



ELSEVIER

Contents lists available at ScienceDirect

## Psychiatry Research

journal homepage: [www.elsevier.com/locate/psychres](http://www.elsevier.com/locate/psychres)

# Trauma exposure and PTSD in women with schizophrenia and coexisting substance use disorders: Comparisons to women with severe depression and substance use disorders

Jennifer M. Aakre<sup>a,\*</sup>, Clayton H. Brown<sup>a,b</sup>, Kathleen M. Benson<sup>c</sup>, Amy L. Drapalski<sup>a</sup>, Jean S. Gearon<sup>d</sup>

<sup>a</sup> VA Capitol Healthcare Network (VISN 5) Mental Illness Research, Education, and Clinical Center (MIRECC), VA Maryland Healthcare System, 10 N Greene St., Baltimore, MD 21201, United States

<sup>b</sup> Department of Epidemiology and Public Health, University of Maryland School of Medicine, University of Maryland, Baltimore 660 W. Redwood Street, Baltimore, MD 21201, United States

<sup>c</sup> Louis Stokes Cleveland VA Medical Center, 10701 East Blvd., Cleveland, OH 44106, United States

<sup>d</sup> The Department of Psychiatry & Behavioral Sciences, The George Washington University School of Medicine and Health Sciences, 2120 L Street, NW, Washington, DC 20037, United States

## ARTICLE INFO

## Article history:

Received 31 December 2013

Received in revised form

24 June 2014

Accepted 3 October 2014

Available online 14 October 2014

## Keywords:

Serious mental illness

Posttraumatic stress disorder

Substance abuse

## ABSTRACT

The present study compared rates of trauma exposure and PTSD among three groups of women at high trauma risk: those with substance use disorders (SUD) and schizophrenia ( $n=42$ ), those with SUD and severe, nonpsychotic depression ( $n=38$ ), and those with SUD and no other DSM-IV Axis I condition ( $n=37$ ). We hypothesized that exposure to traumatic stressors and current diagnosis of PTSD would be more common in women with schizophrenia and SUD, when compared to the other two groups. Results indicate that women with schizophrenia and SUD had a more extensive trauma history than women with SUD only, and were also more likely to have PTSD. Women with schizophrenia had a fourfold greater likelihood of meeting criteria for current PTSD than were women with severe, nonpsychotic depression when potential confounds of age, race, education, severity of trauma history, and childhood trauma exposure were controlled. These results lend support to the possibility that women with psychosis have an elevated vulnerability to PTSD symptomology when exposed to life stressors that is distinct from the vulnerability associated with coexisting nonpsychotic SMI. The psychological sequelae of trauma are substantial and should be addressed in women seeking treatment for schizophrenia and problematic substance use.

Published by Elsevier Ireland Ltd.

## 1. Introduction

Research indicates that individuals with schizophrenia have a fourfold greater likelihood of developing a substance use disorder (SUD) in their lifetimes than the general population, with 47% of individuals with schizophrenia in a large-scale population-based study reporting lifetime SUD comorbidity (Regier et al., 1990). Among individuals with coexisting schizophrenia and SUD (Picken and Tarrier, 2011; Tarrier and Picken, 2011), and particularly among women with these coexisting disorders (Gearon et al., 2003), traumatic life events are alarmingly common. Research suggests that 96% of women with schizophrenia and SUD have been exposed to at least one traumatic event in their lives (Gearon et al., 2003). Childhood trauma and victimization are particularly

common in this group and may contribute to the later development of psychosis (Read et al., 2005; Varese et al., 2012). Research has demonstrated that trauma exposure rates for women with coexisting schizophrenia and SUD are markedly higher than those reported for women in the general population (51%; Kessler et al., 1995) and for the general population of individuals with schizophrenia (64%; Resnick et al., 2003). Furthermore, women with schizophrenia and SUD have significantly higher interpersonal victimization rates than men with coexisting schizophrenia and SUD (Brunette and Drake, 1997).

Given that co-existing SUDs are very common in women with schizophrenia (Buckley et al., 2009) and that rates of trauma exposure are high for women with schizophrenia and SUD (Gearon et al., 2003), it is important to better understand the ways in which trauma exposure affects the lives of such individuals. Previous literature has identified numerous negative clinical and functional outcomes associated with trauma exposure among adults with serious mental illness, including unstable living

\* Corresponding author. Tel.: +1 410 637 1877; fax: +1 410 637 1880.

E-mail address: [Jennifer.aakre@va.gov](mailto:Jennifer.aakre@va.gov) (J.M. Aakre).

conditions, poor quality of life related to social and occupational functioning, the presence of self-harming behaviors and suicidality, risky sexual behaviors, poor neurocognitive functioning, and increased severity of psychotic symptoms (for a review, see Grubaugh et al., 2011). Additionally, research has suggested that girls' response to traumatic life events differs from that of boys, supporting the conduct of gender specific research on the sequelae of trauma exposure (Read et al., 2001).

