



Is There Any Association Between Childhood Traumatic Experiences, Dissociation and Psychotic Symptoms in Schizophrenic Patients?

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Objective The aim of this study was to investigate the rates childhood traumatic experiences (CTEs) of schizophrenia patients and to examine relationship between childhood traumatic experiences, dissociation and psychotic symptoms.

Methods One hundred schizophrenia patients who had 5 or 5 points below in Clinical Global Impression-Severity (CGI-S) and who were not in active psychotic episode and 50 healthy siblings who grew up in the same environment with the patients were included to the study. Structured Clinical Interview for DSM IV, Scale for the Assessment of Positive Symptoms, Scale for the Assessment of Negative Symptoms, Dissociative Experiences Scale (DES), CGI-S, Global Assessment of Functioning Scale and Childhood Trauma Questionnaire (CTQ-28) applied to the patients.

Results Childhood abuse subscales and DES scores were statistically higher in the patient group ($p < 0.001$). We determined moderately significant positive correlation between CTQ-28 and DES. We determined moderately significant positive correlation between CTQ total scores and persecutory delusions, delusions of reference, ability to feel intimacy and closeness; relationship with friends and peers. Also, there was a significant positive correlation between persecutory delusions and CTQ-total, DES-total and all subscales of CTQ-28.

Conclusion Clinicians should inquire about CTEs to develop comprehensive formulations and treatment plans among schizophrenia.

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Key Words Schizophrenia, Childhood trauma, Dissociation.

INTRODUCTION

Genetic susceptibility to schizophrenia may be considerably determinative in pathogenesis.¹ However, the fact that the risk of schizophrenia is not 100% in genetic concordance twins suggests that different etiologic and pathophysiologic mechanisms, including environmental factors, play a significant role in schizophrenia.^{1,2} In this respect, some researchers take into account childhood traumatic experiences (CTEs) (sexual abuse, physical abuse, emotional/psychological abuse and neglect) as a possible potential environmental risk factor that may increase the vulnerability to schizophrenia.^{3,4}

History of CTEs, including all specific forms of traumas,

has been extensively investigated as substantially increasing the risk of psychosis with the odds ratios (ORs) of between 2.78 and 3.60.^{5,6} In addition, in a meta-analysis study evaluating the prevalence of self-reported childhood sexual (CSA), physical (CPA) and emotional abuse (CEA) in psychotic patients, the prevalence of self-reported CSA, CPA, CEA were respectively found to be 26%, 39% and 34%.⁷ This findings were replicated in other studies.⁸⁻¹⁰

It is also essential by which mechanisms CTEs may increase the risk for psychosis. Relevant studies have shown that CTEs such as CPA and CSA can increase the risk of early onset psychotic symptoms,¹¹ psychosis-like clinical symptoms,¹² schizophrenia, and other psychotic disorders¹³ leading to psychological and biological changes in individuals. Some researchers have revealed a causal relationship between CTEs and schizophrenia in some schizophrenia patients according to the Traumatic Neurodevelopmental Model. This model suggests the hypersensitivity to stress commonly described in psychotic patients and it may be the result of neurodevelopmental alterations in the structures of the brain following early life traumatic experiences.^{14,15}

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The relation between CTEs and positive and negative psychotic symptoms was also studied. Some researchers have speculated that specific type of CTEs may facilitate the specific symptoms in adult schizophrenia patients.^{16,17} In general, while CTEs are associated with positive psychotic symptoms,^{12,16-18} findings about negative symptoms appear to be more complex.^{16,17} In a study conducted on first episode psychotic patients, history of sexual assault was associated with both positive and negative symptoms.¹⁸ In a 2-year follow-up prospective population-based study, it was found that early CTEs increase the risk for positive psychotic symptoms.¹² Also, in a study conducted by Gallagher and Jones¹⁶ childhood neglect was found to be associated with negative symptoms of schizophrenia and childhood abuse was related with positive symptoms of the psychosis.

