RESEARCH

Depressive symptoms and coping patterns in a sample of Egyptian mothers of ADHD children

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Abstract

Background Attention-deficit/hyperactivity disorder (ADHD) is considered to be one of the most common neurodevelopmental conditions found in children. The global prevalence in the age group 6–17 years falls between 2 and 18%. Studies have found that mothers of ADHD children are more prone to experience depression, anxiety, social isolation, stress, and self-blame.

Aims and objectives To assess the prevalence of depression and its severity among mothers with children found to have ADHD compared to mothers of the control group, we also investigate the coping mechanisms employed by mothers with ADHD children and identify any potential correlation between coping strategies utilized by mothers in the case group and the severity of depression.

Patients and methods In this cross-sectional study, we recruited 100 participants from the outpatient child psychiatry clinic at Ma'amoura Psychiatric Hospital in Alexandria, Egypt. Two participant groups were assembled: Group I (case) consisted of 50 mothers whose children had ADHD, and Group II (control) consisted of 50 mothers whose children did not have ADHD. Both groups underwent the General Health Questionnaire (GHQ-28), Beck Depression Inventory (BDI-II), and Coping Orientation to Problems Experienced (COPE) inventory.

Results A significant relationship was observed between the Beck Score and hyperactive and combined ADHD types; however, no significant correlation was found between the Beck Score and the inattentive ADHD type. Regarding the coping styles with stress, the current study's results found that in (case group) turning to religion had the highest sub-scale mean, followed by seeking social support and emotional support, while the lowest sub-scale score mean was humor, followed by denial. By employing univariate logistic regression analysis to identify depression predictors in group I, the results showed that the increase in the score of less useful coping by 1 was a probable factor to increase the possibility of depression by OR = 1.438 (1.186–1.743). Combined and hyperactive ADHD types were found to increase the risk of depression by OR 6.706 (1.309–34.353).

Conclusion Depressive complaints were more prevalent among mothers of children with ADHD compared to the control group. We found a statistically important relationship between Beck Depression Scores (depressive symptom severity) in mothers with ADHD children and having hyperactive or combined ADHD types in their children. We also found a statistically significant positive correlation between the severity of depression and some coping styles as turning to religion and seeking social support.

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Introduction

Attention-deficit/hyperactivity disorder (ADHD) is considered a neurodevelopmental disorder with a chronic course, impacting individuals of all ages, including infants and adults. Developmentally unsuitable levels of hyperactivity, inattention, and impulsivity are commonly observed in children diagnosed with ADHD [17]. One of the most common neurodevelopmental conditions in kids is ADHD. The global prevalence of this illness among children and adolescents aged 6–17 years falls between the range of 2 and 18% [7].

Studies have discovered that caregivers of children who are diagnosed with ADHD have a substantial care load [5, 12, 39] and high parenting stress. It has also been found that mothers of children diagnosed with ADHD are more likely to feel anxiety, depression, social isolation, stress, and self-blame, which necessitates that these caregivers be provided with a solid support system for long-term coping [29, 34].

The "predisposition-stress" model suggests that individuals with a genetic predisposition to depression develop the disease due to stressful life events. Stressful events in life, such as loss or overstrain, can trigger or worsen depression depending on one's personality type. The association between stress and depression is not one-way since stressful situations and coping mechanisms might predispose to mood disorders.

The onset and course of depression are influenced by coping strategies, as negative emotional states can narrow attention spans, reduce flexibility and creative thinking, and limit effective coping in stressful situations. This leads to a deterioration in the quality of life and health status [23, 27, 31].

Human functioning is determined by an individual's coping mechanisms with stress. "Coping" is defined as the act of modifying one's cognitive and behavioral strategies in order to effectively handle psychological stress [16]. According to the interactional model, coping is considered a dynamic process in which the person, the stressor, and the environment engage in an ongoing exchange [18]. When considering the practical function of coping in the face of stressors, it has been stated that adaptive coping mechanisms alleviate stress by affecting an individual's subjective perception of their own condition, similar to how a healthy immune system restores equilibrium in the body [13, 40].

The objective of this research is to study whether a correlation existed between the severity of depression and the coping strategies utilized by mothers in the case group. In addition, the prevalence as well as the severity of depression were compared between mothers of ADHD children and those in the control group.

