

Association Between Cognitive Distortions and Childhood Traumas with Medication Adherence of Patients with Major Depressive Disorder

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ABSTRACT

Background: We sought to investigate the effect of various cognitive distortions (CD) on medication adherence of patients with major depressive disorder (MDD) in terms of primary outcomes and determine whether CDs may be related with childhood traumas with secondary outcomes. We also analyzed whether a significant relation exists between childhood traumas and medication adherence and whether CDs play a mediating role between them.

Method: A total of 88 patients who applied to the psychiatric clinic in January–June 2019 for inpatient and outpatient treatment were included in this cross-sectional study. A sociodemographic childhood trauma questionnaire, cognitive distortion scale and Morisky medication adherence scale were used to assess the subjects in this study.

Results: Significant differences were observed between low and moderate-high medication adherence groups in terms of specific CDs. Physical and emotional abuses were positively correlated with CDs. Physical and emotional neglect was negatively correlated with mind reading CD. Significant negative correlations were noted between medication adherence and childhood traumas. Minimizing positive CD showed a significant mediating role between physical abuse-type trauma and medication adherence in the evaluation of each CD ($p=0.041$).

Conclusion: Minimizing the positive was negatively associated with treatment adherence in both interpersonal relationships and personal achievement. Childhood abuse was positively associated with several CDs, whereas

neglect was negatively associated with mind reading CDs. Significant negative correlations were found between medication adherence and childhood traumas. Only physical abuse may disrupt medication adherence by minimizing the positive. But, in general, childhood traumas played no mediating role between CDs and treatment adherence. Further studies with large sample size are needed.

INTRODUCTION

Cognitive distortion (CD) refers to the misinterpretation in reasoning for events and a maladaptive way of thinking (1). CD is one of the fundamental targets of cognitive therapies (2). Common CDs include mind reading, catastrophizing, all-or-nothing thinking, emotional reasoning, labeling, mental filter, overgeneralizations, personalization, “should” statements and minimizing the positive (2, 3). Many studies have shown that CDs are associated with affective symptoms and major depression (4-6). There are many unfavorable CDs about self-assessment in depression (6). Moreover, vulnerability to stressful life events in patients with depression is associated with these CDs (5).

Childhood abuse can be defined as the damage inflicted on the physical, emotional, sexual or mental development of the child as a result of the active actions of people obliged to look after the child (7). The destructiveness of childhood traumas in the mental health of children continues at a severe or moderate level throughout their life. Individuals subject to childhood traumas assign more emotional reactions to daily stressors in the later stages of their lives (8, 9).

Studies carried out in Turkey have affirmed that childhood traumas cause impacts of depressive temperament and negative self-esteem during adulthood periods of individuals (10, 11). Also past trauma can disrupt the victims' cognition and alter schemas in evaluating themselves and the external environment (12)

Non-adherence to treatment is defined as not using a drug at the dose recommended by the doctor, failure to comply with the hours of use of the drug or early discontinuation of medication. The rate of non-adherence with treatment is higher in psychiatric patients than in other medical conditions (13). In almost all diseases, especially chronic diseases, the problem of adherence to treatment is an important phenomenon that prevents the success of treatment. Subsequent treatment is as important as the patient's treatment during an acute attack. Adherence with treatment reduces the number of hospital admissions and morbidity (14).

Non-adherence to treatment results in negative consequences by preventing adequate treatment from all mental illnesses (15, 16). Non-adherence to treatment is a risk factor for nonresponse and early relapse in major depression (17). In literature review, we found no study about medication adherence and CDs in mental disorders. However, negative CDs were found to cause less adherence with behavioral treatments in patients with diabetes mellitus and cardiovascular diseases (18, 19). Restructuring distortions with CBT is a fundamental treatment of depression (20); the same distortions affect the adherence of patients and may lead to a vicious circle. Thus, determining the CDs associated with medication adherence is an important issue.

Both pharmacotherapy and cognitive behavioral therapy (CBT) effectively treat depression (21), although the combination of both is more effective than CBT alone (22). However, no study has indicated the existence of CDs that affect adherence to the combination of CBT and pharmacotherapy, which is the most effective treatment.