The relation between specific types of CTEs and psychotic symptoms is important too. For example, while childhood abuse was often found to be associated with positive symptoms, childhood neglect was often found to be associated with negative symptoms.¹⁶ Researchers have also focused on the link between the development of specific symptoms of psychosis such as auditory hallucinations^{9,19,20} or delusions^{9,21,22} and CTEs specific types such as CPA, CEA or CSA.^{9,13,21} As a result, it seems more likely that CTEs are related to a particular symptom group, rather than categorical diagnosis like schizophrenia.²³ Notwithstanding the above, there is no linear or straightforward relationship between CTEs and schizophrenia. Also, CTEs is neither necessary nor sufficient alone for the risk of schizophrenia.²⁴

There are also studies investigating the relationship between CTEs, dissociation and psychosis.^{10,25,26} Also, dissociation may coincide with positive psychotic symptoms, especially in the acute psychotic episode. Thus, there is an important association between dissociative symptoms, CTEs and psychotic symptoms.²⁷

Much of the evidence for the association between schizophrenia and CTEs has been obtained from studies conducted in Western societies, whereas few studies were conducted on Eastern culture.^{9,10,28} Also, there are very few studies investigating the relation between childhood specific traumatic forms and schizophrenia symptoms or symptom clusters in Eastern culture until now.^{9,28,29}

Thus, first, the aim of this study was to investigate whether there is a difference in the rates of CTEs of schizophrenia patients and their healthy siblings living in the same environment in a sample of Eastern culture. The second aim was to examine relationships between a broad range of childhood specific adversities (including the abuse and neglect) and the presence of DSM-IV characteristic symptoms of schizophrenia: hallucinations, delusions, negative symptoms. Finally, we wanted to know

if there is relationship between dissociation, CTEs and psychotic symptoms.

METHODS

Study participants

The patients followed up with the diagnosis of schizophrenia by Kocaeli University Faculty of Medicine outpatient clinics, and their healthy siblings who grew up in the same environment with the patients were enrolled in the study. 100 schizophrenia patients who had 5 or fewer points in Clinical Global Impression-Severity (CGI-S) and who were not having an active psychotic episode and 50 healthy siblings who grew up in the same environment with the patients like the patient group in terms of age, gender and education as a control group were included in the study. The study was approved by the Kocaeli University Ethics Committee for Clinical Trials with the number of KOU KAEK 2012/55. A written informed consent was obtained from each participant. The study was conducted in accordance with the principles of the Declaration of Helsinki.

Study inclusion criteria for patients were determined as to have a diagnosis of schizophrenia according to DSM-IV,³⁰ to be in the age range of 18–60, to be at least literate, to have no language problem in terms of communication, not to have Electroconvulsive Therapy (ECT) in the last 3 months.

Study inclusion criteria for the control group was determined to grow up in the same environment with the schizophrenia sibling and to be similar to the patient group regarding age, gender and education. Patients who are illiterate, who have significant visual, hearing and cognitive impairment of communication, patients with mental retardation, those with substance and alcohol use disorder, those with the chronic neurological disease with significant cognitive decline such as epilepsy, Parkinson were excluded. Exclusion criteria were the same for the control group.

A sociodemographic data form, Structured Clinical Interview for DSM-IV axis I disorders (SCID-I), Scale for the assessment of positive symptoms (SAPS), scale for the assessment of negative symptoms (SANS), dissociative experiences scale (DES), CGI-S, Global Assessment of Functioning Scale (GAF), and Childhood Trauma Questionnaire (CTQ-28) were applied to the patients. Sociodemographic data form, DES and CTQ-28 were applied to the control group.

Instruments

Sociodemographic data form

This form was prepared to evaluate demographic characteristics of the patients like age, gender, education year, marital status, type of schizophrenia, the age of illness onset, du-

ration of illness, number and duration of hospitalization and psychiatric comorbidity.

Dissociative experiences scale

It is a scale of 28 items developed by Bernstein and Putnam. Scores above 30 on the scale indicate the presence of dissociative disorder.³¹ Turkish validity and reliability study was conducted by Yargıç et al.³²

Childhood trauma questionnaire

This 28-item retrospective questionnaire investigates the presence of the traumatic experiences like abuse and neglect, during childhood and adolescence. It was developed by Bernstein and colleagues. This self-reported form consists of 5 sub-dimensions of emotional neglect, physical neglect, sexual abuse, emotional abuse and physical abuse.³³ It was first developed as 70 items and reduced to 53 items in the following years. Şar et al.³⁴ shortened that form and adapted to Turkish as CTQ28. 28 question form was used in this study.

