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Childhood Trauma and Psychotic Symptomatology in Ethnic Minorities With Schizophrenia

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In response to recent findings implicating trauma in the phenomenology of psychosis, this study explored interactions between adverse childhood experiences (ACEs) and positive symptoms of psychosis in an understudied patient population, comprising individuals of African and Latino ancestry. Endorsement of ACEs was compared between 90 schizophrenia cases and 240 nonpsychotic controls, matched for ethnicity, gender, and age. Relative to controls, cases reported significantly greater exposure to physical abuse, emotional abuse, sexual abuse, neglect, witnessing domestic violence, and household member incarceration. Analyses further evaluated associations between ACEs and subtypes of hallucinations, delusions, and subjective thought disorder. Among female cases, the number of hallucinatory symptoms present increased with increasing ACE score. Hallucinatory symptoms further correlated with individual ACE items. For instance, third-person voices were more common among women exposed to childhood physical and emotional abuse. Interestingly, among women, grandiose delusions were negatively related to sexual abuse, perhaps reflecting the deleterious effects of sexual trauma on the development of a positive self-concept. Among male cases, no positive relationships with hallucinations were observed, but several delusional symptoms were correlated with childhood trauma experiences. The most statistically powerful ACE associations, in both males and females, were observed with experiences of thought broadcasting. This article further advocates for the consideration of ethnicity and gender as factors influencing trauma exposures and their clinical manifestations.

Key words: adverse childhood experiences/trauma/schizophrenia/ethnicity/gender stratification

Introduction

Recent years have seen a renewed effort to understand the effects of early life adversity on the development, clinical course, and symptomatology of schizophrenia. While considerable evidence supports a strong genetic basis for psychosis, the markedly elevated rates of childhood trauma observed in clinical samples[1–6] have led many to contend that these developmentally disruptive experiences be considered as etiologic contributors to psychotic illness. Indeed, adverse childhood experiences (ACEs), spanning dimensions of sexual abuse, maltreatment, and neglect, show consistent associations with risk for psychosis, global symptom severity,[7] and treatment outcome.[8,9] Furthermore, among patients with psychosis, childhood trauma is associated with higher rates of hospitalization, suicidality/self-harm, and substance use disorders (SUD) as well as poorer psychosocial functioning and increased utilization of social services.[2,10–14] Such relationships appear to follow dose-response trends,[15–19] suggesting the cumulative effects of multiple traumas may lead to distinctly poorer clinical outcomes. Understanding the effects of ACEs on the course and presentation of psychotic illness could, therefore, meaningfully inform psychological and psychosocial treatments aimed at symptomatic relief, improved global functioning, and the reduction of disease burden.

Early life stress refers to events perceived as a threat to one's physical or emotional well-being, which surpasses a child's capacity for coping and self-regulation, resulting in prolonged states of physiologic hyperarousal.[20] These experiences are considered powerful transdiagnostic risk factors for psychiatric

illness.[21,22] Patients with psychotic illness, such as those with mood, anxiety, and SUD,[23] often endorse a history of childhood abuse. For instance, in one schizophrenia sample, 83% of patients had been subjected to childhood physical abuse (CPA), sexual abuse (CSA), or emotional neglect (CEN).[3]

Although recent schizophrenia research has largely favored biogenetic paradigms,[24] the etiology of this disorder is widely considered a multifactorial phenomenon, characterized by dynamic interactions between polygenic and environmental factors.[25,26] Rosenthal's[27] diathesis-stress model, in which environmental stressors interact with preexisting genetic vulnerabilities to precipitate or worsen psychosis, continues to provide the foundation for prevailing etiologic theories of schizophrenia. It has served as an interpretative framework to synthesize neuropsychological findings in psychosis research, including observations of heightened stress sensitivity[28,29] and hypothalamic-pituitary-adrenal (HPA) axis dysregulation in patients with schizophrenia. Others have employed cognitive vulnerability models to describe the path from ACEs to psychosis, considering the impact of negative schemas of self and other[30] and dissociation.[31]

