

Effects of Problem Solving Therapy in Substance Use Disorder in Adolescents



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ABSTRACT

Objective: In this study, it was aimed to examine the effects of problem solving therapy, which is a cognitive behavioral method, on adolescents diagnosed with alcohol and substance use disorder.

Method: A semi-structured interview and intelligence test were administered to adolescents with diagnosis of substance use disorder to identify comorbidities. 46 adolescents who met the inclusion criteria were divided into two groups. Problem solving therapy was applied to the first group for 5 weeks, once a week, while the other group continued their routine controls in the center. Beck Depression Inventory, Screen for Child Anxiety Disorders, Revised Social Problem Solving Inventory, Addiction Profile Index and Treatment Motivation Questionnaire were administered to the groups at the beginning of the study and at the end of the 5th week and the results were analyzed.

Results: Sociodemographic and substance use characteristics, comorbid psychopathologies and scale mean scores of the groups in the first evaluation were found to be similar to each other. Although the depression and anxiety scores decreased significantly in both groups, no significant difference was found between the groups. Problem-solving skills and treatment motivation increased in the therapy group and decreased in the control group. The difference between groups was found to be significant ($p=0.045$, 0.037 for problem solving and treatment motivation respectively). While the severity of addiction decreased in therapy group, it increased in control group, but the difference was not significant.

Conclusion: This study is important in that it shows that psychosocial interventions strengthen the treatment of substance use disorder in adolescents. In our country, no other study was evaluating the effects of the intervention methods in addicted adolescents was found. Future studies with larger sample sizes and where the long-term results of substance use disorder are evaluated are needed.

Keywords: Adolescent psychiatry, substance-related disorders, cognitive therapy, psychotherapy, group psychotherapy

INTRODUCTION

Problem Solving Therapy (PST) is a therapy method that uses Cognitive Behavioral Therapy (CBT) techniques to solve psychological problems caused by daily life's challenges. The objective of PST is to teach individuals how to tackle encountered problems and also to teach about problem solving paths and strategies. The goal of PST is to cure the psychological distress caused by such problems and also prevent distress before it happens. In other words, PST is used both in therapy and in prevention; it is also utilized in gaining resilience or enhancing inherent capacity (Eskin 2011).

PST can be used in mental healthcare to treat different psychopathologies. A recently published meta-analysis encompassing 30 studies (with a total of 3530 patients) has concluded that PST is effective in the treatment of depression, with its impact dimension being found low yet comparable to other psychosocial treatment options (Cujipers et al. 2011). A meta-analysis that assesses PST use in primary healthcare found that PST is effective in anxiety disorders and depression (Zhang et al. 2018). A randomized controlled study comparing the use of PST with motivational interview (MI) in the treatment of substance use disorders has shown that, against MI only, the use of PST+MI together significantly decreased

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screening test scores (Sorsdahl et al. 2015). In another study investigating the use of PST in adolescents and young adults, results showed that there was a significant decrease in depression and suicide risk scores of the PST group compared to the wait list group (Eskin et al. 2007).

The treatment of addiction in adolescence is a long-term process as in all age groups. Adolescent addiction treatment should include multidimensional biopsychosocial interventions. Psychosocial interventions should be among the top priority approaches in adolescent addiction treatment. Such approaches include 12-step therapy, therapeutic communities, family-based therapies, behavioral approaches, individual and/or group Cognitive Behavioral Therapy (CBT) approaches. The purpose of CBT is to identify circumstances that trigger substance use in adolescents, develop coping mechanisms appropriate to these situations, and enhance communication and problem solving skills.

A study conducted with adolescents and young adults with substance use problems has shown that such individuals took up maladaptive problem solving methods to a greater extent. A 2009 study investigated the relationship between problem solving, personality characteristics and substance use among 307 high-school students. The study in question has revealed that hopelessness had a significant negative impact on rational problem solving skills (Winters et al. 2011). For such reasons, it is considered that applying problem solving therapy to adolescents who struggle with substance use disorders would increase their problem solving skills, decrease the intensity of comorbid conditions and contribute positively to addiction treatment.

There is a lack of studies which discuss non-pharmacologic treatment options and specialized intervention methods in adolescent addiction. Therefore, the purpose of the present study is to investigate the effects of “problem solving therapy” as an intervention method on adolescents who suffer from substance use disorders.