The development of PTSD is another common clinical outcome associated with trauma exposure in women with schizophrenia and SUD (Gearon et al., 2003). Women in the general population have higher rates of PTSD than men (Kessler et al., 1995), women with SUD are also at heightened risk for PTSD (Dansky et al., 1996), and individuals with schizophrenia and SUD have greater PTSD symptom severity than individuals with schizophrenia alone (Scheller-Gilkey et al., 2004). Thus, women with SUD and schizophrenia are most likely at higher risk for PTSD than women with only one of these two disorders and men with both disorders. It is less clear, however, whether there is diagnostic specificity for this finding. Although previous research has contrasted PTSD rates between individuals with mood disorders featuring psychosis symptomology versus schizophrenia (Neria et al., 2002; Mueser et al., 2001), no research to date has investigated whether women with schizophrenia have similar rates of PTSD to women with non-psychotic mental health disorders featuring similar functional impairments. Furthermore, we do not know whether women with schizophrenia, SUD, and trauma exposure differ in their risk of developing PTSD when compared to individuals with other types of SMI diagnoses, SUD, and trauma exposure.

The present study compares rates of trauma exposure and PTSD among three groups of women at high risk for interpersonal victimization and other traumatic stressors: those with SUD and schizophrenia, those with SUD and severe, chronic nonpsychotic depression, and those with SUD and no other Axis I condition. Our primary hypothesis is that exposure to traumatic stressors and current diagnosis of PTSD will be more common in women with schizophrenia and SUD, when compared to women with SUD and severe depression and to women with SUD only. To our knowledge, trauma exposure and PTSD rates of these participant groups have not yet been directly compared. Furthermore, the relationship between schizophrenia and PTSD is explored by investigating whether women with schizophrenia and SUD are more likely to have PTSD than women with severe depression and SUD.

## 2. Methods

### 2.1. Participants

Baseline data for all participants were collected for a larger, longitudinal study of trauma history among women with schizophrenia and SUD (Gearon et al., 2003). For the present study, a subsample of participants from the larger dataset were divided into 3 groups; (1) women with schizophrenia and SUD (SC group), (2) women with severe, non-psychotic depressive disorders and SUD (DP group), and (3) women with SUD in the absence of other Axis I disorders (SU group). Forty-six individuals from the larger dataset (11 with bipolar disorder, one with a primary diagnosis of non-PTSD anxiety disorder, and 34 with no current SUD) were excluded to create the participant subgroups for the present analyses. All other inclusion and exclusion criteria described herein were features of the larger, longitudinal study.

All participants included in analyses ( $N=117$ ) met DSM-IV criteria for current illicit alcohol and/or drug abuse or dependence. Drug abuse or dependence within the three months prior to data collection was considered "current." All were receiving outpatient mental health treatment at inner-city community-based clinics affiliated with the University of Maryland or the Veterans Administration Medical Center in Baltimore and were stable psychiatrically. Inclusion criteria for all groups included an age range of 18–65 years; exclusion criteria were mental retardation and a documented history of seizure disorder or head trauma with loss of consciousness.

The study participants in the SC group were 42 women with DSM-IV diagnoses of either schizophrenia ( $n=28$ ) or schizoaffective disorder ( $n=14$ ). The study participants in the DP group were 38 women with *Diagnostic and Statistical Manual of Mental Disorders: Fourth Edition* (DSM-IV; American Psychiatric Association, 1994) diagnosis of a non-psychotic, recurrent major depression. Women who were working at least part-time (i.e., 25% of full time) were excluded, in order to include only individuals with the most severe form of nonpsychotic depressive disorder. A history of psychotic symptoms was an additional exclusion criterion for the DP group. The study participants in the SU group were 37 women with DSM-IV diagnoses of current alcohol and/or illicit drug abuse or dependence. Additional exclusion criteria for the SU group were (1) a current diagnosis of an Axis I disorder (apart from SUD), (2) a history of Axis I disorder (apart from SUD), and (3) a history of psychiatric hospitalization.

### 2.2. Procedures

A partial HIPAA waiver was obtained for purposes of recruitment to conduct chart reviews. Medical records of all new intakes at the community mental health centers were reviewed once per week to determine preliminary eligibility, including diagnosis of SMI and current SUD. Therapists of potential participants were then asked whether their client was sufficiently psychiatrically stable to provide informed consent. All potential subjects participated in a standardized informed consent process with trained recruiters and were advised at the time that a Federal Certificate of Confidentiality would protect the information they provided. All assessments and procedures were reviewed and approved by the university and the VA Maryland Health Care System institutional review board.

Each participant was administered a four-hour assessment battery over a two-day period. All research interviewers were women who had masters or doctoral degrees in a mental health discipline. Clinical interviewers were trained by a licensed clinical psychologist, using reading materials, training tapes, and live supervision. Interviewers approved for conducting the assessments attended weekly group supervision sessions where videotaped assessments were reviewed and discussed. Ongoing inter-rater reliability was maintained by obtaining consensus on ratings of symptom intensity and severity as well as diagnosis for randomly selected study participants during weekly supervision sessions.

### 2.3. Assessment measures

#### 2.3.1. Psychiatric diagnosis and symptom assessment

Information about current diagnosis and psychiatric history was obtained using the Structured Clinical Interview for DSM-IV Axis I Disorders (SCID-I; First et al., 1994). Information from the SCID-I, participant self-report, medical records, and information from treatment providers was used to establish Axis I diagnoses. The inter-rater reliability rating (kappa) for the SCID diagnoses, based on ratings of 21 randomly selected cases, was greater than 0.80. Individuals whose psychotic symptoms were substance-induced were excluded from the original study.