Patients and methods

In the outpatient child psychiatry clinic at Ma'amoura Psychiatric Hospital, Alexandria, Egypt, we recruited 100 participants between September 2021 and March 1, 2022, for the purpose of conducting this comparative cross-sectional study. Two groups of participants were assembled: Participating female employees (mothers) of El-Mamoura Psychiatric Hospital comprised Group II (control) and Group I (case): 50 moms whose children appeared to be healthy and 50 mothers whose children had ADHD, socio-demographically matched with the case group.

Inclusion criteria

The inclusion criteria for children in the case group were as follows: they had to be Egyptian natives, have an intelligence quotient (IQ) of at least 90, and be between the ages of 6 and 12, both males and females. Conners Parent Rating Scale-Revised, long version (CPRS-R-L) was used to diagnose ADHD. For mothers in the case group, they had to be Egyptian citizens and live with the patient continuously.

Exclusion criteria

The exclusion criteria for children in both the case group and the control group included the absence of psychiatric disorders other than ADHD, determined through the use of the Kiddie Schedule for Affective Disorders and Schizophrenia, present and lifetime version (K-SADS-PL). Additionally, children with comorbid chronic general medical disorders or an IQ below 90 were excluded from the study. Additionally, in the control group (children), exclusion criteria involved confirming the absence of ADHD using the Conners Parent Rating Scale-Revised, long version (CPRS-R-L). Furthermore, children with chronic general medical illnesses or an IQ below 90 were excluded from both the case and the control group. Also, in both the case and the control group mothers, we excluded mothers who provided care for another family member with either a general medical condition or a mental disease, mothers with a history of psychiatric disorders before having an ADHD child or those currently experiencing acute or chronic general medical conditions in order to minimize confounding variables.

Sampling method
Convenience sampling
Sample size

According to calculations of Ain Shams University's Department of Community, Environmental, and Occupational Medicine, with 80% power and 5% alpha error, the Power Analysis and Sample Size software (PASS11) tool was used for sample size calculation. We calculated that we required a minimum of 50 participants, 25 in each group. We recruited 50 women for the case group and 50 women for the control group.

Ethical consideration

The Mental Health and Addiction Treatment General Secretariat gave its approval for the study. The study was created to follow the guidelines determined by the Ain Shams University's Research Ethics Committee and their approval for the study was granted. The Ethical Committee of Ain Shams University's Neuropsychiatry Department also gave its approval to the study. After providing a comprehensive elucidation of the study's objectives, methods, and risks, as well as reassurances that participation is entirely voluntary, that there would be no direct benefits to the patient or his family, and that without explanation, the patient may resign from the study at any time, that they will be kept fully informed about the study's identity, research team, procedures, risks, and benefits, and that their personal information will be protected in any written or published data derived from the study, we obtained written informed consent from each patient.

Methods
Study tools

I. For children

1. Conners Parent Rating Scale-Revised, long version CPRS-R-L [10]. The Arabic version was used [15].

It is a screening questionnaire that parents are supposed to fill with paper and pencil to help determine whether their children, who range in age from 3 to 17, may have ADHD. There are 80 questions in all, with four options for each. On the CPRS-R-L, a patient is considered to have a substantial pathology if their T-score is greater than 65. The kind and diagnosis of ADHD were verified using this scale.

2. Stanford–Binet Intelligence Scale—Fifth Edition [32]

The Arabic version used was validated and translated [1]: Stanford–Binet (SB-5) is a commonly used standardized intelligence scale that measures a variety of intellectual qualities. SB-5 is appropriate for individuals as young as 2 years old. There are ten subcategories that encompass both verbal and nonverbal aspects. This assessment incorporates five more factors: quantitative reasoning, working memory, fluid reasoning, visual-spatial processing, and knowledge. Each verbal subtest has a nonverbal equivalent for all criteria. These nonverbal actions include movement responses like pointing and creating manipulators. These parallels were used to handle language-reduced judgments in multicultural communities. It was used to rule out children with IQs below 90.