At present, the most well-validated associations between specific childhood traumas and psychotic symptoms are reported between hallucinatory symptoms and experiences of CSA,[17,32–34] CPA,[17,35] childhood emotional abuse (CEA),[36] and CEN.[37] From their chart review of 200 mixed psychiatric patients, Read et al[33] reported increased verbal commenting and command hallucinations in patients with a history of CSA or CPA. Associations between subclinical paranoid ideation and trauma experiences, including CPA, neglect, and separation (ie, institutionalization),[32,34,38] are reported, but similar analyses of paranoid delusions have yielded conflicting results in clinical samples.[33,35,39] Importantly, many of the analyses linking trauma experiences to psychotic symptomatology have found significance within female, but not male samples,[40–43] suggesting the long-term sequelae of trauma may vary by gender.

Although many assert that the effects of early life maltreatment are dependent on the nature of the trauma experienced, others have found traumas of any form to be equivocally predictive of adulthood psychosis.[6] These authors focus, instead, on the additive effects of multiple ACEs. Indeed, understanding the effects of cumulative trauma may be of particular clinical significance, as the experience of only one form of childhood adversity is uncommon among patients with schizophrenia.[44,45] To this end, the ACEs questionnaire is an optimal tool, designed to assess the far-reaching effects of cumulative adversity. In addition to a myriad of negative medical and psychosocial outcomes,[46] total ACE score is a significant predictor of hallucinations[18,44] and risk for psychosis in adulthood.[15] Additionally, endorsement of multiple ACEs is associated with greater psychiatric and medical comorbidity, substance abuse, and psychosocial impairment among patients with schizophrenia.[13]

Understanding the effects of ACEs on the development and clinical course of psychosis may yield insight into often reported ethnic differences in schizophrenia.[47] Authors have described increased prevalence and severity of schizophrenia among black individuals,[47–49] a finding whose interpretation calls for consideration of diagnostician bias,[50] differences in symptom reporting,[51] and the unequal distribution of experiential adversity.[47,49] Recent epidemiologic data continue to indicate elevated rates of psychotic symptoms amongst blacks (15.3%) and Latinos (13.6%), relative to whites (9.7%) and individuals of Asian descent (9.6%) living in the United States.[52] Moreover, blacks and Latinos with psychotic illness report greater childhood abuse and neglect than white cases, which may mediate the relationship between ethnic minority status and elevated positive symptomatology.[53]

The present study examines relationships of ACEs with the symptomatic manifestations of schizophrenia among African American and Latino participants, representing ethnic groups disproportionately afflicted by childhood trauma and psychosis,[47,52,54] who are nonetheless underrepresented in the psychological and medical literature.[55–57] First, we will compare ACE exposures between cases and ethnicity-, age-, and gender-matched controls. We will then explore the ways in which individual ACEs and cumulative ACE exposure relate to positive symptom subtypes. By situating our work within the extant literature, we aim to contribute a novel perspective on the role of social adversity in schizophrenia.

Methods

Participants

Participants in this study are from the Genomic Psychiatry Cohort (GPC).[58] For the present study, phenotypic data from 240 controls, unaffected by schizophrenia or bipolar disorder, and 90 schizophrenia cases were analyzed. Each control was matched with a case by age, gender, and ethnicity using SAS software (SAS Institute Inc., with 2–3 controls for each case to reduce the risk of selection bias.[59] Both cases and controls were recruited from the same communities in Brooklyn, NY, in which the overall median household income was $50 200 with an unemployment rate of 7.7%.[60] Participants were recruited between July 2018 and July 2019 via online advertising, referrals from healthcare professionals, and in-person recruitment in hospital waiting rooms. Controls were screened for personal and family history of bipolar disorder and schizophrenia spectrum disorders.

Procedures

The GPC study procedures have been previously described elsewhere.[58] Briefly, cases and controls completed

self-report GPC questionnaires and the Adverse Childhood Experiences (ACEs) questionnaire.[46]Cases also completed the Diagnostic Interview for Psychosis and Affective Disorders (DI-PAD), an in-person semi-structured interview in which positive symptom subtypes are assessed through direct questioning, and are classified by duration (present for less than 1 month, 1 month or longer, or not present). Interviewers were trained by master raters. Training included side-by-side interviews with trainer and trainee. Further testing of inter-rater reliability was conducted annually. See Pato et al[58] for further details.

