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The Relationship Between Depressive Symptoms, Alexithymia, Emotion Regulation and Empathy in Adolescents with Social Anxiety Disorder

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ABSTRACT

Objective: The aim of our study was to determine the relationship between depressive symptoms, alexithymia, emotion regulation difficulties and empathy in adolescents with social anxiety disorder and to compare the findings with healthy controls.

Method: Our study included a total of 100 adolescents aged 12-18 years, consisting of 50 with social anxiety disorder (SAD) who applied to the child and adolescent psychiatry outpatient clinic between June 2022 and November 2022, and 50 healthy controls. Participants were evaluated with Beck Depression Inventory, Social Anxiety Scale for Adolescents, Toronto Alexithymia Scale, Difficulties in Emotion Regulation Scale and Basic Empathy Scale.

Results: Alexithymia, depressive symptoms and emotion regulation difficulties were significantly higher in adolescents diagnosed with social anxiety disorder compared to healthy controls, but no significant difference was found in empathy skills. The severity of social anxiety disorder was significantly related to depressive symptoms, alexithymia, and emotion regulation difficulties. Logistic regression analysis revealed maternal age, depressive symptoms, and alexithymia as the factors associated with social anxiety disorder in adolescents.

Conclusion: Our study shows that depressive symptoms, alexithymia, and emotion regulation difficulties may be observed in adolescents with social anxiety disorder, and it is important to consider these factors in clinical assessment and intervention processes.

Keywords: Adolescent, alexithymia, depression, empathy, emotion regulation, social anxiety disorder

INTRODUCTION

Social anxiety disorder (SAD) is defined as experiencing significant fear and anxiety in one or more social situations where there is a possibility of being evaluated by others and avoiding these situations (APA 2013). SAD is a significant psychiatric disorder that affects the identity development process and quality of life in adolescents (Gültekin and Dereboy 2011). Although behavioral factors, such as avoidance or safety behaviors, and cognitive factors, such as negative cognition, have been studied in SAD, which is known to be associated with depressive symptoms during adolescence, there are relatively few studies on the accompanying emotional difficulties (Leigh and Clark 2018, Rozen and Aderka 2023). Alexithymia, defined as difficulty identifying and describing feelings, is known to affect social skills and interpersonal relationships and to be a risk factor for the development of emotional problems (Di Tella et al. 2020, Nemiah et al. 1976). The relationship between emotional awareness difficulties and anxiety becomes stronger in younger individuals (Sendzik et al. 2017). A limited number

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of studies conducted on adolescents suggest a positive linear relationship between social anxiety and alexithymia (Buyukbayraktar 2020, Kaur and Kaur 2015).

It is believed that individuals with alexithymia struggle to pay attention to and evaluate their emotions, which may hinder their ability to effectively use emotion regulation strategies (Gross 2015). In addition, the difficulty experienced by individuals with high alexithymia in identifying and expressing their emotions can interfere with the stages necessary for the completion of the empathy process, leading to a deterioration in their empathy skills (Çaka et al. 2018). Studies conducted on adolescents have shown that alexithymia is associated with difficulties in regulating emotions and empathy (Mul et al. 2018, Nalbant et al. 2019, Venta et al. 2013).

Emotion regulation is defined as controlling the initiation and maintenance of emotional processes by regulating the intensity, frequency, and duration of negative emotional experiences (Aldao et al. 2010). Research has shown that individuals with social anxiety experience fewer positive emotions, have difficulty expressing them, and do not dwell on them (Kashdan and Breen 2008, Turk et al. 2005). In challenging situations, individuals with social anxiety struggle to understand their emotions and are overly affected by emotional changes (Dalrymple and Herbert 2007). In adolescents diagnosed with SAD, there is a decrease in the use of adaptive emotion regulation skills and an increase in the use of maladaptive emotion regulation strategies, which leads to an increase in social anxiety (Sackl-Pammer et al. 2019). A prospective study conducted on children and adolescents has revealed that difficulties in regulating emotions predict symptoms of social anxiety (Schneider et al. 2018).