Knowing the CDs that interfere with medication adherence in patients receiving combined therapy may be another factor to guide therapy for patients with depression. Therefore, we sought to investigate the effect of various CDs on medication adherence of patients with major depressive disorder (MDD). We also intended to determine the CDs that may be related with childhood traumas. We hypothesized the existence of a significant relation between childhood traumas and medication adherence and the possible mediating role of CDs between them. We also tested this hypothesis between medication

adherence and childhood traumas using sub-dimensions of each assessment tool.

METHODS

STUDY POPULATION AND DATA COLLECTION

This descriptive study included patients diagnosed with MDD in accordance with the DSM-5 criteria, as assessed by a psychiatrist, and admitted to the outpatient clinic of Gaziantep University Sahinbey Research and Application hospital in Gaziantep, Turkey between January–June 2019.

A total of 88 volunteer patients met the inclusion criteria and agreed to participate in the study. The patient exclusion criteria were as follows: age below 18 years, presence of one comorbid mental disorder (mental retardation, substance abuse, anxiety disorders, etc.), history of head trauma and neurological disease conditions (epilepsy, cerebrovascular event, Parkinson's disease, etc.). Inclusion criteria were being over 18 years of age and being followed up for MDD diagnosis for at least three months. The included patients gave their oral and written consent, and the approval for the study was obtained from the Medical Ethics Committees of the Gaziantep University (2019/113).

ASSESSMENT TOOLS

Personal information forms, Childhood Trauma Questionnaire (CTQ) and Cognitive Distortions Scale (CDS) were implemented by a psychiatric nurse during face-to-face interviews to acquire data.

CHILDHOOD TRAUMA QUESTIONNAIRE (CTQ)

CTQ has been developed by Bernstein et al. (23) to determine childhood sexual, physical and emotional abuses and emotional and physical neglect. The questionnaire consists of 28 items. CTQ was translated into Turkish by Şar et al. (24) This questionnaire contains five available sub-dimensions: physical negligence clauses, emotional neglects, physical abuse, emotional abuse clauses and sexual abuse articles.

COGNITIVE DISTORTIONS SCALE (CDS)

Covin et al. (3) developed the CDS (types of thinking scale), which measures 10 CDs, such as mind reading, catastrophizing or all-or-nothing thinking in interpersonal (social) and achievement domains. The Turkish validity and reliability study of the CDS was conducted by Ardanıç (25). The scale consists of 10 items, and each item was structured to evaluate CDs separately in interpersonal (social) and achievement domains. The items include mindreading, catastrophizing, all-or-nothing thinking, emotional reasoning, labeling,

mental filter, overgeneralization, personalization, “should” statements and minimizing the positive. In these 10 questions, CDS related to interpersonal relationships (IPR) and personal achievement (PA) were evaluated in two groups with separate questions. The choices of the questionnaire were scored in 7-point Likert scale, with scores varying between 1: Never and 7: Always. The Cronbach alpha coefficient of the scale was 0.92 (26).

MORISKY MEDICATION ADHERENCE SCALE (MMAS)

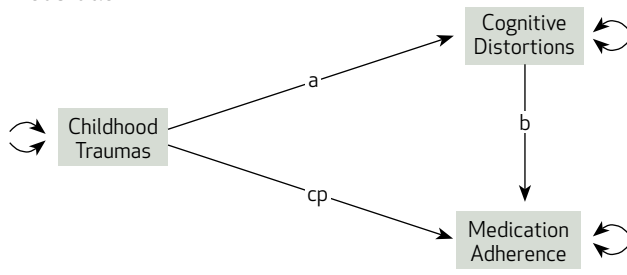
The scale was developed by Donald E. Morisky. In 1986, Morisky, Green and Levine conducted a validation study (27). The scale consists of four two-choice (yes/no) closed-ended questions. If all of the questions were answered with “no,” then drug adherence was considered high, if one or two questions were answered with “yes,” then drug adherence was considered moderate, and if three or four questions were answered “yes,” then drug adherence was considered low. A Turkish validity and reliability study was conducted by Yılmaz (28).