3. The Kiddie Schedule for Affective Disorders and Schizophrenia, Present and Lifetime version (K-SADS-PL) [26]

The translated and validated Arabic version was utilized [28]*:* This is a diagnostic interview designed to clarify the diagnosis and rule out any other comorbidities. A single interviewer records information from both parents and children on a shared answer sheet in this semi-structured integrated parent–child interview. This makes it possible to compare the two informants' responses and ask pointed questions about any differences. Next, by combining the data from the parents and children, diagnoses are obtained. A 0-to-3-point rating scale is used to assign scores to the K-SADS-PL items. Scores of 0 show that information is not available, scores of 1 indicate that the symptom does not exist, scores of 2 show sub-threshold levels of symptoms, and scores of 3 reflect threshold criteria. It was used to rule out other mental comorbidities other from ADHD.

II. For mothers

1) General Health Questionnaire (GHQ-28) [22]. The Arabic version [30] was used.

In order to help guide future action, this self-administered questionnaire is a perfect screening tool for diagnosing non-psychotic and mild psychiatric problems. It is separated into four smaller scales. These are the following: questions 1 to 7 are somatic symptoms; questions 8 to 14 are anxiety/insomnia; questions 15 to 21 are social dysfunction; and finally questions 22 to 28 are severe depression. The completion time is less than 5 min. It was applied to moms in both groups as a screening instrument for possible mental health issues.

2) Beck Depression Inventory (BDI-II) [3]

The Arabic version was administered to mothers of both groups [21]: It is a commonly utilized self-report

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tool with acceptable psychometric features. It consists of 21 items each. It was used to assess the participants' depression diagnoses and severity. The 21 items on symptoms of depression are summed together to get a single BDI-II score. Each item has a 4-point scale that ranges from 0 to 3. On two items (16 and 18), there are seven options for indicating whether appetite and sleeping have been increasing or decreasing. Cut score guidelines for the BDI-II are given, with the suggestion that thresholds be adjusted based on sample characteristics and the intended use of the BDI-II. A score of 0–13 is considered minor, 14–19 is mild, 20–28 is moderate, and 29–63 is severe. The Beck Depression Inventory (BDI) has been used for 35 years for the detection and measurement of depressive symptoms, and it has proven to be exceptionally reliable across all groups. It has a high coefficient alpha (0.80), construct validity has been established, and it can distinguish between depressed and non-depressed people. It was also used to assess the severity of depressive symptoms.

3) COPE-Inventory [6]: The Arabic version [2] was used for mothers (case group). It was used to assess different patterns of coping in them. The original form of the inventory consisted of 15 styles to face the pressures of life. The Arabic-translated version has 14 items only excluding the coping method item of using alcohol and stimulants (substance use) as it is inconsistent with the religion. The 14 coping styles are categorized into four dimensions:

- Problem-focused: active-coping, planning, suppression of competing, restraint-coping, instrumental social support
- Emotion-focused: positive reinterpretation, acceptance, denial, turning to religion, emotional social support
- Less useful: focus on and venting emotions, behavioral disengagement, and mental disengagement
- Recently developed: humor

A low score in each method implies a low use of coping, and a high score means a high use of the method of dealing with stress. It was used to assess the type of coping used by mothers.

Study procedures
Mothers of both groups were screened using the General Health Questionnaire (GHQ-28). All enrolled mothers underwent two assessment meetings: The first assessment included a semi-structured sheet

for the demographic (age) and clinical data (duration of illness) of the children in the case group only, and the diagnosis of attention-deficit/hyperactivity disorder (ADHD) in children was confirmed using the Conners Parent Rating Scale-Revised, long version (CPRS-R-L). The study ruled out children who had additional comorbidities by employing the present and lifetime versions of the Kiddie Schedule for Affective Disorders and Schizophrenia (K-SADS-PL). Additionally, children with an intelligence quotient (IQ) of less than 90 were excluded using the Stanford–Binet Intelligence Scale, Fifth Edition. The second evaluation included a semi-structured form for collecting demographic data like marital status, age, educational level, employment, place of residence, current history of another general medical disease, and family history of mental disorders in the mothers in both the case and control groups. Additionally, using the Beck Depression Inventory (BDI-II), symptoms of depression in mothers were assessed. Finally, the coping methods of mothers of ADHD children were evaluated using the COPE inventory.

Results
There was no statistically significant difference in marital status or residence across the study groups. There were statistically significant differences among the study groups in terms of employment, age, and education (p value more than 0.05) (Table 1).

The sample as a whole consisted solely of individuals who reported hypertension; no general medical history was found to be statistically significant between the two categories. (Table 2).