A version of the Clinician-Administered PTSD Scale (CAPS; Blake et al., 1995), modified for use with individuals with schizophrenia (Gearon et al., 2004), was used to establish current PTSD diagnosis. The CAPS is the most widely-used clinician-administered interview that assesses PTSD diagnostic criteria; it is currently considered the "gold standard" assessment tool for PTSD (Keane et al., 2007). Gearon et al. (2004) adapted the CAPS for use with people with schizophrenia by changing the language of the questions to be at an 8th-grade reading level, inserting additional behavioral definitions and anchors, and providing examples relevant to the life experiences of this patient population. Each of the 17 DSM-IV PTSD symptoms is rated on a scale of 0, low, to 4, high, for both frequency and intensity. PTSD symptom severity is computed by summing the frequency and intensity scores for the 17 items. The modified version of the CAPS used in the present study has demonstrated sufficient convergent validity through comparison to Structured Clinical Interview for DSM-IV-based PTSD diagnosis (First et al., 1994) and the Impact of Events Scale (Horowitz et al., 1979), as well as acceptable interrater and test-retest reliability (Gearon et al., 2004). In the present study, a diagnosis of PTSD was determined by using a cut-off of 45 or higher for the sum total severity (frequency+intensity) of symptoms. Analysis of the psychometric properties of this empirically-derived CAPS scoring rule have been found it to be lenient (i.e., unlikely to generate false negatives), valid, and reliable (Weathers et al., 1999).

Current (past week) symptoms of psychosis were established with the Positive and Negative Syndrome Scale (PANSS; Opler et al., 1986). The PANSS is a widely-used symptom rating interview, which includes 30 items rated by the interviewer on a scale of 1 (absent) to 7 (extreme). The scale provides ratings on subscales of positive psychotic symptoms, negative psychotic symptoms, and general psychopathology, as well as a full scale score. The full scale score was used to describe this study sample.

#### 2.3.2. Lifetime trauma history assessment

Lifetime trauma history was assessed with the Traumatic Life Events Questionnaire (TLEQ; Kubany et al., 2000). This instrument covers a range of commonly-

assessed childhood and adulthood traumatic events. Evidence indicates that the reliability over time of self-reports of trauma in childhood and adulthood by a subsample of the current sample of women with SUDs and schizophrenia is quite satisfactory (Gearon et al., 2004). Other studies have similarly demonstrated good reliability for the reports of sexual and physical abuse by people with serious mental illness, including events occurring in childhood (Goodman et al., 1999; Mueser et al., 2001; Fisher et al., 2011) and adulthood (Goodman et al., 1999; Mueser et al., 2001).

#### 2.4. Statistical analysis

One-way ANOVA and chi-square tests were performed to assess diagnostic group differences on demographic and clinical variables. Group comparisons on multiple trauma exposure variables were made using global chi-square tests. Because multiple tests were conducted, a statistically significant result was defined as a *p*-value less than 0.01 for these analyses. The global tests were followed by pair-wise post-hoc chi-square tests. Logistic regression was performed on the SMI subsample (DP and SC participants) to predict the outcome of current CAPS PTSD diagnosis (yes/no), employing several clinical and demographic covariates.

### 3. Results

#### 3.1. Demographics and psychiatric information

Table 1 provides the demographic information for the three participant groups. The majority of participants in all three diagnostic groups were African American, and groups did not significantly differ by race/ethnicity, age, monthly income, or education. Group differences were found on marital status and PANSS score. See Table 1 for between-group comparisons.

Each participant needed to meet DSM-IV criteria for current substance abuse or dependence to be included. In the full sample, 50% of participants met current substance abuse or dependence criteria for multiple (two or more) substances, and groups did not significantly differ (see Table 1). For those meeting criteria for abuse or dependence on a single substance, cocaine was the most commonly-cited drug of choice in all groups. There were no significant differences in relative preference for subclasses of substances (alcohol, cocaine, opiates, sedatives, and polysubstance) among the three groups,  $\chi^2(8, N=117)=12.04, p=0.15$ .

#### 3.2. Prevalence of trauma exposure and PTSD

All participants reported at least one lifetime traumatic event. The diagnostic groups significantly differed in the number of event types they had experienced,  $F(2,114)=5.085, p=0.008$ . Post-hoc tests demonstrated that the SU group ( $M=6.81, S.D.=2.66$ ) reported experiencing significantly fewer trauma event categories than both the SC group ( $M=8.43, S.D.=3.72$ ) and the DP group ( $M=9.18, S.D.=3.35$ ); the SC and DP groups did not significantly differ from one another. The proportions of women experiencing

particular types of trauma in childhood and adulthood are provided in Table 2. Notably, the three groups did not differ in their endorsement of any adulthood trauma categories, with the exception of the category “having your life threatened.” Both SMI groups were significantly more likely to report a childhood sexual and/or physical abuse history than the SU group (see Table 2).

