Original Article

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The Mental Health and Marital Adjustment of Mothers of Children with Attention Deficit Hyperactivity Disorder

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Abstract

Aim: The mental health of parents is affected by the behavior of their children due to parent-child relationships. This study aimed to examine the marital adjustment, emotional problems, and attention deficit hyperactivity disorder (ADHD) symptoms in the mothers of children with ADHD, and the relationships of these parameters with each other and with the offspring's behavioral problems.

Methods: This study was conducted with 152 mothers, 90 of whom had children with ADHD, between October 2020 and April 2021. The Conners' parent rating scale-revised long version (CPRS-RL) was used to rate the children's symptoms. Mothers were evaluated using a sociodemographic information form, the Beck anxiety inventory (BAI), the Beck depression inventory (BDI), the adult ADHD self-report scale (ASRS), and the marriage adjustment scale (MAS). Statistical comparisons were made between the data obtained from scales and hospital records.

Results: Significant associations were observed between oppositional and anxious-shy symptoms in children and the BAI and ASRS; between social problems and psychosomatic symptoms and the BAI, BDI, ASRS, and MAS; between restless-impulsive symptoms and BAI-BDI, ASRS, and MAS; between emotional lability and BAI, BDI, and ASRS; between inattention and BAI; and between hyperactivity-impulsivity and ASRS scores ($p<0.05$). The BAI, BDI, and ASRS scores were significantly higher, and MAS scores were significantly lower in the mothers of children with ADHD compared to the controls ($p<0.05$). A positive correlation was observed between ASRS scores and BAI ($r=0.497$ $p=0.001$) and BDI ($r=0.04$ $p=0.001$) scores. MAS scores were significantly negatively correlated with ASRS ($r=-0.383$ $p=0.001$), BAI ($r=-0.477$ $p=0.001$), and BDI ($r=-0.437$ $p=0.001$) scores.

Conclusion: This study demonstrated that in children with ADHD, problematic behaviors exacerbate anxiety, depression, and adult attention deficiency symptoms and reduce marital adjustment in mothers.

Keywords: Problem behavior, attention deficit disorder with hyperactivity, mothers, mental health, parent-child relations

Introduction

Attention deficit hyperactivity disorder (ADHD) is the most common childhood neurodevelopmental disorder. Inattention, impulsivity, and hyperactivity symptoms emerge before the age of 12 and lead to disturbances in daily life. It has been reported that approximately 5% of children worldwide are affected by ADHD (1). The etiology is complex and heterogeneous, with genetic and environmental factors being implicated (2,3). Children and adolescents with ADHD suffer impairment in academic, familial, and social contexts. Additionally, parents of these children must come face to-face with their offspring's various coercive problems, such as problems in interpersonal relationships, risk-taking behavior, conflicted parent-child interaction, substance use, academic failure, and employment difficulties (4,5).

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Parental stress is widespread among parents of children of all ages. However, it is higher among families with factors such as negative child behavior and neurocognitive disorders, including ADHD (6-8). It has been reported that parents of children with ADHD experience higher rates of ADHD, and maternal depression/anxiety and psychiatric symptom levels are adversely affected by the problem behaviors of their children (9-11). However, some authors have espoused the opposite perspective, reporting that psychiatric disorders in mothers, such as anxiety and depression, can also exacerbate ADHD symptoms or problematic behaviors in children (12-14). Problem behavior in children can also gradually adversely affect the quality of the parents' relationship (15). Additionally, mothers have experienced higher parental stress than fathers (16). Our review of the literature showed that these difficulties in children may result in a greater psychiatric burden in mothers and may also have an adverse impact on the marital relationship of the parents.

Our hypothesis was that the mothers of children diagnosed with ADHD would have higher ADHD, anxiety, and depression levels and lower marital adjustment than mothers of children with no chronic medical or psychiatric disease, and that these would be associated with behavioral problems of their children. The aims of this study were to examine the levels of marital adjustment, emotional problems, and ADHD symptoms in mothers of children aged 6-18 with ADHD; and to establish the relationships of these parameters with each other and the child's behavioral problem levels.

Materials and Methods

Compliance with Ethical Standards

Approval for the study was granted by the University of Health Sciences Turkey, Bakirkoy Dr. Sadi Konuk Training and Research Hospital Clinical Research Ethical Committee (no. 2020-21-14 dated 19.10.2020). Participants were informed that the data would only be used for scientific purposes. Written and verbal consent were obtained from all participants.