The case group comprised children spanning in age from 6.0 to 11.0 years, with a mean age of 8.96 ± 1.62 years. In relation to the duration of illness experienced by those children, it varied from 6 months to 5 years, with an average of 2.35 ± 1.34 years (Table 3).

No statistically significant variation was seen among mothers who suffered from depression and those who did not regarding the scores of problem-focused, emotional-focused, and humor-focused. Furthermore, a statistically significant disparity was found in the mean and standard deviation of the usefulness scores of mothers who were not depressed (25.90 ± 5.17) and moderately depressed (35.29 ± 4.23) (Table 4).

The means and standard deviations of COPE subscales are shown in (Table 5), and we found that in (case group) turning to religion sub-scale had the highest mean (13.40 ± 1.85), followed by social support, with a mean (12.66 ± 2.29), and emotional support, with a mean

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Table 1 Distribution of the sociodemographic data in each group

Demographic data	Group I (n = 50)		Group II (n = 50)		p value
	No.	%	No.	%	
Marital status					
Married	47	94.0	49	98.0	
Divorced	2	4.0	1	2.0	0.502
Widow	1	2.0	0	0.0	
Education					
Illiterate	1	2.0	0	0.0	
Read and write	3	6.0	0	0.0	
Primary school	5	10.0	4	8.0	0.005
Preparatory school	10	20.0	3	6.0	
High school	5	10.0	0	0.0	
Institute	15	30.0	19	38.0	
College	11	22.0	24	48.0	
Occupation					
Housewife	26	52.0	0	0.0	
Clerk	10	20.0	25	50.0	< 0.001*
Manual	9	18.0	8	16.0	
Professional	5	10.0	17	34.0	
Residence					
Urban	35	70.0	39	78.0	0.361
Rural	15	30.0	11	22.0	
Age (years)					
Min.–max	26.0–45.0		26.0–45.0		
Mean ± SD	36.68 ± 5.12		34.58 ± 4.87		0.03
Median (IQR)	38.0 (32–40)		35.0 (30–38)		

χ^2 chi-square test, *MC* Monte Carlo, *t* Student *t*-test, *p* p value for comparing between Group I and Group II

Group I (cases), Mothers of ADHD children; Group II (control), Mothers of apparently healthy children

* Statistically significant at $p \leq 0.05$

(12.10 ± 2.87), while we found that humor and denial had the lowest scores among subscales with a mean (6.48 ± 2.72) and (7.94 ± 2.21), respectively.

We could find a statistically significant correlation among the Beck Score and the hyperactive and combined ADHD varieties. However, no such correlation was found between the Beck score and the inattentive ADHD type (Table 6).

By employing univariate logistic regression analysis to identify depression predictors in group I, the results showed that the increase in the score of less useful coping by 1 was a probable factor to increase the possibility of depression by OR = 1.438 (1.186–1.743). According to combined and hyperactive ADHD types, they were found to increase the risk of depression by OR 6.706 (1.309–34.353) (Table 7).

By using the chi-square test results of the Beck Depression Inventory, it was found that the case group reported higher levels of mild depressive symptoms (28% versus 12%) and moderate depressive symptoms (14% versus 6%), and the control group had higher scores of no depressive symptoms (82% versus 58%) Fig. 1.

Discussion

Attention-deficit hyperactivity disorder, a pediatric disorder with early onset, is distinguished by hyperactivity, attention deficits, and impulsivity. The incidence of this illness among school-aged children is 3–5%. Children's behaviors are proven to directly affect parents and increase their distress. Interaction between parents and children has been shown to be bidirectional, with a poor home climate worsening the prognosis of ADHD [4].

Coping can be defined as one's resistance to events or situations that cause distress for them. When a person is unable to meet psychological, physical, and social expectations, he or she is required to create a variety of coping mechanisms in an attempt to decrease and/or eliminate the disorder's negative repercussions. Coping behaviors are subcategorized into three types: problem-focused, emotion-focused, and dysfunctional [11].

The primary goal of this research is to determine the rate of occurrence of depressive symptoms in a sample of mothers with ADHD children, as well as to assess various stress-coping strategies used by those mothers and compare these variables to those found in mothers with apparently healthy children (control group).