Twenty-eight percent (33/117) of the full sample met criteria for PTSD at the time of assessment. Forty-eight percent (20/42) of the SC group, 29% (11/38) of the DP group, and 5% (2/37) of the SU group met criteria for current PTSD,  $\chi^2(2, N=117)=17.33, p<0.001$ . Post-hoc pairwise comparisons indicate that the SU group was significantly less likely to meet criteria for PTSD than the SC group,  $\chi^2(1, n=79)=17.45, p<0.001$ , and the DP group,  $\chi^2(1, n=75)=7.25, p=0.007$ . Current PTSD rates of the two SMI groups did not significantly differ,  $\chi^2(1, n=80)=2.93, p=0.087$ .

#### 3.3. Predictors of current PTSD diagnosis

Logistic regression was used to assess the relative odds of meeting criteria for PTSD between the SC group versus DP group, controlling for demographic and clinical covariates. The covariates were selected a priori according to risk factors for PTSD identified in existing research (Vogt et al., 2007), and included age, race, education, number of trauma categories endorsed (as a proxy of severity of trauma history), and childhood trauma history. Participants were categorized as having a childhood trauma history if they reported either childhood physical abuse or sexual abuse on the TLEQ. Participants were categorized as “low trauma experience” if they endorsed 5 or fewer trauma categories and were categorized as “high trauma experience” if they endorsed 6 or more trauma categories. These two categories were created using a median split for the childhood trauma variable on the sample of participants included in the regression.

Women with schizophrenia and SUD were approximately four times more likely to meet criteria for PTSD than women with severe, chronic depression and SUD. Race was also a significant predictor; Caucasian participants were more likely to meet criteria for PTSD than African American participants. See Table 3 for results.

### 4. Discussion

Our primary hypothesis was that trauma exposure and current PTSD would be more common for women with schizophrenia and SUD, when compared to women with SUD and severe, nonpsychotic depression and women with SUD only. This hypothesis was partially supported. Women with schizophrenia and SUD were more likely than women with SUD only to have PTSD, and also had

**Table 1**  
Demographics for the sample,  $N=117$ .

| Demographic and clinical variables                 | Schizophrenia/substance use disorder ( $n=42$ ) | Depressive disorder/substance use disorder ( $n=38$ ) | Substance use disorder ( $n=37$ )   | $\chi^2$    | <i>F</i>     | <i>p</i>     |
|--|---|---|-------------------------------------|-------------|--------------|--------------|
| Mean age in years $\pm$ S.D.                       | 41.02 $\pm$ 6.78                                | 39.63 $\pm$ 8.47                                      | 37.30 $\pm$ 6.47                    |             | 2.60         | 0.078        |
| % Male   | 92.9 (39/42)                                    | 78.9 (30/38)  | 89.2 (33/37)                        | 3.65        |              | 0.161        |
| % African American                                 | 92.9 (39/42)                                    | 78.9 (30/38)  | 89.2 (33/37)                        | 3.65        |              | 0.161        |
| % Caucasian  | 7.1 (3/42)                                      | 21.1 (8/38)   | 10.8 (4/37)                         |             |              |              |
| % Mixed race                                       | 7.1 (3/42)                                      | 21.1 (8/38)   | 10.8 (4/37)                         |             |              |              |
| % Other?   | 7.1 (3/42)                                      | 21.1 (8/38)   | 10.8 (4/37)                         |             |              |              |
| Mean years of education $\pm$ S.D.                 | 11.09 $\pm$ 1.92                                | 11.76 $\pm$ 1.78                                      | 11.46 $\pm$ 1.57                    |             | 1.44         | 0.241        |
| % Never married                                    | <b>71.4 (30/42)*++</b>                          | <b>52.6 (20/38)*</b>                                  | <b>81.1 (30/37)++</b>               | <b>7.30</b> |              | <b>0.026</b> |
| Mean income, past month $\pm$ S.D.                 | 570.80 $\pm$ 331.24                             | 497.89 $\pm$ 322.46                                   | 567.11 $\pm$ 594.54                 |             | 0.34         | 0.710        |
| % Meet criteria for polysubstance abuse/dependence | 52.4 (22/42)                                    | 39.5 (15/38)  | 56.8 (21/37)                        | 2.45        |              | 0.294        |
| Mean PANSS total score $\pm$ S.D.                  | <b>71.10 <math>\pm</math> 14.75*</b>            | <b>53.42 <math>\pm</math> 11.85*+</b>                 | <b>43.41 <math>\pm</math> 9.63†</b> |             | <b>47.72</b> | <b>0.000</b> |

Significant results are in bold. For statistically significant comparisons, groups with the same superscript do not significantly differ.

**Table 2**

Lifetime exposure to traumatic events in a sample of 42 women with substance use disorders (SUD) and schizophrenia, 38 women with SUD and SMI depression, and 37 women with SUD and no other Axis I diagnosis.