Empathy is defined as the process of putting oneself in another person's place, viewing events from their point of view, and accurately understanding, feeling, and communicating their emotions and thoughts (Rogers and Akkoyun 1983). Positive, effective social interaction and psychosocial functioning are related to empathy skills, and a lack of these skills can lead to problems in interpersonal relationships (Eisenberg et al. 2002, Gleason et al. 2009, Zaki and Ochsner 2012). Researchers suggest that patients diagnosed with SAD experience impaired social functioning as their empathy skills decline (Morrison et al. 2016). In addition, a recent study has shown that the cognitive and emotional aspects of empathy play different roles in contributing to social anxiety in adolescents (Tan et al. 2023).

Most studies in the literature regarding depressive symptoms, alexithymia, emotion regulation, and empathy difficulties associated with social anxiety primarily focus on adults and the general population. Our study aims to investigate depressive symptoms, alexithymia, empathy, and emotion regulation difficulties in adolescents diagnosed with SAD and to compare the findings with healthy controls. The hypotheses of our study are that depressive symptoms and alexithymia levels will be higher in the SAD group compared to healthy controls and that emotion regulation and empathy skills will be negatively affected. Another hypothesis of our study is that there will be a correlation between social anxiety severity, depressive symptoms, alexithymia, emotion regulation, and empathy skills in adolescents diagnosed with SAD. In addition, the aim is to reveal the extent to which the factors investigated may be related to SAD.

METHODS

Participants

Between June and November 2022, 62 of 74 adolescents aged 12-18 who presented with SAD symptoms at a city hospital child and adolescent psychiatry outpatient clinic volunteered to participate in our study. The inclusion criteria for the SAD group were to be between 12 and 18 years of age, to meet the diagnostic criteria for SAD according to the Schedule for Affective Disorders and Schizophrenia for School-Age Children-Present and Lifetime Version, DSM-5 (K-SADS-PL-DSM-5-T), a semi-structured diagnostic assessment interview conducted by a child and adolescent psychiatrist and the American Psychiatric Association's Diagnostic Statistical Manual of Mental Disorders, Fifth Edition (DSM-5), and to have clinically normal intelligence. In addition, both the participant and their parents must volunteer to participate in the study and give their consent. Clinical diagnoses of intellectual disability, autism spectrum disorder, acute psychotic disorder, and bipolar disorder have been accepted as exclusion criteria, as they may interfere with the assessment. In the study, six adolescents who did not fully meet the SAD diagnostic criteria and four adolescents with comorbidities such as intellectual disability (n=3) and autism spectrum disorder (n=1) were excluded from the study. In addition, two participants were excluded from the study due to insufficient data. The inclusion criteria for the control group of the study include being between the ages of 12 and 18, not having received any psychiatric diagnosis according to DSM-5 criteria in the past or present, having clinically normal intelligence, and both the participants and their parents voluntarily agreeing to participate in the study and giving their consent. The healthy control (HC) group consisted of adolescents aged 12–18 years who applied for counselling at our hospital's child and adolescent psychiatry outpatient clinic and whose sociodemographic characteristics were similar to those of the patient group. Of the 68 adolescents who volunteered to participate in the control group, 50 adolescents who did not have any past or recent psychiatric disorders according to the K-SADS-PL-DSM-5-T semi-structured diagnostic assessment interview conducted

by a child and adolescent psychiatrist and DSM-5 were included in the study. As a result, a total of 100 adolescents, 50 in the SAD group and 50 in the HC group, were included in our study.

The researchers prepared a sociodemographic data form to record participants' characteristics, such as age, gender, family characteristics, and socioeconomic status. Adolescents' social anxiety, depression, alexithymia, emotion regulation difficulties, and empathy skill levels were assessed using the Social Anxiety Scale for Adolescents (SAS-A), Beck Depression Inventory (BDI), Toronto Alexithymia Scale (TAS-20), Difficulties in Emotion Regulation Scale (DERS), and Basic Empathy Scale (BES), respectively. Informed consent was obtained from all individuals and parents participating in the study. Ethical committee approval was obtained for the study (Date: 27.05.2022/No: E2-22-1855).

