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Trauma Exposure and Posttraumatic Stress Disorder in Adults with Severe Mental Illness: A Critical Review

Anouk L. Grubaugh, Ph.D.^{a,b}, Heidi M. Zinzow, Ph.D.^c, Lisa Paul, M.S.^b, Leonard E. Egede, M.D., M.S.^{a,d}, and B. Christopher Frueh, Ph.D.^{e,f}

^aRalph H. Johnson Veterans Affairs Medical Center, Charleston, SC

^bDepartment of Psychiatry and Behavioral Sciences, Medical University of South Carolina, Charleston, SC

^cDepartment of Psychology, Clemson University, Clemson, SC

^dDivision of General Internal Medicine and Geriatrics, Medical University of South Carolina, Charleston, South Carolina

^eDepartment of Psychology, University of Hawaii, Hilo, HI

^fThe Menninger Clinic, Houston, TX

Abstract

There is a great deal of research on the prevalence, correlates, and treatment of PTSD in the general population. However, we know very little about the manifestation and consequences of PTSD in more complicated patient populations. The purpose of the current paper is to provide a comprehensive review of PTSD within the context of severe mental illness (SMI; i.e., schizophrenia spectrum disorders, mood disorders). Extant data suggest that trauma and PTSD are highly prevalent among individuals with SMI relative to the general population, and both are associated with adverse clinical functioning and increased healthcare burden. However, trauma and PTSD remain overlooked in this population, with low recognition rates in public-sector settings. Additionally, there are few data on the clinical course and treatment of PTSD among individuals with SMI. Particularly lacking are longitudinal studies, randomized controlled treatment trials, and studies using ethno-racially diverse samples. Furthermore, there is a need to better understand the interplay between trauma, PTSD, and severe forms of mental illness and to further develop and disseminate evidence-based PTSD treatments in this population. The current state of the literature and future directions for practice are discussed.

Keywords

posttraumatic stress disorder (PTSD); severe mental illness (SMI); trauma; victimization; psychotic; bipolar

I. Introduction

There is a large body of research examining the prevalence and clinical correlates of posttraumatic stress disorder (PTSD) in the general population. In nationally representative studies, rates of 12-month PTSD are estimated to be about 3.5% (Kessler, Chiu, Demler,

Merikangas, & Walters 2005) and lifetime estimates range from 7 to 12% (Kessler, 2000; Kessler et al., 2005a; Kessler, Sonnega, Bromet, Huges, & Nelson, 1995). PTSD is frequently associated with decreased health functioning and increased medical and psychiatric comorbidities (Jacobsen, Southwick, & Kosten, 2001; Kessler, 2000; Magruder et al., 2004; Schnurr, Spiro, & Paris, 2000). In addition, PTSD is often a chronic condition, with patients suffering symptoms several years after initial exposure to their index trauma (Gold et al., 2000). Finally, data suggest that PTSD may be one of the costliest mental health disorders, with estimated annual productivity losses in excess of \$3 billion dollars (Brunello et al., 2001; Greenberg et al., 1999; Kessler, 2000).

Although there is a great deal of research on trauma exposure and PTSD in the general population, we know very little about their manifestation and consequences in more complicated patient populations. The purpose of the current paper is to provide a comprehensive review of trauma exposure and PTSD within the context of severe mental illness (SMI). More specifically, our inclusion of SMI samples is restricted to patients with a schizophrenia spectrum disorder (i.e., schizophrenia, schizoaffective disorder) or mood disorder (i.e., unipolar, bipolar disorder) coupled with severe and persistent social and occupational impairment. These individuals typically need assistance with daily living, have a history of frequent psychiatric hospitalizations, and are often treated within public-sector settings on an ongoing basis to manage primary symptoms and prevent relapse and/or hospitalization. As such, our review search terms on Pubmed/Ovid Medline and PsychInfo included trauma, victimization, abuse, *or* PTSD *combined with* SMI, schizophrenia, psychotic, major depression, *or* bipolar. For increased relevance, our search was restricted to adult samples, manuscripts published in English, and empirical studies published after 1995, although some earlier contextual articles are also referenced. Additionally, although we report on homelessness as a correlate of trauma exposure and PTSD in our review, we omitted studies that focused exclusively on homeless patient samples in order to generalize to the broader population of individuals with SMI.

II. Underlying Theory of Trauma Exposure, PTSD, and SMI

Empirical research suggests that psychotic disorders are conceptually consistent with diathesis-stress models of psychopathology (Corcoran et al., 2003; Goodman, Rosenberg, Mueser, & Drake, 1997; Mueser, Rosenberg, Goodman, & Trumbetta, 2002; Norman & Malla, 1993; Turkington, Dudley, Warman, & Beck, 2004; Walker & Diforio, 1997). The diathesis-stress model posits that most forms of SMI have both a genetic/biological component, as well as an environmental component. More specifically, an individual's biological vulnerability or symptom severity can be strongly influenced by environmental factors. For example, it can be reduced by medication management and increased by stress. Within this model, traumatic event exposure would obviously constitute an extreme stressor with the potential to exacerbate the expression and severity of SMI. Both this premise and the empirical evidence indicating that psychosocial stressors play a critical role in the onset and relapse of psychotic episodes in individuals with schizophrenia suggest that ongoing anxiety and trauma related symptoms are likely to precipitate increases in symptoms or relapses in vulnerable individuals (Rosenberg, Lu, Mueser, Jankowski, & Cournos, 2007). In fact, there is recent evidence indicating that childhood physical abuse predicts psychosis in adults, and there is a cumulative relationship between trauma and psychotic symptoms, with greater overall number of types of trauma exposure increasing the probability of psychosis (Shevlin, Dorahy, & Adamson, 2007).

One specific model of the interplay between PTSD and SMI hypothesizes that PTSD is a comorbid disorder that mediates the relationship between trauma, increased symptom severity, and increased use of acute care services (Mueser et al., 2002). Within this model,

the effect of PTSD on SMI is both direct and indirect. That is, PTSD directly affects SMI via PTSD-related symptoms of avoidance, distress, and over-arousal and indirectly affects SMI via substance abuse, re-victimization, and a poor working alliance with providers. Other potential intervening factors in this model include social support, coping, and the presence of a personality disorder. A second model more specifically focuses on the neuro-developmental effects of childhood trauma as the diathesis leading to high responsivity to stress among individuals with schizophrenia (Read, Perry, Moskowitz, & Connolly, 2001; Read, van Os, Morrison, & Ross, 2005). Although these permutations of the diathesis-stress model have face validity given the extant literature, and can serve as useful heuristic guides, there is a need for longitudinal research to enhance our understanding of the specific causal pathways between trauma, PTSD, and SMI.