The main results of our study were as follows:

Table 2 Distribution of general medical history in each group

General medical history	Group I (n = 50)		Group II (n = 50)		χ^2	^{MC}p
	No.	%	No.	%		
Negative	43	86.0	44	88.0	0.291	1.000
HTN	5	10.0	4	8.0		
Type 2 DM	2	4.0	2	4.0		

χ^2 chi-square test, *MC* Monte Carlo, *p* p value for comparing between Group I and Group II

Group I (cases), Mothers of ADHD children; Group II (control), Mothers of apparently healthy children

Table 3 Descriptive analysis of the cases examined according to age of child and duration of illness for case group ($n = 50$)

	Min.–max.	Mean ± SD.	Median (IQR)
Age of child (years)	6.0–11.0	8.96 ± 1.62	9.0 (8.0–10.0)
Duration of illness (years)	0.50–5.0	2.35 ± 1.34	2.0 (1.0–3.0)

SD standard deviation, *IQR* inter quartile range

Group I (cases), Mothers of ADHD children

The average age of children diagnosed with ADHD was 8.96 ± 1.62 years, with a range between 6.0 and 11.0 years. The sickness duration ranges between 6 months and 5 years, with an average of 2.35 ± 1.34. The Beck Depression Inventory results revealed that the case group mothers reported higher levels of mild depressive symptoms (28% versus 12%) and moderate depressive symptoms (14% versus 6%), while the control group had higher scores of having no depressive symptoms (82% versus 58%) than the control group. A statistically significant difference in the intensity of depression between the two groups ($p = 0.032$) was found with moms of ADHD children reporting elevated levels of depressive symptoms than found in the control group.

Various research carried out in different societies and cultures demonstrated that moms of children diagnosed with ADHD showed elevated levels of depression than mothers of healthy children [4, 14, 20, 35, 38].

It is well known that mothers of children diagnosed with ADHD encounter more stress in their parenting duties than mothers of normal children. Shata et al. [36] found that increasing parenting stress disturbs the parent–child relationship and has a detrimental influence on parenting behaviors. Parental psychopathology has a key role in understanding parenting strategies in ADHD households [37].

Gerdes et al. [19] found that moms endure life circumstances that they cannot control and rate parenting stress as severe. They claimed that experiencing unpredictable life events and, as a result, higher stress caused mothers to be insensitive to their children's poor behavior. This reduces the mother's problem-solving skills while also raising her depression symptoms.

The relationship between ADHD and mother depression can be best described using a developmental-transactional paradigm, in which maternal depressed symptoms and child disruptive behavior impact one another. Mothers of ADHD children may experience depression symptoms as a result of reduced environmental reinforcement for child misbehaving. Similarly, parental depression can make it difficult to effectively manage

Table 4 Relation between Beck Score (severity of depression) and the main coping parameters in the case group ($n = 50$)

	Beck Score (severity of depression)				Test of sig.	*p*
	Normal ($n = 29$)	Mild ($n = 14$)	Moderate ($n = 7$)	Severe ($n = 0$)		
Problem focused						
Min.–max	41.0–67.0	34.0–67.0	36.0–63.0	–	$H = 2.236$	0.327
Mean ± SD	56.52 ± 6.02	51.29 ± 10.65	54.0 ± 9.87			
Median	57.0	49.5	55.0	–		
Emotional focused						
Min.–max	44.0–65.0	42.0–67.0	48.0–63.0	–	$F = 1.554$	0.222
Mean ± SD	57.52 ± 5.84	54.14 ± 8.51	54.14 ± 5.79	–		
Median	59.0	55.5	54.0	–		
Less useful						
Min.–max	18.0–36.0	27.0–41.0	29.0–41.0	–	$F = 21.911^*$	$< 0.001^*$
Mean ± SD	25.90 ± 5.17	35.29 ± 4.23	34.71 ± 4.57	–		
Median	25.0	36.0	33.0	–		
Sig.bet.Grps	$p_1 < 0.001^*$, $p_2 < 0.001^*$, $p_3 = 0.965$					
Humor						
Min.–max	4.0–14.0	4.0–11.0	4.0–10.0	–	$H = 1.672$	0.434
Mean ± SD	6.79 ± 2.86	5.93 ± 2.62	6.29 ± 2.50	–		
Median	6.0	4.50	6.0	–		