Study Population

This study was conducted between October 2020 and April 2021 at the University of Health Sciences Turkey, Bakirkoy Dr. Sadi Konuk Training and Research Hospital, Clinic of Child and Adolescent Psychiatric. The biological mothers of children aged 6-18 years, diagnosed with ADHD and followed up for at least six months, and the mothers of healthy children with no psychiatric diagnosis were included in the study. All children of the participating mothers were evaluated by a child and adolescent psychiatrist through a DSM-V-based examination. Individuals experiencing difficulty in reading and understanding the forms or who were unable to complete the evaluation process were excluded from the study. The presence of a comorbid psychiatric disorder in children with ADHD and the presence of another offspring with a psychiatric disorder in the family were the other exclusion criteria. Mothers scheduled for inclusion in the control group whose children had any psychiatric or organic diseases were excluded from the research. The study was initially planned with 250 participants, but following the application of the exclusion criteria, it was finally completed with 152 participants-mothers of children diagnosed with ADHD (n=90) and mothers of healthy children (n=62).

Psychometric Instruments

Conners' parent rating scale-revised long version (CPRS-RL) was used to rate symptoms in children diagnosed with ADHD. An information form developed by the authors was used to evaluate the sociodemographic data of the mothers and their medical and familial characteristics. The Beck anxiety inventory (BAI), Beck depression inventory (BDI), adult ADHD self-report scale (ASRS), and marriage adjustment scale (MAS) were applied to evaluate the mothers themselves.

The Conners' parent rating scale-revised long version

The CPRS-RL is used to assess both internalizing and externalizing problems in children aged 3-17 years and consists of 80 items and 14 subscales (17). Problem behavior is evaluated using seven subscales: hyperactivity-impulsivity, psychosomatic, cognitive problems, anxious-shy, perfectionism, social problems, and oppositional. The ADHD Index, intended to determine ADHD based on DSM-IV criteria, is another 12-item subscale differentiating patients from those with no such problem. The Conners global index is used as an assistant tool for problem behavior (Restless-Impulsive, Emotional Lability, Total Score). Additionally, the DSM-IV Symptom Subscale consists of 18 DSM-IV-based criteria aimed at determining and yielding inattention, hyperactivity-impulsivity, and total score. Each item consists of four response options: not at all true (never, rarely) - 0 points; somewhat true (sometimes) - 1 point; quite true (usually, often) - 2 points; and very true (very often) - 3 points. Higher scores from a subscale indicate a higher level of possession of the problem defined by that subscale (Conners). The reliability and validity of the Turkish-language version of the scale were confirmed by Kaner et al. (18).

The Beck Depression Inventory

The BDI is a four-point likert-type self-report developed by Beck et al. (19). It was developed to measure the risk

of depression and the level and severity of depressive symptoms in adults. It consists of 21 items, each of which evaluates a specific behavior. The validity and reliability of the Turkish version were confirmed by Hisli (20). Higher scores indicate higher depressive levels. The cut-off point for the scale was set at 17. In our study, the total scale score was used.

The Beck Anxiety Inventory

The BAI is a four point (0-3) likert type self-report developed to measure anxiety symptom levels (21). It is a self-assessment scale used to determine the frequency of anxiety symptoms experienced by individuals. It consists of 21 items. Our raw score ranged between 0 and 63. Higher scores indicate a higher anxiety state. This has been shown in a Turkish validity and reliability study (22). In this study, the total scale scores were evaluated.

The Adult ADHD Self-Report Scale

The ASRS is used to assess ADHD symptoms in adults. The scale was arranged according to the ADHD diagnostic criteria in DSM-IV (23). The 18 questions contained in the scale investigated the frequency of the appearance of each symptom within the previous six months. Nine items of this five-point Likert-type self-report scale (0= never, 1= rarely, 2= sometimes, 3= often, 4= very often) evaluated inattention, the other nine were concerned with hyperactivity/impulsivity symptoms. "Stepwise logistic regression" analysis showed that six of the 18 questions were more accurate in diagnosing ADHD. Therefore, only the questions in Section A were included in the analysis. The validity and reliability of the Turkish-language version of the scale were confirmed by Doğan et al. (24).