| Type of trauma           | Percent of group exposed (number of participants) |   |                                  | $\chi^2$     | p            |
|--------------------------|---|---|----------------------------------|--------------|--------------|
|                          | Schizophrenia/substance use disorder (n=42)       | Depressive disorder/substance use disorder (n=38) | Substance use disorder (n=37)    |              |              |
| Any traumatic event      | 100 (42/42)                                       | 100 (38/38)                                       | 100 (37/37)                      |              |              |
| Childhood trauma         |   |   |                                  |              |              |
| <b>Sexual abuse</b>      | <b>59.5 (25/42)*</b>                              | <b>57.9 (22/38)*</b>                              | <b>27.0 (10/37)<sup>++</sup></b> | <b>10.21</b> | <b>0.006</b> |
| <b>Physical abuse</b>    | <b>50.0 (21/42)*</b>                              | <b>44.7 (17/38)*</b>                              | <b>13.5 (5/37)<sup>++</sup></b>  | <b>12.81</b> | <b>0.002</b> |
| <b>Either CSA or CPA</b> | <b>69.0 (29/42)*</b>                              | <b>68.4 (26/38)*</b>                              | <b>32.4 (12/37)<sup>++</sup></b> | <b>13.64</b> | <b>0.001</b> |
| <b>Both CSA and CPA</b>  | <b>40.5 (17/42)*</b>                              | <b>34.2 (13/38)*</b>                              | <b>8.1 (3/37)<sup>++</sup></b>   | <b>11.18</b> | <b>0.004</b> |
| Witness violence         | 69.0 (29/42)                                      | 65.8 (25/38)                                      | 43.2 (16/37)                     | 6.28         | 0.043        |
| Adulthood trauma         |   |   |                                  |              |              |
| Sexual abuse/rape        | 64.3 (27/42)                                      | 55.3 (21/38)                                      | 32.4 (12/37)                     | 8.35         | 0.015        |
| Domestic assault         | 78.6 (33/42)                                      | 86.8 (33/38)                                      | 67.6 (25/37)                     | 4.05         | 0.132        |
| Death of loved one       | 85.7 (36/42)                                      | 81.6 (31/38)                                      | 83.8 (31/37)                     | 0.25         | 0.882        |
| Life-threatening illness | 50.0 (21/42)                                      | 50.0 (19/38)                                      | 32.4 (12/37)                     | 5.50         | 0.240        |
| Robbed with weapon       | 54.8 (23/42)                                      | 60.5 (23/38)                                      | 56.8 (21/37)                     | 0.28         | 0.871        |
| Loved one ill, etc.      | 35.7 (15/42)                                      | 44.7 (17/38)                                      | 32.4 (12/37)                     | 1.31         | 0.520        |
| <b>Life threatened</b>   | <b>57.1 (24/42)<sup>+++</sup></b>                 | <b>76.3 (29/38)*</b>                              | <b>37.8 (14/37)<sup>++</sup></b> | <b>11.34</b> | <b>0.003</b> |
| MVA                      | 40.5 (17/42)                                      | 60.5 (23/38)                                      | 43.2 (16/37)                     | 3.68         | 0.159        |
| Stranger assaulted       | 42.9 (18/42)                                      | 36.8 (14/38)                                      | 24.3 (9/37)                      | 3.05         | 0.218        |

Significant results are in bold. For statistically significant comparisons, groups with the same superscript do not significantly differ. CSA is childhood sexual abuse; CPA is childhood physical abuse; MVA is motor vehicle accident.

**Table 3**

Odds ratios and 95% confidence intervals for the odds ratio for having PTSD (per unit increase for continuous predictors or for having a characteristic versus not for dichotomous predictors.).

| Characteristic  | PTSD diagnosis (yes versus no) |                   |             |             |
|---|--------------------------------|-------------------|-------------|-------------|
|   | Odds ratio                     | 95% CI            | $\chi^2$    | p           |
| Age (years)   | 0.98                           | 0.91–1.06         | 0.16        | 0.69        |
| <b>Caucasian race (reference: African American)</b>       | <b>9.33</b>                    | <b>1.53–56.80</b> | <b>5.87</b> | <b>0.02</b> |
| Education (years)   | 1.08                           | 0.81–1.44         | 0.28        | 0.60        |
| Number of trauma types experienced (reference: 1–5 types) | 0.28                           | 0.04–1.83         | 1.75        | 0.19        |
| Childhood sexual and/or physical abuse (reference: no)    | 2.61                           | 0.58–11.72        | 1.56        | 0.21        |
| <b>Specific SMI diagnosis (reference: depression)</b>     | <b>4.32</b>                    | <b>1.33–14.06</b> | <b>5.90</b> | <b>0.02</b> |

a more extensive trauma history. However, rates of trauma exposure and PTSD among women with schizophrenia and women with severe depression did not differ. This is new information, as no previous research has compared PTSD rates of women with psychosis-spectrum disorders versus non-psychotic disorders who have similar functional impairment (Neria et al., 2002; Mueser et al., 2004). Both SMI groups experienced greater childhood trauma exposure than the group of women with only SUD. This is in keeping with a sizeable literature indicating that childhood trauma experiences are linked to the development of myriad mental health issues in adulthood (Hovens et al., 2010; Varese et al., 2012), although the current study did not establish temporality of trauma experiences and development of psychotic or depressive symptoms and thus is not able to assess the role of childhood trauma in the development of these symptoms.

Although the rates of trauma exposure and PTSD in the two SMI groups did not differ, women with schizophrenia had a fourfold greater likelihood of meeting criteria for current PTSD than women with severe, nonpsychotic depression when potential confounds were controlled. These results lend support to the possibility that individuals with psychosis have an elevated vulnerability to PTSD symptomology when exposed to life stressors. Another interpretation of current study findings is that exposure to traumatic life events plays a causal role in the development of both PTSD and psychosis symptoms. The present

study design was such that causal risk factors for the development of psychosis could not be assessed. However, we note that a growing body of empirical research has addressed this hypothesized connection between trauma and psychosis, finding compelling evidence to support a causal relationship (Morrison et al., 2003; Read et al., 2005; Varese et al., 2012).