Data Collection Tools

Sociodemographic data form: It was prepared by researchers to investigate characteristics such as age, gender, family characteristics, socioeconomic status, and history of psychiatric disorders in the family.

Schedule for Affective Disorders and Schizophrenia for School-Age Children-Present and Lifetime Version, DSM-5 (K-SADS-PL-DSM-5-T): It is a semi-structured interview that assesses the current and lifetime psychopathology of children and adolescents according to DSM-5 diagnostic criteria. Current psychopathology covers the last 2 months, while lifetime psychopathology covers all past diagnoses of the child or adolescent. It was developed by Kaufman et al., and its Turkish adaptation, validity, and reliability study were conducted by Ünal et al. (2019).

Beck Depression Inventory (BDI): Developed by Beck, the BDI consists of 21 items that assess depressive symptoms and attitudes. The scale consists of 21 questions about how the person has been feeling over the past week, with each question consisting of four options that can be scored from 0 to 3. The scale can be scored from 0 to 63. Higher scores indicate greater severity of depressive symptoms. The purpose of the scale is not to diagnose but to determine the severity of the disorder. Hisli (1988) conducted the Turkish validity and reliability study.

Social Anxiety Scale for Adolescents (SAS-A): The SAS-A consists of an adapted version of a social anxiety scale developed for children. It consists of 22 items and three subscales: fear of negative evaluation, social avoidance and distress in new situations, and social avoidance and distress in general situations. Four of the 22 items on the scale are unrelated to social anxiety and are not included in the scoring. A 5-point Likert-type rating is used to respond to the scale. The scale ranges from a minimum score of 18 to a maximum score of 90. As the score increases, the level of social anxiety increases. The validity and reliability study of the scale in Turkish was conducted by Aydın and Tekinsav Sütcü (2007), and the Cronbach's alpha coefficient for the entire scale was found to be 0.88.

Toronto Alexithymia Scale (TAS-20): It is a 20-item five-point Likert-type scale developed to determine individuals' levels of alexithymia. Items 4, 5, 10, 18, and 19 are reverse-coded. The TAS-20 consists of three subscales: difficulty identifying feelings, difficulty describing feelings, and externally oriented thinking. A higher score on the scale indicates a higher level of alexithymia in the individual. Güleç et al. (2009) conducted a validity and reliability study in which they found the Cronbach's alpha coefficient to be 0.78. In a study conducted in our country, it was found that the psychometric properties of the Turkish TAS-20 for adolescents were similar to the results of the validity and reliability study conducted for adults (Bolat et al. 2017).

Difficulties in Emotion Regulation Scale (DERS): It is a five-point Likert-type scale consisting of 36 items developed by Gratz and Roemer. It consists of six dimensions: awareness, clarity, non-acceptance, strategies, impulse, and goals. Items 1, 2, 6, 7, 8, 10, 17, 20, 22, 24, and 34 are reverse-coded. High scores on the scale indicate difficulties in regulating emotions. The validity and reliability study of the scale in Turkish was conducted by Rugancı and Gençöz (2010), and the Cronbach's alpha internal consistency coefficient was found to be 0.94. In a study conducted in our country, it was shown that DERS is a valid scale appropriate for the age group to investigate emotion regulation difficulties in adolescents (Sarıtaş-Atalar et al. 2015).

Basic Empathy Scale (BES): It is a 20-item five-point Likert-type scale developed by Jolliffe and Farrington in 2006. 9 items measure cognitive empathy and 11 items measure affective empathy. Items 1, 6, 7, 8, 13, 18, 19, and 20 are reverse-coded. The minimum score for the cognitive empathy subscale of the scale is 9, and the maximum score is 45. The lowest score that can be obtained for the affective empathy subscale is 11, and the highest score is 55. Higher scores indicate a higher capacity for empathy. A validity and reliability study in Turkish was conducted on adolescents and young adults by Topçu et al. (2010), and the Cronbach's alpha coefficients calculated for reliability ranged from 0.76 to 0.80.