III. Clinical Assessment

Due to the nature of psychotic disorders in particular, there are reasonable concerns that patients with SMI may not be able to accurately report on their traumatic memories and associated symptoms. Certainly most instruments for assessing traumatic event exposure and PTSD symptoms were not initially normed on psychotic patients. However, recent studies generally support the reliability and validity of trauma and PTSD assessments conducted in this population. These data include reliable test-retest of physical and sexual assault exposure (Goodman et al., 1999; Klewchuk, McCusker, Mulholland, & Shannon, 2007; Meyer, Muenzemaier, Cancienne, & Struening, 1996; Mueser et al., 2001) and PTSD (Goodman et al., 1999; Mueser et al., 2001); validity of reports of physical and sexual assault against a structured interview (Meyer et al., 1996); the internal consistency of PTSD (Cusack, Frueh, Hiers, Suffoletta-Maierle, & Bennet, 2003; Cusack, Grubaugh, Knapp, & Frueh, 2006; Goodman et al., 1999; Grubaugh et al., 2007; Mueser et al., 2001); and adequate convergent validity between the Clinician Administered PTSD Scale (CAPS; Blake et al., 1990; Weathers, Keane, & Davidson, 2001) and the PTSD Checklist (PCL; Blanchard, Jones-Alexander, Buckley, & Forneris, 1996) (Grubaugh, Elhai, Cusack, Wells, & Frueh, 2007; Mueser et al., 2001). Additionally, treatment studies have typically found strong inter-rater agreement for PTSD diagnoses of participants with SMI (Frueh et al., 2009b; Mueser et al., 2001).

Gearon and colleagues (2004) examined the reliability and validity of the CAPS when tailored specifically for patients with schizophrenia (CAPS-S; Gearon, Bellack, & Tenhula, 2004). Most notably, the authors simplified the language of the CAPS and provided examples relevant for this patient population. They also added specific interview probes to help distinguish between psychotic thought processes that were unrelated to the trauma versus PTSD specific symptoms (e.g., paranoid delusions vs. hypervigilance). Study findings supported the internal consistency ($\alpha = .94$), test-retest ($\kappa = .85$ with 94% agreement between PTSD diagnoses at the two time points), inter-rater reliability (intra class correlations = .97 to .99), criterion validity of diagnoses on the CAPS-S relative to the SCID PTSD module ($\kappa = .53$ with 78% of participants correctly identified), and convergent validity of the CAPS-S with the Impact of Events Scale total score (IES; Horowitz, Wilner, & Alvarez, 1979; SCID; First, Spitzer, Gibbon, & Williams, 1995), which is an alternative method for obtaining PTSD severity (inter-correlation = .72). Although the data were generally supportive of the CAPS-S, the authors themselves acknowledge their small sample size of 19 women and the limitations of adequately determining discriminant validity from single items of depression and anxiety. Despite these limitations, this study marks an important avenue for future study in the assessment of PTSD among patients with SMI. That is, it remains unclear at this point whether the CAPS-S, or another tailored version of the CAPS, would significantly improve the diagnostic accuracy of PTSD above that afforded by the CAPS as it was developed for the general population.

IV. Prevalence of Traumatic Event Exposure and Posttraumatic Stress Disorder

Traumatic Event Exposure

Adults with SMI are extremely vulnerable to both the experience of trauma and the subsequent development of PTSD, and rates of both of these are higher among individuals with SMI (Mueser et al., 2001; Neria, Bromet, Sievers, Lavelle, & Fochtmann, 2002) than in the general population (Breslau, Peterson, Poisson, Schultz, & Lucia, 2004; Kessler, 2005a; Kessler et al., 2005b; Kessler et al., 1995). Rates of trauma exposure among individuals with SMI range from 49 to 100% in study samples and include, among other events, significant rates of both physical and sexual assault across the lifespan (see Table 1 for a review of all studies). More specifically, across a wide range of samples of individuals with SMI, those who report childhood sexual abuse range from 13 to 64% and those who report childhood physical abuse range from 22 to 66%. With regard to adulthood, 13 to 79% of individuals with SMI report sexual assault and 30 to 87% report physical assault.

Two of the largest known surveys of crime victimization among adults with SMI support the high rates of trauma exposure found in the smaller studies reported above (Chapple et al., 2004; N=962 participants with psychosis; Teplin, McClelland, Abram, Weiner, 2005; N=936 treatment-seeking participants with SMI). Chapple and colleagues found that 17.9% of their sample reported criminal victimization in the past year. Consistent with these high rates, Teplin and colleagues found that slightly more than 25% of patients in their study reported violent crime victimization in the past year, which was 11.8 times higher than those found in a comparable community survey (National Crime Victimization Survey [NCVS]; US Department of Justice, 1992-1999). Additionally, the annual incidence of violent crime was 168 incidents per 1000 persons; this rate was approximately four times greater than general population estimates from the NCVS.

Importantly, a significant number of individuals with SMI report multiple traumas, including recent experiences and violent victimization. In some samples, as many as 75 to 98% of participants report multiple traumas (see Table 1 for a review of all studies) and the average number of traumatic events range from one to eight, depending upon the assessment measure used. With regard to recent traumatic experiences, a study conducted by Goodman and colleagues (2001) demonstrated that approximately one-third of adults with SMI were victims of a physical assault within the past year, and approximately 13% were victims of a sexual assault within the past year. Finally, in a study examining a four month time-frame prior to assessment, 8% of former inpatients with SMI reported that they were victims of a violent crime and 22% reported that they were victims of a non-violent crime (Hiday, Swartz, Swanson, Borum, & Wagner, 1999). While the rate of non-violent crime victimization found in this study was similar to the rate found in the general population, the rate of violent victimization was much higher than the general population rate of 3%. Further underscoring the high rate of violent victimization among individuals with SMI, Brekke and colleagues (2001) found that 38% of their sample had been the victim of a crime in the past three years, 91% of which were violent (Brekke, Prindle, Bae, & Long, 2001).

Finally, data indicate that traumatic and harmful experiences, such as physical or sexual assaults, occurring within inpatient psychiatric hospitals are common and are associated with adverse mental health consequences and reduced involvement in subsequent psychiatric care (Frueh et al., 2005; Reddy & Spaulding, 2010). For example, one study found that outpatients with SMI (N = 142) reported high rates of lifetime traumatic events that occurred within psychiatric settings, including physical assault (31%), sexual assault (8%), and witnessing traumatic events (63%). Moreover, other negative aspects of

psychiatric hospitalization (e.g., involuntary hospitalization, seclusion and restraint use, police transport) are also often experienced as upsetting, frightening, or stressful (Donat, 2003; Frueh et al., 2005; Robins et al., 2005; Shaw, McFarlane, Bookless, & Air, 2002).. These treatment experiences may interact with prior traumatic event exposure to exacerbate symptoms of PTSD and global severity of illness. Thus, the common treatment experiences of people with SMI may in and of themselves contribute to the illness burden of posttraumatic reactions.

Posttraumatic Stress Disorder

PTSD is rarely assessed in public mental health clinical settings (Mueser et al., 1998; Frueh et al., 2001) and thus, it is an underserved and understudied condition in this population. Three studies using the Clinician Administered PTSD Scale (CAPS; Blake et al., 1990; Weathers, Keane, & Davidson, 2001), which is typically considered the “gold standard” structured interview assessment for PTSD, yielded current PTSD prevalence rates of 13, 44 and 46% among SMI participants (Ford & Fournier, 2007; Gearon, Kaltman, Brown, & Bellack, 2003; Resnick, Bond, & Mueser, 2003), while studies using self-report measures yielded current PTSD rates between 19% and 53% (See Table 2 for a review of all studies). Lifetime rates of PTSD among individuals with SMI, based on structured interviews, have ranged between 14 and 53%. Worth noting, these estimates are much higher than the estimated current (3.5%) and lifetime (7-12%) prevalence of PTSD in the general population (Kessler, 2000; Kessler et al., 1995; Kessler et al., 2005a; Kessler et al., 2005b)

V. Demographic/Background Correlates of Victimization and PTSD

The majority of studies examining the demographic correlates of PTSD among patients with SMI have focused on gender, race, age, and living status and their relation to victimization experiences, given the vulnerability of this population to these particular types of traumatic events.