The Caucasian women in this study were more likely to meet criteria for PTSD than were African American women. This finding runs counter to PTSD research in the general population, in which minority racial status is associated with higher rates of PTSD (Brewin et al., 2000). Targeted research on the intersection of race, ethnicity, gender, and mental health conditions in the development of PTSD is needed, particularly because race may be a proxy risk factor (Vogt et al., 2007). A better understanding of the causal risk factors for which race may act as a proxy is needed, in order to unpack this apparent difference in response to traumatic experiences.

In keeping with findings in the present study, research has suggested shared environmental risk factors between the development of psychosis and PTSD symptoms (Morrison et al., 2003; Read et al., 2001). Shared psychological processes, for example emotion regulation strategies (Livingston et al., 2009) and negative schemas of the self and the world (Garety et al., 2001) have also been noted in the literature. Furthermore, it is plausible that psychotic symptoms can indirectly place some at risk for the development of PTSD. For

example, paranoia, social anhedonia, and other common features of psychotic disorders commonly lead to social isolation and resulting lack of social support. Poor social support after exposure to a traumatic event increases risk of developing post-traumatic stress symptoms (Brewin et al., 2000; Stevens et al., 2013); thus, symptoms of psychosis can indirectly increase vulnerability to PTSD (Mueser et al., 2002).

Childhood trauma exposure and PTSD rates were very high in both of the SMI groups, suggesting the importance of assessing trauma history in and providing trauma-informed care to women with SMI. For many women with these co-occurring disorders, the treatment of psychotic symptoms (West et al., 2005) and problematic substance use (Buckley et al., 2009) eclipse the treatment of PTSD and other clinically-significant reactions to trauma. In these cases, the chronicity of posttraumatic reactions may be further prolonged, contributing to maladaptive coping responses, increased patterns of substance use, and revictimization in this already vulnerable population. The growing evidence of the relationship between trauma history and severity of other mental health issues (Grubaugh et al., 2011), along with the results of this current study, reveal a need to make trauma-informed care a priority. Skillful assessment of trauma and abuse history, although an often-neglected component of mental health care provided to individuals with psychosis, is an essential first step (Read et al., 2007). Several interventions have been developed and tested to treat PTSD in individuals with coexisting SMI (Harris, 1996; Mueser et al., 2008; Frueh et al., 2009) and there is emerging evidence that PTSD treatments with an empirical base in the general population are also efficacious for individuals with coexisting PTSD and SMI (Van den Berg and van der Gaag, 2012). There is a great need to disseminate and implement these treatments, and to address barriers to the provision of PTSD treatment for individuals with coexisting SMI (Frueh et al., 2006).

This study featured numerous strengths, including the use of strictly-defined diagnostic groups, and the inclusion of only women with severe, chronic depressive disorders in the depressed group in order to reduce the confounding influence of functional disability level. Despite several strengths of this study, there are also several limitations. First, this study uses retrospective self-reports of childhood abuse for which corroborating information was not available. Although research supports the reliability of such reports from individuals with SMI, based on temporal stability of reporting (Fisher et al., 2011), it is not possible to state with complete confidence that these data are accurate. Secondly, the sample size was small. Third, all three groups were assessed for PTSD using a version of the CAPS that was validated for use with individuals with schizophrenia. Finally, information on the index trauma upon which the CAPS was scored were not available in the dataset, and are thus not presented here.

The present study offers evidence of exceedingly high rates of lifetime exposure to traumatic experiences and PTSD in women with serious mental illness and coexisting SUD. In addition, women with schizophrenia and SUD appear to experience particularly high rates of PTSD. The present data add strength to the contention that the psychological sequelae of trauma must be assessed and addressed in women seeking treatment for schizophrenia and problematic substance use. Such women will be well-served by the conduct and application of research on the integration of treatments for these interconnected mental health issues, and by widespread delivery of trauma-informed care.

## Acknowledgments

Preparation of this article was supported in part by the National Institutes of Health Grant DA-11199-01 to Dr. Gearon, the Office of

Academic Affiliations, Advanced Fellowship Program in Mental Illness Research and Treatment, Department of Veterans Affairs, and the VA Capitol Health Care Network VISN 5 Mental Illness Research, Education, and Clinical Center. The funding sources had no further role in study design; in the collection, analysis and interpretation of data; in the writing of the report; and in the decision to submit the paper for publication.