Statistical Analysis

The statistical analysis of the data obtained in the study was performed using the SPSS (The Statistical Package for Social Sciences) 26.0 software package and R software (version 4.4.1). The distributions of continuous variables were evaluated using the Kolmogorov-Smirnov test. Variables

showing a normal distribution were expressed in terms of arithmetic mean and standard deviation, while those not showing a normal distribution were expressed in terms of median and minimum/maximum (min/max). Categorical variables are expressed in terms of frequency (n) and percentage (%). When appropriate conditions were met for comparing the two groups, the parametric *t*-test, Mann-Whitney U test, or Pearson-$\chi 2$ test was used. Cohen's d is given as the effect size for the parametric *t*-test, and $r=z/\sqrt{n}$ is given for the Mann-Whitney U test. Spearman correlation analysis was used to determine the relationship between social anxiety, depressive symptoms, alexithymia, empathy, and emotional regulation difficulties in the SAD group. The effects of the variables examined in our study that could be related to SAD were evaluated using binary logistic regression analysis. Variables with $p<0.05$ in the univariate analysis results in Table 1 and Table 2 were included in the multiple logistic regression model. The 'pROC' (Robin et al. 2011) and 'caret' (Kuhn 2008) packages in R software were used to calculate the accuracy, sensitivity, specificity, and area under the curve values for the logistic regression model established. According to the post-hoc power analysis result, the power (1-β) of the t-test conducted between two independent groups was calculated as 0.999 with an effect size (Cohen's d) of 1.466, sample sizes of 50 each, and a significance level of 0.05. $p<0.05$ was accepted as the level of significance.

RESULTS

In our study, there was no statistically significant difference between the SAD (n=50) and HC (n=50) groups in terms of age, gender, parents' educational levels, and income levels. It was found that the ages of mothers and fathers in the SAD group were lower than those in the HC group (p=0.002 and p=0.003, respectively). In addition, a higher rate of psychiatric disorder history in the family was found in adolescents diagnosed with SAD ($p<0.001$). The sociodemographic characteristics of both groups are presented in Table 1. In addition, 42% (n=21) of adolescents diagnosed with SAD had comorbid major depressive disorder (MDD), 22% (n=11) had generealised anxiety disorder, 16% (n=8) had attention-deficit/hyperactivity disorder, 4% (n=2) had obsessive-compulsive disorder, 4% (n=2) had panic disorder, 4% (n=2) had specific learning disorder, and 2% (n=1) had conduct disorder.

In our study, the total BDI score, total score and subscale scores of SAS-A were found to be statistically significantly higher in adolescents diagnosed with SAD than in controls ($p<0.001$ for all variables). Between the two groups, difficulty identifying feelings, difficulty describing feelings, externally oriented thinking subscales and total scores of TAS-20 were found to be statistically significantly higher in SAD patients than in controls ($p<0.001$, $p<0.001$, $p=0.003$ and $p<0.001$, respectively). In terms of the DERS, it was observed that the SAD group scored statistically higher on the clarity, non-acceptance, strategies, and goals subscales, and their total scores were higher than those of the HC group (first $p=0.006$, others $p<0.001$). However, no significant difference was found between the two groups in terms of the awareness and impulse subscales of the DERS. Furthermore, no significant difference was observed between the two groups in terms of the cognitive and affective subscales and the total score of the BES (Table 2). When comparing the clinical characteristics of adolescents diagnosed with SAD with and without MDD, it was found that those with MDD had significantly higher DERS scores for clarity, non-acceptance, strategies, impulse, goals, and total scores than those in the other group ($p=0.014$, $p<0.001$, $p=0.003$, $p=0.017$, $p=0.012$, $p=0.002$, respectively) (Table 3).