METHOD

Study Design and Sample

This study was designed to be prospective and experimental. The blinding procedure was not applied during the assignment of cases included in the study to groups. At the beginning, it was planned to include 30 persons per group, totaling up to 60 people. Because of time limitations and the need to see the effectiveness of this application, cases included in the study were primarily assigned to the PST group. The control group was formed after the PST group. We were able to reach 16 cases for the control group. Following this, a power analysis was conducted as the study ran. Sample size of the study was calculated by using the G*Power software package (Faul

et al. 2009). Duplicate measurement results showed that in order to achieve an 80% statistical power with an alpha error rate of 0.05 and Cohen's effect size of 0.30, the required sample size was at least 12 participants per group. Due to time limitations and the fact that the required number of cases as calculated under the power analysis was reached, no further cases were added to the control group.

The study sample consists of 46 adolescents between the ages of 14-18 who are first application or follow-up patients diagnosed with alcohol/substance use disorder (ASUD) at Child and Adolescent Alcohol-Substance Addiction Research and Application Center. All subjects participated in the study on a voluntary basis. At the beginning 40 cases were included in PST group; however, 10 of them were subsequently excluded from the study. Of these 10 cases, 4 were excluded due to absenteeism, 2 due to displaying mental retardation ($IQ < 70$) as a result of the intelligence tests performed, 1 due to attending the sessions under the influence and the remaining 3 cases due to missing data in the scales. The control group consisted of 20 cases, with 4 of them being excluded from the study later on. The reasons for exclusion for these 4 cases are as follows: according to the structured interview conducted, 1 of them had a psychotic disorder; 2 were excluded because of missing data in the second scale, and 1 case was excluded due to missing data in all scales. The study was completed with 46 participants with 30 cases in the PST group and 16 cases in the control group. Before participating in the study, a written statement of informed consent was taken from patients and their first degree relatives or their legal guardians (as per the Helsinki Declaration). An approval was received from Ege Faculty of Medicine Ethics Committee with the decision dated 29.06.2015 and numbered 15-5.1/5.

Inclusion and Exclusion Criteria

Volunteer cases between 14-18 years of age diagnosed with alcohol/substance use disorder (ASUD) according to the DSM-5 criteria (Diagnostic and Statistical Manual of Mental Disorders) (American Psychiatric Association 2013) were included in the study. Cases who had a mental retardation diagnosis or psychopathologies which prevent them from attending the sessions were excluded from the study. Cases who did not obey group rules, who were coming to sessions under the influence, absent for more than two sessions and wished to be excluded from study were also excluded from study.

Data Collection Tools

Socio-Demographic Information Form

This form was prepared by researchers to collect information on age, gender, educational status, family type, socioeconomic status, place of residence, status of parents, personal background, and family history.