Gender

Among individuals with SMI, some studies have found comparable rates of traumatic event exposure by gender (Kilcommons & Morrison, 2005; Mueser et al., 1998), whereas other studies indicate that women have higher rates of trauma exposure overall (Neria et al., 2002; Shack, Averill, Kopecky, Krajewski, & Gummattira, 2004). These findings contrast with the general population, wherein women are slightly less likely to experience traumatic events compared to men (Kessler et al., 1995; Norris, Foster, & Weisshaar, 2002). With regard to exposure to particular types of traumatic events, the majority of studies suggest that women with SMI are significantly more likely to experience sexual violence than men, both in childhood and adulthood (Cusack, Frueh, & Brady, 2004; Cusack et al., 2006; Goldberg & Garno, 2005; Goodman et al., 2001; Kilcommons & Morrison, 2005; Lipschitz et al., 1996; McFarlane, Schrader, Bookless, & Browne, 2006; Meade et al., 2009b; Mueser et al., 1998; Mueser et al., 2004; Neria et al., 2002; O'Hare, Shen, & Sherrer, 2010; Rosenberg et al., 2007; Shack et al., 2004; Switzer et al., 1999; Teplin et al., 2005; Van Dorn et al., 2005) and physical assault is the most common trauma among men (Mueser et al., 1998; Neria et al., 2002; Switzer et al., 1999). This is a similar pattern to that observed within the general population, with women being more likely to report sexual assault or child molestation and men being more likely to report physical assault, combat exposure, or being threatened or attacked with a weapon (Norris et al., 2002).

Due to the overall high rates of victimization among both men and women with SMI, base rates of PTSD among men and women in this population are often comparable (Fan et al., 2008; Mueser et al., 1998; Mueser et al. 2004; Switzer et al., 1999). When gender

differences are found, women are generally more likely than men to meet criteria for PTSD (Neria et al., 2002; Resnick et al., 2003), which is consistent with general population data (Norris et al., 2002). Data on PTSD rates in the broader population indicate that women have a higher conditional risk of developing PTSD given exposure to a traumatic event relative to men (Norris et al., 2002). With regard to SMI patient populations, Mueser and colleagues (2004) found that the risk of developing PTSD for women post-trauma is greater than that for men after childhood and adult sexual and physical victimization, aside from experiencing a sexual assault within the last year. Another study found that sexual assault is the most likely trauma to result in PTSD for women (odds ratio [OR] = 5.5 from Neria et al. 2002), while combat exposure is the most likely trauma to result in PTSD for men (OR = 8.3; Neria et al., 2002). This finding is consistent with data from the National Comorbidity Survey, which found that rape and combat exposure were the traumas most commonly associated with PTSD for women and men, respectively (Kessler et al., 1995).

Race/Ethnicity

In the general population, findings regarding the interplay between trauma exposure, PTSD, and race/ethnicity are often mixed (Breslau et al., 1998; Grubaugh, et al., 2006; Norris, 1992; Roberts, Gilman, Breslau, Breslau, & Koenen, 2010). Studies examining the relation between race and rates of trauma exposure and PTSD among patients with SMI have focused almost exclusively on differences between African American and Caucasian participants. To date, these data are also mixed, with some studies indicating an increased risk of PTSD among African Americans (Calhoun et al., 2007; veteran sample), others showing higher rates of trauma exposure or PTSD among Caucasians (Mueser et al., 2004; Shack et al., 2004), and yet most others generally failing to find significant racial differences in either rates of trauma exposure (Cusack et al., 2004; Fitzgerald et al., 2005; Neria et al., 2002) or PTSD before and/or after controlling for confounding variables (Calhoun et al., 2007; Cusack et al., 2004; Fan et al., 2008; Goldberg & Garno, 2005; Hiday et al., 1999). Studies examining traumatic event exposure by race and ethnicity within the SMI population reveal some differences. Some research shows that African Americans report higher rates of losing a loved one by homicide (Cusack et al., 2004) and Caucasians report higher rates of child sexual abuse, child physical abuse, and/or adult sexual assault (Cusack et al., 2006; Meade, Kershaw, Hansen, & Sikkema, 2009; Mueser et al., 2008). However, when race was broken down by gender, Teplin and colleagues (2005; N=936) found higher rates of 12-month aggravated assault and other forms of violent victimization among African American versus Non-Hispanic White and Hispanic males. This study suggests the need to more closely examine the interplay between race and gender in this population.

Age

Consistent with general population findings, most studies using samples of individuals with SMI have generally found higher rates of PTSD among younger adults (Goldberg & Garno, 2005; Mueser et al., 2004; Neria et al., 2002), with fewer studies failing to find a significant relationship between age and PTSD (Mueser et al., 1998).

Traumatic Event Characteristics

With regard to trauma-related variables, younger age at the time of the first trauma has been associated with a greater risk for developing PTSD among individuals with SMI (Neria et al., 2002). Significant support also exists for an increased risk of PTSD and PTSD severity among those with re-victimization histories, both with regards to the risk conferred by child abuse (Gearon et al., 2003; Goodman et al., 2001; Mueser et al., 2004; Neria et al., 2002; Resnick et al., 2003), as well as previous adult victimization (Hiday, Swartz, Swanson, Borum, & Wagner, 2002). On a related note, experiencing heterogeneous traumas (e.g., multiple forms of child abuse) is also found to increase the risk of PTSD (Goldberg &

Garno, 2005; Goodman, Dutton, & Harris, 1997; McFarlane et al., 2001; Mueser et al., 1998). More specifically, one study demonstrated that there was a 33% likelihood of developing PTSD after exposure to one trauma (McFarlane et al., 2001). Exposure to two traumatic events increased this risk by 7%, and a third trauma increased the risk of developing PTSD by an additional 6%. Finally, recent traumatic events (Goodman et al., 1997a), as well as ongoing traumatic events, have been linked with an increased risk of PTSD among individuals with SMI (Neria et al., 2002).

Veterans

Less is known regarding the associations between trauma, PTSD, and SMI among veterans. The data that are available demonstrate similar patterns to those found in civilian samples. In a sample of 330 veterans with bipolar disorder, childhood abuse (inclusive of physical and sexual abuse) was reported by 48.3% of the sample, physical abuse by 19.5% of the sample and sexual abuse by 9.7% of the sample (Brown et al., 2005). In this same study, female veterans reported more sexual abuse and male veterans reported more physical abuse. Finally, childhood abuse was associated with poorer mental health status and a higher likelihood of current PTSD and lifetime substance use disorder as well as a higher likelihood of at least one suicide attempt. Strauss and colleagues (2006) also found that veterans with comorbid PTSD and SMI reported higher rates of suicidal ideation and suicidal behaviors than those with SMI alone. In a sample of 168 veterans with a psychotic disorder, 96% reported interpersonal trauma or combat exposure, and the prevalence of current PTSD was 47% (Calhoun et al., 2007). However, as with other clinical settings, chart recognition was low, with only 14% (i.e., 11 cases) identified. Finally, in a three group comparison of veterans (i.e., combat related PTSD only, psychotic disorder only, combat related PTSD and psychotic disorder), Sautter and colleagues (1999) found that veterans with comorbid PTSD and psychosis demonstrated symptoms of general psychopathology and violent thoughts, feelings, and behaviors that far exceeded the veterans in the other two groups. Consistent with aforementioned findings regarding increased service use, another study found that veterans with bipolar disorder and PTSD had significantly higher global clinical severity scores and more frequent inpatient psychiatric treatment relative to veterans with either disorder alone (Thatcher, Marchland, Thatcher, Jacobs, & Jensen, 2007). Although more research is necessary to determine whether veterans and civilians with SMI differ on trauma exposure and PTSD prevalence, extant data suggest that veterans with comorbid SMI and PTSD represent a high risk population.

