

ORIGINAL ARTICLE

Depressive, anxiety and stress levels among mothers of ADHD children and their relationships to ADHD symptoms

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Abstract

Introduction: To date, there are limited published literatures addressing behaviors of Attention Deficit and Hyperactive Disorder (ADHD) children and their parents' psychological characteristics. It is also crucial to know the relationship between characteristics of ADHD behaviors on their parental psychological impacts.

Objective: To determine the level of stress, anxiety and depressive among mothers of ADHD children compared to control group and also to determine the associations between domains of children's behaviors (externalizing or internalizing) that gives most impact to these maternal psychological aspects.

Method: This is a cross-sectional study. Seventy mothers of ADHD children who came to Child and Adolescent Clinic, Universiti Kebangsaan Malaysia Hospital completed self-rating questionnaires of Child Behavior Checklist (CBCL), Parenting Stress Index (PSI) and Hospital Anxiety and Depressive Scale (HADS). Seventy mothers of asthmatic children were recruited as a control group.

Results: Mothers with ADHD children are more anxious, depressed and stressed ($p < 0.001$). Odd ratios are 3.8, 6.4 and 6.4 respectively. ADHD children displayed difficult behaviors in almost all CBCL subscales than asthmatic children. Externalizing behavior caused significant anxiety, depressive and stress levels ($p < 0.05$), whereas internalizing behaviors caused significant in stress level but not to anxiety and depressive levels.

Conclusions: Mothers of ADHD children are more psychologically distressed. Their psychological distress is contributed mainly by externalizing behaviors of their ADHD children.

Key words: stress, anxiety, depressive, ADHD

Introduction

Attention deficit hyperactivity disorder (ADHD) is among the most common neurodevelopmental disorders of childhood and adolescence. The prevalence of ADHD among the school age children is about 10% of boys and 4% of girls [1]. ADHD children are highly associated with other forms of psychiatric disorders and comor-

bidities. As high as two thirds of the total cases of ADHD had other psychiatric comorbidities such as learning difficulties (40%), conduct disorder (30-40%), substance abuse (20-30%) and oppositional defiant disorder (30-60%) [2]. About 70% of hyperactive children would continue to have hyperactive and inattentive features during their adulthood. Between 18 to 23%

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of children with ADHD would develop antisocial personality disorder in later part of their lives [3]. These are the plausible factors that could impose substantial psychological distress to their carers, especially their mothers.

In the literature research, there are limited studies that have been done to specifically look at the prevalence of depression, anxiety and stress level among the parents or caretakers of ADHD children and also its relationship with ADHD behaviors. Befera and Barkley have concluded from their study that mothers of children with ADHD show higher rates of depressive symptoms in comparison to mothers of normal children [4]. Families of ADHD children are more likely to have more stress, feeling of parental incompetence, marital discord, social isolation and marital disruption. The present study further explores this association by categorizing behaviors of ADHD children into internalizing and externalizing behaviors.

The main objective of this study is to determine the level of stress, anxiety and depressive scores among mothers of ADHD children compared to the control group. Additional objective is to determine the associations between domains of ADHD behaviors (internalizing behavior or externalizing behavior) that gives most impact to stress, anxiety and depressive levels.

Methods

This study was reviewed and fully approved by the Institution Review Board of Universiti Kebangsaan Malaysia (UKM). It had been conducted in the Child and Adolescent Psychiatric clinic and General Pediatric clinic UKM Hospital. Informed consents of the participants were obtained after the nature of the procedures had been fully explained.

Subjects

Study subjects are mothers of ADHD children (new and old cases) whom came to

Child and Adolescent Psychiatric clinic UKM Hospital during the period of study. For control group, subjects were chosen among all the mothers who accompanied their asthmatic children to General Pediatric clinic.

Inclusion criteria of mothers with ADHD children:

1. All mothers of ADHD children (aged between 6 and 18 years old) who came to Child Psychiatric Clinic UKM Hospital during that one year period of study (from March 2005 to February 2006) regardless whether they were new or old cases.

2. The diagnosis of ADHD was ascertained based on the Diagnosis and Statistical Manual of Mental Disorders, Fourth Edition (DSM-IV) criteria applied by at least one experienced child and adolescent psychiatrist in the department.

Exclusion criteria of mothers with ADHD children:

1. The cases would be excluded from the study when the diagnosis of mental retardation, autism and other developmental disorders were made on ADHD children.

2. Those ADHD children who fulfilled for other major psychiatric diagnoses such as schizophrenia, major depressive disorder or bipolar affective disorder would also be excluded from the study.

Inclusion criteria for control group:

All mothers of children with a diagnosis of bronchial asthma who came to the general pediatric clinic for follow up would be enrolled as control subjects. The children would be matched for their age, sex and race.