The Marriage Adjustment Scale

The MAS was developed by Locke and Wallace (25). It consists of 15 items, with possible scores ranging from 1 to 60, with higher scores indicating greater marital adjustment and lower scores lacking marital adjustment. In addition to general marital adjustment, the scale measures agreement or disagreement on subjects such as the family budget, the expression of emotions, friends, sexuality, and philosophy of life, as well as relationship type in terms of trust, conflict resolution, and spare time and outside activities. The validity and reliability of the Turkish-language version of the scale were confirmed by Tutarel Kışlak (26).

Statistical Analysis

In this study, mean, standard deviation, median, frequency, percentage, minimum, and maximum values were used in the research data. The normality of the distribution of quantitative data was checked using the Shapiro-Wilk test and chart examinations. Normally distributed quantitative variables were compared between two groups using the Student's t-test and non-normally distributed quantitative variables using the Mann-Whitney U test. Non-normally distributed quantitative variables were compared between more than two groups using the Kruskal-Wallis test and the Dunn-Bonferroni test. Qualitative data was compared using Pearson's chi-square tests, Fisher's exact tests, and the Fisher-Freeman-Halton test. A Spearman's correlation analysis was performed to determine correlations between quantitative variables. Statistical significance was defined as p-values less than 0.05.ANCSS 11 (Number Cruncher Statistical System, 2017 Statistical Software) software and MedCalc Statistical Software version 18 were used in our analysis. (MedCalc Software Bvba, Ostend, Belgium; http://www.medcalc.org; 2018).

Results

The study was completed with 152 mothers. Of those, 90 had a child diagnosed with ADHD (the ADHD group), and 62 had a child with no psychiatric or chronic disease (control group). The mean age of the participating mothers was 37.2±5.4 years, ranging between 28 and 50 years. The two groups were similar in terms of age, education, employment status, monthly family income, number of children, and presence of physical medical diseases ($p>0.05$). No difference was observed between the ADHD and control groups in terms of their socio-demographic characteristics (Table 1).

The correlation between the scores of CPRS-RL and maternal self-reports revealed that there was a significant positive correlation between children's oppositional scores and mothers' BAI and ASRS scores ($p<0.05$). A significant positive correlation was also determined between hyperactivity-impulsivity scores in children and ASRS scores in mothers ($p<0.05$). Anxious-shy scores in children were significantly positively correlated with mothers' BAI and scores ($p<0.05$). A significant positive correlation was also observed between children's social problems scores and mothers' BAI, BDI, ASRS, and MAS scores ($p<0.05$) (Table 2).

Social problems in children impacted adversely on all the parameters we evaluated in mothers. A significant positive correlation was observed between children's psychosomatic scores and mothers' BAI and ASRS scores, and a negative correlation with mothers' MAS scores ($p<0.05$). A significant correlation was determined between children's restless-impulsive scores and mothers' BAI, BDI, ASR, and MAS scores ($p<0.05$). Children's emotional lability scores were significantly positively correlated with mothers' BAI, BDI, and ASRS scores ($p<0.05$). Total Conners' global index scores were

Table 1. Comparison of the socio-demographic characteristics of the ADHD and control groups				
		ADHD	**Control**	**P-value**
Age	Mean ± SD Min.-Max. (Median)	37.18±5.53 28-49 (37)	37.28±5.33 28-50 (37)	[a]0.775
		n (%)	**n (%)**	
Educational level	Primary school	56 (62.2)	38 (61.3)	[b]0.055
	Middle school	18 (20.0)	20 (32.3)	
	University	16 (17.8)	4 (6.4)	
Employment status	Not working	68 (75.6)	42 (67.7)	[c]0.077
	In regular employment	18 (20.0)	20 (32.3)	
	Frequently change jobs	4 (4.4)	0 (0.0)	
Monthly family income	<MW	16 (17.8)	12 (19.4)	[b]0.316
	1-2 MW	64 (71.1)	38 (61.3)	
	≥2 MW	10 (11.1)	12 (19.4)	
Number of children in the family	1	24 (26.7)	18 (29.0)	[c]0.818
	2	44 (48.9)	26 (41.9)	
	3	20 (22.2)	16 (25.8)	
	4	2 (2.2)	2 (3.2)	
Physical disease	Absent	80 (88.9)	58 (93.5)	[b]0.329
	Present	10 (11.1)	4 (6.5)	
Previous psychiatric admissions	Absent	60 (66.7)	58 (93.5)	**[b]0.001**
	Present	30 (33.3)	4 (6.5)	