Global assessment of functioning scale

It is used to assess the mental, social and occupational functioning of the patient on axis V of the DSM-IV. The clinician examining the patient assesses the overall level of adjustment of the patient over a score ranging from 0–100 using his or her judgment.³⁰

Scale for the assessment of positive symptoms

It was developed by Andreasen³⁵ Turkish validity and reliability study was conducted by Erkoç et al.³⁶

Scale for the assessment of negative symptoms

It was developed by Andreasen³⁵ Turkish validity and reliability study was conducted by Erkoç et al.³⁷

Structured clinical interview for DSM-IV

This is a structured clinical interview developed for use by mental health professionals. SCID-I allows diagnosing both present and lifetime Axis I mental disorders.³⁸ For the reliability of the Turkish form, the overall percent agreement for all diagnoses was 98.1%, and the kappa coefficient was 0.86.³⁹

Clinical global impression-severity

This scale is used for general evaluation of mental disorders.⁴⁰ Clinical impression is scored between 1 (undetected) and 7 (the most severe patients). High scores on the scale indicate that the clinical symptoms are severe.

Statistical analysis

Data were analyzed using the Statistical Program for Social

Sciences (SPSS version 13; SPSS Inc., Chicago, IL, USA). The appropriate parametric and nonparametric tests were used for testing whether the data has a statistically normal distribution property. To compare the differences between the groups, the chi-square test was used for categorical variables, and the Mann-Whitney U test was used for mean values of continuous variables. Pearson Correlation Tests were used to examine the relationship between CTQ, DES, SAPS, SANS, the age of illness onset, CGI-S and GAF. Results were evaluated by taking $p < 0.05$ level of significance into consideration. Correlation strength is weak if $r = 0.00-0.24$, moderate if $r = 0.25-0.49$, strong if $r = 0.50-0.74$, and very strong if $r = 0.75-1.00$.⁴¹

RESULTS

Sociodemographic characteristics

100 patients diagnosed with schizophrenia and 50 healthy siblings were included in this study. There was a significant difference regarding marital status while there was no difference between the groups regarding age, gender and education year. The mean age of the groups were 38.7 ± 10.5 years for patients and 35.3 ± 10.4 years for healthy controls ($p = 0.059$). The mean of education year of the groups 8.5 ± 3.4 for patients and 8.8 ± 3.4 for healthy controls ($p = 0.669$).

In the patient group mean age of illness onset was 24.4 ± 8.9 ; mean duration of illness was 14.1 ± 8.5 years; a mean number of hospitalizations was 3.0 ± 2.7 ; mean duration of hospitalization was 78.4 ± 70.4 days. Sociodemographic characteristics of the patient and the control group are presented in Table 1.

Although there were no statistically significant differences between groups in terms CTQ-28 total and neglect (CPN and CEA) subscales, there was statistically significant differences between groups in terms abuse (CPA, CSA, CEA) subscales. There were also statistically significant differences between groups in terms DES total scores ($p < 0.001$). Mean SAPS score was 36.18 ± 21.53 , mean SANS score was 47.01 ± 21.81 ; mean CGI-S score was 3.02 ± 1.27 , and the mean score of GAF was 63.35 ± 10.00 in the patient group. Mean scores of the scales are presented in detail in Table 2.

Correlations between CTQ-28 total and CTQ-28 subscales and DES total scores are presented at Table 3. There was a moderately significant positive correlation between CTQ-28 total and CTQ-28 subscales and DES total scores.

Correlations between CTQ-28 and DES with age at illness onset, CGI-S, GAF are presented in Table 3. There was a moderately significant positive correlation between DES total scores and CGI-S. There was also a significant positive correlation between GAF and CTQ-total scores and CGI-S (Table 4).

Correlations between CTQ-28, CTQ subscales and DES with SAPS and some psychotic symptoms are presented in

Table 5.

Correlations between CTQ-28 and DES with some negative symptoms are presented in Table 5.

There was a moderately significant positive correlation between CTQ total scores and persecutory delusions, delusions of reference, ability to feel intimacy and closeness; relationship with friends and peers.

There was a moderately significant positive correlation between DES scores and persecutory delusions, delusions of reference, physical anergia, recreational interests and activities, the ability to feel intimacy and closeness; relationship with friends and peers.