F, F for One-way ANOVA test, pairwise comparison between the 2 groups was done using post hoc test (Tukey); *H*, H for Kruskal–Wallis test; *p*, *p* value for comparing between the studied groups; *p₁*, *p* value for comparing between normal and mild; *p₂*, *p* value for comparing between normal and moderate *p₃*, *p* value for comparing between mild and moderate; *SD* standard deviation

Group I (cases), Mothers of ADHD children

* Statistically significant at $p \leq 0.05$

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Table 5 Descriptive analysis according to coping parameters for case group (*n* = 50)

	Min.–max	Mean ± SD	Median (IQR)
Positive interpretation	5.0–16.0	10.74 ± 2.93	11.0 (9–13)
Mental disengagement	4.0–15.0	9.12 ± 2.72	9.0 (47–11)
Focus on and venting emotions	6.0–16.0	11.08 ± 3.24	10.50 (8–14)
Social support	7.0–16.0	12.66 ± 2.29	13.0 (11–14)
Active coping	4.0–14.0	10.52 ± 2.21	10.50 (10–12)
Denial	4.0–12.0	7.94 ± 2.21	8.0 (6–10)
Turning to religion	9.0–16.0	13.40 ± 1.85	14.0 (12–15)
Humor	4.0–14.0	6.48 ± 2.72	6.0 (4–8)
Behavioral disengagement	6.0–16.0	9.56 ± 2.56	9.50 (8–11)
Restraint	6.0–16.0	10.94 ± 2.56	11.0 (9–13)
Emotional support	6.0–16.0	12.10 ± 2.87	12.50 (10–14)
Acceptance	8.0–15.0	11.92 ± 1.85	12.0 (10–14)
Suppression of competing activities	5.0–16.0	11.06 ± 2.29	11.0 (10–13)
Planning	4.0–15.0	9.52 ± 3.32	10.0 (6–12)

child behavior. Given that early parenting and mother depression independently predict unfavorable outcomes for ADHD children, treatment should address both maternal depressive symptoms and parenting to promote long-term functioning in this population [9].

Regarding the relationship between depression severity and the type of attention deficit hyperactivity disorder (ADHD), we managed to find a statistically significant link between depression severity and both hyperactive and mixed ADHD categories.

Other studies could not find a significant relation between ADHD subtypes and depressive symptom severity [14, 24, 38].

Mothers with hyperactive children are more likely to experience stress, social isolation, self-blame, and sadness. Mothers of children with ADHD mixed and inattentive subtypes are less satisfied with their jobs as

parents and frequently experience greater negativity in social situations. They generally feel less competent in their parenting abilities [25].

Regarding the coping styles with stress, the current study's results found that in (case group) turning to religion had the highest sub-scale mean (13.40 ± 1.85), followed by seeking social support mean (12.66 ± 2.29) and emotional support mean (12.10 ± 2.87), while the lowest sub-scale score was humor mean (6.48 ± 2.72) followed by denial mean (7.94 ± 2.21). The results of descriptive analysis of the case group according to the main coping parameters found that emotional-focused coping had the highest mean (56.10 ± 6.76) followed by problem-focused mean (54.70 ± 8.25), while the lowest score was for the humor mean (6.48 ± 2.72).

This can be comprehended by the idea that an increased score of emotion-focused coping such as turning to religion, seeking socio-emotional support, positive reinterpretation, and acceptance of stressors could be used to minimize the negative emotional consequences of stressful circumstances, as mothers may face a variety of stressors when caring for their ADHD children, such as dealing with their children's behaviors, overseeing their children's daily tasks, maintaining family relationships, and asking for social support.

Regarding the relation between depression severity and coping type among the studied mothers (case group), there was a statistically significant difference among the scores of less useful coping styles in mildly depressed mothers (mean ± SD = 35.29 ± 4.23), moderately depressed mothers (mean ± SD = 34.71 ± 4.57), and non-depressed mothers (mean ± SD = 25.90 ± 5.17).

We also observed a statistically significant positive correlation among the severity of depression with the following coping styles: positive interpretation (*p* = 0.002), religious turning (*p* = 0.041), active coping (*p* = 0.001), restraint coping (*p* = 0.001), suppression of competing activities (*p* = 0.001), acceptance (*p* = 0.019), and planning (*p* = 0.001).