VI. Clinical Correlates of Traumatic Event Exposure and PTSD

There are sufficient data to suggest that, among individuals with SMI, child and adult victimization experiences are correlated with alcohol and/or drug use (Brekke et al., 2001; Carballo et al., 2008; Chapple et al., 2004; Dean et al., 2007; Ford & Fournier, 2007; Goodman et al., 2001; Goodman et al., 1997b; Hiday et al., 1999; Hiday et al., 2002; Honkonen et al., 2004; Mueser et al., 2008; Neria et al., 2002; Scheller-Gilkey, Moynes, Cooper, Kant, & Miller, 2004; Sells, Rowe, Fisk, & Davison, 2003; Walsh et al., 2003; Wexler et al., 1997; White, Chafetz, Collins-Bride, & Nickens, 2006); transient living conditions or homelessness (Chapple et al., 2004; Dean et al., 2007; Goodman et al., 2001; Goodman et al., 1997b; Hiday et al., 1999; Hiday et al., 2002; Mueser et al., 2008; Walsh et al., 2003), decreased health related quality of life (Lysaker & La Rocco, 2009; Maguire, McCusker, Meenagh, Muholland, & Shannon, 2008) the additional presence of a personality disorder (Carballo et al., 2008; Dean et al., 2007; Hiday et al., 1999; Hiday et al., 2002; Lysaker, Wickett, Lancaster, & Davis, 2004; Walsh et al., 2003; Wexler et al., 1997); HIV or sexual risk behaviors (Goodman et al., 1997b; Van Dorn et al., 2005), suicidality and self-injurious behaviors (Carballo et al., 2008; Mueser et al., 2008; Read, 1998), measures of hostility and anger (McFarlane et al., 2006), neuroticism (Lysaker et al., 2001); and indices

of social, occupational and community functioning (Chapple et al., 2004; Hodgins, Lincoln, & Mak, 2009; Lysaker et al., 2001; Lysaker, Beattie, Starsburger, & Davis, 2005; Lysaker et al., 2004b). Most notably, Brekke and colleagues (2001) also found that having more severe clinical symptoms and greater substance use at baseline were significant predictors of victimization at three years. In a study looking at the cumulative effects of adverse childhood events, Rosenberg and colleagues (2007) found that increased exposure to adverse childhood events was significantly correlated with psychiatric difficulties such as suicidal ideation, poorer functional status, substance abuse, homelessness, and physical health problems—most notably HIV infection. Another study using structural equation modeling found that childhood abuse was both directly and indirectly associated with HIV risk through drug abuse and adult victimization (Meade et al., 2009a). Also using structural equation modeling, yet another study found that high risk behaviors and drinking to cope significantly mediated the relationship between lifetime victimization and PTSD symptom severity (O'Hare et al., 2010).

The clinical correlates of PTSD among individuals with SMI largely mirror those for trauma exposure. Relative to individuals with SMI alone, those with comorbid PTSD have poorer functional status and self-rated quality of life (Fan et al., 2008; Mueser et al., 2004); increased substance abuse and dependence (Ford & Fournier, 2007); poorer cognitive functioning related to attention and memory (Fan et al., 2008); are more likely to have transient living conditions and/or be homeless (Mueser et al., 2004); report more psychosocial problems including negative self-perceptions, alienation and inexplicable somatic symptoms (Ford & Fournier, 2007); and have higher disability ratings, criticism of others, delusional/paranoid hostility, general hypochondriasis, and disease conviction scores (McFarlane et al., 2001).

There are also data to suggest a link between trauma exposure and/or trauma symptoms and an increased severity of some of the primary symptoms of psychosis, such as delusions, hallucinations, depression, and disturbance of volition (Brekke et al., 2001; Fisher et al., 2009; Ellason & Ross, 1997; Fitzgerald et al., 2005; Hammersley et al., 2003; Hiday et al., 2002; Kilcommons & Morrison, 2005; Lysaker & La Rocco, 2008; Lysaker et al., 2005; Read & Ross, 2003; Schenkel, Spaulding, DiLillo, & Silverstein, 2005; Ukok & Bikmaz, 2007) and bipolar disorder symptoms such as mood recurrence and polarity shifts (Meade et al., 2009b). Along a similar vein, there are data to suggest that the number of specific trauma types experienced in childhood increases the probability of psychosis later in life, indicative of a dose-response relationship (Rubino, Nanni, Pozzi, & Siracusano, 2009; Shevlin et al., 2007; Shevlin, Houston, Dorahy, & Adamson, 2008). Other studies, albeit fewer in number, have failed to find a significant relationship between trauma exposure, PTSD, and specific symptoms of SMI (Chapple et al., 2004; Honkonen et al., 2004; Resnick et al., 2003). When all studies are taken into account, including a review on the topic by Read and colleagues (2005), there are compelling data to suggest that early victimization experiences may predict SMI severity. However, this topic is still under debate and there is some criticism in the literature regarding how trauma and SMI have been defined in these studies, as well as some methodological concerns (e.g., small sample sizes, insufficient power, reliance on cross-sectional study designs, inadequate attention to the role of mediating and moderating variables; Bendall, Jackson, Hulbert, & McGorry, 2008; Morgan & Fisher, 2007; Morrison, Frame, & Larkin, 2003).

VII. Mental Health Service Use and Costs

Traumatic event exposure in the general population and most patient populations is associated with higher health care use, and PTSD specifically is associated with high rates of healthcare use (Greenberg et al., 1999; Kessler, 2000; Magruder et al., 2004). Among

individuals with SMI, history of victimization, most often childhood sexual and physical abuse, has been associated with a greater number of or more recent psychiatric hospitalizations (Mueser et al., 2004; McFarlane et al., 2006; Schenkel et al., 2005) and outpatient encounters (Hiday et al., 2002). A past year PTSD diagnosis has been associated with use and frequency of outpatient services and inpatient hospital stays (Switzer et al., 1999). Similarly, a study of veterans enrolled in care at the Veterans Health Administration found that veterans with bipolar disorder and PTSD had higher rates of inpatient care relative to those with bipolar or PTSD alone (Thatcher et al., 2007). Other studies have failed to find clinically or statistically significant differences in past year psychiatric hospitalization rates or frequency by victimization status (Brown et al., 2005; Hiday et al., 1999; Lu, Mueser, Rosenberg, & Jankowski, 2008). Finally, some studies have found an association between a history of childhood sexual abuse and poorer participation in vocational rehabilitation, such as fewer work hours per week, relative to those without such a history (Lysaker et al., 2005; Lysaker, Nees, Lancaster, & Davis, 2004).

In sum, trauma exposure among the SMI population is linked to similar clinical and social correlates as those found within the general population. It appears that a bidirectional relationship exists, with mental health symptoms placing individuals at risk for victimization, and victimization leading to increased symptoms and impairment. In comparison to the general population, individuals with both SMI and trauma exposure are likely to present a complex clinical picture and prolonged course of illness that require specialized treatment, resulting in an increased healthcare burden.