Measures

GPC Screening Questionnaire. This screening questionnaire collects demographic information and a general history of symptoms, including medical and psychiatric conditions (mood, anxiety, and psychotic disorders).[58]

Diagnostic Interview for Psychosis and Affective Disorders. The DI-PAD is a semi-structured clinical interview developed from the Diagnostic Interview for Genetics Studies (DIGS).[58,61] The DI-PAD is applied in conjunction with the Operational Criteria Checklist for Psychotic Illness (OPCRIT) to determine a diagnosis of schizophrenia (or bipolar disorder), which has yielded strong consistency with the best-estimate lifetime procedure.[62] OPCRIT diagnoses are based on criteria outlined in Diagnostic and Statistical Manual of Mental Disorders, 4th Edition, Text Revision (DSM-IV-TR)[63] and DSM-V.

The DI-PAD subdivides positive symptoms into hallucinations, delusions, and subjective thought disorder. Subjective thought disorder comprises experiences of thought insertion, withdrawal, broadcasting, and echo.

The ACEs Study Questionnaire. The ACEs questionnaire is a self-report tool used to assess the following adversities, occurring before the age of 18: emotional abuse, physical abuse, sexual abuse, emotional neglect, physical neglect, parental separation/divorce ("Divorce"), witnessing domestic violence ("Battered Mother"), household member with SUD, household member with mental illness ("Mental Illness"), and household member imprisonment ("Prison").[46] It yields a summed score from 0 to 10. The ACEs questionnaire has been shown to have good internal consistency, validity, and reliability.[64] Furthermore, the ACEs questionnaire has been previously used to assess associations of childhood adversity with hallucinations.[18]

Analyses

All analyses were conducted using SPSS version 24 (IBM Corp.) and were performed on both gender-stratified and combined-gender groups. Comparisons of discrete variables were carried out using the Pearson chi-square, with effect sizes defined by the measure of association, phi (φ), and a significance level set at $P < .05$. Due to the exploratory nature of this study, correction for multiple comparisons was not used. While this decision decreases the likelihood of false-negative results, it carries an increased risk of false positives.[65] Responses to each ACE item were dichotomized as present or absent, as were DI-PAD data pertaining to the experience of each symptom. Chi-square was used to facilitate case-control comparisons of ACE responses and to identify associations between ACE items and psychotic symptoms. Case-control comparisons of ACE score utilized 2-tailed independent samples *t*-tests, with 95% confidence intervals. Binary logistic regressions were then carried out, with each type of psychotic symptom as a categorical dependent variable and ACE score as the independent variable. Finally, 3 linear regressions were run to characterize relationships between ACE score and the number of symptoms endorsed in each of 3 symptom categories (hallucinations, delusions, and subjective thought disorder). Regression models included age and gender as additional independent variables.

Results

Clinical Characteristics

As illustrated in table 1, 83.3% of schizophrenia cases and 82.5% of controls identified themselves as African Ancestry (AA), while 13.3% of cases and 12.9% of controls identified themselves as Latino Ancestry (LA).

ACE Exposures

Among cases, cumulative ACE scores ranged from 0 to 10 (M = 2.72, SD 2.784) and were significantly higher than control ACE scores (M = 1.04, SD 1.581). ACE scores were higher in male cases (M = 2.44, SD 2.620) than male controls (M = 0.93, SD 1.383) and higher in female cases (M = 3.37, SD 3.090) than female controls (M = 1.26, SD

Table 1. Sample Characteristics

Variables	Schizophrenia Cases (*n* = 90)	Controls (*n* = 240)
Male	63 (70%)	159 (66.2%)
Female	27 (30%)	81 (33.8%)
Age (mean [SD])	40.64 (13.734)	42.27 (13.768)
Ethnicity		
African American	75 (83.3%)	198 (82.5%)
Hispanic/Latino	12 (13.3%)	31 (12.9%)
Mixed race	2 (2.2%)	10 (4.2%)
Other	1 (1.1%)	0 (0%)
Missing	0 (0%)	1 (0.4%)
Age of onset (mean [SD])	21.52 (8.963)	N/A
ACE score (mean [SD])	2.72 (2.784)	1.04 (1.581)
Male	2.44 (2.620)	0.93 (1.383)
Female	3.37 (3.090)	1.26 (1.902)

Note: ACE, adverse childhood experience.