Also, there was a significant positive correlation between persecutory delusions and CTQ-total, DES-total and all subscales of CTQ-28. There was a significant positive correlation

Table 1. Sociodemographic characteristics of the patient and control groups

	Patient (N, %)	Control (N, %)	p value
Gender			0.116*
Male	69 (69)	28 (56)	
Marital status			0.020*
Married	31 (31)	27 (54)	
Single or divorced	69 (69)	23 (46)	
Type of schizophrenia			
Paranoid	60 (60)		
Undifferentiated	25 (25)		
Residual	13 (13)		
Desorganised	2 (2)		
Comorbide psychiatric diagnosis			
Mood disorder	27 (27)		
SUD	10 (10)		
Anxiety disorder	8 (8)		
PTSD	4 (4)		
APD	1 (1)		
Education			0.669**
Years	8.5±3.4	8.8±3.4	

*chi-square test, **t test. SUD: substance use disorder, PTSD: post-traumatic stress disorder, APD: antisocial personality disorder

Table 3. Correlation between CTQ-28 and DES with age of illness onset, CGI-S, GAS

	CPA	CEA	CSA	CPN	CEN	CTQ-total	DES-total
Onset of illness	-0.289**	-0.319**	-0.233*	-0.408**	-0.324**	-0.396**	-0.188*
GAF	0.054	0.147	0.192	0.196	0.257*	0.219*	0.242*
CGI-S	-0.030	-0.149	-0.222*	-0.165	-0.196	-0.197*	-0.264**

Pearson Correlation Test. *p<0.05, **p<0.01. CPA: Childhood Physical Abuse, CEA: Childhood Emotional Abuse, CSA: Childhood Sexual Abuse, CPN: Childhood Physical Neglect, CEN: Childhood Emotional Neglect, CTQ: Childhood Trauma Questionnaire, DES: Dissociative Experiences Scale

between Delusions of reference and CTQ-total, DES-total and all subscales of CTQ-28 (Table 5).

DISCUSSION

Although the patient group reported higher rates of CPA, CSA and CEA, consistent with some studies,^{7-9,13,28,42} they did not report higher rates of childhood trauma compared with healthy siblings in contrast to some studies.^{24,43} Similar with our results, recently in a study conducted by Alameda et al.⁴⁴ researchers found that 24.8% of the patient group had a documented history of CSA and/or CPA in early psychosis patients. Supporting our findings about CPA, Fisher et al.⁴² found that schizophrenia is associated particularly with CPA in their large population-based case-control study of childhood abuse and psychosis. In a 30-year follow up period, a prospective case-control study conducted to determine whether CSA is a risk factor for later life psychosis, rates of psychotic disorders including schizophrenia, were found to be higher among individuals with a history of CSA compared with those not having a history of CSA controls.¹³

Table 2. Mean scores of the scales

Scales	Patient	Control	Statistics*
	Mean±SD	Mean±SD	
CTQ total	45.17±16.38	40.08±9.50	p=0.210
Physical abuse	7.57±3.68	5.72±1.61	p<0.001*
Sexual abuse	6.61±3.43	5.30±0.76	p=0.009*
Emotional abuse	9.08±4.63	7.36±2.70	p=0.033*
Physical neglect	9.42±3.61	8.58±2.80	p=0.276
Emotional neglect	12.57±5.18	13.12±5.17	p=0.510
DES	22.62±17.62	10.80±11.76	p<0.001*
GAF	63.35±10.00		
CGI-S	3.02±1.27		
SAPS	36.18±21.53		
SANS	47.01±21.81		

*Mann Whitney U test. CTQ total: Childhood Trauma Questionnaire, DES: Dissociative Experiences Scale, GAF: Global Assessment of Functioning Scale, CGI-S: Clinical Global Impression-Severity, SAPS: Scale for the assessment of positive symptoms, SANS: Scale for the assessment of negative symptoms

Table 4. Correlation between CTQ-28, CTQ subscales and DES with SAPS some positive psychotic symptoms

