveness and safety of medication, poor adherence has been reported. Studies using Medication Event Monitoring Systems have reported rates of ADHD medication adherence for children and adolescents as between 53.8 and 66.9%, and 42.7% for adults.[8-10] Poor adherence to pharmacotherapy diminishes the effectiveness of treatment and can lead to unfavorable social, economic, and emotional consequences for patients.[11] Poor adherence to pharmacotherapy is associated with poor response to medications and subsequent treatment failure, increasing the possibility of behavioral, academic, economic, and social difficulties and impairment to family functioning over time.[11-12]

In general, medication adherence connotes the child's and parent's participation and engagement in using a medication regimen believed to be beneficial by both the family and the clinician who prescribes it.[13] For young children with ADHD, healthcare decisions are usually made by the parent; therefore, the parent's perceptions and experiences are of central importance. However, child take medication according to their beliefs, and parent often incorporate their understanding of their child's experiences.[8,13] Moreover, even if a child keeps taking medicine according to parents' instructions during childhood, problems may arise as the child grows. As children grow older, decision-making responsibilities gradually transfer from the parent to the child.[14-15] While almost all children with ADHD begin to take responsibility for medication management and treatment decisions between 12 and 15 years of age, many refuses to partner with the attending physician in the treatment process until that time[16] and decide to discontinue taking medication during the responsibility transfer period.[14] Therefore, improving both children's and parents' attitudes towards ADHD medication is very important for enhancing medication adherence.

Non-adherent behaviors in patients can be categorized as unintentional and intentional. While unintentional behaviors comprise patients' attentional deficiencies such as forgetting medication and environmental factors such as a lack of parent's medication management, intentional behaviors are the result of patients' beliefs regarding the value of the medication and their ability to make decisions regarding their medication management. To maintain medication adherence, it is necessary to promote both. Measures against unintentional noncompliance are important such as the simplification of a management plan, organization of daily lifestyle, medication habituation, and medication management training.[15] The intentional non-adherence behavior of children with ADHD is influenced by 'attitudes and beliefs on the medication of children'.[17-19] In a study of adolescents' attitudes toward psychotropic medications (including youths with ADHD), Townsend, Floersch, and Findling (2009) used the Drug Attitude Inventory-10 (DAI-10),[20-21] which has long been used to assess medication adherence in psychiatry. The researchers showed that a positive attitude towards medication correlated with the likelihood of taking medication as prescribed among youths. Moreover, a few qualitative studies have investigated the medication-related perceptions and attitudes of children with ADHD. In these studies, almost all children aged 12 years and younger experienced changes in their symptoms and improved performance at school after taking medication. However, while appreciating the effectiveness and necessity of taking the medicine, they also experienced many side effects that were difficult to tolerate, and this created negative feelings towards the medication.[17.22-23] Consequently, children tried changing their medication regimen based on their cost/benefit experiences, including exploring other medications with fewer side-effects, trying smaller dosages, adjusting their medication regimen to suit themselves, and discontinuing their medication for extended periods.[16-17,23] In addition, children's social environments influence their medication-related attitudes. Young children tend to be influenced by their parents' perceptions of medication,[24-26] and for adolescents, feedback from peers strongly influences their appraisal of the utility of medication and their medication behaviors.[16]

Recent research on this subject includes proposals to improve medication adherence in children with ADHD and research on interventions[13-14]. Most psychoeducation programs concerning medication adherence of individuals with ADHD address the parents.[27-29] Only two studies addressed psychoeducation programs for children with ADHD and their families. Savill et al. (2013) were successful in improving medication continuation rates in a sample of ADHD patients aged 18 years and younger when they were prescribed atomoxetine (Strattera®) for the first time, which was combined with three interventions referred to as Strattera Support Service.[30] In addition, Lopez et al. (2005) implemented the Children's Medication Algorithm Project (CMAP), a comprehensive, well-received program that includes lifestyle and pharmacotherapy interventions for 6–17-year-olds with ADHD and/or depression and their parents.[31] However, Savill et al. (2013) evaluated medication continuation rates only,[30] and Lopez et al. (2005) evaluated only parent and child satisfaction.[31]

Neither evaluated children's attitudes towards medication. Consequently, we developed a program to improve children's attitudes towards medication, which we called the Group Psychoeducation Program focusing on Attitudes towards Medication in children and adolescents with ADHD and their parents (G-PAM for ADHD). We conducted a preliminary survey on what effect this program has on improving children's attitude towards medication.