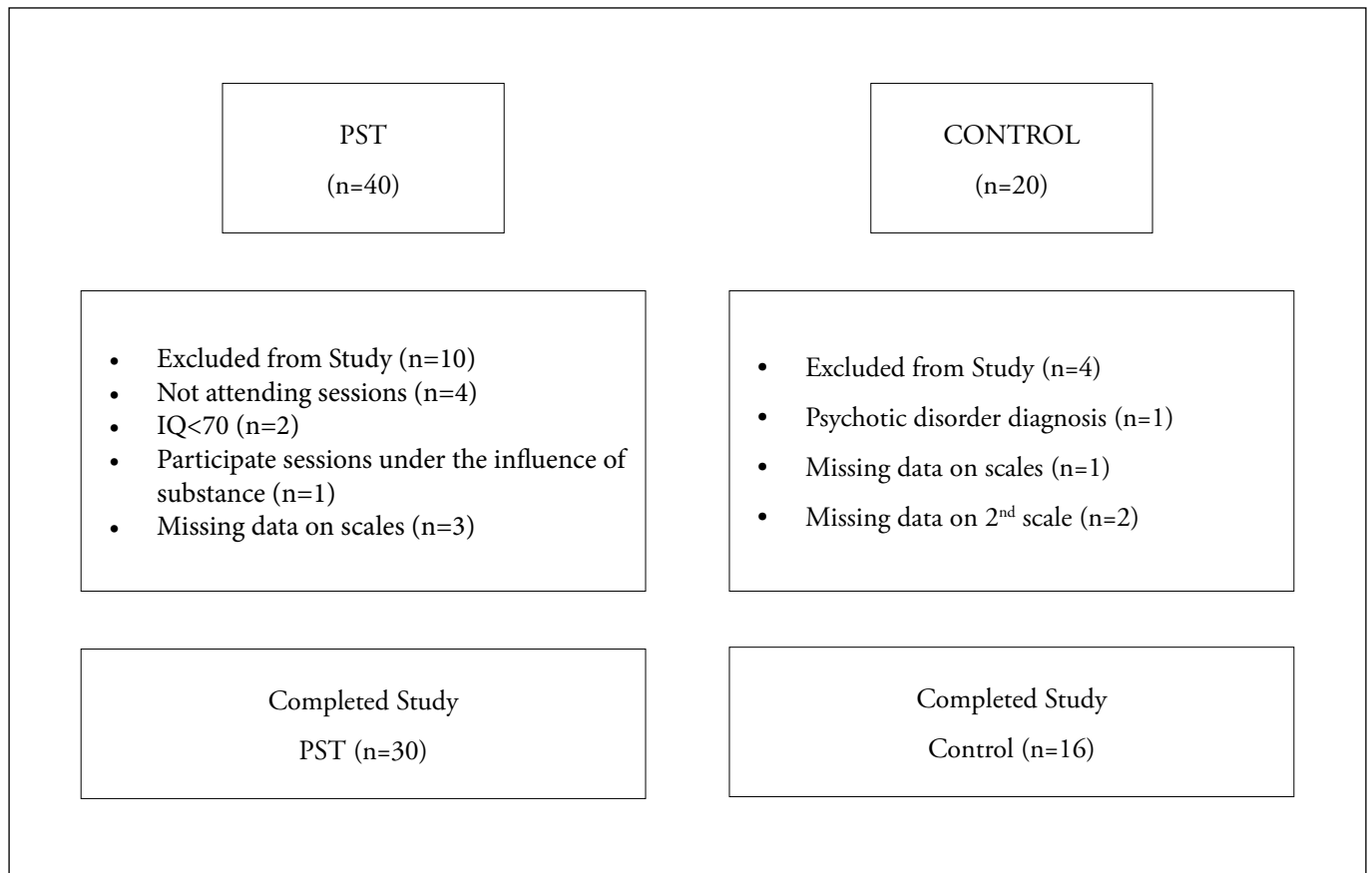


Figure 1. Flow Chart

PST: Problem Solving Therapy, IQ: Intelligence Quotient

Schedule for Affective Disorders and Schizophrenia for School-Age Children-Present and Lifetime Version (K-SADS-PL)

K-SADS-PL is a semi-structured interview form that aims to identify present and lifetime psychopathologies in children and adolescents. The form consists of three sections. Reliability and validity of the scale for the Turkish sample was ensured (Kaufman et al. 1997, Gökler et al. 2004).

Beck Depression Inventory (BDI)

Beck depression inventory (BDI) is a self-report scale developed by Beck in 1961 for the purpose of evaluating emotional, cognitive, somatic and motivational components of depression. Even though its primary aim is to assess depressive symptoms it also enables the evaluation of cognitive contents. Scale scores range between 0-63. Any score equal to or above 10 is considered as a signifier for depression. Validity and reliability of BDI for the Turkish society was provided (Beck 1969, Hisli 1989).

Treatment Motivation Questionnaire (TMQ)

It is a self-report 5 point Likert scale with 26 items, developed to measure reasons of participating and continuing alcohol/

substance use treatment. Scale was developed by Ryan et al. in 1995 and in 2006 reliability and validity study was conducted by Evren et al. (Ryan et al. 1995, Evren 2006).

Social Problem-Solving Inventory-Revised (SPSI-R)

The scale developed by Maydeu-Olivares and D’Zurilla between 1995-96 was revised later on in 2002. The inventory consists of 2 main domains that identify problem orientation and problem solving methods with subdomains for each domain. These are:

“Positive Problem Orientation, Negative Problem Orientation, Reasoning, Handicapping, Failure Avoidance, Problem Solving”. Social Problem-Solving Inventory-Revised (SPSI-R) was translated into Turkish and its reliability and validity was ensured by Eskin and Aycan (D’Zurilla et al. 2002, Eskin 2009).

Addiction Profile Index (API) Adolescent form

API was developed by Ögel et al. They also provided the reliability and validity of this scale. The scale consists of 25 items and 5 subdomains (diagnosis, characteristics of substance use, the effect of the substance on person’s life,

craving and motivation). It is a self-report, 5-point Likert scale (Ögel et al. 2012).

Screen for Child Anxiety Related Emotional Disorders (SCARED)

Screen for Child Anxiety Related Emotional Disorders (SCARED) scale was developed by Birmaher et al. (1999) for screening childhood anxiety disorders. Its reliability and validity was ensured by Çakmakçı (2004). Child and parent forms of the scale are available. The SCARED scale consists of 41 items, with a total score of 25 and above being considered as a warning sign for anxiety disorder (Birmaher et al. 1999, Çakmakçı 2004).

Wechsler Intelligence Scale for Children-Revised (WISC-R)

Wechsler Intelligence Scale for Children was developed by Wechsler in 1949 to measure the intelligence of children between the ages of 5-15. In 1974, it was revised and the applicable age group was updated to between 6-16 years old. Adaptation of WISC-R for the Turkish culture was performed by Savaşır and Şahin (Wechsler 1974, Savaşır 1995).