Exclusion criteria for control group:

The subjects should not suffer from any serious or terminal illness, such as leukemia, or any congenital abnormalities, such as metabolite abnormalities.

Procedures

Psychiatric diagnoses were established

through clinical evaluation based on DSM-IV criteria and administration of the Conner's Parent Rating Scale. The administration of Child Behavior Checklist (CBCL), Parenting Stress Index (PSI) and Hospital Anxiety and Depressive Scale (HADS) were done by a single person (main investigator) to ensure the standardizing of scores.

Statistical Analysis

Demographic data, levels of anxiety, depression/stress and children's behaviors were analyzed by using Mann-Whitney, Chi-Square and Student-t tests.

Results

Socio-demographic data

Subject characteristics and socio-demographic data are shown in Table 1.

Demographic comparisons of two groups (study and control groups) were comparable in various aspects; age, race distribu-

tion, family income, educational level, marital status, gender of subjects and number of children ($p > 0.05$).

Table 2 shows means and standard deviations of anxiety, depressive and stress scores between study and control groups. All scores for anxiety, depressive and stress in study group were significantly higher ($p < 0.001$) as compared to control group.

Analysis of the scores shows that 80% of mothers with ADHD children were anxious, 63% were depressed and 63% were stressed, as compared to 51%, 21% and 21%, respectively, for mothers with asthmatic children. Possible anxiety and depressive cases were defined when subjects scored 7 and more for HADS anxiety and depressive subscales. Odd ratios for anxiety, depressive and stress in comparison between ADHD group and its control group were 3.8, 6.4 and 6.4, respectively. These signify that mothers with ADHD

Table 1: Socio-demographic variables

	ADHD n=70	Asthma n=70	P value*
Age (median)	8	7	0.51**
Sex Male	54 (77%)	51 (73%)	0.56
Female	16 (33%)	19 (27%)	
Race			
Malay	36 (51.4%)	38 (54.3%)	0.12
Chinese	33 (47.1%)	31 (44.3%)	
Indian	1 (1.4%)	1 (1.4%)	
Fathers' education (Secondary Education)	33 (47%)	37 (53%)	0.21
Mothers' education (Secondary Education)	35 (50%)	43 (61%)	0.35
Family income			
Low income group	29 (41%)	27 (39%)	0.56
Middle income group	18 (26%)	22 (31%)	
High income group	23 (33%)	21 (30%)	
Number of children			
1-2	47 (68%)	34 (49%)	0.16
>2	22 (32%)	36 (51%)	
Marital status (Married)	69 (98.6%)	70 (100%)	0.24
Number of patients on medications	48 (69%)	NA	

* Chi-Square test for all comparisons, except age

** Mann-Whitney U test

Table 2: Levels of anxiety, depression and stress between study and control groups

	Group	n	Mean	Standard deviation	P value
Anxiety score	ADHD	70	9.31	3.45	<0.001*
	Asthma	70	6.10	2.27	
Depressive Score	ADHD	70	7.70	3.42	<0.001*
	Asthma	70	4.14	2.36	
Stress score	ADHD	70	108.21	20.03	<0.001*
	Asthma	70	79.91	15.11	

*Independent sample t-test

children are four to six times more distress as compared to mothers with asthmatic children.

In the Child Behavior Checklist (CBCL) there are three main subscales of children’s behaviors; internalizing, externalizing and other behaviors. *Internalizing behavior* is a total score of anxious/depressed subscale, withdrawn/depressed subscale and somatic complaints. *Externalizing behavior* is a total score of rule-breaking behavior subscale and aggressive behavior subscale. *Other Behaviors* is a total score of social problems subscale, thought problems subscale, attention problems subscale and other problems subscale.

Table 3 shows mean differences between study and control groups in all behavioral subscales. ADHD children were different in all subscales of behavior as compared to asthmatic children except in somatic complaints. ADHD children had significantly higher scores in all subscales asthmatic children ($p < 0.001$). For somatic subscale, study and control groups had total means of 2.99, and 2.43, respectively. Nevertheless it was not statistically significant ($p > 0.05$). This indicates that both groups of children have similar tendency to complain about somatic presentations.

Table 4 shows that internalizing behaviors of the ADHD children significantly raised the stress level of their mothers ($p < 0.05$). However, internalizing behaviors did not

significantly raise the anxiety and depressive scores ($p > 0.05$). Externalizing behaviors of ADHD children caused psychological impacts in all aspects of their mothers. This included the raise of anxiety, depressive and distress levels ($p < 0.05$).

Discussion

Awareness and vigilance on the issue of psychological impacts on the parents of ADHD children are still low. In Malaysia, public awareness on the illness itself is minimal. Most parents regard behaviors exhibited by these children as “naughty behaviors”. Results in this study support the notion that parents of ADHD children suffer substantial psychological distress as a result of difficulties faced by them in nurturing these children.