Table 1. Comparison of sociodemographic characteristics between social anxiety disorder and healthy control groups

	SAD (n=50)	HC (n=50)	z / χ^2	p	Effect Size
Age (months)	180 (144/216)	180 (144/216)	-1.453	0.146[a]	0.145
Gender n (%)					
Female	34 (68)	27 (54)	2.060	0.151[b]	0.144
Male	16 (32)	23 (46)			
Maternal age (years)	42.0±6.4	45.8±5.9	3.180	0.002[c]	0.144
Mothers' education (years)	12.0 (5.0/16.0)	12.0 (5.0/16.0)	-1.685	0.092[a]	0.144
Paternal age (years)	45.0 (38.0/60.0)	50.0 (36.0/65.0)	-3.021	0.003[a]	0.286
Fathers' education (years)	12.0 (8.0/16.0)	12 (5.0/16.0)	-1.898	0.058[a]	0.194
Income level (TL)	9k (3.5k/40k)	10k (4k/24k)	-1.844	0.065[a]	0.295
Family history of psychiatric disorder n (%)					
Yes	15 (30.6)	1 (2.0)	14.952	<0.001[b]	0.389
No	34 (69.4)	49 (98.0)			

Data are presented as median (minimum/maximum) or mean± standard deviation. Categorical variables reported as frequency (percent).
SAD: Social anxiety disorder, HC: Healthy control, TL: Turkish lira
[a]Mann-Whitney U test was applied.
[b]Chi-square test was applied.
[c]*t* test was applied.

Table 2. Comparison of clinical variables between social anxiety disorder and healthy control groups

	SAD (n=50)	HC (n=50)	z/t	p	Effect Size
BDI	22.57±13.54	10.05±5.25	-6.981	<0.001[a]	1.396
SAS-A FNE	25.22±9.86	15.43±5.55	-6.274	<0.001[a]	1.268
SAS-A SAD-G	16.89±5.40	9.93±3.63	-7.443	<0.001[a]	1.505
SAS-A SAD-N	24.0 (10.0/30.0)	14.5 (6.0/23.0)	-6.418	<0.001[b]	0.642
SAS-A Total	70.0 (32.0/93.0)	39.8±11.9	-6.238	<0.001[b]	0.637
TAS-20 DIF	23.0 (7.0/35.0)	12.0 (7.0/23.0)	-5.215	<0.001[b]	0.538
TAS-20 DDF	20.0 (7.0/25.0)	11.0 (5.0/18.0)	-5.685	<0.001[b]	0.577
TAS-20 EOT	23.24±4.07	21.17±3.74	-2.997	0.003[a]	0.615
TAS-20 Total	63.86±13.09	46.12±9.04	-6.965	<0.001[a]	1.466
DERS Awareness	18.32±5.09	16.43±3.65	-1.985	0.050[a]	0.401
DERS Clarity	16.27±4.07	14.40±2.80	-2.801	0.006[a]	0.560
DERS Non-acceptance	15.0 (6.0/30.0)	10.0 (6.0/23.0)	-3.623	<0.001[b]	0.364
DERS Strategies	24.84±9.09	15.67±5.99	-5.696	<0.001[a]	1.150
DERS Impulse	15.0 (6.0/30.0)	14.0 (6.0/24.0)	-1.276	0.202[b]	0.128
DERS Goals	20 (5/25)	15 (5/25)	-4.436	<0.001[b]	0.444
DERS Total	111.70±30.42	86.67±17.21	-4.815	<0.001[a]	0.993
BES Cognitive	34.65±6.56	35.38±5.90	0.086	0.932[a]	0.017
BES Affective	37.00±10.35	37.55±7.90	0.120	0.904[a]	0.025
BES Total	71.6±15.0	73.0 (52.0/94.0)	-0.019	0.985[b]	0.002

Data are presented as median (minimum/maximum) or mean± standard deviation.
[a]*t* test was applied.
[b]Mann-Whitney U test was applied.
SAD: Social anxiety disorder, HC: Healthy control, BDI: Beck depression inventory, SAS-A: Social anxiety scale for adolescents, FNE: Fear of negative evaluation, SAD-G: Social avoidance and distress in general situations, SAD-N: Social avoidance and distress in new situations, TAS-20: Toronto alexithymia scale, DIF: Difficulty identifying feelings, DDF: Difficulty describing feelings, EOT: Externally oriented thinking, DERS: Difficulties in emotion regulation scale, BES: Basic empathy scale

Table 3. Comparison of clinical characteristics of cases with and without major depressive disorder in adolescents with social anxiety disorder