Wechsler Adult Intelligence Scale (WAIS)

WAIS is a scale that evaluates intelligence on a multidimensional level and is applied individually. In 1945 when Wechsler developed WAIS, it could be administered to individuals at the age of 16 and above, with 11 sub-tests evaluating verbal and performance skills. Reliability and validity of the Turkish version of the scale was provided by Epir and İskit. Even though the reliability and validity of the scale was ensured, Turkish norms are not yet available (Wechsler 1974, Epir 1972).

Procedure

This study started after introducing the aim of the research, answering the questions of volunteers and signing of the informed consent forms. All cases included in the study were administered with the K-SADS-PL, which is a test assessing sociodemographic characteristics and comorbid psychiatric disorders, during a clinical interview in the first application. After that, in order to determine intelligence level of cases, WISC-R was administered to cases under 16 years old and WAIS was administered to cases who were aged 16 years and above. The PST group consisted of 30 cases, and the study was completed by dividing them to sub groups with each group including a minimum of 5 and maximum 10 cases.

Two specialists ran the PST sessions together the first is a lecturer and Mental Health Specialist as well as a cognitive behavioral therapist; the second one is a Research Assistant in Child and Adolescent Psychiatry. Before starting the procedure, a meeting was held with Prof. Dr. Mehmet Eskin who

pioneered the use of PST in Türkiye and conducted studies in this area. The researchers received training on problem solving therapy. The training materials were obtained and studies in the field of PST were examined. The contents of structured sessions were prepared together.

All cases included in the study group were administered with problem solving therapy. PST involves 8 stages. In this study, for the regular attendance of adolescents, therapy sessions were planned to be completed in 5 weeks and each session lasted 45 minutes. During this time, outpatient follow-up controls of cases continued without interruption. In sessions participants played warm-up games; then the agenda was set with theoretical explanations always being supported with practice, and at the end homework was given. During the sessions, the story of an addicted adolescent was told; examples from this story were given to facilitate the active participation of the cases in detecting problems and finding solution options. Cases included in the control group continued their regular follow-ups in the center. Social Problem-Solving Inventory-Revised (SPSI-R), Beck depression inventory (BDI), Screen for Child Anxiety Related Emotional Disorders (SCARED), Addiction profile index (API) (adolescent form) and Treatment motivation questionnaire (TMQ) were administered to all cases at the beginning of study and on the 5th week of the study.

Stages of Problem Solving Therapy

Evaluation and debriefing interview: This constitutes the first interview with participants. The aim of this stage is to create a collaborative trust environment by evaluating the individual's existing complaints and their problem solving skill levels and informing them about the content of therapy.

Problem orientation training: The purpose of this second session is to assist individuals in recognizing their existing problems and exhibiting positive attitude while tackling these problems. In this stage, our aim was to develop a mindset of positive problem orientation in our cases. This mindset involves believing that problems can be solved, seeing problems as a part of life, and not evading the issues.

Describing problems: In this stage, reasons or problems that contribute to existing distress or complaints of individuals are identified and formulated. The aim is to evaluate and describe problems that can cause distress by answering the questions of where, when, how often and with whom these problems occur.

Setting goals: After overcoming existing problems, the individual tries to evaluate his/her current situation and set goals with a realistic attitude. This session is centered around the question of whether the goals set by the individual have to do with changing the problem or decreasing the emotional impact thereof.

Coming up with possible solution options: The aim of this stage is to create as many solutions as possible to the existing problem. All possible solutions are noted down without discussing whether it is suitable or effective.

Choosing a suitable solution option: All solution options are evaluated according to their problem solving and goal achieving power and acceptability and applicability with the highest rated option being selected at the end.

Implementing the solution: This is the stage where the individual is prepared for the implementation. For this, all advantages and disadvantages of such implementation are discussed with the person in advance.

Evaluation of the Procedure: At this stage, results of the implementation are evaluated by asking whether the problem is solved or not, and whether the goal is achieved or not. In the case of an unsuccessful implementation, all stages are reviewed. If there is an error in the implementation of a particular stage, the procedure is backtracked and started again from there.

In our study, the 8-stage PST sessions were administered as follows:

1. **Week:** Evaluation, debriefing, and problem orientation training (1. and 2. stages)
2. **Week:** Describing problems (3. stage)
3. **Week:** Setting goals and coming up with possible solution options (4. and 5. stages)
4. **Week:** Choosing the suitable solution option and implementing the chosen solution (6. and 7. stages)
5. **Week:** Evaluating the whole procedure (8. stage)

Statistical Method

The data was evaluated with the SPSS (The Statistical Package for Social Sciences) 22.0 software package. Normality assumption was evaluated by using the Shapiro-Wilk and Kolmogorov-Smirnov tests for normality. Chi-Square test, independent samples T-test and McNemar test were used for the comparison of the groups. In repeated application of scales for evaluating the potential differences between groups, "repeated measures analysis of variance" was used, with $p < 0.05$ being accepted as statistically significant. In order to show the significance level of findings, the p value was input directly.