As observed in the results of this study, demographic data between study and control groups are comparable in various aspects. These include aspects of age of the children, gender, race distributions, parental educational levels, number of children in family and marital status. This indicates that the control group which is recruited in this study is comparable control group, and it is suitable to use in analyses of the hypotheses. In this study, three important demographic variables were controlled in the recruitment of the control group. They are age of the subjects, race and gender. These three factors are needed to be controlled as it would determine the level of burden, fulfillment of children’s needs, and

Table 3: Children's behavior subscales

Subscales	Group	Mean	Standard. deviation	P value
Anxious	ADHD	6.53	3.922	<0.001**
	Asthma	3.79	2.792	
Withdrawn	ADHD	4.10	2.687	<0.001**
	Asthma	2.31	2.171	
Somatic complaints	ADHD	2.99	3.100	0.230**
	Asthma	2.43	2.313	
Social problems	ADHD	8.70	3.913	<0.001**
	Asthma	4.27	2.823	
Thought problems	ADHD	7.19	4.480	<0.001**
	Asthma	2.13	2.245	
Attention deficit	ADHD	11.47	3.238	<0.001**
	Asthma	4.77	3.163	
Rules breaking	ADHD	6.01	4.500	<0.001**
	Asthma	3.23	2.989	
Aggressiveness	ADHD	13.43	6.305	<0.001**
	Asthma	7.26	5.342	
Other problems	ADHD	8.19	4.635	<0.001**
	Asthma	4.84	3.068	
<i>Internalizing</i>	ADHD	13.61	7.863	<0.001*
	Asthma	8.53	5.503	
<i>Externalizing</i>	ADHD	19.44	10.151	<0.001*
	Asthma	10.49	7.798	
<i>Others</i>	ADHD	35.54	13.502	<0.001**
	Asthma	16.01	9.335	
Total scores	ADHD	68.60	28.744	<0.001**
	Asthma	35.03	20.447	

* t-test (normally distributed)

** Mann-Whitney U test (not normally distributed)

Table 4: Relationships between children's internalizing and externalizing behaviors with their mothers' psychological aspects.

	Anxiety	Depressive	Stress
<i>Internalizing</i>	0.098	0.06	0.006**
<i>Externalizing</i>	0.031*	0.035*	0.004**

P values by Chi-Square tests with 95% CI

*/ ** indicate significant p values (<0.05)

they would eventually influence the results on parental psychological distress in taking care of their children. Since all demographic data between two groups are comparable, we can conclude that there is an association between the high levels of anxiety, depressive and stress among mothers of ADHD children with difficulties in nurturing of these children.

Anxiety, depressive and stress levels

Not many studies previously paid attention to the anxiety levels of parents with ADHD

children. In this study, it has been proven that there is a significant level of anxiety among mothers of ADHD children as compared to mothers of asthmatic children. Eighty percent of mothers with ADHD children had significant scores on HADS anxiety subscale (total score 7 or more on this subscale).

Results of this study revealed that 63% of mothers of ADHD children displayed significant depressive scores as compared to mothers of asthmatic children, where the score is only 21%. The odds ratio is 6.4. This means that the risk of mothers with ADHD children to have depression is about six times more compared to mothers of asthmatic children. Further analysis of depression scores shows that although majority of respondents' scored moderate in depressive subscale, there were mothers in ADHD and asthmatic groups who scored quite high and considered severely depressed.

These groups of mothers (63% in cases and 21% in controls) are suggestive cases of depression. However, further evaluation is needed to ensure whether they are really fulfilled the diagnosis of depression. By identifying whether they meet the criteria of depression, subsequently therapeutic interventions can be done to limit their morbidities. The finding that 63% of mothers with ADHD children were depressed is enormously high as compared to the study done by Harrison and Sofronoff [5], which found only 21%. In a study carried out by Cunningham [6], which used different depressive scales, about 23% of mothers with ADHD children rated in their depressive scales with significant scores.

Another study carried out by Cunningham and colleagues, which compared both parents (fathers and mothers) with ADHD children and parents of normal children, they found that total scores of Beck Depression Inventory and total amount of alcohol consumption in families with ADHD

children were significantly higher than families with normal children [7].

The high percentage of mothers who were depressed in this study may be due to the cut-off score of 7, which was used in the HADS scale instead of 8. Other explanation regarding the disproportionate figure as compared to other studies is that this study was conducted in a hospital. A large percentage of depressive mothers could be obtained from a hospital-based study as compared to a population-based study.

