Effect of Nursing Intervention Program on stress and competence of Parents of Attention Deficit Hyperactivity Disorders Children

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Abstract:

Background: The Attention-Deficit/Hyperactivity-Disorder (ADHD) is a common neurobehavioral childhood problem with negative impacts on child and parents. The **aim of this study** was to evaluate the effect of a nursing intervention program on stress and competence of parents of ADHD children. **Subjects &Methods: Research Design**: A quasi-experimental study was utilized in this study. **Settings**: The study was conducted in the outpatient psychiatric clinic in El Mabarra and El Ahrar Hospitals at Zagazig city on 50 parents and their children with ADHD. **Tools**: Data were collected through interviewing parents using the Parenting Stress Index (PSI), the Parenting Sense of Competence (PSOC), and the ADHD checklist. The researcher designed and implemented the intervention program responding to the identified parents' needs. The work lasted from October 2014 to May 2015. **results** revealed that children's age ranged from 4 to 14 years, with 76.0% males. After the intervention, statistically significant improvements were revealed in parenting satisfaction, efficacy, and PSOC; child-related, parent-related, and total PSI ($p<0.001$). ADHD improved among 78% after the intervention ($p<0.001$). Statistically significant negative correlations were found between the scores of parents' satisfaction, competence, and PSOC from one side and each of the child-related, parent-related, PSI, and ADHD scores. In **conclusion**, the implementation of an educational intervention to the parents of children with ADHD is effective in improving their parenting satisfaction, efficacy, and PSOC, with reduction in their stress, and improvement of child abnormal behaviors. **Recommendations**: It is recommended to apply the developed program in the study settings for more improvements. The school health team needs to be trained in screening and early detection, with counseling clinics for parents of ADHD children.

Keywords: nursing intervention, stress, competence of parents, Attention Deficit Hyperactivity Disorders Children

Introduction:

Attention Deficit Hyperactivity Disorder (ADHD) is a neuro-developmental disorder characterized by difficulty paying attention, excessive activity, and impulsivity (acting before thinking) [(1)]. There are three major presentations of ADHD: predominantly inattentive, in which children and adolescents have problems concentrating and focusing; predominantly hyperactive-impulsive, in which children and adolescents experience impulsivity and excess activity; and combined type, in which children and adolescents experience symptoms of inattention, hyperactivity, and impulsivity [(2)].

Parenting stress can result from a plethora of factors that are typically divided into three basic categories, namely parental factors, child factors and life stressors. Previous research has identified several parental factors that may interfere with the parent-child relationship and increase the risk for parental stress. These include low confidece in parenting abilities, low perceived attachment with child, health

problems, role restriction (i.e., the level at which the parental role is restricting their freedom and their ability to maintain their own identity), depression, anxiety, and spouse involvement (i.e., level of emotional and active support from co-parent) [(3)].

Stress and perceived self-efficacy or competency related to one's role as parents are two dimensions of caregiver well-being that have been negatively associated with having a child with ADHD [(4)]. Additionally, low parenting self-efficacy has been linked to less favorable child outcomes for families participating in intervention for ADHD. Thus, consideration of parent coping and confidence in managing child behaviors is important not only with regard to parent wellbeing, but also as it relates to parents' ability to participate successfully in an intervention for their child [(5)].

Parent training is a treatment program whose objective is to inform the parents about ADHD and to teach them how to use behavioral therapy techniques to improve the management of their children. It is intended to increase the confidence of the parents and improve parent-child relationship through better communication and attention to child's development. The programs are structured, developed in a specific number of sessions and generally done in groups [(6)].

The nurse should assess the global impact of the child's mental health disorder on the child's social functioning, education, and family life. The risk for harm to self or others, and potential for abuse or neglect are important elements of the assessment. A family history of mental health disorders should also be ascertained [(7)]. Nurses help parents understand the rationale for the diagnostic process, the approach to treatment, and the importance of follow-up to re-evaluate the child and make sure that the diagnosis and treatment are appropriate over time. Lastly, nurses help families understand and cope with the inevitable uncertainties [(8)].

Significance of the study:

The ADHD it is one of major clinical and public health problems because of its associated morbidity and disability in children, adolescents, and adults. Its consequences on the society are enormous in terms of financial cost, stress on families, impact on academic and vocational activities, and negative effect on self-esteem. Hence, the parents of children with ADHD face challenges placing them at high risk for stress and other negative psychological outcomes, which may result in poor child-parent relationship. Therefore, it was deemed important to conduct this study to assess the effect of a nursing intervention program on the stress and competence of parents of ADHD children.