RESULTS

The PST group consisted of 16 (53.3%) girls and 14 (46.7%) boys. The control group consisted of 5 (31.2%) girls and 11 (68.8%) boys. The mean age of participants was

16.3 (PST: 16.2, control: 16.5). Groups were similar to each other in terms of the mean age of participants and gender distribution ($p=0.124$, 0.152). Nearly half of participants were not attending school (52.2%). Looking at the rates of psychiatric comorbidities, attention deficit and hyperactivity was found to be (ADHD) 82.6% ($n=38$), conduct disorder (CD) 30.4% ($n=14$), oppositional defiant disorder (ODD) 63% ($n=29$), major depressive disorder (MDD) 41% ($n=19$), and anxiety disorder (AD) 28.4% ($n=13$). It was found that sociodemographic and clinical characteristics of groups were similar to each other. The relevant data are shown in detail under Table 1.

Tobacco and substance use rates of groups are as follows: tobacco 91.3%, alcohol 93.5%, cannabis 93.5%, ecstasy 69.6%, synthetic cannabinoids 69.6%, inhalants 45.7%, heroin 8.7%. Starting ages are; for tobacco use 12.3, for alcohol 13.4, for cannabis 13.8, for ecstasy 14.5, for synthetic cannabinoids 15.1, for inhalants 14.6, and for benzodiazepines 14.8 years old. Tobacco, alcohol, ecstasy, synthetic cannabinoids, inhalants, benzodiazepines, and heroin rate of use ($p=0.759$, 1.000 , 0.274 , 0.316 , 0.512 , 0.095 , 1.000 , 0.602), starting ages ($p=0.532$, 0.818 , 0.527 , 0.609 , 0.667 , 0.440 , 0.724) and amounts of tobacco use ($p=0.286$) of groups were found to be similar.

The groups' initial BDI, SCARED, TMQ, API, SPSI-R average scores were found to be similar ($p=0.702$, 0.523 , 0.318 , 0.344 , 0.091). After 5 weeks a significant decrease was observed in BDI and SCARED scores of both groups ($p=0.001$); but in terms of such decrease there was no significant difference between the groups ($p=0.645$, 0.654). It was seen that TMQ and SPSI-R scores increased in the PST group and decreased in the control group; however, the rate of change was not significant ($p=0.998$, 0.961). In the course of time, SPSI-R and TMQ scores increased in the PST group and decreased in the control group. As a consequence, a significant difference was found between groups ($p=0.045$, 0.037). Changes in scale scores are presented in detail in Table 2.

When the groups were evaluated in terms of BDI cutoff scores, it was seen that in the first measurement, 80% of the PST group was in the "depressed" category ($n=24$). In the second measurement this rate decreased with only 30% of group falling in the "depressed" category ($n=6$). This change was statistically significant ($p=0.001$). In the control group, it was observed that in the first measurement 81.2% of the group was in the "depressed" category ($n=13$) and in the second measurement that the same rate decreased down to 56.2% ($n=9$). This change was found not to be statistically significant ($p=0.125$). Table 3 presents the changes in BDI cutoff scores.

Table 1. Comparison of Sociodemographic and Clinical Characteristics of PST and Control Groups