STATISTICAL ANALYSIS

Statistical Package for Social Sciences (SPSS) 24.0 (IBM Corporation, New York, United States) software was used for variable analyses. Normal distribution of data was assessed with the Shapiro–Wilk test. The relationships between the numerical variables were tested via Spearman’s correlation coefficient. Mean ± standard deviation for numerical variables and the number and percentage for categorical variables were given as descriptive statistics. P < 0.05 was considered as statistically significant.

We calculated the direct and indirect effects of a predictor in the path models of mediation and moderation (Figure 1). A bootstrapping method was used to calculate confidence intervals for the indirect effects. Mediation models are extended regression models showing the explicit effects of particular covariates in the model. Moderation

Figure 1. Mediation Analyses: Direct and Indirect Effects of Childhood Traumas in the Path Models of Mediation and Moderation



was conducted by multiplication of the predictor variables. We tested a few different three-variable mediation models. In a three-variable mediation model, the independent variable childhood trauma was assumed to cause the mediator “cognitive distortions,” resulting in dependent variable “treatment adherence,” which explains the effect of childhood trauma on cognitive distortions and partly or fully the effect of cognitive distortions on treatment adherence. IBM SPSS for Windows (Version 21.0, Armonk, NY, IBM Corp.) was used for statistical analysis.

RESULTS

This study included 88 patients, of which 63% were female and 37% were male. A total of 25% of the patients were between the ages of 18-24, 52.3% were married, and 37.5% had no children. Table 1 shows the sociodemographic data of the patients.

Table 1. Distribution of Socio-Demographic and Clinical Characteristics of Patients with Major Depressive Disorder

Description	N	%	Description	N	%		
Age	18-24	22	Hospitalizations	No	40	45.5	
	25-29	13		14.8	1	28	31.8
	30-34	18		20.5	2-5	16	18.2
	35-39	8		9.1	5-10	1	1.1
	40-44	9		10.2	10 and above	3	3.4
	45-49	5	5.7	Physical diseases	No	66	75
50 and above	13	14.8	Yes		22	25	
Marital status	Married	46	52.3	Suicide attempt history	Yes	32	36.4
	Single	28	31.8		No	56	63.6
	Divorced	14	15.9	Regular polyclinic admissions	Yes	62	70.5
Siblings	No	33	37.5		No	26	29.5
	1	14	15.9	Smoking	Yes	39	44.3
	2	14	15.9		No	49	55.7
	3 and above	27	30.7	Alcohol	Yes	20	22.7
Education	Illiterate	7	8		No	68	77.3
	Literate	13	14.8	Onset age	Under 18	12	13.6
	Primary school	34	38.6		18-25	19	21.6
	High school	11	12.5		25-30	20	22.7
	University	23	26.1		30-40	21	23.9
					40 and above	16	18.2

Among the patients, 45.5% had no hospitalization, 23.9% reported an age of onset between 30-40 ages, 63.6% had no records of suicide attempt, 70.5% claimed regular clinic visits, and 44.3% were smokers (Table 1).

Of the 88 patients included in the study, 44, 35 and 9 showed low, moderate and high medication adherence, respectively. Given the imbalance in the distribution of the groups, the patients were divided into two groups: low and moderate-high medication adherence.

No significant difference was found between low and moderate-high treatment adherence groups in terms of age, gender, marital status, the number of children,

educational status, age of onset, the number of hospitalizations, smoking, alcohol, substance use, suicide attempts and regular visits compared with the controls.

Significant differences were observed between low and moderate-high medication adherence groups in terms of specific CDs. CDs that showed significant levels include all-or-nothing thinking, emotional reasoning, labeling and minimizing the positive in IPR CD and all-or-nothing thinking, emotional reasoning and “should” statements in personal achievement (PA) CD (Table 2).

Physical abuse was correlated with CD in both IPR and PA. Emotional abuse was correlated with CD in PA. Total CDs in IPR was highly correlated with total CDs in PA. Also physical abuse was correlated with emotional abuse (r: 0.71) and sexual abuse (r: 0.71) (Table 3).

When the correlation of each cognitive distortion with each type of childhood trauma was evaluated only the following correlations were found to be significant.