	CPA	CEA	CSA	CPN	CEN	CTQ-total	DES-total
SAPS total	0.057	0.071	0.183	0.027	0.037	0.089	0.192
Auditory hallucinations	0.069	0.028	0.206*	0.049	0.029	0.085	0.250
Somatic hallucinations	0.075	0.054	0.305**	-0.102	-0.014	0.068	0.131
Persecutory delusions	0.240*	0.298**	0.293**	0.270**	0.228*	0.336**	0.274**
Somatic delusions	0.185	0.220*	0.384**	-0.035	0.028	0.185	0.152
Delusions of reference	0.218*	0.283**	0.249*	0.269**	0.212*	0.312**	0.278**

Pearson Correlation Tests. *p<0.05, **p<0.01. SAPS: Scale for the Assessment of Positive Symptoms, CPA: Childhood Physical Abuse, CEA: Childhood Emotional Abuse, CSA: Childhood Sexual Abuse, CPN: Childhood Physical Neglect, CEN : Childhood Emotional Neglect, CTQ: Childhood Trauma Questionnaire, DES: Dissociative Experiences Scale

Table 5. Correlation between CTQ-28 and DES with some negative symptoms

	CPA	CEA	CSA	CPN	CEN	CTQ-total	DES-total
Affective nonresponsivity	0.008	0.102	0.098	0.104	0.238*	0.147	0.127
Physical anergia	0.036	0.156	0.113	0.275**	0.243*	0.208*	0.260**
Recreational interests and activities	-0.009	0.143	0.055	0.239*	0.196	0.162	0.278**
Ability to feel intimacy and closeness	0.084	0.204*	0.147	0.280**	0.333**	0.272**	0.306**
Relationship with friends and peers	0.119	0.249*	0.194	0.320**	0.292**	0.298**	0.280**
SANS total	-0.056	0.084	0.064	0.230*	0.219*	0.153	0.222*

Pearson Correlation Tests. *p<0.05, **p<0.01. CPA: Childhood Physical Abuse, CEA: Childhood Emotional Abuse, CSA: Childhood Sexual Abuse, CPN: Childhood Physical Neglect, CEN: Childhood Emotional Neglect, CTQ: Childhood Trauma Questionnaire, DES: Dissociative Experiences Scale

These differences in the prevalence of CTEs may be due to some reasons. First, it may be because of the properties of patients. Our study group was not a homogeneous group like consisting only early onset psychotic symptoms, psychosis-like clinical symptoms, early psychosis patients or chronic psychosis patients. Second, the sociocultural characteristics of the population in which the research is conducted are also important.⁴⁵ Much of the evidence for the relationship between schizophrenia and CTEs has been obtained from studies conducted in Western societies. The influence of CTEs in Eastern culture, where parenting relationships and social structure differ significantly from Western culture, may be different.^{9,28,29} Finally, different methods used for collecting data from patients such as interviewing with patients, using retrospective data, different measures or scales can affect the results of the studies.² We analyzed CTEs using a self-report questionnaire based on a retrospective assessment of CTEs. Most of the studies evaluating the associations between psychosis and CTEs relied on retrospective assessments. This is often because of expense, extremely long prospective follow-up period of the patients. Also, there are some ethical problems related to prospective longitudinal examinations.^{2,46} Relevant literature suggests the evidence that retrospective analysis of CTEs tends to underestimate rather than exaggerate real incidence rates.⁴⁶ The result of our study can be because of underestimating the rates of CTEs too. Studies have also demonstrated the validity

and reliability of trauma-related retrospective reports in psychotic samples, indicating that 1) early life traumatic experiences are stable over a long period, 2) unaffected by current psychopathology, and 3) similar when obtained by other sources of information such as different assessment instruments.⁴⁷ Also it can be possible that schizophrenia patients with having active psychotic episode accompanied by disinhibition may have a greater tendency to display the exact nature of the abuse.⁴⁷ Our study group included schizophrenia patients who had 5 or fewer points in CGI-S and who were not having active psychotic episode. These characteristics of our patient group may contribute to the findings of our study. Although recent meta-analysis comparing the rates of CTEs across different countries revealed that Lower and Middle-Income Countries (LMIC) had higher rates than upper-income countries (UIC),⁴⁵ our findings are not consistent with the results of this meta-analysis. In particular, it was well established that LMICs have higher rates of crime, poverty, and unemployment—all of which are socio-economic factors known to affect the rates of CTEs.⁴⁵ Since we have conducted our study in tertiary care in a big city center, our results are found to be similar to the studies conducted on UIC.