VIII. PTSD Services in Public-Sector Mental Health Settings

Despite the high prevalence of and healthcare service use costs associated with PTSD among individuals with SMI, trauma and PTSD are often over-looked in public-sector clinical settings—the settings most likely to treat patients with SMI. This oversight is due in part to psychotic symptoms “trumping” other diagnoses in the hierarchy of organicity (Freeman & Garety, 2003; Grubaugh, Cusack, & Zinzow, 2008), and as such, it is generally recognized that most public-sector settings do not routinely screen for or treat trauma exposure and PTSD (Frueh et al., 2001; Frueh et al., 2002; Read & Ross, 2003; Tucker, 2002). Despite the high documented prevalence of PTSD among the SMI population, the available data suggest that only an estimated 2-14% of individuals with SMI have a chart diagnosis of PTSD in their respective treatment settings (Brady, Rierden, Penk, Losardo, & Meschede, 2003; Calhoun et al., 2007; Cusack et al., 2004; Cusack et al., 2006; Kilcommons & Morrison, 2005; McFarlane et al., 2001; Mueser et al., 1998; Mueser et al., 2002; Switzer et al., 1999). In one multi-site study, it was found that although 98% of patients with SMI at a community mental health center had a lifetime history of traumatic event exposure, and 42% met criteria for PTSD using structured interviews, a clinical records review found that only 2% of the sample carried an assigned diagnosis of PTSD (Mueser et al., 1998). Parallel low rates of recognition extend to non-U.S. study samples, as well (Lommen & Restifo, 2009).

Thus, PTSD is likely to be a target of intervention in only a small fraction of those SMI patients who could benefit from PTSD-related treatment. As such, a significant number of patients with SMI are not recognized and appropriately treated for their trauma-related difficulties. Moreover, leaving PTSD unaddressed in the severely mentally ill almost certainly exacerbates patients' illness severity and hinders their care (Hamner, Frueh, Ulmer, & Arana, 1999; Kimble, 2000; Resnick et al., 2003). Several state systems across the U.S. have initiated formal “trauma initiatives” to address this service gap and improve care for patients with SMI and trauma-related difficulties (Cusack, Wells, Grubaugh, Hiers, & Frueh, 2007; Frueh et al., 2001). Unfortunately, severe cuts to state mental healthcare budgets have

seen a dramatic rollback of therapeutic services for patients with SMI and it is likely that clinical services and resources for treating PTSD in most state systems has been dramatically reduced (Frueh, Grubaugh et al., manuscript under review).

On a related note, there is a growing national consensus that use of institutional measures of control within psychiatric hospitals, such as seclusion, restraint, enforced medications, and hand-cuffed transport, are all too common and potentially counter-therapeutic—especially for patients with prior traumatic event exposure (Borckardt et al., 2007; Donat, 1998; Frueh et al., 2005; Hardesty et al., 2007). At present there is little extant data on reducing measures of last resort and improving the safety of psychiatric settings (Borckardt et al., 2007; Donat, 2003), and only one controlled trial demonstrating the effectiveness of specific behavioral efforts on the subsequent reduction of seclusion and restraint events. However, various healthcare organizations and patient advocacy groups have called for provision of care that is more “trauma-informed,” and relies less on institutional measures of control. Several systems of care around the country have made a specific effort to incorporate these recommendations.

IX. Treatment

A mounting body of empirical evidence demonstrates that cognitive-behavioral therapy (CBT) can be effective in treating a wide range of symptoms in individuals with SMI (Beck & Rector, 2000; Dickerson, 2000; Gould, Mueser, Bolton, Mays, & Goff, 2001; Kurtz & Mueser, 2008). Recent reviews and a meta-analysis of CBT treatments in schizophrenia (including over 20 randomized control trials and 1,500 patients in total) have demonstrated the efficacy of CBT for decreasing many of the symptoms of schizophrenia (Gaudiano, 2005; National Institute of Clinical Evidence [NICE], 2002; Pilling et al., 2002). There is also sufficient evidence to conclude that CBT is superior to standard care (i.e., case management and psychopharmacology) and a wide range of other therapeutic approaches. Treatment gains have been maintained as far out as 12-months post-treatment. These studies also report virtually no evidence of symptom exacerbation, clinical status deterioration, or critical incidents (suicide or self harming behavior) that could be traced to patient involvement in a CBT intervention. In fact, in some countries such as the U.K., CBT is considered to be the standard of care for individuals suffering with SMI (Barrowclough et al., 2006; Turkington et al., 2004; Turkington, Kingdom, & Weiden, 2006).

The efficacy of PTSD-specific interventions for patients with SMI is far from established, as these individuals have historically been excluded from PTSD clinical trials. Although this exclusion was mostly guided by the desire to limit the impact of confounding factors on outcomes, researchers and clinicians have expressed concerns that some frontline interventions for PTSD may be ‘over-stimulating’ for patients with SMI and potentially exacerbate patients’ primary symptoms and/or cause relapse (Braiterman, 2004; Fowler, 2004). Our own exchanges with public-sector clinicians yielded similar concerns and were coupled with additional fears regarding clinicians’ competence to effectively address trauma related issues in their patients (Frueh, Cusack, Grubaugh, Sauvageot, & Wells, 2006). Despite these concerns, there are now preliminary data to support the feasibility and potential effectiveness of PTSD interventions in this patient population. Due in part to the concerns noted above, most of these studies (albeit still small in number) have focused on the use of cognitive restructuring without exposure for the treatment of PTSD. Only one study has tested the feasibility and effectiveness of an exposure based intervention, although exposure therapy is typically considered the frontline intervention for PTSD.

Cognitive Restructuring

The majority of published research on the treatment of PTSD among patients with SMI has focused on the use of cognitive behavioral interventions. Such efforts have included single case or small case series designs (Hamblen, Jankowski, Rosenberg, & Mueser, 2004; Kevan, Gumley, & Coletta, 2007; Marcello, 2009), two pilot studies (Mueser et al., 2007 [N=80]; Rosenberg, Mueser, Jankowski, Salyers, & Archer, 2004 [N=22]) and a randomized controlled trial (Mueser et al., 2008 [N=108]). Rosenberg and colleagues (2004) tested a 12 to 16 week cognitive behavioral intervention consisting of psycho-education about PTSD, breathing retraining, and cognitive restructuring in a sample of 22 patients enrolled in a program of care in a Northeastern community mental health center or VA. Patients in this open trial demonstrated reductions in CAPS PTSD diagnoses from 100% at baseline to 64% at post-treatment and 50% at three-month follow-up. However, change in PTSD diagnostic status was not significant from baseline to post-treatment and only marginally significant from baseline to three-month follow-up. A larger open trial (N=80) was conducted in group format at a community mental health center and consisted of 21 sessions of orientation, breathing retraining, education, cognitive restructuring, coping skills, and developing a recovery plan (Mueser et al., 2007). At post and three-month follow-up, treatment completers evidenced statistically significant decreases in depressive symptoms on the BDI and in PTSD severity on the PCL, with 73% of completers meeting diagnostic criteria for PTSD on the PCL post-treatment and at follow-up.

In the largest study of patients with either a major mood disorder or a psychotic disorder treated in a community health center (N = 108), patients were randomized to either a 12 to 16 session cognitive behavioral program consisting of psycho-education about PTSD, breathing retraining, and cognitive restructuring (CBT) or to treatment as usual (TAU; Mueser et al., 2008). Contrary to the authors' hypotheses, CBT was not more effective than TAU at eliminating PTSD diagnostic status at post, three-, and six-month follow-ups. However, CBT was significantly better than TAU at decreasing PTSD severity and negative trauma-related cognitions, depressive symptoms, other anxiety symptoms, and health-related concerns. The strongest effects were for patients with more severe PTSD symptoms. Not unexpectedly, homework completion was associated with greater symptom improvement across a range of indices.