Method

Study design and setting

This was a non-randomized pragmatic evaluation with a comparative before-after design. The intervention group received treatment as usual and program intervention for 3 months, and the control group underwent treatment as usual only. Changes from pre-intervention (baseline) in the intervention group were studied post-intervention (endpoint) and compared with changes in the control group.

Participants

The study sample consisted of children and adolescents taking medications for ADHD and their parents (or the family member with the most influence over the medication regimen). Inclusion criteria were (1) diagnosis of ADHD including any subtype according to the Diagnostic and Statistical Manual of Mental Disorders (4th ed., text rev.) (DSM-IV),[32] (2) children aged between 8 and 15 years, (3) being treated with either methylphenidate and/or atomoxetine, and (4) both parent and child consented to participate in the study and could participate in the program together. Exclusion criteria were: (1) severe intellective disabilities (IQ < 70) and (2) diagnosis of severe autism spectrum disorders.

G-PAM for ADHD

The program's purpose was to increase children's knowledge about and interest in their individual pharmacotherapies through discussion with each other so that they can take on more responsibility for managing their treatment. Further, the program aimed to improve the ability of parents and children to work together to manage treatment by teaching parents to accept their children's feelings and to support their efforts to become more independent in their medication management. The program directors consisted of a nurse, who is first author, and an occupational therapist, who is second author of this article. The program consisted of five 90-minute sessions. The theme and goals for each session are shown in Table 1. Five families participated in each round of the program.

Table 1. Themes and main focus of the five sessions in the Group Psychoeducation Program

Theme	Goals
1. What is adherence.	To understand the content of the program and to get to know the participating members. To be motivated to think independently about the medical treatment you are receiving.
2. Let me think about my medication.	To think about what the positive and negative aspects of taking the medication are for you. To learn about the differences between medications.
3. Let me learn about ways of managing my medication.	To understand how your medication is usually managed. To try taking over part of your medication management yourself.
4. Managing my medication myself.	To think back over your experience of trying to manage your medication and continue/improve on that going forward. To find ways to avoid forgetting to take your medication.
5. Program review and graduation.	To review what you have learned and think about how you can make use of what you have learned in the program going forward.

Every intervention session consisted of four elements: Lecture, Discussion, Recreation, and Homework. For Lecture, information was provided about medications; for Discussion, participants were encouraged to offer their opinions and consider the theme as a group; for Recreation, they learned interpersonal skills through games; and for Homework, they were asked to discuss their treatment at home with their parents. The nurse's role is as a facilitator in the whole program, and the occupational therapist's role is as an individual support person according to the situation of the child in the program. Only during a recreation session, the occupational therapist facilitates games for children, and the nurse facilitates questions and answers with mothers and provides time for mothers to talk with one another. During the program, the staff, as a rule, provided children with positive feedback and created an environment that allowed children to freely express negative opinions about their treatment. For example, staff would praise children immediately when they performed positive actions (e.g. sharing their opinions, doing homework, etc.). Even if children shared negative opinions about taking medication, they were used as examples to discuss other children's experiences.

Measures

Knowledge of psychopharmacology. The children were asked to write down what they knew about their treatment (e.g.., name of the medication they were prescribed and reasons for taking it) to determine whether their understanding was correct or not.