In the second part of the study, we have hypothesized that specific types of CTEs appear to have different effects on particular cognitive processes and at least seem to differ in the psychotic symptoms they are related. In regard to positive psy-

chotic symptoms, particularly hallucinations, we have tested the hypotheses that severe childhood trauma, particularly CSA, would likely disrupt the source monitoring processes necessary for discriminating between thoughts and external stimuli. We found significant positive relation between CSA and auditory and somatic hallucinations consistent with some studies in the literature.^{17,20,21,48,49} Thus the hypothesis (e.g.,^{49,50}) that differential associations exist between particular adversities and psychotic symptoms was supported by our results.

One of the possible explanation for this significant association between CTEs and schizophrenia as well as the association between CSA and auditory hallucinations, is the diathesis-stress model of schizophrenia.⁵¹ According to this model, in individuals having a biological and genetical vulnerability for psychiatric disorders, additional environmental stressors can exacerbate this vulnerability in the form of oversensitivity to stress, facilitating the manifestation of a psychiatric disorder. In this regard, history of CTEs was considered as possible severe environmental stressor having impacts on specific brain regions such as the hypothalamic-pituitary-adrenal (HPA) axis, a system which is known to activate as a part of the stress response in individuals.⁵² History of CTEs can result in impaired HPA axis stress response in adulthood. Thus, HPA axis provides possible mechanisms through which CTEs could aggravate the underlying biological risk factors implicit in schizophrenia, putting individuals at higher risk for experiencing psychotic symptoms. Although the neural underpinnings of auditory hallucinations are still mostly unclear, some researchers have speculated that the networks involved in auditory hallucinations are particularly affected by the stress of CTEs, resulting in an even higher risk for the experience of auditory hallucinations.²⁰ The other important model that can explain the associations between traumatic life events such as CTEs and schizophrenia is traumatogenic neurodevelopmental (TN) model presenting the similarities between the effects of traumatic events on the developing brain and the biological abnormalities in schizophrenia patients, such as overactivity of the HPA axis; abnormalities of neurotransmitters and brain structures.^{14,15}

There was a significant positive correlation between persecutory delusions and CTQ-total and all subscales of CTQ-28. Also, there was a significant positive correlation between delusions of reference and CTQ-total, and all subscales of CTQ-28. However somatic delusions were moderately positively correlated only with CSA consistent with the literature.^{9,48-50,53} In the analysis of the UK 2007 Adult Psychiatric Morbidity Survey, it was suggested that paranoia was specifically associated with CPA.⁴⁹ Bentall and Fernyhough⁵⁴ note that paranoia is linked to heightened threat over-anticipation and a tendency to attribute negative experiences to external

sources. Recently in a review conducted by Bentall et al.,⁴⁸ attachment styles thought to have specific effects on the development of paranoid symptoms. One possible explanation for the association between attachment and paranoid thoughts (delusion of persecution), the attachment might be expected to have effects on the developing self-concept and the ability to trust others.⁴⁸ Literature suggests the evidence that paranoid beliefs arise in the context of insecure attachment.⁴⁹ Consistent with this, in a non-clinical sample researchers have revealed the differential associations between paranoid beliefs and neglect and that insecure attachment mediates the relationship between neglect and paranoia.⁵⁰ Recently, in a study conducted by Wicham et al.,⁵³ the insecure attachment was found to be particularly associated with paranoid delusions. Examining the relevant literature, we have noticed that association between paranoid delusions and CTEs particularly CPA and neglect was thought to be mediated through the insecure attachment styles.⁴⁸⁻⁵⁰ It is important to take into account the attachment styles of the schizophrenic patients particularly admitting with paranoid delusions while making the treatment plan.