		PST		Control		Total		X ² /t	P
Gender (n-%)	Girl	16	53.3	5	31.2	21	45.7	2.051 ^a	0.152
	Boy	14	46.7	11	68.8	25	54.3		
Age (mean-SD)		16.2	0.92	16.5	0.62	16.3	0.84	-1.571 ^b	0.124
SES (n-%)	Low	11	36.7	6	37.5	17	37	0.138 ^a	0.933
	Medium	12	40	7	43.8	19	41.3		
	High	7	23.3	3	18.8	10	21.7		
School (n-%)	Vocational high school	23	85.2	9	60	32	76.2	4.243 ^a	0.236
	Other	7	14.8	7	40	14	23.8		
School attendance (n-%)	Yes	16	53.3	6	37.5	22	47.8	1.416 ^a	0.493
	No	14	46.7	10	72.5	24	52.2		
Mother's age (mean-SD)		42.5	6.2	41.5	5.7	42.2	6.02	0.534 ^b	0.596
Father's age (mean-SD)		48.3	7.6	47.7	4.7	48.1	6.63	0.313 ^b	0.756
Psychiatric application (n-%)	Mother	9	30	3	18.8	12	26.1	0.685 ^a	0.498
	Father	7	28	2	12.5	9	22	1.368 ^a	0.441
Family characteristics (n-%)	Nuclear	20	66.7	14	87.5	34	73.9	2.643 ^a	0.267
	Extended	2	6.7	0	0	2	4.3		
	Fragmented	8	26.7	2	12.5	10	21.7		
Smoking (n-%)	Mother	16	53.3	6	37.5	22	47.8	1.048 ^a	0.306
	Father	20	80	11	68.8	31	75.6	0.670 ^a	0.472
Regular alcohol use (n-%)	Mother	0	0	0	0	0	0	0.006 ^a	1.000
	Father	8	32	1	6.2	9	22	3.907 ^a	0.142
Intelligence Level (n-%)	Borderline (70-79)	0	0	1	6.3	1	2.2	2.798 ^a	0.424
	Low Average (80-89)	4	13.3	1	6.3	5	10.9		
	Average (90-110)	24	80	12	75	36	78.6		
	High Average (111-120)	2	6.7	2	12.5	4	8.7		
Psychiatric Comorbidity (n-%)	ADHD	23	76.7	15	93.8	38	82.6	2.12 ^a	0.230
	CD	12	40	2	12.5	14	30.4	3.72 ^a	0.092
	ODD	21	70	8	50	29	63	1.79 ^a	0.181
	MDD	12	40	7	43.8	19	41.3	0.061 ^a	0.806
	AD	8	26.7	5	31.2	13	28.3	0.108 ^a	0.744
	No Diagnosis	2	6.7	1	6.2	3	6.5	0.003 ^a	1.000

PST: Problem Solving Therapy, SD: Standard Deviation, SES: Socioeconomic Status, ADHD: Attention Deficit Hyperactivity Disorder, CD: Conduct Disorder, ODD: Oppositional Defiant Disorder, MDD: Major Depressive Disorder, AD: Anxiety Disorder.

a: Chi Square Test, b: Independent Sample T-Test, p<0.05

Table 2. Comparison of Baseline Values and Changes in Scale Scores

	1.evaluation				2.evaluation			Change		Between-group difference
	PST	Control	t	P*	PST	Control	F	P**	F	P**
BDI	20.5	19.1	0.385	0.702	9	12.8	33.326	0.001	0.215	0.645
SCARED	27.4	30.1	0.645	0.523	22.7	23.9	13.384	0.001	0.204	0.654
TMQ	81.2	87.6	1.011	0.318	89.1	79.8	0.001	0.998	4.272	0.045
API	8.5	9.6	0.957	0.344	8.2	9.9	0.001	0.977	1.647	0.206
SPSI-R	12.5	11.2	1.728	0.091	13	10.7	0.002	0.961	4.657	0.037

PST: Problem Solving Therapy, BDI: Beck Depression Inventory, SCARED: Screen for Child Anxiety Related Emotional Disorders, TMQ: Treatment Motivation Questionnaire, API: Addiction Profile Index, SPSI-R: Social Problem Solving Inventory-Revised

*Unpaired T-test, p<0.05

**Repeated measures analysis of variance p<0.05

Table 3. Comparison of the Change of BDI According to the Cut-off Score

	BDI >9				
	evaluation		evaluation		P
	f	%	f	%	
PST	24	80	6	30	0.001*
Control	13	81	9	56.2	0.125

PST: Problem Solving Therapy, BDI: Beck Depression Inventory

*McNemar test, $p < 0.05$

DISCUSSION

This study intends to examine the effects of PST, a cognitive behavioral therapy method, on adolescents who have substance use disorder. At the end of study, BDI and SCARED scores decreased significantly in both groups but a statistically significant difference was not found between the two groups. While mean SPSI-R and mean TMQ scores increased in the PST group, these scores decreased in the control group and a significant difference was found between the groups. As mean API scores decreased in the PST group, the same increased in the control group. However, there was no significant difference between the groups. When the groups were compared according to their BDI score categories, in the PST group the number of cases in the “depressed” category significantly decreased; yet there was no significant decrease in the control group.

Cognitive Behavioral Therapy (CBT) methods are used effectively in depression treatment by themselves or in combination with pharmacotherapy. In the treatment of children and adolescents who are diagnosed with mild to moderate major depressive disorder (MDD), CBT is recommended as the first option (Melvin et al. 2006). In studies falling within the scope of Treatment of Adolescent with Depression (TADS) wherein 4 different treatment methods (medication, medication+CBT, CBT, and placebo) are compared, it was reported that medication+CBT treated depression faster than fluoxetine treatment or CBT treatment alone (AACAP 2007, TADS Team 2009). Similarly, in the study titled “Treatment of SSRI-Resistant Depression in Adolescents (TORDIA)” it was found that on the 12th week, medication+CBT was more effective than only medication (AACAP 2007). The present study confirms the findings in the literature in that PST administered in addition to routine treatment gives way to a more positive change according to evaluations made over the BDI cutoff scores.