## References

- American Psychiatric Association, 1994. Diagnostic and Statistical Manual of Mental Disorders, Fourth ed. American Psychiatric Association, Washington, DC.
- Blake, D.D., Weathers, F.W., Nagy, L.M., Kaloupek, D.G., Guzman, F.D., Charney, D.S., Keane, T.M., 1995. The development of a clinician-administered PTSD scale. *Journal of Traumatic Stress* 8, 75–90.
- Brewin, C.R., Andrews, B., Valentine, J.D., 2000. Meta-analysis of risk factors for posttraumatic stress disorder in trauma-exposed adults. *Journal of Consulting and Clinical Psychology* 68 (2000), 748–766.
- Buckley, P.F., Miller, B.J., Leher, D.S., Castle, D.J., 2009. Psychiatric comorbidities and schizophrenia. *Schizophrenia Bulletin* 35 (2), 383–402.
- Brunette, M.F., Drake, R.E., 1997. Gender differences in patients with schizophrenia and substance abuse. *Comprehensive Psychiatry* 38 (2), 109–116.
- Dansky, B.S., Brady, K.T., Saladin, M.E., Killeen, T., Becker, S., Roitzsch, J., 1996. Victimization and PTSD in individuals with substance use disorders: gender and racial differences. *American Journal of Drug and Alcohol Abuse* 22 (1), 75–93.
- First, M.B., Spitzer, R.L., Gibbon, M., Williams, J.B.W., 1994. Structured Clinical Interview for Axis I DSM-IV. New York State Psychiatric Institute, New York.
- Fisher, H.L., Craig, T.K., Fearon, P., Morgan, K., Dazzan, P., Lappin, J., Hutchinson, G., Doody, G.A., Jones, P.B., McGuffin, P., Murray, R.M., Leff, J., Morgan, C., 2011. Reliability and comparability of psychosis patients' retrospective reports of childhood abuse. *Schizophrenia Bulletin* 37, 546–553.
- Frueh, B., Cusack, K.J., Grubaugh, A.L., Sauvageot, J.A., Wells, C., 2006. Clinicians' perspectives on cognitive-behavioral treatment for PTSD among persons with severe mental illness. *Psychiatric Services* 57 (7), 1027–1031.
- Frueh, B.C., Grubaugh, A.L., Cusack, K.J., Kimble, M.O., Elhai, J.D., Knapp, R.G., 2009. Exposure-based cognitive-behavioral treatment of PTSD in adults with schizophrenia or schizoaffective disorder: a pilot study. *Journal of Anxiety Disorders* 23, 665–675.
- Garety, P.A., Kuipers, E., Fowler, D., Freeman, D., Bebbington, P.E., 2001. A cognitive model of the positive symptoms of psychosis. *Psychological Medicine* 31, 189–195.
- Gearon, J.S., Bellack, A.S., Tenhula, W.N., 2004. Preliminary reliability and validity of the Clinician-Administered PTSD Scale for Schizophrenia. *Journal of Consulting and Clinical Psychology* 72 (1), 121–125.
- Gearon, J.S., Kaltman, S.L., Brown, C., Bellack, A.S., 2003. Traumatic life events and PTSD among women with substance use disorders and schizophrenia. *Psychiatric Services* 54 (4), 523–528.
- Goodman, L.A., Thompson, K.M., Weinfurt, K., Corl, S., Acker, P., Mueser, K.T., Rosenberg, S.D., 1999. Reliability of reports of violent victimization and PTSD among men and women with SMI. *Journal of Traumatic Stress* 12, 587–599.
- Grubaugh, A.L., Zinzow, H.M., Paul, L., Egede, L.E., Frueh, B.C., 2011. Trauma exposure and posttraumatic stress disorder in adults with severe mental illness: a critical review. *Clinical Psychology Review* 31, 883–899.
- Harris, M., 1996. Treating sexual abuse trauma with dually diagnosed women. *Community Mental Health Journal* 32 (4), 371–385.
- Horowitz, M., Wilner, N., Alvarez, W., 1979. Impact of Event Scale: a measure of subjective stress. *Psychosomatic Medicine* 41 (3), 209–218.
- Hovens, J.G., Wiersma, J.E., Giltay, E.J., van Oppen, P., Spinhoven, P., Penninx, B.W., Zitman, F.G., 2010. Childhood life events and childhood trauma in adult patients with depressive anxiety, and comorbid disorders vs. controls. *Acta Psychiatrica Scandinavica* 122 (1), 66–74.
- Keane, T.M., Brief, D.J., Pratt, E.M., Miller, M.W., 2007. Assessment of PTSD and its comorbidities in adults. In: Friedman, M.J., Keane, T.M., Resick, P.A. (Eds.), *Handbook of PTSD: Science and Practice*. The Guilford Press, New York, pp. 279–305.
- Kessler, R.C., Sonnega, A., Bromet, E., Hughes, M., Nelson, C.B., 1995. Posttraumatic stress disorder in the National Comorbidity Study. *Archives of General Psychiatry* 52, 1048–1060.
- Kubany, E.S., Haynes, S.N., Leisen, M.B., Owens, J.A., Kaplan, A.S., Watson, S.B., Burns, K., 2000. Development and preliminary validation of a brief broad-spectrum measure of trauma exposure: the Traumatic Life Events Questionnaire. *Psychological Assessment* 12 (2), 210–224.
- Livingston, K., Harper, S., Gillanders, D., 2009. An exploration of emotion regulation in psychosis. *Clinical Psychology and Psychotherapy* 16 (5), 418–430.
- Morrison, A.P., Frame, L., Larkin, W., 2003. Relationships between trauma and psychosis: a review and integration. *British Journal of Clinical Psychology* 42, 331–353.
- Mueser, K.T., Rosenberg, S.D., Goodman, L.A., Trumbetta, S.L., 2002. Trauma, PTSD, and the course of severe mental illness: an interactive model. *Schizophrenia Research* 53, 123–143.