Aim of the study:

The aim of this study was to evaluate the effect of the nursing intervention program on stress and competence of parents of attention deficit hyperactivity disorders children.

Research hypothesis:

Parental stress will be reduced and their competence toward their children with ADHD will be enhanced after attending the nursing intervention program than before attending the nursing intervention program.

Subjects and methods:`

Research design:

A quasi-experimental research design with pre-post assessment was used to conduct the study.

Study Setting:

The study was conducted in two settings, namely the outpatient psychiatric clinic in El Mabarra Hospital affiliated to the National Health Insurance Organization (HIO) and El Ahrar Hospital affiliated to the Ministry of Health (MOH), at Zagazig city.

Study Subjects:

A total sample of 50 parents and their children diagnosed with ADHD were selected from the above mentioned two settings. A non-probability purposive sampling technique was used in recruiting study subjects according to the eligibility criteria. For children the inclusion criteria were being diagnosed with ADHD based on DSM-IV; children with major psychiatric diagnoses such as schizophrenia, major depressive disorders, and bipolar affective disorders were excluded. For parents, the inclusion criteria were living in the same household, and providing care to the ADHD child.

Tools of data collection:

It included three standardized tools, in addition to a part for socio-demographic and child illness characteristics.

Part I: A- socio-demographic characteristics of the parents and the ADHD child. The characteristics included age, gender, level of education, birth order, and number of male and female siblings. The parents' characteristics covered the residence, family size, and parents' level of education and job status. B- A medical data sheet for the child. It was used to collect data regarding the duration of illness, symptoms noticed by parents, child state before entering school, and any family history of ADHD.

Part II this was the Parenting Sense of Competence (PSOC) scale. It was developed by Johnston and Mash [(9)]. The scale is a 16-item questionnaire to assess how confident parents feel in their ability to handle their child's problems. This is a standardized, consistent instrument with proven validity and reliability and has been widely used in several studies Ohan et al. [(10)];Banks et al [(11)]. It yields two subscales. The efficacy subscale (7 items) measures parents' self-perceptions regarding the skills and understanding required to be a good parent; and the satisfaction subscale (9 items) measuring the degree to which respondents feel comfortable and capable in their role as parents and the value they assign to the parental role. The scale was translated into Arabic language by the researcher using the translation-back-retranslation procedure.

Scoring system: The responses are on a 6-point Likert-type scale: "strongly agree," "agree," "mildly agree," "mildly disagree," "disagree," and "strongly disagree." These are scored from 6 to 1. The scoring was reversed for negatively stated items so that a higher score means more satisfaction and more parenting efficacy. For each of the two subscales and for the total scale, the scores of the items were summed-up. The parents' satisfaction, efficacy, and sense of competence were categorized into "high," "moderate" or "low" according to the cutoff points

given in the tool scoring instructions booklet. (low 16-50; Moderate 51-69; High 70-96).

Part III: This part was the Parent Stress Index (PSI) developed by Abidin [12] to measure the parenting stress among the parents of children with chronic illness. An Arabic version translated by Elbeblawy [13] was utilized in this study. The tool consists of 101 items with a 5-point Likert scale responses ranging from "strongly agree," to "strongly disagree." The items are grouped into two main domains of stressors, namely child-related and parent-related stress.

Scoring system: The stress items were respectively scored 5 to 1 for the responses from "strongly agree" to "strongly disagree." For each subscale and domain, and for the total scale, the scores of the items were summed-up and the total divided by the number of the items, giving a mean score for the part. This was converted to a percent score. The stress in each subscale, domain, and the total PSI scale was categorized into "high" or "low" according to the cutoff points given in the tool scoring instructions booklet.

Part IV: This consisted of the Attention Deficit Hyperactivity Disorder (ADHD) checklist. The tool was developed by Wender Utah [14] to measure the presence of ADHD symptoms in childhood and adulthood. The Arabic version of this scale translated by Mahmoud [15] was utilized in this study. It consists of 42 items with a 5-point Likert scale responses: "not at all or very slightly," "mild," "moderate," "quite a bit," and "very much." The scale was modified for the current study to classify the items into four subscales, namely co-morbidity (17 items), hyperactivity (9 items), inattention (7 items), and impulsivity (9 items) subscales.

Scoring system: The items of each subscale were score from 0 to 4 for the responses from "not at all or very slightly" to "very much." The highest score indicates the highest level of symptom intensity.