In a study including 6050 adults who use alcohol, it was reported that the group that was diagnosed with alcohol addiction diagnosis according to DSM-IV had 4 times higher MDD comorbidity when compared to the group that was not diagnosed with alcohol addiction (Hasin & Grant 2002). ASUD may give way to other disorders or, more frequently, it follows other disorders. It is known that adolescents diagnosed

with ASUD have a psychological disorder which possibly had its outset in childhood, that affects etiology and treatment (Kaplan & Sadock 2012). Considering the fact that MDD is a disorder that disrupts the psychosocial adaptation of an individual, similarly to our study, it could be said that treating this disorder will positively contribute to ASUD treatment.

Looking at the efficacy of PST in the treatment of MDD in adolescents, a study conducted in Türkiye included 27 adolescents and young adults in the problem solving group and 19 adolescents and young adults in the wait list, all between the ages of 15-18. Said cases were administered with 6 sessions of PST. BDI scores showed that in the PST group 77.8% of participants were considered to be treated; however, in the control group only 15.8% of participants were treated. In addition to this, researchers conducted a follow-up interview one year after the study, with results showing that treatment gains were maintained (Eskin et al. 2008). In another study, 22 cases were included in the problem solving group and 23 in the waitlist group, with the ages of the participants ranging between 12-21 years old. This study revealed that depression scores of the PST group decreased significantly (Hoek et al. 2012). Our study was found to confirm these two studies evaluating depression scores. On the other hand, our study differs from other studies in that it only involves adolescents.

In a meta-analysis examining the effects of CBT on adolescents who are diagnosed with anxiety disorder (AD) a comparison of 3 treatment types as CBT+medication, CBT treatment alone and medication alone was performed. In turn, response to treatment rates were reported to be 68%, 46% and 46% respectively. 36 weeks later, response treatment rates were reported to be 73%, 52% and 52% in the same order (Kendall & Peterman 2015). In a controlled study where a CBT method titled “Coping Cat Program” was applied to 488 children and adolescents between 7-17 years old, it was found that all CBT, medication and CBT+medication methods were effective, as well as CBT+medication being found superior to other methods (Kendall et al. 2016). In another meta-analysis encompassing 44 different studies comparing different CBT methods in treatment of anxiety disorders as counselling, CBT and PST, all methods were found effective but differences between the methods were not statistically significant (Cape et al. 2010).

Our study found that the decrease in mean SCARED scores was statistically significant in the PST group, which corresponds to other studies in the literature that state combined treatment approaches are effective in the treatment of anxiety disorders. However, no studies were found in the literature wherein the implementation of problem solving therapy in the treatment of anxiety disorder in children and adolescents was practiced.

Patients who present with ASUD-comorbid anxiety disorder display the following characteristics: higher levels of incapacity, heavier drinking/smoking, worse social adaptation, higher hospitalization numbers and more severe psychiatric distress (Grant et al. 2005, Burns et al. 2005). A longitudinal follow-up study on generalized anxiety disorder patients reported that ASUD comorbidity decreases the possibility of treatment for generalized anxiety disorder and also increases its recurrence probability (Bruce et al. 2005). It is observed that there is a frequent comorbidity between ASUD and anxiety disorder (as well as other mental disorders) and that this comorbidity affects response to treatment rates. It could be deduced that the treatment of anxiety disorder is an effective option in treating ASUD.

Motivation is an internal state affected by external factors and is therefore changeable. Motivation is necessary in the treatment of addiction. In a study assessing 170 adolescents between 13-18 years old who are diagnosed with ASUD, the cases received CBT for 10 weeks and it was reported that their treatment motivation increased. The same study emphasizes that with the increase of treatment motivation, the amount of substance use decreased (Kaminer et al. 2016). A longitudinal follow-up study conducted in 2011 evaluated addiction severity and treatment motivation of 167 adults diagnosed with ASUD through psychometric scales. As a result it was stated that high treatment motivation was a predictor of low addiction severity (Korcha et al. 2011). During a study wherein 142 patients who were receiving smoking cessation treatment were evaluated, all cases were examined 3 times; before treatment, after CBT+medication treatment and 6 months after treatment, and it was emphasized that the success of treatment was significantly related to low levels of anxiety and depression and to high levels of treatment motivation (Pawlina et al. 2015). In our study, it was found that receiving PST in addition to regular treatment increased treatment motivation and this result is compatible with literature.