	Without MDD (n=29)	With MDD (n=21)	z/t	p	Effect Size
SAS-A FNE	25.50 (9 – 54)	29 (7 – 35)	0.992	0.321[a]	0.142
SAS-A SAD-G	15.48±5.86	18.55±4.44	1.979	0.054[b]	-0.575
SAS-A SAD-N	24 (13 – 30)	26 (12 – 30)	1.499	0.134[a]	0.212
SAS-A Total	65 (32 – 93)	73.50 (27 – 90)	1.245	0.213[a]	0.180
TAS-20 DIF	19.96±8.02	24.28±6.57	1.905	0.063[b]	-0.575
TAS-20 DDF	16 (7 – 25)	21 (9 – 25)	1.887	0.059[a]	0.270
TAS-20 EOT	24.07±3.82	23.10±4.40	0.810	0.422[b]	0.239
TAS-20 Total	60.37±14.01	67.94±12.31	1.862	0.069[b]	-0.567
DERS Awareness	18.14±5.24	19.30±5.32	0.758	0.452[b]	-0.220
DERS Clarity	15.28±4.03	17.71±2.74	2.547	0.014[b]	-0.687
DERS Non-acceptance	13.61±5.82	20.14±6.09	3.815	<0.001[b]	-1.101
DERS Strategies	21.97±9.60	29.30±6.52	3.184	0.003[b]	-0.864
DERS Impulse	13 (6 – 30)	21 (7 – 29)	2.391	0.017[a]	0.338
DERS Goals	19 (5 – 25)	21 (16 – 25)	2.502	0.012[a]	0.354
DERS Total	101.57±30.99	128.05±21.58	3.226	0.002[b]	-0.959
BES Cognitive	34.38±6.93	34.84±6.00	0.238	0.813[b]	-0.070
BES Affective	35.37±11.09	39.62±9.66	1.392	0.171[b]	-0.405
BES Total	69.48±16.97	74.79±12.70	1.154	0.255[b]	-0.345

Data are presented as median (minimum/maximum) or mean± standard deviation.
[a]Mann-Whitney U test was applied.
[b]*t* test was applied.
MDD: Major depressive disorder, SAS-A: Social anxiety scale for adolescents, FNE: Fear of negative evaluation, SAD-G: Social avoidance and distress in general situations, SAD-N: Social avoidance and distress in new situations, TAS-20: Toronto alexithymia scale, DIF: Difficulty identifying feelings, DDF: Difficulty describing feelings, EOT: Externally oriented thinking, DERS: Difficulties in emotion regulation scale, BES: Basic empathy scale

Spearman correlation analysis was used to determine the relationship between social anxiety, depressive symptoms, alexithymia, emotion regulation difficulties, and empathy skills in adolescents diagnosed with SAD. In the SAD group, a significant positive moderate correlation was found between the SAS-A total score and the BDI, TAS-20, and DERS total scores (p=0.002, p<0.001, p<0.001, respectively). A significant, strong positive correlation was found between the BDI and TAS-20 total scores and between the BDI and DERS total scores (p<0.001 for both). In addition, a significant strong positive correlation was found between the TAS-20 total score and the DERS total score (p<0.001). However, no correlation was found between the total BES score and the total scores for BDI, SAS-A, TAS-20, and DERS (Table 4).

Table 4. Spearman correlation analysis between the SAS-A, BDI, TAS-20, DERS and BES scales in the social anxiety disorder group

	1	2	3	4	5
1. SAS-A	-				
2. BDI	0.443*	-			
3. TAS-20	0.579**	0.708**	-		
4. DERS	0.495**	0.780**	0.802**	-	
5. BES	0.223	0.121	0.203	0.138	-

*p<0.01, **p<0.001
SAS-A: Social anxiety scale for adolescents, BDI: Beck depression inventory, TAS-20: Toronto alexithymia scale, DERS: Difficulties in emotion regulation scale, BES: Basic empathy scale