Table 6 Relation between Beck Score (severity of depression) and ADHD type in group I (*n* = 50)

ADHD type	Beck Score				χ^2	*p*
	Normal (*n* = 29)		Depression (*n* = 21)			
	No.	%	No.	%		
Hyperactive	3	10.3	3	14.3	0.018	[FE]*p* = 1.000
Inattentive	12	41.4	2	9.5	6.972[*]	0.008[*]
Combined	14	48.3	16	76.2	3.955[*]	0.047[*]

χ^2 chi-square test, *FE* Fisher exact, *p p* value for comparing between the different categories

Group I (cases), Mothers of ADHD children

[*] Statistically significant at *p* ≤ 0.05

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Table 7 Univariate logistic regression analysis for the parameters affecting depression (*n* = 21) for no-depression (*n* = 29) groups in group I (cases)

	Univariate		#Multivariate	
	p	OR (95% C. I)	*p*	OR (95% C.I)
Marital status	1.000	–		
Education	0.310	–		
Occupation	0.177	–		
Residence (urban)	0.097	2.875 (0.826–10.001)		
Age (years)	0.408	1.049 (0.937–1.175)		
Medical history	0.672	–		
Age of child	0.120	1.347 (0.925–1.962)		
Duration of illness	0.153	1.375 (0.888–2.130)		
Problem focused	0.074	0.935 (0.869–1.006)		
Emotional focused	0.085	0.925 (0.846–1.011)		
Less useful	<0.001*	1.438 (1.186–1.743)	0.001*	1.433 (1.164–1.764)
Humor	0.339	0.898 (0.720–1.120)		
ADHD type (combined + hyperactive)	0.022*	6.706 (1.309–34.353)	0.933	1.096 (0.130–9.218)

OR odd's ratio, *C.I* confidence interval, *LL* lower limit, *UL* upper limit

All variables with *p* < 0.05 were included in the multivariate
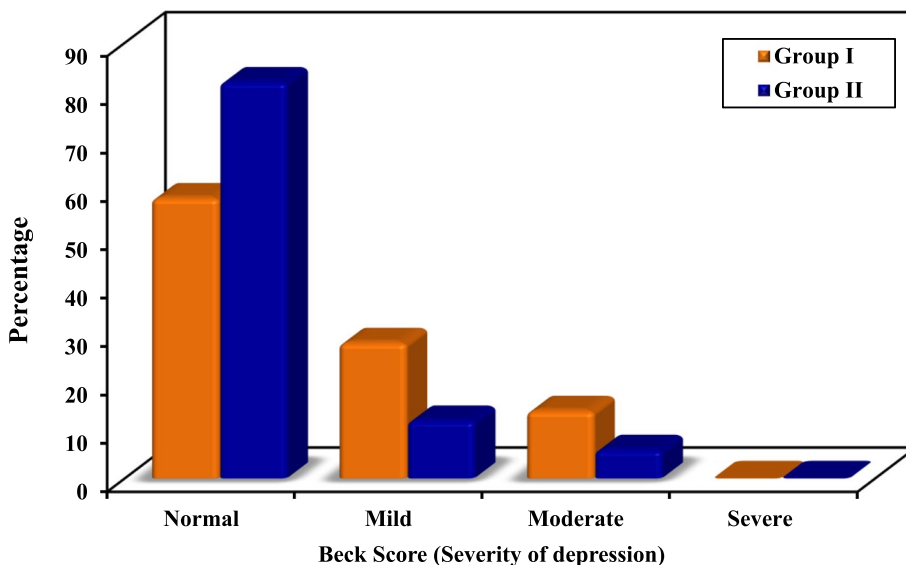
* Statistically significant at *p* ≤ 0.05

Fig. 1 Comparison between the two studied groups according to Beck Score

While we observed no statistically significant distinction in the utilization of humor, emotional-focused coping, or problem-focused coping strategies between depressed and non-depressed mothers, a statistically significant variance was found in the application of less effective coping mechanisms (*p* < 0.001).

Sabry et al. [33] found that spiritual support was used considerably in mild depression, whereas social support and reframing were used significantly in severe depression. This might be regarded as a spiritual enlargement of the meaning of life and disease, assisting mothers in balancing their obligations while caring for their children. Mothers may reconsider the meaning and purpose of life in light of their religious beliefs.