Cognitive behavioral group therapy (CBGT) seem to be more practical in terms of its low cost and power of reaching more people. In a review study assessing CBGT involving the adult age group, it was found that CBGT is generally more efficient than standard treatments. In the same study, CBGT was compared with pharmacotherapy and it was found that the efficiency of CBGT alone is similar to medication treatments (Yıldırım & Sütçü 2016). In a study published in 2014, 279 cannabis addicts between 16-63 years old were examined,

with 149 of them receiving combined treatment (CBT, motivational therapy and problem solving training together) and the remaining 130 being kept in the waitlist group. At the end of treatment, it was reported that cannabis use decreased in a statistically significant manner in the therapy group compared to the waitlist group. Also, the amount of cannabis use and problems associated with cannabis use decreased significantly in the therapy group (Hoch et al. 2014). Another study was conducted with 240 young adults who had cannabis dependence according to DSM-IV with all participants being randomly assigned to 4 groups. Each group received different modes of treatment as follows: the 1st group had a standard psychiatric interview, the 2nd group motivational interview and CBT, the 3rd group contingency management and avoidance reinforcement approach, and the 4th group motivational therapy, CBT and additionally, contingency management. At the end of treatment these four groups were compared and it was seen that the decrease in substance use frequency and intensity was lowest in the standard therapy group and such frequency and intensity was significantly decreased in the contingency management group. 1 year later cases were evaluated again and it was determined that individuals in the combined therapy group used significantly less amounts substance and that the severity of their addiction decreased (Kadden et al. 2007). In 2009, a controlled study was conducted with adolescents who were between 14-18 years of age and had cannabis addiction; one group received motivational therapy+CBT+contingency management and psychoeducation was delivered to their families, and the other group was included in the waitlist. 69 adolescents were included in this study and 3 months, 6 months and 9 months after treatment, the cases were evaluated in terms of their restarting cannabis use. In all measurements, restarting rates were significantly less in the group receiving therapy when compared to the control group (Stranger et al. 2009).

In the literature, we found a study wherein PST was administered in substance use disorder treatment in the adolescent age group. In this study, 29 cases received family supported behavioral therapy, and 27 cases were included in the individual PST group. Results of satisfaction scale for young people, satisfaction scale for family and urine tests showed that there was a statistically significant decrease in substance use for both groups; besides this, it was emphasized that none of the methods applied was superior to the others (Azrin et al. 2000).

In the literature there were 7 studies practicing CBGT including problem solving therapy in the treatment of alcohol use disorder in adults. In a study involving 78 convicted adult males diagnosed with alcohol addiction according to DSM-IV, it was found that CBGT including problem solving training is superior to 12-step programs (Easton et al. 2007). In another study comparing naltrexone, CBGT and placebo, it was emphasized that CBGT including naltrexone+problem solving training reduced cravings for alcohol more (O'Malley

et al. 2007). In a study comparing CBGT including problem solving training to motivational group intervention (MGI), it was reported that CBGT including problem solving training is superior to motivational group intervention (Rosenblum et al. 2005). In a study conducted in our country which examined 90 alcohol dependent patients, CBGT including problem solving training was administered alongside standard therapy procedures; yet a control group was not established for the study. In the follow-up it was found that 72.3% of cases were in remission (Türkcan et al. 2001). Our study shows that adding PST to regular interviews decreases addiction severity and also that CBT approaches decrease addiction severity; thus, the findings of our study are in accord with the literature. However, the difference between groups was not statistically significant. This could be explained with the inadequate size of the sample, methodological differences and the application of a different intervention method.

The literature includes a study wherein SPSI-R is administered to adolescents diagnosed with ASUD. In said study it was reported that with PST, the subscale mean scores for PPO (positive problem orientation) and RPS (rational problem solving) increased whereas NPO (negative problem orientation), ICPSS (impulsive-careless problem solving style), APSS (avoidant problem solving style) subscale mean scores decreased (Azrin et al. 2001). In our study, mean SPSI-R scores increased in the PST group and decreased in the control group. It was seen that such changes were statistically significant ($p=0.037$). When evaluated in terms of subscale scores, there was no statistically significant difference between the groups.

CONCLUSION AND LIMITATIONS

In ASUD treatment for adolescents, in addition to pharmacotherapy, psychosocial interventions are needed. Nowadays CBT techniques are practiced in centers that administer such treatment, but this procedure is not prevalent and has not become the standard. As a cognitive behavioral intervention method, PST could be considered as an effective option. Our study is the first one in Türkiye examining an intervention method applied to adolescents with addiction. The limitations of our study were as follows: low number of cases, case numbers in the groups not being equalized, gender distribution not being homogenous, blind procedure not being used while forming and evaluating the groups, interventions administered to groups not starting at the same time, case numbers included in groups not being equal, and power analysis not being performed at the beginning of the study. Different studies which do away with these limitations and evaluate the long term results are needed.

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