There was a moderately significant positive correlation between CTQ total scores and ability to feel intimacy and closeness; relationship with friends and peers consistent with the findings about negative symptoms and CTEs.⁴⁴

In the patient group, there was a significant negative correlation between CTQ total scores and GAF and CGI-S consistent with the other studies.^{23,43,44} Studies have consistently suggested that history of CTEs has an important effect on global functioning^{23,43} and may lead poorer patient outcomes.⁴³

There was a moderately significant positive correlation between CTQ-28 total and CTQ-28 subscales and DES total scores. In a study conducted by Schafer et al.⁵⁵ for evaluating the correlations between CTEs and dissociation in patients with schizophrenia spectrum disorders, researchers have suggested that CPN and CEA showed significant correlations with dissociative symptoms at admission. When patients were stabilized, about a month, CEA still showed a significant correlation with dissociative symptoms.^{10,56}

Dissociation and psychosis can be a different diagnosis, or they can be synonymous structures or overlapping structures with common and different properties. Schneiderian symptoms of schizophrenia (auditory hallucinations, thought withdrawal, thought insertion, thought broadcasting, etc.) are also common in dissociative disorders. Dissociation and psychosis are not always but usually, occur as a result of traumatic experiences.⁵⁵ Dissociative experiences were significantly higher in the patient group, consistent with the literature.^{10,25-28} This may be related to the high rate of CTEs in the patient group and its causal relationship with dissociation. There was a moderately

significant positive correlation between some negative symptoms (e.g., ability to feel intimacy and closeness, relationship with friends and peers) and both CTQ total scores and DES scores. Since the dissociative symptoms have similarities and differences with the psychotic symptoms, this may have resulted in higher DES scores in the patient group.⁵⁵

Finally, we tested if there is relationship between dissociation, CTEs and psychotic symptoms. There was a moderately significant positive correlation between DES total score and delusions (persecutory delusions, delusions of reference), consistent with the literature.⁵⁶ In contrast with some studies, we did not find any significant association between dissociative experiences and hallucinations.⁵⁷⁻⁵⁹ In a study conducted by Perona-Garcelán et al.⁵⁹ CTEs was found to be positively correlated with the dissociation, hallucination, and delusions. Moreover, it was indicated that the dissociation was suggested to be a potential mediator between CTEs and hallucinations.⁵⁹ Also regarding auditory hallucinations, researchers have suggested that specific adversity, particularly CSA, may inhibit the source-monitoring mechanisms required to differentiate between external and self-generated stimuli, possibly in combination with adversity-induced dissociation.⁴⁸

The TN model suggests potential explanations for other findings in schizophrenia research beyond oversensitivity to stress, including cognitive impairment, pathways to positive and negative symptoms, and the association between psychotic symptoms and dissociation.¹⁴ Negative life events almost certainly do not have “pure” psychological effects. Negative life events tend to co-occur so that, for example, a child who is sexually abused is at increased risk of being bullied at school. Also, symptoms can co-occur because the experience of one symptom can facilitate the occurrence of another.⁵⁵ It is necessary to analyze further the causal link between CTEs and Schneiderian symptoms and dissociative symptoms in a large population-based prospective study.

Limitations

There are some limitations to our study. Our sample represents a regularly monitored group in tertiary health care, so it can not be generalized to the whole sample of schizophrenia patients. So, the findings could not be generalized to all patients. Another limitation of this study is the small sample size. Bonferroni correction is calculated as $p\text{-value}/\text{number of comparisons}$ and made to reduce the type 1 error.⁶⁰ Bonferroni correction has not been made in comparisons in our study. There are, however, some debates in this regard, as it can increase type II error, cause significant differences to be considered insignificant, reduce statistical power, and cause bias. Therefore, publications are suggesting that Bonferroni correction should not be done.⁶¹ Then, we preferred not to do Bonferroni correc-

tion in our study.

Conclusion

Our findings imply that exposure to CTEs particularly abuse should be regarded as an essential determinant of schizophrenia. Our results suggest that clinicians should routinely inquire about CTEs in order to develop comprehensive formulations and treatment plans when working with patients with schizophrenia or similar diagnoses. Psychosocial interventions which have been used for patients affected by trauma might be considered among the treatment options for patients with psychosis. Clinicians should keep in mind CTEs as a crucial environmental stressor in the etiologic and pathophysiologic process of schizophrenia. This is particularly important for making comprehensive formulations and appropriate treatment strategy (e.g., trauma-focused interventions) in psychotic patients.

Conflicts of Interest

The authors have no potential conflicts of interest to disclose.

Author Contributions

Zeynep Yildiz Akbey: Collecting data, statistical analysis, finding the references. Mustafa Yildiz: Designing and mentoring the study, revising the manuscript. Nermin Gündüz: Writing the manuscript.

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