Using univariate logistic regression analysis to identify depression predictors in group I, the findings revealed

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that an increase in the score of less helpful coping techniques might lead to an increased risk of depression by OR = 1.438 (1.186–1.743). They continue to feel useless and are unable to function, and their quality of life suffers due to their poor coping strategies.

Negative coping methods may increase an individual's depression, which may have a detrimental effect on their self-perceived quality of life, which is likely to be higher in the absence of depression. The current study's findings are similar to those of Chou et al. [8], who found that caregivers' early adoption of less efficient coping techniques increased the risk that the individual would acquire depressive symptoms.

Ineffective coping mechanisms, as assessed by the COPE, consist of mental and behavioral disengagement. Behavioral disengagement can be described as a coping strategy in which a person decreases the amount of effort necessary to face a stressor. This may lead to learned helplessness; in spite of all their efforts, caregivers of children with ADHD struggle to properly affect their children's behavior. Individuals who feel helpless typically engage in behavioral disengagement to cope with their stress.

Mental disengagement is defined as a coping method used by people to distract their focus away from the specific behavioral feature or goal that the stressor is preventing. As a coping method, caregivers who use mental disengagement may participate in alternate activities, sleep excessively, or use the Internet or television to take their focus away from the difficulties of parenthood. Behavioral and mental disengagement, which are less effective coping techniques, frequently impede the development of adaptive coping strategies. Therefore, the chances of feeling psychological anguish and sadness are higher.

By employing negative coping mechanisms, people increase their dissatisfaction and failure to cope with their lives, function, and quality of life. These poor coping mechanisms can exacerbate their sadness, and depression can also have an impact on their view of their quality of life, which would likely be higher if they did not have depression.

Finally, our study found no statistically significant difference in sociodemographic variables (including residence, current general medical history, education, marital status, occupation, and family history of psychiatric disorders) between the control and case groups, as indicated by the mothers' sociodemographic data (*p* value > 0.05). A non-significant variation in hypertension was observed among the two categories, and the majority of the sample members lacked a comprehensive medical history aside from that.

Conclusion

There were more depressive complaints from mothers of children with ADHD in comparison to the control group. There was a statistically significant relationship between Beck Depression Scores (depressive symptom severity) in mothers with ADHD children and having hyperactive or combined ADHD types in their children.

Strengths and limitations

➢ Strengths
The findings of this study highlight the significance of evaluating the mental health of mothers and using appropriate interventions for ADHD children as well as for their parents, particularly mothers. It also highlights the conclusion that negative behaviors in children with ADHD are increased as a result of disruption in positive parenting in depressed mothers, which is linked to detrimental consequences for the children and the family as a whole. The acceptable sample size and the use of reliable, valid scales strengthen the reliability of our study.
➢ Limitations
Due to the fact that mothers are typically the primary caretakers, only mothers of children with ADHD were recruited in this study; however, a variety of psychological issues, such as depression, anxiety disorders, marital difficulties, issues with anger management, adult ADHD, and substance use disorders, may affect both mothers and fathers of children with ADHD. Also, the study did not examine multiple factors that may have an impact on the severity of depressive symptoms and the caregiver's coping styles, such as parenting style, marital satisfaction, and socioeconomic stress. Furthermore, the generalization of the results can be limited by the small study sample. The study did not assess the type of treatment received by the child and the patient's adherence and response to it which can be considered confounding factors that may have an effect on the severity of depressive symptoms and coping style used by the mothers.

Abbreviations

ADHD	Attention deficit hyperactivity disorder
GHQ	General Health Questionnaire
BDI	Beck Depression Inventory
COPE	Coping Orientation to Problems Experienced
K-SADS	Kiddie Schedule for Affective Disorders and Schizophrenia
IQ	Intelligence quotient
PASS	Power Analysis and Sample Size Software
CPRS-R-L	Conners Parent Rating Scale-Revised, long version
SB	Stanford–Binet
SD	Standard deviation
IQR	Inter quartile range

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Availability of data and materials

The corresponding author is willing to provide the datasets analyzed during the current study upon reasonable request.

Declarations

Ethics approval and consent to participate

After explaining the study's objectives, all participants provided their informed consent. Our research was created to follow the guidelines developed by the Ain Shams University's Research Ethical Committee and their approval for the study was granted.

Consent for publication

Not applicable.

Competing interests

The authors declare that they have no competing interests.

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