SAMBA. We used the SAMBA to evaluate the attitudes and behaviors towards medication of children with ADHD and their parents.[26] The SAMBA, child and parent versions (SAMBA-C and SAMBA-P, respectively), assesses the perceptions of treatment and consists of four scales: 'perceived psychosocial benefits of medication (Benefits)', 'perceived psychosocial costs of medication (Costs)', 'patient's stigma (Stigma)', and 'resistance to medication (Resistance)'. The SAMBA-P consists of seven scales: the previously listed four scales plus 'parental stigma (Parental stigma)', 'inconsistency in administering medication (Inconsistency)', and 'dosing flexibility (Flexibility)'. Therefore, in the SAMBA-P, Parental stigma assesses stigma about the parents, whereas patient's stigma (child stigma) assesses the parents' evaluation of stigma regarding their child. All responses were provided on a 5-point Likert scale (1 = *strongly disagree*, 5 = *strongly agree*). Except for inconsistency in using medication, which had a Cronbach's alpha reliability coefficient of .67, all scales had good internal reliability (Cronbach's α s > .7). In this study, we used the four subscales of the child version and six subscales of the parent version, leaving out the parental flexibility subscale. Children who were prescribed methylphenidate have adherence flexibility; however, children who were prescribed atomoxetine must take their medicine every day. Score interpretations would change depending on the prescription content; therefore, we omitted the parental flexibility subscale.

Child Adherence Questionnaire (CAQ). We used the CAQ to evaluate children's attitudes towards medication.[33] The CAQ is based on the DAI-10,[21] which measures adherence in children receiving pharmacotherapy with psychotropic medications. The scale consists of two factors: 'attitude toward medication' (10 items) and 'awareness of medication influences' (15 items). Participants responded with either '*yes*' or '*no*'. Positive and negative answers were scored as +1 and -1, respectively. Previous research has demonstrated Cronbach's alpha coefficients of .76 for the CAQ total score, .59 for the 'attitude toward medication' subscale, and .69 for the 'awareness of medication influences' subscale.[33] The 'awareness of medication influences' subscale contains items on the effects and side effects of psychotropic medication. Therefore, depending on what methylphenidate or atomoxetine is prescribed, the score interpretation would differ. Therefore, we only used the 'attitude toward medication' subscale in this study.

ADHD Rating Scale, 4th Edition (ADHD-RS-IV). We used the ADHD-RS-IV to evaluate ADHD symptom severity.[34] This scale obtains parent ratings regarding the frequency of each ADHD symptom based on DSM-IV criteria. The Japanese version of the ADHD-RS-IV was created by Ichikawa and Tanaka (2008).[35] The scale consists of two subscales: inattention (nine items) and hyperactivity/impulsivity (nine items). All items are scored on a 4-point Likert scale from 0 (*rarely or never*) to 3 (*always or very often*), with higher scores reflecting higher degrees of inattention and hyperactivity/impulsivity. Because the cut-off points for the ADHD-RS differ by age, we used the scale to calculate percentile values for the participants by sex and age. The reliability and validity of the Japanese ADHD-RS-IV have been established: Cronbach's α s are total score = .92, inattention = .86, and hyperactivity/impulsivity = .88.[35]

Family 'Appearance, Pulse, Grimace, Activity, Respiration' health assessment (APGAR). We used the Family APGAR to evaluate family member's perception of family functioning by examining child and parent satisfaction with family relationships. The Family APGAR consists of five parameters of family functioning: adaptability, partnership, growth, affection, and resolve.[36] The response options were designed to de-

scribe the frequency of feeling satisfied with each parameter on a 3-point Likert scale ranging from 0 (*hardly ever*) to 2 (*almost always*). Cronbach's alpha values across studies have ranged from .80 to .85.[36]

Client Satisfaction Questionnaire 8 (CSQ-8) Japanese version. We used the CSQ-8 to evaluate participants' satisfaction with the program.[37] The CSQ is a self-report measure that assesses patients' satisfaction with services received and contains eight items scored on 4-point Likert scale (1 = *not at all satisfied*, 4 = *completely satisfied*), with a higher score indicating higher satisfaction. The Japanese version was developed by Tachimori and Ito (1999) and showed good internal consistency (Cronbach's α = .83) and moderate validity.[38]