1.902). Among cases, 27 (30%) reported 0 ACES, while 29 (32.2%) reported 4 or more ACEs.

Relative to male controls, male cases had significantly greater exposure to every ACE item, except for parental separation/divorce (divorce) and household member incarceration (prison). Relative to female controls, female cases had greater exposure to every ACE item, outside of parental separation/divorce. When comparing female and male cases, females reported significantly greater exposure to domestic violence perpetrated against their mother/stepmother (battered mother) than their male counterparts. Additionally, female cases reported CSA more than twice as frequently as male cases, although this trend did not reach statistical significance (figure 2).

Symptom Associations

Subjective Thought Disorder. As illustrated in supplementary table 3, among cases, significant relationships were found between thought broadcasting and endorsement of physical abuse, ($\chi^2(1) = 7.908$, $P = .005$), sexual abuse ($\chi^2(1) = 13.210$, $P < .001$), household SUD ($\chi^2(1) = 4.313$, $P = .038$), household mental illness ($\chi^2(1) = 6.391$, $P = .011$), and household member incarceration ("Prison") ($\chi^2(1) = 6.783$, $P = .009$).

When stratified by gender, additional relationships were observed. In female cases, CSA was independently associated with thought broadcasting ($\chi^2(1) = 5.082$, $P = .024$). Among males, thought broadcasting was associated with CSA ($\chi^2(1) = 8.851$, $P = .003$), CPA ($\chi^2(1) = 5.962$, $P = .015$), CEN ($\chi^2(1) = 4.242$, $P = .039$), household SUD ($\chi^2(1) = 5.661$, $P = .017$), and household member incarceration ($\chi^2(1) = 5.236$, $P = .022$).

In addition, using logistic regression, a cumulative ACE score was found to predict symptoms of thought broadcasting (odds ratio [OR] = 1.293, 95% confidence interval [CI]: 1.089, 1.536) among the combined male and female groups (table 3).

Hallucinations. While male cases displayed no positive associations between ACEs and hallucinations, for female cases (supplementary table 2), third-person verbal hallucinations were associated with CEA ($\chi^2(1) = 5.105$, $P = .024$), CPA ($\chi^2(1) = 4.626$, $P = .031$), parental divorce/separation ($\chi^2(1) = 4.473$, $P = .034$), and household mental illness ($\chi^2(1) = 4.513$, $P = .034$). Additionally, among female cases, command voices were associated with emotional neglect ($\chi^2(1) = 5.266$, $P = .022$).

Among female cases, linear regression revealed a significant relationship between cumulative ACE score and the total number of auditory hallucinations (table 2). This relationship was not significant in the male group or the entire schizophrenia group.

Delusions. For male cases, delusions of influence correlated with physical neglect ($\chi^2(1) = 6.477$, $P = .011$). Delusions of grandiosity were significantly higher among men who had witnessed violence against their mother/stepmother ($\chi^2(1) = 4.385$, $P = .036$) (supplementary table 4). Additionally, delusions of influence were associated with greater cumulative ACE score in male cases (OR: 1.280, 95% CI: 1.028, 1.592) (supplementary table 6).

For female cases, there were no positive associations between ACEs and delusions. Interestingly, among women, grandiose delusions were negatively associated with experiences of CSA ($\chi^2(1) = 4.725$, $P = .030$).

Discussion

The present study examined relationships of ACEs with the positive symptoms of schizophrenia among participants from ethnic minority groups, disproportionately affected by both psychotic illness and childhood adversity.[52,66] In our sample, we identified significant differences in rates of exposure to childhood traumas between schizophrenia cases and ethnicity-matched controls. We further described relationships between ACEs and distinct forms of hallucinations, delusions, and subjective thought disorder, many of which were gender specific.