Content validity and reliability:

The Parenting Sense of Competence (PSOC) scale was translated by the researcher into Arabic language and tested for its content-validity through a panel of experts in psychiatric nursing. The tools of data collection were tested for its reliability by measuring its internal consistency of items. It showed excellent reliability with Cronbach alpha coefficient 0.914 for Parent stress index scale, 0.852 for Parent sense of competence scale and 0.872 for behavioral disorders checklist.

Field work:

The execution of the study was through four phases, namely assessment, planning, implementation, and evaluation. This lasted for 7 months and half from the first of October 2014 to the middle of May 2015.

Assessment phase: involved the pre-intervention data collection for baseline assessment. Upon obtaining necessary official permissions. The researcher met with parents who met the criteria for inclusion, explained to them the aim and procedures and invited them to participate .The researcher then read and explained each item of the study scales to the parent and recorded his/her response to each item .the time consumed for completing the interview and filling the

form ranged from 45 to 60 minutes. The data were preliminarily analyzed to provide the basis for the design of the intervention program.

Planning phase: Based on the results obtained from assessment phase, the researcher designed the intervention program and sessions contents according to the identified parents' needs and in view of the related literature. The program consisted of four main components. The first component was for giving a theoretical background of ADHD, The second component of the intervention program was focused on parental stress, the third component addressed parental competence, and the fourth component included parental misconception methods in raising their children and their impact on children's personality.

Implementation phase: The intervention was implemented in the form of 20 sessions. The duration of sessions ranged between forty-five minutes and one hour. It was difficult to gather all parents at the same time, so the program was implemented in small groups in the outpatient clinic; each group consisted of 5-10 parents according to their attendance. The sessions were administered twice per week for each study group. This phase lasted for 10 weeks.

All participants received the same content using same training methods, discussion and same booklet. The training methods included demonstration-re-demonstration, group discussions, role-play, and reinforcement. The sessions were aided by using pictures and posters.

Evaluation phase: The evaluation of the effect of the intervention program was done immediately after its implementation by comparing the change in parents' stress level and competence through applying the same tools used in the pretest.

Pilot study:

A pilot study was done to test feasibility of the study, and to know the time needed for filling the tools. The pilot sample involved about ten percent of parents living with children having ADHD fulfilling the set criteria. The subjects included in the pilot sample were not included in the main study sample.

Administrative and ethical considerations:

An official permission was obtained using proper channels of communication. This was done through letters addressed from the Dean of the Faculty of Nursing, Zagazig University explaining the aim and procedures of the study and asking for cooperation.

The parents were informed about the study purpose and procedures and invited them to participate. A verbal consent was obtained by each participant who was informed about the rights to withdraw at any time without giving any reason and with no consequences. Data were considered confidential and not be used outside this study.

Statistical analysis:

Data entry and statistical analysis were done using SPSS 20.0 statistical software package. Cronbach alpha coefficient was calculated to assess the reliability of the developed tools through their internal consistency. Qualitative categorical variables were compared using chi-square test. Spearman rank correlation was used for assessment of the inter-

relationships among quantitative variables and ranked ones. In order to identify the independent predictors of parents' scores, multiple linear regression analysis was used. Statistical significance was considered at p-value <0.05.

Results:

Table (1): shows that the age of children in the study sample ranged from 4 to 14 years with median 7 years, and male was constituted of the sample (76%). Slightly more than half of them were first in birth rank (52.0%). The numbers of female and male siblings ranged between 0 and 4, and 0 and 3, respectively, with equal medians of 1 sibling.

Figure (1): illustrates that slightly more than half of the children were in primary education level (58.0%). Meanwhile, approximately one-third (30.0%) were at pre-school level.

Table (2): shows that a half of the fathers (50.0%) and slightly more than two thirds of the mothers (70.0%) had basic/ secondary education. Meanwhile, more fathers than mothers had university education, 32.0% and 24.0% respectively. As for parents' job, the majority of fathers were workers (62.0%), and of mothers (74.0%) were housewives. The family size ranged between 2 and 7 members with a median 5 persons.

Table (3): demonstrates that none of them had high levels of satisfaction with parenting, or with total PSOC, and only 36% had high level of parenting efficacy before the intervention. At the post-intervention phase, there were statistically significant improvement in parenting satisfaction, efficacy, and PSOC (p<0.001). The percentage of parents having high PSOC rose from 0% at the pre-intervention phase to 80% at the post-intervention phase.