In this study, 63% of mothers with ADHD children scored significant stress levels, whereas scores in control group is only 21%. It is a statistically significant ($p < 0.0005$). The conclusion that can be derived from this result is that mothers of ADHD children are more stressed as compared to mothers of asthmatic children. The stress faced by parents of ADHD children are very much related to burden of care that they have to endure. As the nature of ADHD itself, which is pervasive and chronic, it is not surprising that many of these parents find this disorder and its comorbidities are extremely difficult to manage and eventually find themselves distressed. Previous observational studies have concluded that ADHD children imposed extra burden to their parents, siblings, teachers and peers [7,8,9,10].

In this study, the result supports the evidence that the stress level is higher in parents of ADHD children with a high odds ratio of 6.4. This figure indicates that the risk of mothers with ADHD children to have stress is about six times more compared to mothers of asthmatic children. The main findings in this study are in keeping with most studies in the past which support the notion that mothers of ADHD children are suffering more distress. Breen and Barkley also used Parenting Stress Index, and again it showed that mothers of hyperactive girls scored higher to mothers with normal girls [7]. Johnson & Reader used

different form of measurements to look into parental psychological aspects [11]. They utilized the Disruptive Behavior Stress Inventory (DBSI) and the Family Stress Survey (FSS) also come with similar findings. However the figure of 63% mothers with ADHD children being distressed in this study is also high in comparison with other studies. In a study done by Harrison and Sofronoff [5], 24% of their respondents were stressed even though they used the same questionnaire, which is Parenting Stress Index.

Mothers of ADHD are not only affected psychologically but also in various aspects of their lives. There is a complex interaction of environmental factors and psychological characteristics of parents with ADHD children. Other studies concluded that this group of mothers is not only depressed due to the burden to take care of their ADHD children, but ADHD behaviors had also affected other aspects of their lives, such as poorer general health, lower sense of competence and restrictiveness in parenting role [10, 12]. Stress experienced by parents of ADHD children also comes from other demands placed on parents [20]. The difficulties confronting parents of ADHD children would adversely affect other aspects of individual, marital, and family functioning [4,10,13,14].

Maternal psychological distress in relation to children's behaviors

A few studies in the past affirmed that there is a relationship between parental psychological effects with behavioral patterns of ADHD children. Substantially higher level of stress among ADHD mothers has been associated with disruptive and externalizing behaviors of their ADHD children. The results of this study support the above statement as p values were statistically significant. This result indicates that stress among mothers with ADHD children in this study is not only contributed by externalizing behavior, but also by internalizing behavior of ADHD children.

Looking into a broader perspective, symptoms of ADHD such as inattention, impulsivity and overactivity may result problems in family interaction and integration. Other studies have established the link between maternal depression and externalizing behaviors of their ADHD children. However they failed to control other confounding factors [14,15,16]. In this study, authors managed to control three main possible confounders such as number of children in the family, socioeconomic status and marital status (single or married).

Limitations

Parental psychological distress suffered by mothers of ADHD children may not be solely caused by externalizing or internalizing behaviors of their children. It could also imposed by other comorbidities such as conduct disorder, substance abuse and learning disabilities, which cover a substantial proportion of children with ADHD. In this study, the author did not exclude these comorbidities in recruiting the subjects as these comorbidities are very common among ADHD children. It can be part and parcel of ADHD. By excluding those comorbidities, it may result in non-naturalistic of the study and losing many subjects.

The significant psychological impairments suffered by mothers of ADHD and asthmatic children might have also caused by any recent adverse psychosocial events happened in their lives. This factor was not measured in the study. However more important confounding factors, in particular, family demographic characteristics (such as income, educational level, marital status) and number of children were controlled and neutralized.

Mothers of asthmatic children that are used in this study may not be an ideal control group. Asthma is a physical illness and the attacks can be relatively brief, whereas ADHD is a developmental disorder. However the similarities between these two ill-

nesses are that they are chronic, not a terminal illness, commonly found and respond well to medications. It is therefore fairly reasonable to be chosen as a control group.

Implications of the study

The needs to help out and ease the burdens of mothers with ADHD children are essential. Psychological incompetence of mothers in this group is one of the adversities that may hamper good parental nurturing. Disruption in positive parenting increases negative behaviors in children. Difficult behaviors exhibited by children with ADHD are significant family stressors. These stressors are associated with negative outcomes to the children and generally to the family. Therefore giving extra-attention to the psychological well-being of parents would help them to adopt more adaptive parental nurturing. In fact, suggestion has been made to consider assessment of the parental psychological aspects together with the assessment of ADHD children in developing a comprehensive treatment programme. In treating ADHD children, one must not ignore the possible psychological distress suffered by this group of mothers. Harrison and Sofronoff proposed that interventions for ADHD not only aimed at children's behavior but also paying equal attention to their mothers [5]. This can be done by screening their mothers for any psychological morbidities and delivering the necessary interventions. Healthy nurturing of the children only comes from healthy mothers.

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