Exposure Therapy

To date, there is only one study that has tested the effectiveness of an exposure-based intervention for PTSD among patients with SMI. Frueh and colleagues (2009b) conducted an open trial of 20 patients enrolled in a regular program of care within a community mental health center. Their combined intervention, which was developed previously for the treatment of complex PTSD, consisted of 22-sessions: 14 sessions of group therapy focused initially on education and relaxation training and later on social skills building, followed by eight sessions of individual exposure therapy (Frueh et al., 2004). Study findings suggested that the treatment was effective—10 out of 13 treatment completers no longer met criteria for PTSD at the three-month follow-up and there were significant decreases in other targeted domains such as anger and general mental health functioning. Worth noting, additional analyses from this trial suggest that clinicians can effectively implement an exposure based intervention in this population with minimal compromise to the integrity of sessions or the therapeutic alliance (Long et al., 2010).

Altogether, these data suggest that both cognitive restructuring and exposure based interventions are feasible to implement and can lead to PTSD symptom reduction among patients with SMI without significant exacerbation of patients' primary symptoms. Although promising, there is clearly a need for randomized controlled trials of PTSD in this

population, particularly exposure based interventions. Such data would serve to mitigate myths that individuals with SMI cannot benefit from trauma-related services. In light of the high attrition rates and modest effect sizes from the existing studies, there is also a need to explore ways to maximize retention and treatment response in this population. Finally, research efforts are needed to disseminate efficacious treatments for PTSD in this population (Cahill, Foa, Hembree, Marshall, & Nacasch, 2006; Cook, Schnurr, & Foa, 2004; Foa, 2006; Frueh, Grubaugh, Cusack, & Elhai, 2009), and to study how these efforts may be effectively integrated with existing treatment programs in order to improve mental health service delivery for this underserved group.

X. Limitations of the Existing Literature and Future Directions for Research, Practice, and Policy

Although the research base on the interface of PTSD and SMI has grown dramatically over the past fifteen years, there are still large gaps in our knowledge regarding PTSD in this population. Moreover, we are a far way off from providing optimal mental healthcare for persons with SMI and comorbid PTSD. We conclude this paper with a discussion of the limitations of the existing literature and directions for future research, practice, and policy efforts.

Conceptual and Phenomenological Issues

There are a number of conceptual and phenomenological issues that require further study, beginning with our understanding of the causal pathways between traumatic event exposure and psychosis, as well as the relation between PTSD and psychotic symptoms. Preliminary evidence suggests that psychosocial stressors play a critical role in the onset and relapse of psychotic episodes in individuals with schizophrenia (Rosenberg et al., 2007) and, more specifically, that childhood physical abuse and an overall traumatic event exposure “dose” predicts psychosis in adults (Shevlin et al. 2007). Yet, this relation is poorly understood, and it raises the question of why some people with severe trauma exposure histories do not develop SMI. Moreover, at this point we do not know much about what happens to psychotic symptoms when PTSD is successfully treated, or whether early childhood intervention and identification of risk and protective factors may prove fruitful. There may also be a need to refine our assessment and understanding of certain types of psychotic symptoms that share common features with PTSD (e.g., flashbacks vs. hallucinations). Such data may have implications for future iterations of the *Diagnostic and Statistical Manual of Mental Disorders (DSM)* (APA, 1994). Research involving neuroimaging, genetic phenotyping, and other biological markers will be especially important in helping improve our conceptual and phenomenological understanding of PTSD and SMI.

Epidemiological Research

More epidemiological research is needed using large and ethnoracially diverse samples, structured clinical interviews, multiple sites, and longitudinal designs to improve our understanding of the prevalence, predictors, and illness course for both PTSD and SMI symptoms. Such work should be done in a range of clinical settings and within the general population. This research is especially needed for special populations, such as minorities and veterans, who are generally understudied and for whom little research has yet been conducted in this area. There is also a need for more studies using non-PTSD treatment-seeking samples of patients with SMI, as these individuals may differ in meaningful ways from those actively seeking services for PTSD.

Treatment Outcome Research

At this point the literature base on the treatment of PTSD among adults with SMI is extremely limited, with only a handful of studies completed, some of which are open trials (Frueh et al., 2009b; Mueser et al., 2007; Mueser et al., 2008; Rosenberg et al., 2004). Thus, there are more questions than answers; as noted above, one reason for these remaining questions is that patients with psychotic symptoms, recent histories of suicidal or unstable behavior, and severe illness burden have typically been excluded from PTSD clinical trials. Importantly though, extant data offer promise that PTSD is a treatable condition among even the most severely mentally ill.

Similar to recommendations for epidemiological research, there is a need for more treatment outcome studies for PTSD in a range of SMI populations and diagnoses, including randomized controlled designs, large and ethnoracially diverse samples, long-term follow-up, efficacy and effectiveness designs, and more therapeutic approaches, including psychotropic treatments (Hamner et al., 2003). In general, current studies have included primarily White female participants and/or have suffered from high drop-out rates (e.g., Frueh et al., 2009b; Mueser et al., 2007; Mueser et al., 2008; Rosenberg et al., 2004). Because many adults with SMI experience significant disorganization, transportation barriers, substance abuse, impaired cognitive functioning, medical illnesses and have healthcare need burdens, interventions may need to include strategies specifically designed to improve treatment retention and adherence, such as contingency management and transportation assistance. Comprehensive treatment approaches may also need to include components designed and tailored for different variants of SMI or symptoms, such as suicidal ideation and anger management, substance abuse/dependence interventions, and safety planning to minimize additional traumatic event exposure. Conversely, dismantling studies may eventually be needed to determine which elements of an intervention (e.g., relaxation training, cognitive therapy, exposure therapy, social skills training) are most effective for specific symptoms or behavioral difficulties.

We yet have little understanding of what it means to successfully treat PTSD in this population. While there is promise that PTSD symptoms may be meaningfully reduced via cognitive behavioral treatment, it is not clear from extant data what effect these changes have on psychotic or depressive symptoms, daily role functioning, social relationships, or occupational abilities. It will be interesting for future studies to evaluate how PTSD contributes to “recovery” and reduction of overall illness burden. It also will be important to learn whether reductions in PTSD symptoms are associated with reduced use of medical/mental healthcare services or disability benefits. Future research will benefit from economic cost-analyses to determine the utility of such targeted interventions.

Finally, as treatment outcome research is completed, efforts will be needed to disseminate and implement evidence-based treatments for PTSD in this population (Cahill, Foa, Hembree, Marshall, & Nacash, 2006; Cook, Schnurr, & Foa, 2004; Drake et al., 2001; Frueh et al., 2001; Frueh et al., 2009a; Rosenberg et al., 2001; Salyers, Evans, Bond, & Meyer, 2004), and to study such efforts empirically, including strategies for clinical supervision and therapist adherence to treatment protocols. Treatments will also need to be adapted for use within existing systems of care, including integrating active case management and medication monitoring. Health services research will be needed to examine how to best improve screening, identification, and treatment of PTSD within different types and levels of public mental health care settings.