ACE Exposures

Consistent with past research,[13,67] our cases had significantly greater exposure to childhood traumatic stress than controls, matched for age, gender, and ethnicity. Relative

Table 2. Effects of Cumulative ACE Score on the Number of Hallucinatory, Delusional, or Subjective Thought Disorder Symptoms Among Cases

			Hallucinations	Delusions	Subjective Thought Disorder
ACE score	All	β	0.108	0.031	0.163
		CI (95%)	−0.051, 0.151	−0.115, 0.152	−0.024, 0.167
	Male	β	−0.042	0.125	0.106
		CI (95%)	−0.153, 0.111	−0.078, 0.222	−0.068, 0.162
	Female	β	0.420*	−0.171	0.206
		CI (95%)	0.019, 0.295	−0.386, 0.159	−0.082, 0.265

Note: ACE, adverse childhood experience; β, regression coefficient; CI, confidence interval.
*$P < .05$.

to controls, physical neglect was elevated by a factor of 10 among cases, while physical (CPA), emotional (CEA), and sexual (CSA) abuse experiences were over 3 times more common in cases than controls. In fact, all ACE items, with the exception of parental separation/divorce, were significantly more prevalent in cases (figure 1).

In line with the literature on polytraumatization in schizophrenia,[15] the majority of cases reported 2 or more forms of childhood adversity, with 24.4% of the sample endorsing 6 or more ACE items. Such trends may speak to the interrelatedness of ACE categories,[46] as it is well established that exposure to one form of trauma increases a child's risk of exposure to another, which may then inflict cumulative psychological harm.[13,68]

Our female cases reported CSA more than twice as often as male cases, supporting past findings on sexual trauma in women with a psychotic disorder.[13,67] In fact, female cases reported every ACE item more frequently than their male counterparts, although most of these relationships did not reach statistical significance (figure 2). This may be due to the small size of the female schizophrenia group, which comprised only 27 participants. Previous publications on patients with severe mental illness have reported equivalent rates of global trauma in men and women.[40,44,45,69]

Here, we identified rates of household member incarceration among participants with schizophrenia that were not only greater than those of controls but also roughly 7 times greater than rates reported among the general population.[46] The prevalence observed here may speak to the ethnic makeup of our sample, as rates of incarceration are markedly higher within African American and Latino communities in the United States.[70,71] They may further reflect the socioeconomic disadvantage associated with

Table 3. Effects of Increasing ACE Score on the Presence of Subjective Thought Disorder Symptoms Among Cases

			Thought Insertion	Thought Withdrawal	Thought Broadcast	Thought Echo
ACE score	All	OR	1.047	1.000	1.293**	1.022
		CI (95%)	0.895–1.225	0.820–1.220	1.089–1.536	0.821–1.273
	Male	OR	0.971	1.006	1.321*	0.944
		CI (95%)	0.801–1.177	0.789–1.283	1.063–1.642	0.707–1.262
	Female	OR	1.198	0.884	1.227	1.198
		CI (95%)	0.901–1.593	0.575–1.359	0.923–1.631	0.901–1.593

Note: ACE, adverse childhood experience; OR, odds ratio; CI, confidence interval.
*$P < .05$, **$P < .01$.