As regards the child-related dimension of the Parental Stress Index (PSI), **Table (4)** demonstrates that, at the pre-intervention phase, almost all children had high levels of reinforcing parents (98%), acceptability (92%) and demandingness (98%). The post-intervention phase shows statistically significant decreases in the levels of high distractibility (p= 0.009), adaptability (p= 0.001), and demandingness (p= 0.03). Meanwhile, no changes were revealed in the areas of reinforcing parents, mood, and acceptability.

As for the parent-related stress dimension of the Parental Stress Index (PSI), **Table(5)** shows generally high percentages of parents with high levels of stress before the intervention. This was highest for parent attachment (86%) and lowest for parental health (6%). After implementation of the intervention, statistically significant improvements were revealed in parents' sense of competence, restrictions of parent role, parent depression, and parent social isolation (p < 0.001). Although the areas of parent attachment and relationship with spouse showed improvements, this did not reach statistical significance, p=0.053 and p=0.08 respectively.

In total, **Figure (2)** illustrates statistically significant improvements in both child-related (p=0.01) and parent-related (p<0.001) dimensions as well as in total PSI (p<0.001) at the post-intervention phase. The improvement was more evident in the parental-related dimension. Overall, almost all parents (92%) had high level of PSI before the intervention. This dropped

to almost one-half (54%) after the intervention.

Table(6) demonstrates that out of the 50 (100%) children having ADHD before the intervention, 39 (78%) improved after the intervention. This difference was statistically significant ($p<0.001$). The table also shows statistically significant improvements in children's behaviors concerning comorbidity ($p<0.001$), hyperactivity ($p=0.04$), and impulsiveness ($p<0.001$) at pre the post-intervention phase. Meanwhile, the inattention problem improved but not significantly.

Table (7) demonstrates a statistically significant moderate to strong positive correlations among the scores of parents' satisfaction, efficacy, and PSOC. Similarly, statistically significant moderate to strong positive correlations were revealed among the scores of child-related, parent-related, and PSI scores. Conversely, statistically significant moderate to strong negative correlations were demonstrated between the scores of parents' satisfaction, competence, and PSOC from one side and each of the child-related, parent-related, PSI, and ADHD scores.

As regards the multivariate regression model for PSI score, **Table (8)** indicates that the PSOC score and the rural residence were its statistically significant independent negative predictors. On the other hand, child female gender and father education were statistically significant independent positive predictors. The value of the standardized beta coefficient demonstrates that the PSOC is the most influential factor on PSI score. The model explains 60% of this score as shown by the value of r-square. Other child and parents' characteristics had no influence on PSI score.

The best fitting multiple linear regression model for the Parents Sense of Competence (PSOC) score (**Table 9**) indicates that the only statistically significant positive independent predictor of this score was the study intervention. Meanwhile, a working mother was a negative predictor. The model explains 72% of the competence score as shown by the value of r-square. Other child and parents' characteristics had no significant independent influence on PSOC score.

Discussion:

The present study hypothesized that the implementation of the nursing intervention program to the parents with ADHD children would lead to improvements in their parenting satisfaction, efficacy, and PSOC. The study findings revealed significant amelioration of the satisfaction subscale of the Parent Sense of Competence (PSOC) scale. This would make the parents feel comfortable and capable of fulfilling their role as parents. Such success of the program could be attributed to its being based on real identified needs of the target attendants. The independent effect of the intervention program on parents' parenting satisfaction was further confirmed by multivariate analysis, and it explains a significant percentage of the variation in this score. In line with this, the effectiveness of similar interventions was reported in previous studies such as Sanders et al. [(16)] in Australia, and Lamb [(17)] in USA.

The present study has also demonstrated significant

improvements in the parent efficacy subscale of total parenting sense of competence (PSOC) and in the total scale. The effect of the intervention was also confirmed through multivariate analysis, which identified the intervention as a positive independent predictor of this score. This improvement might be due to that the mothers started to understand and accept their children's ADHD problems. Such acceptance and understanding helped them to believe in their capability to manage and deal with their children's problem behavior. Additionally, the skills acquired from the intervention may have resulted in enhancement of their sense of competency.

These foregoing present study findings are consistent with those of Alma et al. [18] who showed a significant increase in parenting efficacy and reduction in intensity of child behavior problems at the post-program intervention phase in a Chinese society. On the same line, Stattin et al. [19], in a study in Sweden, demonstrated that the parents of ADHD children showed considerably less negative behaviors toward their children at posttest compared with pretest. Moreover, they increased in parental competence. The authors concluded that the behavioral programs were more effective than the non-behavioral programs.