Practice and Policy Implications

There is an urgent need to promote screening and treatment efforts for PTSD within public sector settings that serve patients with SMI. Unfortunately, one current reality of public mental health care in the U.S. is that state mental health budgets have received dramatic cuts over the past few years due to a variety of factors, including the economic recession (Frueh et al., manuscript under review). Mental health services and infrastructure have been reduced across the continuum of care (e.g., inpatient, outpatient, residential, day-hospital, case management). Thus, pre-existing barriers to the treatment of trauma and PTSD, which clearly exist given the discrepancy between expected and documented PTSD diagnoses, are now likely to grow. It is not yet clear whether this represents a temporary reduction in resources that will change in the near future. Nor is it clear how social policies and mental health funding and services will be structured in the newly revamped U.S. healthcare system. Given that most patients with SMI are receiving some form of social security, unemployment, and/or disability financial assistance, research efforts will also be required to examine how to maximize PTSD interventions and psychiatric rehabilitation strategies (e.g., supported employment programs; Burns et al., 2007) and policies. Finally, it will be important to maximize the cost-effectiveness and widespread applicability of empirically supported interventions for comorbid SMI and PTSD.

In conclusion, individuals with SMI are at high risk for trauma exposure, PTSD, and other trauma-related mental health problems. Data suggest that women, young adults, and individuals who have been repeatedly victimized are at the highest risk for poor mental health outcomes. The causal pathways linking SMI with these outcomes can be understood within the diathesis-stress model. However, additional research using representative samples and longitudinal designs is necessary to understand mediators and moderators of the relationships among SMI, PTSD, clinical correlates, and healthcare use. In comparison to other trauma-exposed populations, individuals with comorbid SMI and PTSD are likely to exhibit more severe and complex symptoms, a poorer prognosis, and increased service needs. Cognitive behavioral interventions represent promising approaches that require further testing, development, and dissemination. However, economic pressures and poor PTSD detection rates pose significant barriers that need to be overcome in order to improve services and treatment outcomes for the SMI population.

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Table 1

Prevalence of Sexual and Physical Assault among Individuals with SMI

Study	Sample	Definition of Events	Findings
Brekke, Prindle, Bae, & Long (2001)	172 individuals with a schizophrenia spectrum disorder who used a community-based program in a single city (45 women)	<i>Victimization</i> : clinical interview regarding the frequency and nature of victimization (i.e., robbery, assault- within the last 6 months; data collapsed over a 3-year period)	38% victimization in the 3-year period 34% violent victimization in the 3-year period
Calhoun et al. (2007)	165 men admitted to a single Veterans Affairs psychiatric inpatient unit with a schizophrenia spectrum disorder	<i>Child sexual abuse (CSA)</i> : Sexual Abuse Exposure Questionnaire (SAEQ) <i>Child physical abuse (CPA)</i> : violence subscale of the Revised Conflict Tactics Scale (CTS-2) <i>Adult sexual assault (ASA)</i> : forced or threatened oral, anal or vaginal intercourse <i>Adult physical assault (APA)</i> : physical assault subscale of the CTS-2	31% CSA 61% CPA 27% ASA, 10% past year 87% APA, 44% past year
Chapple et al. (2004)	962 individuals with psychosis who presented to a range of settings in four catchment areas used in a nationwide survey (e.g., inpatient and outpatient clinics, homeless shelters, day centers, boarding homes) (387 women)	<i>Victimization</i> : "physically assaulted, beaten, molested, or otherwise a victim of violence" within the last year	17.9% victimization in the past year
Cloitre, Tardiff, Marzuk, Leon, & Portera (1996)	409 consecutive female inpatient admissions in an urban private university psychiatric hospital	<i>Victimization</i> : Study specific close- ended interview assessing for history of violence	12% CSA prior to age 16 15% PSA prior to age 16 22% lifetime ASA
Cusack, Frueh, & Brady (2004)	505 community mental health center (CMHC) patients with SMI in South Carolina (316 women)	<i>Lifetime traumatic events</i> : Trauma Assessment for Adults (TAA); 1 of 12 events (including "other")	91% exposed to at least one traumatic event ($M = 4.7$ events) 31% CSA prior to age 13 39% CSA prior to age 18 45% ASA 47% physical assault without a weapon 45% physical assault with a weapon 55% lifetime sexual assault 58% lifetime physical assault
Cusack, Grubaugh, Knapp, & Frueh (2006)	142 patients with SMI participating in a psychosocial rehabilitation program at a single CMHC (63 women)	<i>Lifetime traumatic events</i> : TAA	87% exposed to at least one traumatic event ($M = 2.6$) 33% physical assault without a weapon 31% physical assault with a weapon 35% lifetime sexual assault 48% lifetime physical assault 58% either lifetime sexual or physical assault
Davidson, Shannon, Mulholland, & Campbell (2009)	30 patients with SMI from community health services in Ireland.	<i>Childhood Physical & Sexual Abuse</i> : The Childhood Trauma Questionnaire (CTQ) if rated low, moderate, or severe	22.6% CSA 25.8% CPA
Ford & Fournier (2007)	35 female patients with SMI at a single CMHC	<i>Lifetime traumatic events</i> : Trauma Events Screening Inventory (TESI); 1 of 10 events	23% CSA 48% CPA 86% APA
Gearon, Kaltman, Brown, & Bellack (2003)	54 female outpatients with a schizophrenia spectrum disorder and active substance abuse or dependence receiving	<i>Lifetime traumatic events</i> : Traumatic Life Events Questionnaire (TLEQ); 1 of 10 events	96% exposed to at least one lifetime traumatic event ($M = 8.1$) 61% CSA 48% CPA