Procedure

For the families who consented to participate in the study, the researchers interviewed the attending physician regarding the child's age, sex, IQ, medication prescribed, and treatment period to establish a baseline. Then, both the parent and child were asked to complete the SAMBA and Family APGAR. Further, the child was asked to complete the questions regarding their knowledge about medication and the CAQ. The parent was asked to complete the ADHD-RS. Afterward, children in the intervention group took their medication and participated in the program, while children in the control group only took their medication. At the 3-month endpoint, the same data that were collected at baseline were collected again. In addition, parents and children in the intervention group were asked to complete the CSQ-8.

Data analysis

First, to look for differences in characteristics between the intervention and control groups, simple tabulation was performed on the demographic data. Chi-square tests were performed on factors such as sex and medication prescribed, and Mann-Whitney U tests were performed on factors such as age, IQ, ADHD-RS, and treatment period. Next, for the intervention and control groups, changes between baseline and endpoint data were compared. McNemar tests were performed on knowledge about medication, and Wilcoxon signed-rank tests were performed on the results for the SAMBA, CAQ, ADHD-RS, and Family APGAR. Finally, for the children in the intervention group, Spearman correlations were calculated on the results of the CSQ-8, demographic data (age, IQ, ADHD-RS), and pre- and post-intervention changes in the CAQ and SAMBA results. Statistical analyses were conducted using PASW Statistics 18.0 for Windows (SPSS Inc., Chicago, Illinois). All tests were two-sided and employed a significance threshold of 5%.

Ethical considerations

Before participating in this study, both children and parents received verbal and written explanations from the researchers, including an overview, that participation in the study was voluntary, that participants could withdraw at any time, and other ethical considerations. Signatures of both the parents and children were obtained on the consent forms. This study was performed with the approval of the Ethics Committee (approval no. 12072633) of the Nagasaki University Graduate School of Biomedical Sciences, Health Sciences Courses.

Results

Sample characteristics

This survey was conducted from December 2013 to December 2014. The intervention group consisted of 15 families (17 children) who participated in the program in 3 groups. Two children did not meet the inclusion criteria and were excluded. Therefore, the analysis was performed on 14 families (15 children). The control group consisted of 20 families (20 children); however, two withdrew during the study. One of the children who withdrew is 10 years old; that child's score on the CAQ and SAMBA-C was the lowest among the control group. The other is a 13-year-old boy who quite frequently forgot to take his medicine. Therefore, the analysis was performed on 18 families (18 children). Table 2 shows the demographic characteristics of the children and their parents at baseline. No significant differences between the intervention and control groups were observed for any of the factors.

Comparison of median values of pre-intervention and post-intervention in each group

Table 3 shows the comparisons of the changes between baseline and endpoint data using McNemar and Wilcoxon signed rank tests.

Regarding knowledge about their medication, the number of children in the intervention group who knew the names of their medications increased from 12 (80%) to 15 (100%), and the number who knew the reasons for taking the medications grew from 10 (66.7%) to 13 (86.7%). However, these increases were not statistically significant. In the control

group, the number of children who knew the names of the medications they were taking increased from 10 (55.6%) to 14 (77.8%), and the number who knew the reasons for taking the medications decreased from 13 (72.2%) to 9 (50.0%). However, like the intervention group, these changes were not statistically significant.

Regarding attitudes toward medication in the intervention group, resistance to taking medication was lower than before the intervention; that is, the Resistance scores of the SAMBA-C decreased significantly ($p = .05$). The CAQ attitude scores increased significantly ($p = .026$) compared to before the intervention, showing an improvement in attitude toward medication. In the control group, there were no significant differences between baseline and endpoint scores for either scale.