The present study has also hypothesized that the implementation of the intervention program would lead to significant reductions in the level of stress among the parents of ADHD children. The results of the study led to acceptance of this hypothesis, with significant decreases in the scores of child-related, parent-related, and total Parent Stress Index (PSI). These results were further confirmed through multivariate analyses.

As regards the child-related component of the Parent Stress Index (PSI), the post-intervention phase showed significant improvements in child distractibility, adaptability and child demandingness. These improvements could be attributed to the parents attaining knowledge and awareness about ADHD, and learning how to manage problematic behaviors of their children. This is associated with better PSOC with a positive change in their perceptions of the stressfulness of ADHD, which may prevent them from falling in a distressing situation. In confirmation of this explanation, the multivariate analysis identified the PSOC score as the main negative predictor of the child-related stress score. Thus, a higher sense of competence is associated with lower score of child-related stress.

In congruence with these present study findings, Hands [20] , in a study of the impact of a psycho-educational program on stress among parents of children with ADHD in Kuwait, found statistically significant improvements in parents' stress related to child at the posttest. These changes were shown in the all areas of child-related stress. On the same line, Masse et al. [21], in a study in Canada, demonstrated significant improvements in most of the domains of child-related stress of the PSI. The improvements were only among the parents who completed the program.

However, in disagreement with the abovementioned current study findings, Andreson and Guthery [22] carried out a study in USA to test the effectiveness of a Mindfulness-based Psycho-education intervention for

parents of children with ADHD. They demonstrated significant improvements in the parental distress and parent-child dysfunctional interaction subscales, but not in the child-related stress subscale. These discrepancies with the present study might be related to differences in the approaches of the interventions as well as the characteristics of the parents such as the level of education and acceptability of the intervention itself, as well as the study design.

The present study has also demonstrated improvements in the parent-related component of the PSI at the post-intervention phase. This was significant in most of its domains, and the improvement was higher compared to the child-related subscale. Thus, were relieved of the stress related to their sense of competence, restrictions of parent role, depression, and social isolation.

In agreement with these results, Andreson and Guthery [(22)], in a study in USA, reported significant decreases in parent-related subscale of PSI after an 8-week intervention, but not in the child-related subscale. Moreover, Hands [(20)] who conducted a study in Kuwait showed significant reductions in the stress level in all subscales of the parent-related domain of the PSI among participants. This improvement was noticed in almost all components of this subscale as also shown in the present study.

In total, the present study findings indicate significant improvements in the total PSI scores as well as its two components or subscales. These improvements are certainly due to the positive changes induced by the intervention on the parents, with ameliorations in their competence leading to reduction of their related stress. In support of this explanation, the multivariate analysis identified the PSOC score as the main negative predictor of the PSI score. Thus, the intervention worked on stress through improvement of the parents' sense of competence.

The foregoing present study results are in agreement with those of Hands [(20)] whose study in Kuwait demonstrated a statistically significant improvement in the total score of PSI after implementation of an educational program. Similar findings were also reported by Ghorbanshirodi [(23)] in a study in Iran, and by Moore [(24)] in a study in USA.

In addition, the findings of the present study showed improved among the majority of the children after the intervention, with significant improvements in children's comorbidity, hyperactivity, and impulsiveness behaviors. Such improvements are undoubtedly due to the program's positive impact on the ability of the mothers to regulate their children's behavior. This better ability is certainly related to their stress relief and better competence. In fact, the PSOC score was identified in the multivariate analysis as the main negative predictor of ADHD score. Thus, the more the mother has a sense of competence the lower is the score of her child's ADHD symptoms.

Similar successes of educational interventions in reducing the symptoms of ADHD were previously reported. Thus in Egypt, Shala[(25)] in a study of psychosocial intervention for parents of children with ADHD in Alexandria reported statistically significant decreases in the mean total scores recorded by parents on Conners rating scale immediately after program completion. On the

same line, Alma et al. [18], in USA, demonstrated that the intervention group had a significant reduction in the intensity of ADHD child behavior problems.

On the other hand, other studies could not demonstrate such success of intervention programs on child's ADHD symptoms. For instance, Moore [24] showed no significant difference between the experimental and control groups with regard to parental perceptions of ADHD child behavior problems and symptoms. Similarly, Alaniz [26] reported no significant drop in the ADHD child behavior checklist total scores from pre to post-intervention levels in a study in Kuwait.

The multiple regression analysis identified child female gender, in addition to father education score, as an independent positive predictor of the parent stress score. The finding is in congruence with Lahey et al. [27], in a study of the outcomes of ADHD in the United States found that the outcomes were poorer among girls compared with boys. Conversely, and in disagreement with the current study finding, Theule et al. [28] in a study in Canada showed that child female gender was a significant moderator of parent stress, with less parenting stress in samples with higher proportions of girls.