- Physical neglect was negatively correlated with mind reading in PA (r: -235, p = 0.028).
- Emotional neglect was negatively correlated with mind reading in PA (r: -269, p = 0.011).
- Emotional abuse was positively correlated with all-or-nothing thinking in PA (r: +299, p = 0.005), and minimizing the positive in IPR (r: +250, p = 0.019), but negatively correlated with “should” statements in PA (r: -241, p = 0.024)
- Physical abuse was positively correlated with labeling in IPR (r: +265, p=0.012), personalization in PA (r: +280, p = 0.008), personalization in IPR (r: +293, p = 0.006), “should” statements in IPR (r: +249, p = 0.019) and minimizing the positive in IPR (r: +327, p = 0.002).
- Sexual abuse was positively correlated with labeling in IPR (r: +220, p = 0.039), personalization in PA (r: +304, p = 0.004), personalization in IPR (R: +262, p = 0.014) and minimizing the positive in IPR (r: +267, p = 0.012).

Based on the analysis results on the hypothesis, CDs played no significant mediating role between CTQ and medication adherence. However, in the evaluation of each CD, minimizing the positive CD IPR had a significant mediating role between physical abuse and medication adherence (p = 0.041). Table 4 shows the CDs with significant mediating roles.

Table 2. The Comparison of the Items of Questionnaire of the Cognitive Distortions Scale and the Morisky Medication Adherence Scale Total Score Mean of Patients with Major Depression

Means of Questionnaire of the Cognitive Distortions Scale	Low medication adherence group (N=44)	Moderate-high medication adherence group (N=44)	P
Total Score Means of CDs related to personal achievement	42.09±10.5	35.0±11.4	<0.001*
Total Score Means of CDs related to interpersonal relationships	42.09±9.9	35.63±11.6	<0.001*
Means of Each CDs related to interpersonal relationships			
Mind Reading	4.20±1.65	4.22±1.85	0.909
Catastrophizing	4.31±1.5	3.61±1.6	0.043*
All-or-Nothing Thinking	4.13±1.8	3.13±1.7	0.014*
Emotional Reasoning	4.86±1.5	3.95±1.7	0.008*
Labeling	4.04±1.6	3.15±1.7	0.009*
Mental Filter	4.29±1.66	3.63±1.86	0.094
Over Generalization	3.93±1.68	3.59±1.82	0.385
Personalization	4.04±1.65	3.50±1.77	0.120
Should Statements	3.86±1.23	3.40±1.72	0.068
Minimizing the Positive	4.38±1.5	3.40±1.6	0.004*
Means of Each CDs related to personal achievement			
Mind Reading	4.31±1.49	3.84±1.65	0.161
Catastrophizing	4.00±1.64	3.72±1.84	0.515
All-or-Nothing Thinking	4.56±1.7	3.25±2.0	0.002*
Emotional Reasoning	4.65±1.5	3.47±1.7	0.001*
Labeling	3.90±1.69	3.27±1.56	0.062
Mental Filter	4.45±1.54	3.77±1.73	0.064
Over Generalization	4.02±1.57	3.59±1.82	0.225
Personalization	4.04±1.91	3.38±1.99	0.100
Should Statements	4.15±1.7	3.25±1.7	0.010*
Minimizing the Positive	3.95±1.44	3.43±1.73	0.092

*p<0.005

DISCUSSION

In this study, we investigated the relationship among treatment adherence, medication adherence and the child-

Table 3. Correlation of Cognitive Distortions Scale, Childhood Trauma Questionnaire and Morisky Medication Adherence Scale of Patients with Major Depressive Disorder

		1	2	3	4	5	6	7	8	9	10
1	CTQ	1									
2	CTQ_PN	0.51**	1								
3	CTQ_EN	0.68**	0.27*	1							
4	CTQ_PA	0.78**	0.31**	0.36**	1						
5	CTQ_EA	0.8**	0.33**	0.36**	0.71**	1					
6	CTQ_SA	0.77**	0.36**	0.34**	0.71**	0.62**	1				
7	CD	0.15	0	0.05	0.26*	0.25*	0.2	1			
8	CD IPR	0.12	0.03	0	0.25*	0.21	0.19	0.97**	1		
9	CD PA	0.15	-0.03	0.08	0.24*	0.27*	0.18	0.98**	0.9**	1	
10	Medication adherence	-0.42**	-0.3**	-0.3**	-0.3**	-0.44**	-0.4**	-0.44**	-0.43**	-0.44**	1