Regarding parents' attitudes toward their children's medication before and after the intervention, the SAMBA-P Benefits scores significantly increased ($p = .015$) in the intervention group, indicating that parents' perceptions of the psychosocial benefits of their children's medication became more positive. In the control group, there was no significant difference between baseline and endpoint scores.

Regarding the severity of ADHD symptoms, in both groups, there were no significant differences between baseline and endpoint ADHD-RS scores. Regarding satisfaction with family functioning, in the intervention group, the children's Family APGAR scores decreased significantly ($p = .025$) after the intervention, while there was no significant change in the control group.

Table 2. Demographic characteristic of children and adolescents at baseline (N = 33)

Characteristics		Intervention group (N = 15)	Control group (N = 18)	*p*-value
Child				
Age	Range	9–14 years	9–15 years	.569
	Mean (± SD)	11.1 (2.1)	11.6 (1.8)	
Sex	Male	11 73.3%	15 83.3%	.674
	Female	4 26.7%	3 16.7%	
IQ (Mean ± SD)	Verbal IQ	97.1 (15.6)	89.1 (9.3)	.137
	Performance IQ	89.0 (15.7)	89.4 (11.9)	.664
	Full-scale IQ	92.6 (15.7)	86.8 (9.1)	.526
Medication prescribed	Methylphenidate	7 46.7%	12 66.7%	.505
	Atomoxetine	3 20.0%	2 11.1%	
	Both	5 33.3%	4 22.2%	
Treatment period (months)	Range	0–83 months	9–62 months	.550
	Mean (± SD)	27.9 (21.6)	31.1 (15.9)	
ADHD-RS (percentile, mean ± SD)	Inattention	81.3 (22.6)	82.1 (18.1)	.435
	Hyperactivity/impulsivity	57.7 (33.0)	62.4 (28.8)	.971
	Total	76.9 (22.6)	75.9 (19.6)	.512
Parent				
Relationship	Mother	14 93.3%	17 94.4%	.362
	Father	1 6.7%	0 0.0%	
	Other	0 0.0%	1 5.6%	
Age	Younger than 31	2 13.3%	0 0.0%	.421
	31-35	1 6.7%	3 16.7%	
	36-40	4 26.7%	4 22.2%	
	41-45	7 46.7%	8 44.4%	
	46-50	1 6.7%	1 5.6%	
	Older than 50	0 0.0%	2 11.1%	

Chi-square tests were used for sex, medication prescribed, and parent relationship; otherwise, Mann-Whitney U tests were used. IQ: intelligence quotient; SD: standard deviation; ADHD-RS: attention deficit hyperactivity disorder rating scale.