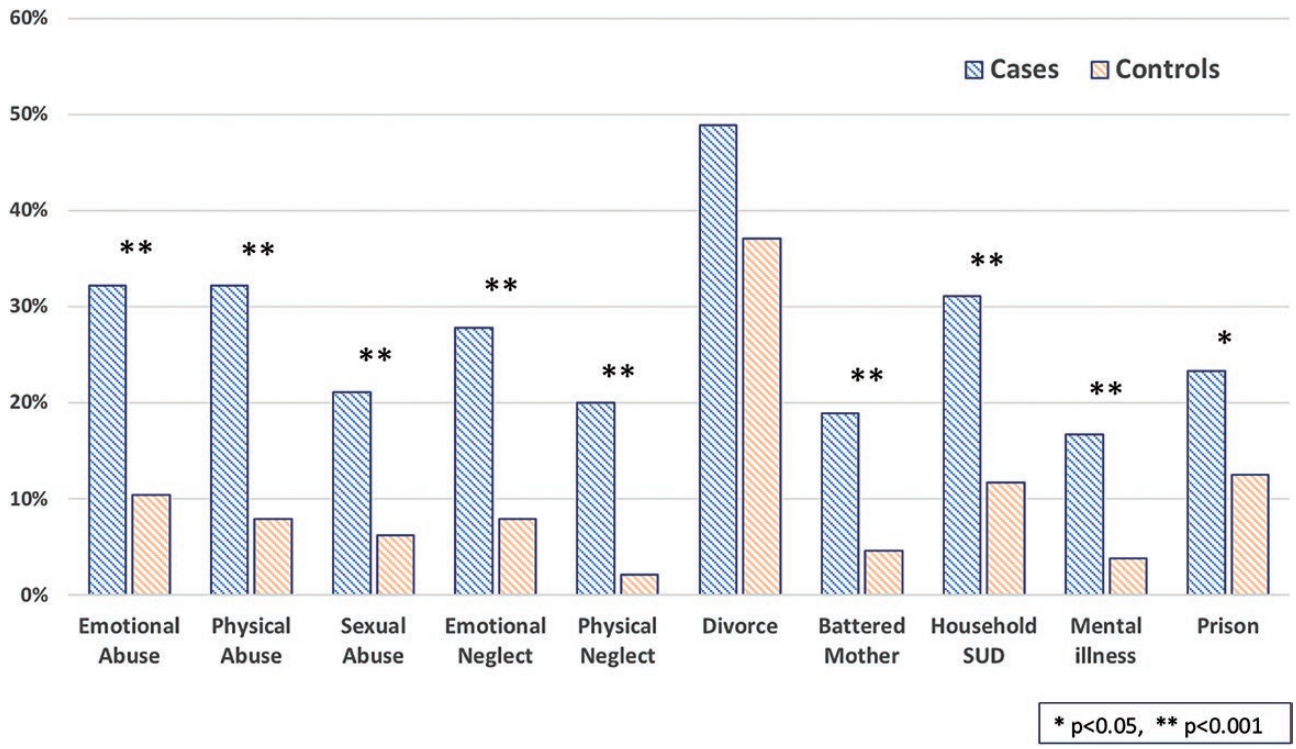

Fig. 1. Adverse childhood experience exposures in cases compared with ethnicity-, age-, and gender-matched controls.