Univariate logistic regression analysis was performed for the variables of mother and father age and the total scores from the BDI, DERS, and TAS-20, which were found to be statistically significant differences between the two groups in univariate analyses (Table 5). When the independent variables were examined in terms of multicollinearity, it was found that the DERS total score variable had a correlation of over 70% with both the TAS-20 total and BDI scores. As a result, the DERS total score variable was removed from the model to eliminate the multicollinearity problem. Therefore, the effects of factors that may be related to SAD, such as maternal and paternal age, depressive symptoms, and alexithymia, were evaluated using multiple logistic regression analysis with variable selection using the backward likelihood ratio method. In conclusion, the final logistic regression model achieved an accuracy rate of 85.7%, a sensitivity of 84.44% and a specificity of 87.23%. The area under the receiver operating characteristic curve (AUC), reflecting the model's ability to distinguish between classes, was calculated to be 0.915. Maternal age, depressive symptoms, and alexithymia were found to be significantly associated with SAD in adolescents (p=0.003, p=0.006, p=0.013, respectively) (Table 6).

Table 5. Variables associated with social anxiety disorder according to the results of univariate binary logistic regression analysis

Variables	Odds Ratio	%95 Confidence Interval	p
Maternal age	1.11	1.04-1.20	0.004
Paternal age	1.05	1.00-1.12	0.102
BDI	1.18	1.10-1.27	<0.001
DERS Total	1.04	1.02-1.06	<0.001
TAS-20 Total	1.14	1.08-1.20	<0.001

BDI: Beck depression inventory, DERS: Difficulties in emotion regulation scale, TAS-20: Toronto alexithymia scale

Table 6. Variables associated with social anxiety disorder according to multiple binary logistic regression analysis

Variables	Odds Ratio	%95 Confidence Interval	p
Maternal age	1.19	1.06-1.32	0.003
BDI	1.17	1.05-1.30	0.006
TAS-20 Total	1.08	1.02-1.16	0.013

Hosmer and Lemeshow test: $\chi 2=4.918$, p=0.766
BDI: Beck depression inventory, TAS-20: Toronto alexithymia scale

DISCUSSION

Our study found that adolescents diagnosed with SAD had higher levels of depressive symptoms, alexithymia, and emotion regulation difficulties compared to healthy controls, but no difference in empathy skills. It was found that social anxiety levels in adolescents diagnosed with SAD were parallel to depressive symptoms, alexithymia, and emotion regulation difficulties. In addition, maternal age, depressive symptoms, and alexithymia were identified as potential factors that may be associated with SAD in adolescents.

According to the findings of our study, the level of alexithymia is higher in adolescents diagnosed with SAD than in healthy controls. Furthermore, our study reveals that social anxiety increases as the level of alexithymia increases and that alexithymia may be a factor associated with SAD in adolescents. In a study conducted by Radetzki et al. (2021), a high level of alexithymia was found in those diagnosed with SAD, and it was suggested that difficulties in emotional awareness and expressing emotions play a role in the severity of SAD. A study conducted on university students in our country has revealed a relationship between social anxiety and alexithymia (Dalbudak et al. 2013). In addition, our study found a positive correlation between alexithymia, depressive symptoms, and difficulties in emotion regulation. Preece et al. (2023) suggested that alexithymia is associated with anxiety and depression through its effect on emotion regulation. Motan and Gençöz (2007) found that anxiety symptoms are associated with difficulties in identifying and describing feelings, while depressive symptoms are associated

with difficulties in communicating feelings. The results of our study indicate that young people who have difficulty identifying and regulating their emotions may have difficulty controlling their increased anxiety in social settings.

Our study revealed that adolescents diagnosed with SAD have more difficulty regulating their emotions than controls. In addition, a significant relationship was found between the severity of social anxiety and difficulties in regulating emotions. It has been shown that social anxiety is associated with emotional regulation difficulties in adults, and that as these difficulties increase, the severity of the disorder also increases (Jazaieri et al. 2015, Karaağaç and İmre 2024). The fact that emotion regulation is a skill that develops with age makes it difficult to adapt findings from adults to adolescents (Gross 2013). A recent review examining the role of emotion regulation in children and adolescents with social anxiety highlights that repetitive negative thoughts and reduced emotional expression are common in this group. It also shows that there is a bias in the attention and interpretation processes related to social information in this group (Golombek et al. 2020). Our study found that adolescents with SAD accompanied by MDD had greater difficulties regulating their emotions than those without MDD. It has been demonstrated that adolescents with high levels of social anxiety and depressive symptoms have reduced emotional awareness and expression and that these adolescents are unable to adequately utilise emotion regulation strategies (Klemanski et al. 2017). Based on the results of our study, it is considered important to address the emotion regulation strategies of young people with social anxiety and accompanying depressive symptoms.