Table 3. Comparison of median value baseline and endpoint data

Factor	Score range	Intervention group (N = 15) Median value (quartile values)		*p*-value	Control group (N = 18) Median value (quartile values)		*p*-value
		Baseline	Endpoint		Baseline	Endpoint	
Child							
SAMBA-child							
Stigma[a]	4–20	7 (4, 10)	6 (5, 8)	.893	5.5 (4, 8)	5.5 (4, 8.3)	.929
Benefits	4–20	16 (15, 20)	17 (13, 20)	.726	16.5 (12.8, 19)	17.5 (12, 19.3)	.681
Costs[a]	4–20	6 (4, 12)	8 (6, 12)	.373	5.5 (4, 8.5)	7 (4, 11.3)	.261
Resistance[a]	4–20	9 (8, 12)	8 (7, 11)	.050 *	9 (6.8, 12.3)	9.5 (7.8, 11)	.864
CAQ Attitude toward medication	-10–10	4 (2, 6)	6 (4, 8)	.026 *	2 (0, 6)	4 (2, 6)	.134
Family-APGAR	0–10	9 (7, 9)	7 (5, 9)	.025 *	8 (6, 10)	7 (6, 9)	.380
Parent							
SAMBA-parents							
Costs[a]	4–20	8 (5, 11)	7 (5, 9)	.286	7.5 (4, 9.3)	7 (5, 8.3)	.949
Resistance[a]	4–20	10 (8, 13)	10 (8, 12)	.340	11 (9, 12.3)	10 (8, 12)	.069
Benefits	4–20	15 (13, 16)	17 (16, 19)	.015 *	18 (16, 19)	17 (15.8, 19)	.485
Child stigma[a]	4–20	7 (6, 10)	7 (6, 8)	.216	8 (5.8, 10)	8 (4, 9)	.461
Parental stigma[a]	4–20	8 (6, 11)	8 (5, 11)	.069	11.5 (5, 13.3)	9.5 (7, 13)	.954
Inconsistency[a]	3–15	6 (4, 8)	6 (4, 7)	.811	6 (5, 8)	6 (4.8, 7)	.538
Family-APGAR	0–10	6 (5, 9)	7 (5, 9)	.417	7.5 (5.8, 10)	7.5 (5.8, 10)	.587
ADHD-RS							
Inattention[a]	0–27	15 (8, 19)	13 (11, 20)	.820	13.5 (9.8, 16.3)	13 (8, 15)	.175
Hyperactivity/impulsivity[a]	0–27	6 (3, 11)	9 (3, 13)	.375	7.5 (2.8, 10.3)	5 (3, 9.3)	.504
Total[a]	0–54	20 (11, 32)	26 (14, 34)	.423	20 (16.3, 24.8)	18.5 (11.5, 23.5)	.223

Wilcoxon signed rank test, *$p < .05$. [a]Lower values indicate more positive evaluation.

SAMBA: Costs = "perceived psychosocial costs of medication"; Resistance = "resistance to medication"; Benefits = "perceived psychosocial benefits of medication"; Stigma (SAMBA-child) = "patient's stigma"; Stigma (SAMBA-parents) = "child stigma" (patient's stigma, i.e., parent evaluation of child's stigma) and "parental stigma"; Inconsistency = "inconsistency in administering medication." ADHD-RS: attention deficit hyperactivity disorder rating scale; APGAR: appearance, pulse, grimace, activity, respiration; CAQ: Child Adherence Questionnaire; SAMBA: Southampton ADHD Medication Behavior and Attitude Scale.

Program satisfaction and related factors

Regarding satisfaction of the intervention group (n = 15) with the program, which was evaluated using the CSQ-8, the mean score for the children was 26.67 (SD = 7.06) and 27.47 (SD = 5.29) for the parents, indicating that the parents were more satisfied with the program than their children were. To examine what aspects of the program they were most satisfied with, we calculated Spearman correlations between the CSQ-8 scores and baseline age, IQ, ADHD-RS, and pre-/post-intervention changes in the CAQ and SAMBA scores. Significant positive correlations were shown between children's CSQ-8 scores and verbal (r = .55, p = .034) and full-scale IQ (r =.552, p =.033). No significant correlations were observed for children's changes in attitudes toward medication. For the parents, a significant negative correlation (r = -.525, p = .045) was shown between the CSQ-8 and Parental Stigma as there was a decrease in pre-/post-intervention scores. No significant correlations were observed for children's changes in attitudes toward medication.

Discussion

This study empirically tested the effectiveness of the G-PAM for ADHD by comparing the results of an intervention group with those of a control group. The results confirmed that children's attitude and behaviors towards medication improved after the program. Although the changes in knowledge about treatment did not show significant changes, the number of children in the intervention group who knew the reasons for taking the prescribed medication tended to increase, while that percentage tended to decrease in the control group.