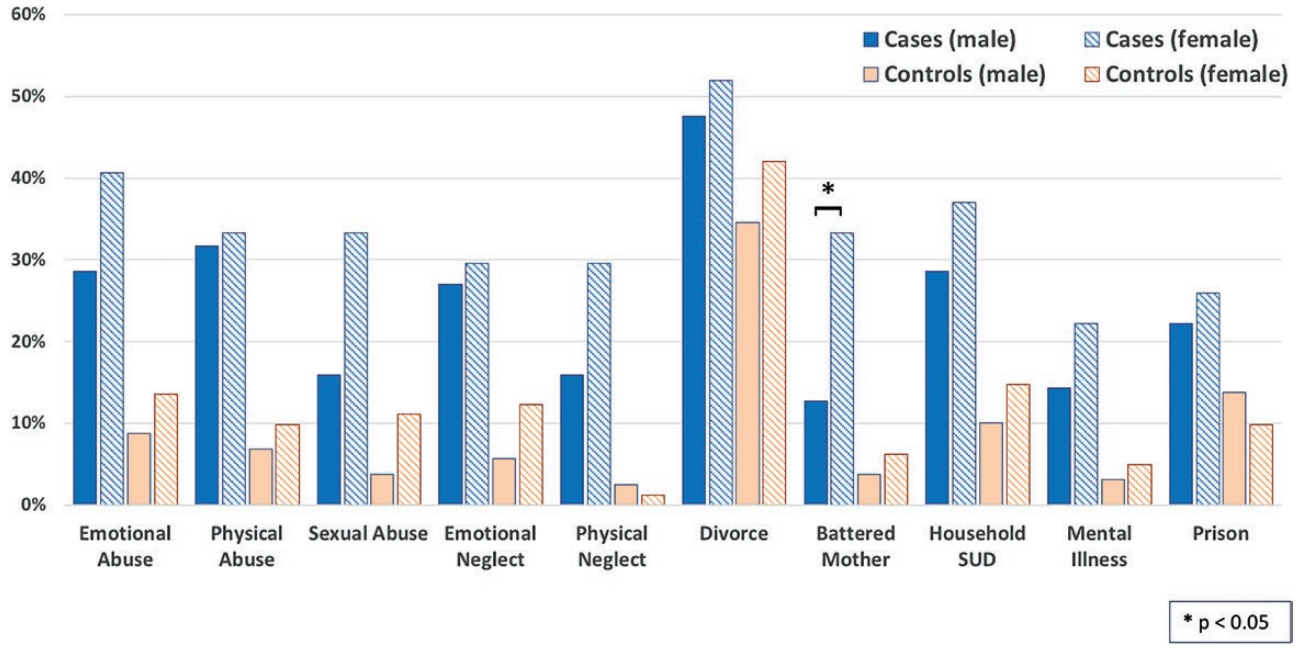

Fig. 2. Adverse childhood experience exposure comparisons by gender in cases and controls.

psychotic illness.[72] While childhood exposure to household member incarceration has been associated with poor physical and mental health outcomes,[71,73] the path from household incarceration to negative health outcomes in adulthood is varied and complex. The literature suggests that criminality within the household puts a child at risk of a number of other ACE exposures, including CEA, CPA, CSA, and CEN.[46,68]

The manner in which childhood adversity may give rise to psychosis remains a matter of speculation. There are notable neurobiological commonalities between trauma survivors and individuals with schizophrenia, including HPA hyperresponsiveness[74] and dysregulation of subcortical dopamine.[75] Aberrant dopamine signaling may contribute to the heightened salience assigned to internal representations in psychosis,[76] while disinhibited HPA activity underlies increased stress sensitivity.[77] Other authors suggest that dissociative phenomena stemming from abuse experiences may contribute to adulthood psychosis, noting considerable overlap in the symptomatology of dissociative disorders and schizophrenia.[31,78]

Positive Symptom Associations

Previous publications suggest that positive psychotic symptoms, particularly auditory hallucinations, correspond strongly with childhood trauma.[33,40] However, like Misiak et al,[40] we found that hallucinatory symptoms related to ACEs only in female cases. For our female cases, auditory hallucinations correlated positively with a number of distinct ACE categories as well as with total ACE score. For instance, third-person voices were significantly more common in women with a history of childhood physical or sexual abuse. Furthermore, linear regression analysis of female cases identified a positive correlation between cumulative ACE score and the number of hallucinatory symptoms endorsed (table 2), supporting the notion that symptomatic effects of childhood trauma may be additive in nature.[6]

While past descriptions of ACE associations with delusions are inconsistent,[33,35,39] our data suggest that significant positive relationships exist but may occur only among men. For example, delusions of influence were predicted by a history of physical neglect as well as by higher ACE score among our male cases. Additionally, persecutory delusions and delusions of grandiosity were associated with parental separation/divorce and witnessing domestic violence, respectively. Previous conflicting findings on the association of grandiose delusions with adverse experiences[33,79] may reflect a failure to account for gender differences, as our data suggest grandiose delusions relate to ACEs differently in women and men.

In fact, among the women in our sample, grandiose delusions displayed a negative association with CSA. Interestingly, this is not the first time that childhood abuse has been shown to predict the absence of grandiose delusions.[80] This may speak to the injurious effects of abuse experiences on a child's development of self-esteem, rendering grandiose delusional content incongruent with one's sense of self. Indeed, among psychosis patients, delusions of grandiosity are significantly less common in both males and females with low self-esteem,[81,82] although low self-esteem may be more common in women with schizophrenia.[83]

To our knowledge, we are the first to investigate relationships of trauma with thought broadcasting (table 3, supplementary table 3), which revealed a number of robust associations. Thought broadcasting correlated with distinct ACE categories, including physical and sexual abuse, as well as with total ACE score in the combined-gender group. The basis of these relationships is yet unclear, as there is scarce literature available to interpret such findings. Symptoms of thought broadcasting are believed to stem from situational appraisals that evoke the perception of a breach in privacy or a loss of boundaries, rendering one's internal mental processes transparent to others.[84,85] As elements of abuse experiences are often incorporated into psychotic perceptual distortions,[86] associations between thought broadcasting and experiences of physical and sexual abuse may relate to the nature of these traumas, which represent profound breaches of physical and emotional boundaries.[87]