[a]Student's t-test, [b]Pearson chi-square test, [c]Fisher-Freeman-Halton exact test
Bold values denote statistical significance at the p<0.05 level
MW: Minimum wage, ADHD: Attention deficit hyperactivity disorder, SD: Standard deviation, Min.: Minimum, Max.: Maximum

significantly correlated with mothers' BAI, BDI, ASRS, and MAS (p<0.05). Inattention scores from the DSM-IV symptom subscale were significantly correlated with mothers' BAI and ASRS scores, hyperactivity-impulsivity scores with ASRS, and total scores with BAI and ASRS (p<0.05). No correlation was found between children's Conners' global ındex scores, age, comorbid behavioral disorder, or number of children in the family and mothers' BAI, BDI, ASRS, or MAS scale scores (p≥0.05) (Table 2).

BAI, BDI, and ASRS were significantly higher (p=0.005, p=0.001, p=0.043, respectively) and MAS scores (p=0.001) were significantly lower in the ADHD group than in the control group (Figure 1).

Correlation analysis between mothers' self-report scales in the group of mothers with ADHD showed that ASRS scores were positively correlated with BAI and BDI scores (p<0.05). Anxiety and depression levels increased in line with the mothers' ADHD scores. Anxiety and depression levels in mothers were also significantly positive correlated with one another (p<0.05). MAS scores were negatively correlated with ASRS, BAI, and BDI scores (p<0.05). Marital adjustment decreased as mothers' anxiety, depression, and ADHD symptoms increased (Table 3).

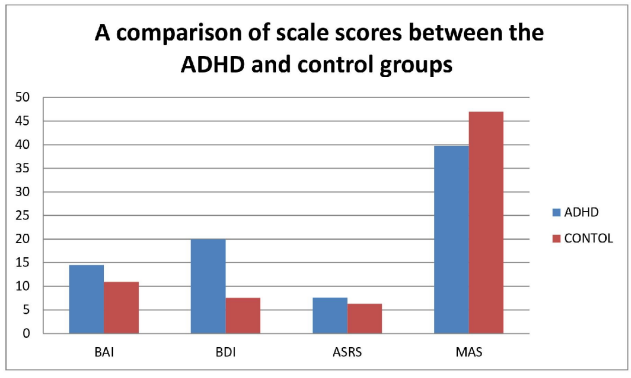

Figure 1. Comparison of scale scores between the ADHD and control groups
BAI: Beck anxiety inventory, BDI: Beck depression inventory, ASRS: Adult ADHD self-report scale, MAS: Marriage adjustment scale, ADHD: Attention deficit hyperactivity disorder

Discussion

This study examined the mothers of children with ADHD to determine their marital adjustment, emotional problems, and ADHD symptom levels and the relationships of these parameters with each other and with their offspring's behavioral problems. The study findings confirmed our original hypothesis; mothers of

Table 2. Distribution of CPRS-RL scores in the ADHD group, and correlation with maternal scale scores