Contrary to expectations, our study found no difference in empathy skills between adolescents diagnosed with SAD and controls. Similarly, Bayraktutan et al. (2020) found no difference in empathy skills between adults diagnosed with SAD and controls. However, in a study by Gambin and Sharp (2018) examining the relationship between anxiety and empathy skills in adolescents, it was found that affective empathy had a positive relationship with all dimensions of anxiety, while cognitive empathy had a negative relationship with social anxiety, separation anxiety, and panic dimensions. Öztürk et al. (2022) showed that adolescents diagnosed with SAD had higher cognitive and affective empathy scores than the control group. Studies examining empathy skills in cases diagnosed with SAD have yielded conflicting results, as seen in the literature. Differences in methodologies, including participant age, sample groups included in the studies, and tools used to assess empathy skills, may be the reason for this inconsistency. In addition, it should be noted that the use of self-report scales in researching empathy skills may create bias, particularly due to individuals diagnosed with SAD evaluating themselves negatively (Golde et al. 2023).

Our study found that depressive symptoms are associated with increased levels of social anxiety. The literature provides evidence that both social anxiety and depression may be interrelated factors (Hamilton et al. 2016, Krygsman and Vaillancourt 2022). A recent follow-up study has shown that social anxiety and depressive symptoms develop together throughout adolescence (Danneel et al. 2020). However, when interpreting the findings of our study, it is important to consider the literature findings indicating a bidirectional relationship between social anxiety and depressive symptoms in adolescents (Belmans et al. 2019). Given these findings, it is considered important to assess young individuals presenting with social anxiety complaints for depressive symptoms.

Our study found that the ages of mothers and fathers of adolescents diagnosed with SAD were lower than those of the control group, and that there was a potential relationship between maternal age and SAD in adolescents. The literature shows conflicting relationships between parental age and psychiatric disorders in children. Advanced maternal age has been associated with depression, anxiety, and stress in children (Tearne et al. 2016). Another study indicated that children of both young and older parents had a higher risk of psychiatric disorders than children of parents aged 25–29 (McGrath et al. 2014). The findings of our study suggest that young mothers need to be supported in terms of psychiatric disorders such as SAD that may be seen in their children.

Our study has some limitations. The fact that our study was conducted on a clinical sample makes it difficult to generalise the findings to the normal population. Its cross-sectional structure prevents the cause-effect relationship from being fully revealed. Our study found that adolescents diagnosed with SAD had comorbid psychiatric disorders, such as MDD, generalised anxiety disorder, and attention-deficit/hyperactivity disorder. It is known that these comorbidities may influence variables such as emotional regulation difficulties and alexithymia (Preece et al. 2024, Sheppes et al. 2015). Therefore, when interpreting the findings of our study, the effect of accompanying psychiatric disorders must be taken into account. Another limitation of our study is that alexithymia, emotion regulation, and empathy skills were assessed using self-report scales. During adolescence, it is known that assessing alexithymia, emotion regulation, and empathy skills is challenging because emotion regulation skills are still developing (Jolliffe and Farrington 2006, Parker et al. 2010). In future studies, the parameters under investigation could be assessed using different methods, such as clinical interviews (Muzi et al. 2023).

CONCLUSION

Our study draws attention to depressive symptoms, alexithymia, and emotion regulation difficulties accompanying

SAD diagnosis and shows that addressing these factors may be important in the assessment process. The impact of depressive symptoms, alexithymia and emotion regulation difficulties experienced by adolescents diagnosed with SAD on their treatment processes, as well as the problems these issues can cause in adulthood, can be examined as a separate research topic.

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