Regarding knowledge about their treatment, the percentage of children in the control group who could provide the reasons for taking the prescribed medication decreased, while that percentage increased in the intervention group. The American Academy of Pediatrics recommends that when prescribing medication for children, the necessity for taking the medicine should be thoroughly explained. However, it has been suggested that maintenance of that knowledge requires development of the child's independence regarding their treatment and ongoing educational interventions. The improvement in the children's attitudes and behaviors towards medication in the intervention group was related to a decrease in the SAMBA Resistance scores and an increase in the CAQ Attitude scores. This suggested that the principal effects of this program consisted of a reduction in the children's resistance to their ADHD medication and the development of a more positive attitude toward taking medication. Negative attitudes towards pharmacotherapy, concerns about side effects, and experiencing the medication as not effective have been found to be predictors of reduced adherence.[13] The improvement in children's knowledge of and attitudes toward their medication through this program can also be expected to lead to improved medication adherence. The improvement in parents' attitudes and behaviors towards medication for their children was related to increased SAMBA Benefits scores. This suggested that the principal effect of this program for the parents was that they developed more positive perceptions of the psychosocial benefits of their children's medication. Children and adolescents are sensitive to the opinions of family members and other people around them; therefore, there is a close relationship between children's medication adherence and whether parents experience their children's medication as effective.[24-25] Given that Hébert *et al*. (2014), using the SAMBA scale, also found that parents' 'perceived psychosocial benefits of medication' predicted improvement in their children's medication adherence,[18] it is reasonable to assume that because parents who participated in this program developed positive perceptions of the psychosocial benefits of their children's medication, the children's adherence also improved.

The mean CSQ-8 scores for child and parent participants indicated high program satisfaction. The result that G-PAM was a subjective highly satisfactory treatment is very important on view of person-centred care. While this program was mainly focused on children, the parents were more satisfied with it than their children were. One factor that might be related to the high satisfaction among children is a high IQ. Because the program included educational content, intelligent children may have been more satisfied with it. Furthermore, the reduction in parental stigma after the intervention was related to high satisfaction with the program among parents. Previous research has shown that parents raising children needing medical treatment for ADHD tended to feel stigmatized.[25] While the difference between pre- and post-intervention scores for parental stigma in this study was not statistically significant (p = .069), the decreasing trend suggests that the program not only improved the children's attitudes toward medication, but also might have mitigated parental feelings of being stigmatized for medicating their children.

While this program did not directly improve ADHD symptoms, this study demonstrated that it improved the attitudes and behaviors towards medication for both children and their parents. However, this was based solely on pre-/

post-intervention assessments, and long-term, on-going assessments remain an issue for the future. Further, because parents and children managed the medication regimen together as part of the program, we had expected that parent-child relationships would improve. However, in the intervention group, the children's ratings of their parents decreased. Studies by McNeal *et al*. (2000) and Thorell & Dahlström (2009) found that parental evaluations of the benefits of pharmacotherapy for their children were higher and evaluations of side-effects were lower than their children were.[24,39] In this study, the parents' post-intervention perceptions of the benefits of medication improved similarly; however, for the children, reduced resistance to taking medication was more salient than improvement in their perception of medication benefits. Therefore, there was a divergence between parents and children in their perceptions regarding medication, which could potentially result in conflicts of opinion. Program directors need to keep in mind that perceptions between parents and children can easily diverge during program implementation.

Limitations

A major limitation of this study was its relatively small sample size. Further, because this was not a randomized controlled trial, it is possible that the intervention group was biased toward participants being highly knowledgeable about their medication. Nonetheless, the study results provided us with insights regarding the current program's effectiveness and how to develop it further. To enhance the program's effectiveness, more data should be collected using larger samples, on-going observations of the intervention effects need to be performed, and the program content should be revised accordingly. Furthermore, it will be necessary in the future to analyze participants' changes, in detail, based on their individual backgrounds, and to compare the changes from this program to those that occur after individual guidance in order to see which element of this program improved children's attitudes. Moreover, information on parental influence is lacking in this study. It will be necessary in future research to consider the influence of parental socioeconomic factors.

Conclusion

Despite these limitations, the current psychoeducation program provides a new approach to improve attitudes and behaviors towards medication of children and adolescents with ADHD and their parents in a clinical setting. Long-term efficacy of the intervention should be studied in future research.

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