Children's CPRS-RL scale score distribution			Correlation with mothers' scale scores			
		Mean ± SD Min.-Max. (Median)	BAI r p	BDI r p	ASRS r p	MAS r p
CPRS-RL	**Oppositional**	23.04±10.20 0-43 (24)	0.239 **0.023**	0.131 0.220	0.217 **0.040**	-0.162 0.127
	Cognitive problems	11.71±6.20 0-23 (11)	0.204 0.053	0.049 0.648	0.118 0.270	-0.135 0.203
	Hyperactivity-impulsivity	11.98±5.64 0-26 (12)	0.163 0.125	0.140 0.190	0.292 **0.005**	-0.176 0.096
	Anxious-shy	13.24±5.02 2-23 (14)	0.241 **0.022**	0.185 0.081	0.222 **0.036**	-0.154 0.147
	Perfectionism	3.64±2.28 0-8 (3)	0.159 0.135	0.106 0.319	0.103 0.335	-0.027 0.799
	Social problems	9.58±4.42 1-18 (9)	0.282 **0.007**	0.253 **0.016**	0.254 **0.016**	-0.229 **0.030**
	Psychosomatic	18.67±7.21 0-32 (20)	0.273 **0.009**	0.168 0.114	0.299 **0.004**	-0.250 **0.017**
Conners' ADHD index		3.04±2.96 0-11 (2)	0.246 **0.020**	0.263 **0.012**	0.166 0.118	-0.195 0.065
Conners' global index	**Restless-impulsive**	3.96±3.26 0-13 (3)	0.287 **0.006**	0.329 **0.002**	0.255 **0.015**	-0.243 **0.021**
	Emotional lability	5.62±3.54 0-18 (5)	0.251 **0.017**	0.246 **0.019**	0.303 **0.004**	-0.166 0.118
	Total score	6.07±3.69 0-17 (6)	0.347 **0.001**	0.333 **0.001**	0.231 **0.029**	-0.228 **0.031**
DSM-IV symptom subscale	**Inattention**	11.00±6.14 0-24 (11)	0.266 **0.011**	0.186 0.079	0.245 **0.020**	-0.131 0.217
	Hyperactivity- impulsivity	14.91±7.77 0-32 (14)	0.161 0.130	0.142 0.183	0.257 **0.015**	-0.190 0.072
	Total score	12.20±5.99 0-28 (12)	0.285 **0.007**	0.198 0.061	0.232 **0.028**	-0.102 0.337
AGE		125.04±26.40 84-204 (120)	-0.017 0.876	-0.042 0.696	0.051 0.633	-0.188 0.076
Number of children		1 24 (26.67) 2 44 (48.89) 3≤ 22 (24.44)	[e]0.487	[e]0.051	[e]0.650	[e]0.329

[e]Kruskal-Wallis test, [d]Mann-Whitney U test, r= Spearman's Correlation Coefficient, bold values denote statistical significance at the p<0.05 level
CPRS-RL: Conners' parent rating scale long form-revised, ADHD: Attention deficit hyperactivity disorder, DSM-IV: Diagnostic and statistical manual of mental disorders, fourth edition, BAI: Beck anxiety inventory, BDI: Beck depression inventory, ASRS: Adult ADHD self-report scale, MAS: Marriage adjustment scale, CGI: Clinical global impression SD: Standard deviation, Min.: Minimum, Max.: Maksimum

children diagnosed with ADHD were found to possess lower marital adjustment scores, and greater anxiety, depression, and ADHD symptoms. Marital adjustment was also correlated with levels of problem behaviors in children, in addition to mothers' anxiety, depression, and ADHD symptoms.

Previous studies have observed that behavioral/emotional problems in children with ADHD adversely impact mothers' parental stress levels (27,28). This situation is reciprocal, and parental stress can negatively affect ADHD symptoms in the child (29,30). Behavioral disturbances in children with ADHD have been shown to be associated with maternal depression, and these behavioral problems also adversely affect parenting (31,32). Most studies have shown higher depressive findings in mothers of children with ADHD compared to mothers of children without ADHD (11,33,34). Additionally, children of depressive mothers exhibit more behavioral problems than those of non-depressive mothers (35). Mothers of children with ADHD exhibit significantly higher anxiety scores than the mothers of typical-developed children (11). It was also found that there was a significant positive relationship between the ADHD symptoms of the children and the severity of the mother's anxiety symptoms (36). High anxiety in parents of children with ADHD adversely affects child and parent interaction (less parental warmth,

less positive participation, negative discipline, and social problems) (34,37). Similarly, this study demonstrated that mothers of children with ADHD exhibited greater depressive and anxious symptoms than mothers of children without ADHD, and their anxiety and depression exacerbated their offspring's behavioral problems. Maternal depression and anxiety have previously been reported not to be associated with the level of hyperactivity symptoms in children diagnosed with ADHD (38). However, findings similar to those of this research are more common in studies with a higher impact power in the literature. There is a clear relationship between ADHD-related problem behaviors in children and maternal depression and anxiety. We think that, by their nature, these relationships can result in adverse outcomes for both mother and child. Additionally, similar to Kashdan et al. (37), correlation analysis revealed that the effects of these anxiety and depression scores in mothers produced an adverse effect on one another. We believe that this is associated with the increased psychological burden on mothers.