* p < 0.05, ** p < 0.001

EN: Emotional neglect, PN: Physical Neglect, PA: Physical Abuse, EA: Emotional Abuse, SA: Sexual Abuse, CD IPR: Total CDs related to interpersonal relationships, CD PA: Total CDs related to personal achievement

hood traumas that may affect the formation of CDs in patients with MDD. We also evaluated the CDs associated with medication adherence that could be given priority for combined therapy. We noted that physical and emotional neglect were correlated with mind reading CD negatively, whereas physical, emotional and sexual abuses were positively correlated to some other CDs. As physical and emotional abuse scores increased, the total scores of CDs in PA increased proportionally. The patients with low medication adherence showed more CDs, including all-or-nothing thinking and emotional reasoning, in both PA and IPR. Minimizing the positive CD had mediating role between physical abuse and treatment adherence.

The total CD score was higher in patients with low adherence than those with moderate-high adherence. All-or-nothing thinking, emotional reasoning, labeling and minimizing the positive in IPR CD and all-or-nothing thinking, emotional reasoning and “should” statements in CDs which are related to personal achievement were related to low medication adherence in the evaluation of each CD. When we evaluate these distortions in terms of medication adherence, the patient may think that the treatment will not work because of his depressive mood. If a treatment response occurs, but the remission is incomplete, then the treatment may be interpreted as not beneficial at all. The patient may be neglecting the efficacy because of minimal side effects. Additional emphasis on the effectiveness of the treatment, especially from this CD, and detailed information about possible side effects may improve medication adherence in patients with MDD. The results of this study may contribute to cognitive behavioral approaches that are already used for medication adherence (29).

Childhood traumas increase the risk of depression in adulthood (30, 31) rendering these victims vulnerable to depression (30). Vulnerability to depression is also associated with CDs (5). Thus, determining the CDs associated with childhood traumas is an important issue. Firstly, only physical and emotional abuses were associated with the increased total scores of CDs in this study. CDs about one’s self-assessment are fundamental characteristic in MDD (6). Abuse may be worse than neglect when considering self-assessment. In addition, emotional abuse was correlated with CDs in PA only, which indicates self-assessment. Meanwhile, neglect is a passive inertia related to care, and abuse is directly related to child harm and malfeasance. Also the significant correlation between different types of childhood traumas suggests that many traumas affect cognitive distortions together.

Mind reading CD is making unrealistic sense from one’s feelings and thoughts of others. One of the remarkable results of the study is the negative correlation between physical and emotional neglect and mind reading CD. Numerous studies on this issue indicate that traumatic events can make the person stronger than previously (32). However, even the most traumatic events with high stress levels do not guarantee growth. Age and gender education is one of the affecting factors (32). In MDD, physical and emotional neglect may be a strengthening factor for mind reading CD. Possibly, individuals with both conditions already feel neglected and have no emotional expectations from others, resulting in the development of their relevant coping skills.

In minimizing, the positive CD person considers his positive traits worthless. This CD in IPR was correlated

Table 4. Mediation Analysis Statistics: Direct and Indirect Effects of Childhood Traumas in the Path Models of Mediation and Moderation