As regards father education, the results revealed that it was a significant positive predictor of the child-related parental stress score, the parent-related parental stress score, total PSI, as well as the ADHD symptoms scores. This indicates that the higher level of education the father has, the higher is the level of stress, and the more prevalent/severe are the symptoms of ADHD. This might be explained by that the fathers with higher education might be more anxious about the school performance of their children, which increases their stress. Moreover, the increased stress will consequently have a negative impact on their relations with the child, which would lead to worsening of the ADHD symptoms.

Although some research shows a high prevalence of ADHD in children of parents with low level of education such as Al-Hamed et al. [29] and Farid et al. [30], on the contrary El-Nemer et al. [31] could not demonstrate any significant association between parents' education and ADHD subtypes.

According to the study findings, rural residence turned to be a significant negative predictor of the parent-related stress subscale and of the total PSI scores. Thus, the parents residing in rural communities suffered less stress compared with those in urban areas. This might be attributed to the relatively calmer environment in rural areas, with lower stressors. Added to this is the closer social relations that may provide support to the families having children who suffer from ill health.

In congruence with this, McCabe and Sharf [32] highlighted that the parents, as well as the ill child, often need social, emotional, and financial support that could be received from family members and friends. Moreover, ADHD is less prevalent in rural areas compared with urban areas as shown in a study in Canada, Yallop et al. [33].

The present study has also demonstrated statistically significant moderate to strong negative correlations between the scores of

parents' satisfaction, efficacy, and PSOC from one side and each of the child-related, parent-related, PSI, and ADHD scores. More importantly, the results of the multivariate analyses demonstrated that the scores of PSOC were the main statistically significant independent negative predictors of stress and ADHD symptoms scores. This signifies that the parents who have a higher sense of competence suffer less stress, and their children exhibit less ADHD symptoms.

In agreement with these present study findings and their explanation, Van den Hoofdakker **(34)**, in a study in Netherlands, showed that maternal self-efficacy plays a moderating role in the decrease of the behavioral problems and ADHD symptoms among affected children. Furthermore, and in congruence with the present study findings, Johnston et al. (35), in a study in Canada, reported that mothers with higher parenting efficacy view behavioral strategies as being more likely to being effective, which predicts positive treatment experience.

Overall, the present study demonstrated an improvement in parents' competence after implementation of the intervention program. This indicates that the program was effective and achieved its goal. The effectiveness of the program could be attributed to its content and process and can be garnered by the fact that nursing intervention programs help parents to deal successfully with the many challenges that produce new attitudes in order to reach behavioral changes toward their children. This is supported by the notion that a change in parenting competence can lead to changes in parenting stress through acquisition of effective parenting skills that help these parents in facing the stressful situation.

Conclusion:

In the light of the main study findings, it can be concluded that, the implementation of an educational intervention to these parents is effective in improving their parenting satisfaction, efficacy, and PSOC, with reduction in their Parental Stress Index (PSI) with its child-related and parent-related subscales. The improvement in parents' sense of competence is the predictor of the reduction of their stress and of the improvement in their children's behavior. Child's and parents characteristics are influencing stress, competence, and child's behavioral changes.

Recommendations:

Based on the results it is recommended to:

1- Apply the developed program in the study settings for more improvements.

2- The school health team needs to be trained in screening and early detection, with counseling clinics for parents of ADHD children.

3- Schoolteachers should also be taught about the early symptoms.

4- Nurses should exert more effort to support the parents of children with ADHD, and they need training to be able to do this.

Table 1: Socio-demographic characteristics of children in the study sample (n=50)

Items	Frequency	Percent
Age:		
<7	18	36.0
7+	32	64.0
Range	4.0-14.0	
Mean±SD	8.2±2.7	
Median	7.0	
Gender:		
Male	38	76.0
Female	12	24.0
Birth order:		
1	26	52.0
2+	24	48.0
Range	1.0-5.0	
Mean±SD	1.8±1.0	
Median	1.00	
No. of female siblings:		
0	17	34.0
1+	33	66.0
Range	0-4	
Mean±SD	1.1±1.1	
Median	1.0	
No. of male siblings:		
0	13	26.0
1+	37	74.0
Range	0-3	
Mean±SD	1.0±0.8	
Median	1.0	