Higher inattention/cognitive problems/hyperactivity/irritability/impulsivity and emotional indecision and lower self-esteem have been shown in the parents of children with ADHD compared with parents of children without ADHD (39). It has been reported that maternal ADHD may be associated with ADHD in children in later years due to its mediating effects (40). Additionally, ADHD is considered an inherited disorder in which genes play a role in its pathogenesis (41). The mothers of children with ADHD exhibit higher clinical levels of ADHD symptoms than those of children without ADHD (27,34). Additionally, increased maternal ADHD symptoms have been linked to a greater severity of ADHD symptoms, emotional problems, and peer problems in children (42). Similarly, in this study, the mothers of children with ADHD reported higher ADHD findings, and maternal ADHD symptom levels were positively correlated with child ADHD. This finding of this study is consistent with previous studies examining familial clustering of ADHD.

Table 3. Evaluation of the relationship between scale scores

		BAI	BDI	ASRS	MAS
BAI	**r** **p**	–	0.709 **0.001**	0.497 **0.001**	-0.477 **0.001**
BDI	**r** **p**	0.709 **0.001**	–	0.400 **0.001**	-0.437 **0.001**
ASRS	**r** **p**	0.497 **0.001**	0.400 **0.001**	–	-0.383 **0.001**
MAS	**r** **p**	0.477 **0.001**	-0.437 **0.001**	-0.383 **0.001**	–

r= Spearman's Correlation Coefficient, bold values denote statistical significance at the p<0.05 level
BAI: Beck anxiety inventory, BDI: Beck depression inventory, ASRS: Adult ADHD self-report scale, MAS: Marriage adjustment scale, ADHD: Attention deficit hyperactivity disorder

The parenting and communication established by a parent with ADHD symptoms with a child diagnosed with ADHD have been reported to be frequently perceived negatively by the other partner (43). ADHD symptoms in mothers may compromise not only mother-child interactions, but also marital adjustment by impairing the partner relationship. In this study, increased ARDS scores in mothers were negatively correlated with MAS scores. Consistent with previous studies (44,45), this result shows that maternal ADHD adversely impacts on marital adjustment. Additionally, this study showed that in children with ADHD, higher levels of behavioral problems adversely affected marital adjustment in their parents. Wymbs (46). previously reported that disruptive behavior in children deteriorated adjustment among parents. It seems that ADHD symptoms in both the mother and her offspring appear to have adversely affected marital adjustment.

Study Limitations

One limitation of this study was its cross-sectional nature. The investigation of the relationships examined in longitudinal studies with larger sample groups will yield stronger results. Additionally, although this study focused solely on the effects of ADHD, other comorbid psychiatric disorders are observed in many children diagnosed with ADHD in clinical practice. We believe that further studies that also include the parents of children with ADHD and other comorbid disorders will contribute to the significance of this field. The strength of our study is that we could evaluate many factors together in a large clinical group. Although some of these parameters have been studied one by one before, the fact that we have examined the relationship between them increases the value of the study.

Conclusion

This study revealed that the mothers of children diagnosed with ADHD have greater anxiety, depression, and adult attention deficit symptoms and lower marital adjustment than the mothers of children without ADHD. Problem behavior in children with ADHD was associated with increased anxiety, depression, and adult attention deficit symptoms in mothers, and with decreased marital adjustment. Considering potential psychiatric symptoms in mothers when intervening in children with ADHD will be beneficial to avoid negative outcomes for both the child and mother.

Ethics

Ethics Committee Approval: Approval for the study was granted by the University of Health Sciences Turkey, Bakirkoy Dr. Sadi Konuk Training and Research Hospital

Clinical Research Ethical Committee (no. 2020-21-14, dated: 19.10.2020).

Informed Consent: Written and verbal consent were obtained from all participants.

Peer-reviewed: Externally and internally peer-reviewed.

Authorship Contributions

Concept: S.Y, F.A.K., T.K., Design: S.Y, F.A.K., T.K., Data Collection, or Processing: S.Y, F.A.K., T.K., Analysis, or Interpretation: S.Y, F.A.K., T.K., Literature Research: S.Y, F.A.K., T.K., Writing: S.Y, F.A.K., T.K.

Conflict of Interest: No conflict of interest was declared by the authors.

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