		Estimates	Std. Err.	Z	p value
Medication Adherence	CD IPR (b)	-0.031	0.013	-2.361	0.018
	CTQ PA (cp)	-0.032	0.031	-1.043	0.297
CD IPR	CTQ PA (a)	0.652	0.241	2.702	0.007
a*b	Indirect Effect (ab)	-0.02	0.011	-1.778	0.075
Medication Adherence	CD PA (b)	-0.032	0.013	-2.476	0.013
	CTQ PA (cp)	-0.031	0.031	-1.014	0.31
CD PA	CTQ PA (a)	0.65	0.24	2.709	0.007
a*b	Indirect Effect (ab)	-0.021	0.012	-1.828	0.068
Medication Adherence	Mind Reading (PA)	-0.207	0.088	-2.361	0.018
	CTQ PN	-0.173	0.066	-2.609	0.009
Mind Reading (PA)	CTQ PN	-0.162	0.064	-2.534	0.011
a*b	Indirect Effect (ab)	0.034	0.018	1.917	0.055
a*b+cp	Total Effect	-0.139	0.064	-2.178	0.029
Medication Adherence	Personalization (IPR)	-0.171	0.084	-2.045	0.041
	CTQ PA	-0.033	0.031	-1.061	0.289
Personalization (IPR)	CTQ PA	0.112	0.036	3.135	0.002
a*b	Indirect Effect (ab)	-0.019	0.011	-1.788	0.074
a*b+cp	Total Effect	-0.052	0.032	-1.628	0.104
Medication Adherence	Minimizing the Positive (IPR)	-0.205	0.086	-2.375	0.018
	CTQ PA	-0.025	0.031	-0.818	0.414
Minimizing The Positive (IPR)	CTQ PA	0.132	0.026	5.018	<0.001
a*b	Indirect Effect (ab)	-0.027	0.013	-2.04	0.041*
a*b + cp	Total Effect	-0.052	0.03	-1.717	0.086
Medication Adherence	Minimizing the Positive (IPR)	-0.175	0.081	-2.163	0.031
	CTQ SA	-0.066	0.047	-1.411	0.158
Minimizing The Positive (IPR)	CTQ SA	0.13	0.03	4.302	<0.001
a*b	Indirect Effect (ab)	-0.023	0.013	-1.755	0.079
a*b+cp	Total Effect	-0.089	0.043	-2.074	0.038

CTQ EN: Emotional neglect, CTQ PN: Physical Neglect, CTQ PA: Physical Abuse, CTQ EA: Emotional Abuse, CTQ SA: Sexual Abuse, CD IPR: Total CDs related to interpersonal relationships, CD PA: Total CDs related to personal achievement

to all the physical, sexual and emotional abuse in patients with MDD in this study. Possibly they consider positive attitudes in IPRs make them vulnerable to abuse. “Should” statements, personalization, all-or-nothing thinking and labeling were other related factors with abuse. These CDs make people vulnerable, that is, they may decrease psychological resilience. Results of the studies showed the

inconsistent relationship between abuse and resilience (33, 34). However, psychological resilience, that is, the ability of an individual to adapt or cope with stressful life events such as trauma, is reduced in psychological disorders such as depression (35, 36)

In the study, medication adherence was negatively correlated with childhood traumas. Indeed, we thought that childhood traumas would reduce treatment adherence because they would increase cognitive distortions. However, total CDs showed no significant mediating role between CTQ and medication adherence. Only minimizing positive CD, however, showed a significant mediating role between physical abuse and medication adherence in the evaluation of each CD. Physical abuse may cause low medication adherence via the emergence of four different CDs that exhibited positive correlations between CDs and physical abuse (labeling, personalization, “should” statements and minimizing the positive) in correlation analyses. The relationship between adherence and childhood traumas may be attributed to attachment styles. Childhood traumas are already related with depression in late life (37, 38). This association was an indirect effect via insecure attachment (37-39). Consequently, if there is less attachment, then there may be less trust in the psychiatrist and thus less treatment adherence.

The most important limitation of this study is the small sample size. Other limitations include the treatment duration of the patients and the lack of knowledge about the drugs they use. However, patients who were under medication for at least three months were included in the study. In addition, no structured interview, such as SCID, was conducted, but at least two psychiatrists reviewed the diagnoses in accordance with the DSM-5 definition.

CONCLUSION

Abuse was positively associated with CDs. Neglect was negatively associated with mind reading CDs. Medication adherence was negatively associated with all-or-nothing thinking, emotional reasoning, labeling and minimizing the positive in CD which are related to interpersonal relationships and all-or-nothing thinking, emotional reasoning and “should” statements in CDs related to personal achievement. Patients with low medication adherence had experienced extensive childhood trauma as indicated by scores excluding emotional neglect. CDs had no significant mediating role between CTQ and medication adherence in total. Only minimizing the positive CD showed a significant mediating role between physical abuse type of childhood

trauma and medication adherence in the evaluation of each CD. Physical abuse-type trauma may disrupt medication adherence by minimizing the positive CD. However, when childhood traumas are evaluated in general, there is no mediator role in treatment adherence. Further studies with a large sample size are needed.

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