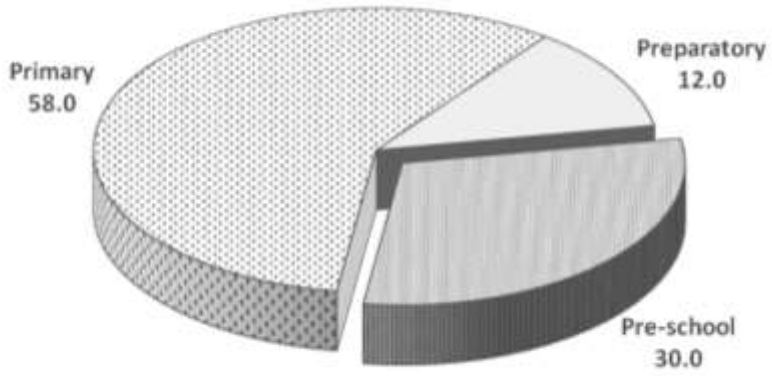

Figure 1: Distribution of children in the study sample by level of education (n=50

Table 2: Family characteristics of children in the study sample (n=50)

Items	Frequency	Percent
Father education:		
Illiterate	9	18.0
Basic/Secondary	25	50.0
University	16	32.0
Father job:		
Employee	19	38.0
Worker	31	62.0
Mother education:		
Illiterate	3	6.0
Basic/Secondary	35	70.0
University	12	24.0
Mother job:		
Housewife	37	74.0
Working	13	26.0
Family size:		
<5	19	38.0
5+	31	62.0
Range	2-7	
Mean±SD	4.8±1.1	
Median	5.0	

Table3: Changes in Parenting Sense of Competence (PSOC) throughout intervention

Parent competence	Time				X^2 test	p-value
	Pre (n=50)		Post (n=50)			
	No.	%	No.	%		
Satisfaction with parenting:						
High	0	0.0	29	58.0		
Moderate/low	50	100.0	21	42.0	40.85	<0.001*
Parenting efficacy:						
High	18	36.0	49	98.0		
Moderate/low	32	64.0	1	2.0	43.46	<0.001*
Parenting sense of competence (PSOC):						
High	0	0.0	40	80.0		
Moderate/low	50	100.0	10	20.0	66.67	<0.001*

(*) Statistically significant at p<0.05 (--) Test result not valid

Table 4: Changes in child-related Parental Stress Index (PSI) throughout intervention

Child – related stress	Time				X^2 test	p-value
	Pre (n=50)		Post (n=50)			
	No.	%	No.	%		
Distractibility:						
High	28	56.0	15	30.0		
Low	22	44.0	35	70.0	6.90	0.009*
Reinforcing parents:						
High	49	98.0	45	90.0		
Low	1	2.0	5	10.0	Fisher	0.20
Mood:						
High	28	56.0	28	56.0		
Low	22	44.0	22	44.0	0.00	1.00
Acceptability:						
High	46	92.0	43	86.0		
Low	4	8.0	7	14.0	0.92	0.34
Adaptability:						
High	29	58.0	12	24.0		
Low	21	42.0	38	76.0	11.95	0.001*
Demandingness:						
High	49	98.0	42	84.0		
Low	1	2.0	8	16.0	Fisher	0.03*

(*) Statistically significant at p<0.05

Table 5: Changes in parent-related Parental Stress Index (PSI) throughout intervention

Parent –related stress	Time				X^2 test	p-value
	Pre (n=50)		Post (n=50)			
	No.	%	No.	%		
Parent sense of competence:						
High	30	60.0	5	10.0		
Low	20	40.0	45	90.0	27.47	<0.001*
Parent attachment:						
High	43	86.0	35	70.0		
Low	7	14.0	15	30.0	3.73	0.053
Restrictions of parent role:						
High	30	60.0	6	12.0		
Low	20	40.0	44	88.0	25.00	<0.001*
Parent depression:						
High	31	62.0	5	10.0		
Low	19	38.0	45	90.0	29.34	<0.001*
Relationship with spouse:						
High	19	41.3	11	23.9		
Low	27	58.7	35	76.1	3.17	0.08
Social isolation:						
High	42	84.0	15	30.0		
Low	8	16.0	35	70.0	29.74	<0.001*
Parental health:						
High	3	6.0	0	0.0		
Low	47	94.0	50	100.0	Fisher	0.24