- Mueser, K.T., Rosenberg, S.D., Xie, H., Jankowski, M.K., Bolton, E.E., Lu, W., Hamblen, J.L., Rosenberg, H.J., McHugo, G.J., Wolf, R., 2008. A randomized controlled trial of cognitive-behavioral treatment for posttraumatic stress disorder in severe mental illness. *Journal of Consulting and Clinical Psychology* 76, 259–271.
- Mueser, K.T., Salyers, M.P., Rosenberg, S.D., Ford, J.D., Fox, L., Carty, P., 2001. A psychometric evaluation of trauma and PTSD assessments in persons with severe mental illness. *Psychological Assessment* 13, 110–117.
- Mueser, K.T., Salyers, M.P., Rosenberg, S.D., Goodman, L.A., Essock, S.M., Osher, F.C., et al., 2004. Interpersonal trauma and posttraumatic stress disorder in patients with severe mental illness: demographic, clinical, and health correlates. *Schizophrenia Bulletin* 30, 45–57.
- Neria, Y., Bromet, E.J., Sievers, S., Lavelle, J., Fochtmann, L.J., 2002. Trauma exposure and posttraumatic stress disorder in psychosis: findings from a first-admission cohort. *Journal of Counseling and Clinical Psychology* 70, 246–251.
- Opler, L.A., Kay, S.R., Lindenmayer, J.P., Fiszbein, A., 1986. Structured Clinical Interview for the Positive and Negative Syndrome Scale (SCI-PANSS). Multi-Health Systems, New York.
- Picken, A., Tarrier, N., 2011. Trauma and comorbid posttraumatic stress disorder in individuals with schizophrenia and substance use. *Comprehensive Psychiatry* 52, 490–497.
- Read, J., Hammersley, P., Rudegeair, T., 2007. Why, when and how to ask about childhood abuse. *Advances in Psychiatric Treatment* 13, 101–110.
- Read, J., Perry, B.D., Moskowitz, A., Connolly, J., 2001. The contribution of early traumatic events to schizophrenia in some patients: a traumagenic neurodevelopmental model. *Psychiatry* 64, 319–345.
- Read, J., van Os, J., Morrison, A.P., Ross, C.A., 2005. Childhood trauma, psychosis and schizophrenia: a literature review with theoretical and clinical implications. *Acta Psychiatrica Scandinavica* 112, 330–350.
- Regier, D.A., Farmer, M.E., Rae, D.S., Locke, B.Z., Keith, S.J., Judd, L.L., Goodwin, F.K., 1990. Comorbidity of mental disorders with alcohol and other drug abuse. *JAMA* 264, 2511–2518.
- Resnick, S.G., Bond, G.R., Mueser, K.T., 2003. Trauma and posttraumatic stress disorder in people with schizophrenia. *Journal of Abnormal Psychology* 112 (3), 415–423.
- Scheller-Gilkey, G., Moynes, K., Cooper, I., Kant, C., Miller, A.H., 2004. Early life stress and PTSD symptoms in patients with comorbid schizophrenia and substance abuse. *Schizophrenia Research* 69 (2–3), 167–174.
- Stevens, N.R., Gerhart, J., Goldsmith, R.E., Heath, N.M., Chesney, S.A., Hobfoll, S.E., 2013. Emotion regulation difficulties, low social support, and interpersonal violence mediate the link between childhood abuse and posttraumatic stress symptoms. *Behavior Therapy* 44 (1), 152–161.
- Tarrier, N., Picken, A., 2011. Co-morbid PTSD and suicidality in individuals with schizophrenia and substance and alcohol abuse. *Social Psychiatry and Psychiatric Epidemiology* 46, 1079–1086.
- Van den Berg, D.P.G., van der Gaag, M., 2012. Treating trauma in psychosis with EMBD: a pilot study. *Journal of Behavior Therapy and Experimental Psychiatry* 43, 664–671.
- Varese, F., Smeets, F., Drukker, M., Lieverse, R., Lataster, T., Viechtbauer, W., Read, J., van Os, J., Bentall, R.P., 2012. Childhood adversities increase the risk of psychosis: a meta-analysis of patient-control, prospective- and cross-sectional cohort studies. *Schizophrenia Bulletin* 38 (4), 661–671.
- Vogt, D.S., King, D.W., King, L.A., 2007. Risk pathways for PTSD: making sense of the literature. In: Friedman, M.J., Keane, T.M., Resick, P.A. (Eds.), *Handbook of PTSD: Science and Practice*. The Guilford Press, New York, pp. 99–115.
- Weathers, F.W., Ruscio, A.M., Keane, T.M., 1999. Psychometric properties of nine scoring rules for the Clinician Administered Posttraumatic Stress Disorder Scale. *Psychological Assessment* 11 (2), 124–133.
- West, J.C., Wilk, J.E., Olfson, M., Rae, D.S., Marcus, S., Narrow, W.E., Pincus, H.A., Rieger, D.A., 2005. Patterns and quality of treatment for patients with schizophrenia in routine psychiatric practice. *Psychiatric Services* 56 (3), 283–291.