Limitations

When interpreting data based on retrospective self-reports of childhood trauma, particularly in individuals with severe mental disturbances, reliable reporting cannot always be guaranteed. Some authors suggest that retrospective reporting may be influenced by the cognitive impairments,[88] delusional symptoms, and detachment from reality associated with psychotic illness, as well as by normal processes of forgetting.[89] However, an inquiry into the veracity of such reports has found surprising reliability within this patient population. For patients with severe mental illness, data on childhood trauma from self-report and clinician-rated assessments show high concordance.[90] Moreover, reports of child abuse from patients with psychosis appear stable over time and not associated with the current severity of psychotic symptoms.[89]

The size of our clinical sample (n = 90), while comparable to those used in similar studies, is relatively small and provides limitations to data analysis. Our gender distribution was also skewed, with a greater representation of male cases (n = 63) than female cases (n = 27). In spite of this, the analysis of female cases yielded a number of significant associations. In our case-control analyses (figures 1 and 2), we selected 2 to 3 controls matched by age, gender, and ethnicity for each schizophrenia case, allowing for a larger control group (n = 240), thereby reducing the likelihood of selection bias. We did not have socioeconomic status (SES) data with which to match controls. This could confound ACE comparisons, as trauma exposures and the development of schizophrenia may relate to SES.[47]However, both cases and controls were recruited from the same communities through identical means, increasing the likelihood of shared socioeconomic factors.

Finally, the inclusion of both AA and LA individuals in our sample potentially introduces elements of heterogeneity, for ACE exposures, and their psychological effects can vary significantly by ethnicity.[91,92] However, unfavorable social factors associated with minority status itself, such as poverty and discrimination, may be more relevant to psychotic illness than biological or cultural differences between ethnic groups.[47]

Conclusions

Taken together, the findings presented here support continued consideration of childhood adversity in future research on the etiology and manifold symptoms of schizophrenia. Within an ethnic minority sample, we found elevated exposure to nearly every ACE item among participants with schizophrenia, relative to ethnicity-matched controls. While purely correlational, these striking differences in ACE exposures support previously described theories on the pathogenic effects of trauma in schizophrenia. This article further validates the use of gender stratification in research on trauma and psychosis, as many observed symptomatic relationships were gender specific. We found relationships between ACEs and hallucinatory symptoms only in women, while ACEs tended to positively relate to delusional symptoms in men. Notably, thought broadcasting correlated with a number of trauma exposures in both men and women, including physical and sexual abuse, as well as with cumulative ACE score. Our findings further support the notion that multiple traumas may have additive effects on positive symptomatology. While psychological effects of trauma may vary by ethnicity,[91,93] these distinctions remain unclear in schizophrenia. Through broadened investigation of similar ACE associations across multiple ethnic groups, future research may help to establish the ethnic specificity or generality of findings reported here.

Clinical Significance

Early life abuses and comorbid posttraumatic stress disorder (PTSD) diagnoses are often overlooked in patients with psychotic disorders.[69,76] A preexisting diagnosis of schizophrenia may make clinicians less likely to take an abuse history[94] and the symptoms of psychosis may further mask those of PTSD.[95] Moreover, identified traumas are less often addressed in treatment plans for patients with schizophrenia.[96] Trauma-informed treatment has grown increasingly prevalent in mental healthcare settings,[97] and many authors indicate the need for such approaches in the treatment of psychotic illness.[24] At present, cognitive behavioral (CBT) and psychodynamic therapies have been effectively applied to the treatment of schizophrenia,[98,99] but their applicability to severely traumatized psychosis patients remains unclear. Effective adaptation of CBT techniques may entail a deeper dyadic exploration of connections between the patient's unique psychotic experiences and past traumas.[100] Continued investigation

into the symptomatologic effects of ACEs may shed light on the clinical heterogeneity of schizophrenia, enabling the development of more precisely targeted and individualized treatment approaches. To better reflect the patient population,[47,51] such research efforts will benefit from the purposeful inclusion of ethnic minority participants.

Supplementary Material

Supplementary data are available at *Schizophrenia Bulletin Open* online.

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