(*) Statistically significant at p<0.05

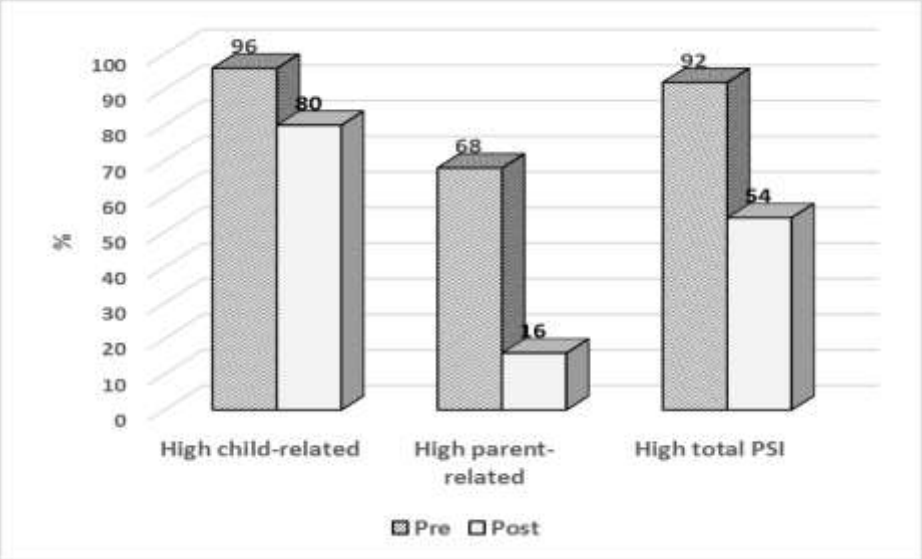

Figure 2: Changes in total Parental Stress Index (PSI) throughout intervention

Table 6: Changes in children's behavior throughout intervention

ADHD symptoms	Time				X^2 test	p-value
	Pre (n=50)		Post (n=50)			
	No.	%	No.	%		
Comorbidity:						
Present	15	30.0	1	2.0		
Absent	35	70.0	49	98.0	14.58	<0.001*
Hyperactivity:						
Present	32	64.0	22	44.0		
Absent	18	36.0	28	56.0	4.03	0.04*
Inattention:						
Present	32	64.0	25	50.0		
Absent	18	36.0	25	50.0	2.00	0.16
Impulsiveness:						
Present	31	62.0	12	24.0		
Absent	19	38.0	38	76.0	14.73	<0.001*
ADHD:						
Present	50	100.0	11	22.0		
Absent	0	0.0	39	78.0	63.93	<0.001*

(*) Statistically significant at p<0.05

Table 7: Correlation matrix of PSOC, PSI, and ADHD scales

	Spearman's rank correlation coefficient						
	Satis-Faction	Effi-Cacy	PSOC	Child-related	Parent-related	PSI	ADHD
1. Satisfaction							
2. Efficacy	.660**						
3. Total PSOC	.947**	.845**					
4. Child-related stress	-.545**	-.413**	-.550**				
5. Parent-related stress	-.718**	-.565**	-.717**	.646**			
6. Total PSI	-.701**	-.560**	-.709**	.855**	.942**		
7. ADHD	-.502**	-.442**	-.531**	.758**	.629**	.728**	

(*) Statistically significant at p<0.05 (**) Statistically significant at p<0.01

Table 8: Best fitting multiple linear regression model for the PSI score

	Unstandardized Coefficients		Standardized Coefficients	t-test	p-value	95% Confidence Interval for B	
	B	Std. Error				Lower	Upper
Constant	399.43	17.44		22.902	<0.001	364.81	434.06
Child female gender	13.05	5.69	0.15	2.292	0.024	1.75	24.36
Rural residence	-10.78	4.86	-0.14	2.219	0.029	-20.42	-1.13
Father education	0.64	0.14	0.28	4.423	<0.001	0.35	0.93
PSOC score	-2.15	0.19	-0.71	11.116	<0.001	-2.54	-1.77

r-square=0.60
Model ANOVA: F=38.30, p<0.001
Variables entered and excluded: age, duration of illness, mother education, parents' job, intervention

Table 9: Best fitting multiple linear regression model for the PSOC score

	Unstandardized Coefficients		Standardized Coefficients	t-test	p-value	95% Confidence Interval for B	
	B	Std. Error				Lower	Upper
Constant	30.88	2.13		14.469	<0.001	26.64	35.11
Intervention	21.00	1.33	0.84	15.830	<0.001	18.37	23.63
Working mother	-3.53	1.51	-0.12	-2.336	0.022	-6.53	-0.53

r-square=0.72
Model ANOVA: F=128.02, p<0.001
Variables entered and excluded: age, gender, residence, duration of illness, parents' education, father job

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