Study	Sample	Definition of Events	Findings
	services at two community-based clinics		59% ASA 82% APA
Goldberg & Garno (2004)	100 patients with a bipolar disorder who sought treatment from a single bipolar-specific clinic (49 women)	<i>Child emotional abuse, CSA and CPA</i> : Child Trauma Questionnaire (CTQ); only if rated "severe" on scale (i.e., none, mild, moderate, severe) and interviewer had high confidence in patient's responses, categories collapsed <i>ASA and APA</i> : Traumatic Stress Schedule (TSS); past year and lifetime events	51% severe child abuse history 27% ASA 38% APA
Goodman et al. (1999)	50 patients with SMI using a single CMHC; assessed at 2 times points that were 2 weeks apart for reliability (29 women)	<i>CSA</i> : SAEQ <i>Adult victimization</i> : Physical assault, sexual coercion and injury subscales of the CTS-2, modified to include acquaintance or stranger perpetrators; since age 16 and within the past year	62% CSA at Time 1, 61% at Time 2 63% ASA at Time 1, 53% at Time 2 40% past-year ASA at Time 1, 31% at Time 2 85% APA at Time 1, 81% at Time 2 56% past-year APA at Time 1, 56% at Time 2
Goodman et al. (2001)	782 patients with SMI receiving public mental health services in 4 states (321 women)	<i>CSA</i> : SAEQ (i.e., any unwanted sexual contact) <i>CPA</i> : 3 questions created from the most severe items on the Conflict Tactics Scale (CTS; i.e., beating, kicking, choking, burning, use of a weapon on the child) <i>ASA</i> : Sexual assault subscale of the CTS-2 (i.e., forced or threatened oral, anal, or vaginal penetration); since age 16 and in the last year <i>APA</i> : Physical assault subscale of the CTS-2 (i.e., any assault type); since age 16 and in the last year	37% CSA 56% CPA 37% ASA, 13% past year 77% APA, 30% past year 51% lifetime sexual assault 84% lifetime physical assault
Greenfield, Strakowski, Tohen, Batson, & Kolbrener (1994)	38 patients with a psychotic or bipolar disorder admitted to a single hospital on their first psychiatric admission (19 women)	<i>CSA</i> : Life Experiences Questionnaire (LEQ) <i>CPA</i> : LEQ	8% CSA only 24% CPA only 21% both CSA and CPA
Hiday, Swartz, Swanson, Borum, & Wagner (1999)	331 involuntarily admitted patients with SMI from 3 hospitals who were mandated to outpatient treatment after discharge (153 women)	<i>Adult victimization</i> : Questions from the Quality of Life Interview (QLI) with direct questions about violent and non-violent victimization experienced in the last 4 months	27% exposed to some form of victimization in past 4 months 8% violent victimization in the past 4 months 22% non-violent victimization in the past 4 months
Jacobson & Herald (1990)	100 psychiatric inpatients admitted to a single hospital (50 women)	<i>Child sexual abuse</i> : Researcher-created scale with 15 behaviorally-specific questions; categorized as major (i.e., physical contact with victim's or perpetrator's genitals) or minor (e.g., fondling, taking inappropriate photos, requests for sexual contact)	18% major CSA 22% minor CSA 40% either major or minor CSA
Kilcommons & Morrison (2005)	32 patients with a schizophrenia spectrum disorder who used CMHCs in a restricted geographic area of England (7 women)	<i>Childhood victimization</i> : Trauma History Questionnaire (THQ) <i>Adult victimization</i> : THQ	94% exposed to at least one traumatic event ($M = 3.6$) 13% CSA 10% CPA without a weapon 10% CPA with a weapon 13% ASA 41% APA without a weapon 50% APA with a weapon 25% lifetime sexual assault 75% lifetime physical assault
Lab & Moore (2005)	74 male inpatients at 5 hospitals in a restricted area	<i>CSA</i> : Questionnaire that assessed for behaviorally-specific acts and characteristics	31% CSA

Study	Sample	Definition of Events	Findings
	of England	of the abuse and related distress	
Lipschitz et al. (1996)	120 male and female inner city psychiatric outpatients	<i>Lifetime victimization:</i> Traumatic Events Questionnaire	44% CSA prior to age 18 34% CPA prior to age 18 23% ASA 37% APA
Lysaker & LaRocco (2008)	68 patients with a schizophrenia spectrum disorder who were seen at a single VA or CMHC who were part of a larger study and reported at least one traumatic event (11 women)	<i>Lifetime traumatic events:</i> TAA	54% lifetime sexual assault 45% lifetime physical assault
McFarlane, Bookless, & Air (2001)	141 psychiatric inpatients at a single hospital (97 women)	<i>Lifetime traumatic events:</i> Inquiry as to whether a traumatic event had been experienced, similar to DSM-III wording (i.e., "being in a fire, flood, or traffic accident, being threatened with a weapon, being attacked or raped")	61% exposed to at least one traumatic event ($M = 1.13$) 11% lifetime sexual assault 11% lifetime physical assault
McFarlane, Schrader, Bookless, & Browne (2006)	130 psychiatric inpatients who were admitted to a single hospital in Australia for at least 2 days (61 women)	<i>Lifetime traumatic events:</i> Traumatic Antecedents Questionnaire (TAQ)	88% lifetime victimization of some form 51% CSA 66% CPA 25% ASA 68% APA 57% lifetime sexual assault 84% lifetime physical assault 55% both sexual and physical assault
Meade, Kershaw, Hansen, & Sikemma (2009a)	152 patients with SMI who used any of a number of services (e.g., CMHC, supportive housing) in a single city (70 women)	<i>Childhood victimization:</i> TSQ, prior to 18 <i>Adult victimization:</i> TSQ	47% CSA 58% CPA 70% either form of abuse, 32% both sexual and physical abuse
Meade et al. (2009b)	90 patients with comorbid bipolar disorder and substance use disorder at a single hospital who were part of a larger study (41 women)	<i>Lifetime sexual abuse:</i> Single question from the Addiction Severity Index: "In your lifetime, has anyone ever abused you sexually?" <i>Lifetime physical abuse:</i> Defined in a similar manner	31% lifetime sexual abuse 43% lifetime physical abuse 49% either lifetime sexual or physical abuse
Meyer, Muenzenmaier, Cancienne, & Struening (1996)	70 female patients with SMI at a single outpatient clinic	CSA: Clinical interview with 3 behaviorally-specific questions prior to age 18 CPA: Defined in a similar manner with 9 behaviorally-specific questions	46% CSA at Time 1, 44% at Time 2 53% CPA at Time 1, 49% at Time 2
Mueser et al. (1998)	275 inpatients and outpatients with SMI in 2 states (153 women)	<i>Lifetime victimization:</i> THQ and selected questions from the Community Violence Scale	98% exposed to at least one traumatic event ($M = 3.5$) 45% CSA 18% CPA without weapon, 17% with weapon 47% ASA 38% APA without weapon, 42% with weapon
Mueser et al. (2001)	30 outpatients with SMI from a single mental health center interviewed at 2 time points (2 weeks apart) (16 women)	<i>Lifetime victimization:</i> THQ	80% exposure to at least one traumatic event at Time 1, 80% at Time 2 ($M = 3$ at Time 1, $M = 2$ at Time 2) 55% sexual abuse/assault at Time 1, 61% at Time 2 43% attacked without a weapon at Time 1, 31% at Time 2

Study	Sample	Definition of Events	Findings
			41% attacked with a weapon at Time 1, 13% at Time 2
Mueser et al. (2004)	782 patients with SMI receiving public inpatient or outpatient mental health services in 4 states (321 women)	CSA: SAEQ CPA: Combination of the three most severe items from the CTS ASA: sexual assault subscale of the CTS-2 APA: physical assault subscale of the CTS-2	37% CSA 57% CPA 38% ASA, 13% past year 77% APA, 31% past year 52% lifetime sexual assault 84% lifetime physical assault
Mueser et al. (2007)	80 patients with SMI and comorbid PTSD who completed the baseline assessment for participation in a trauma-focused group therapy in a single city (63 women)	<i>Lifetime traumatic events:</i> THQ	64% CSA 63% ASA 62% attacked with a weapon 74% attacked with intent to kill
Neria, Bromet, Sievers, Lavelle, & Fochtmann (2002)	426 patients with a first admission for psychosis in a restricted geographic area (171 women)	<i>Lifetime traumatic events:</i> Trauma module from the National Comorbidity Survey (NCS)	69% exposure to at least one traumatic event 32% childhood victimization of any nature 22% CPA 14% rape, 15% sexual molestation 30% APA
Resnick, Bond, & Mueser (2003)	47 patients with schizophrenia spectrum disorder from 4 CMHCs in a restricted geographic area (30 women)	<i>Lifetime traumatic events:</i> THQ	64% exposed to at least one traumatic interpersonal event 23% CSA prior to 13, 15% CSA 13-17 38% ASA 30% attacked with a weapon 27% attacked without a weapon
Teplin, McClelland, Abram, & Weiner (2005)	936 patients with SMI using outpatient, day treatment and residential services in a single city (453 women)	<i>Adult victimization:</i> National Crime Victimization Survey (NCVS); past year events	3% ASA 25% any type of violent crime, 17% completed violence, 11% threatened violence
Wurr & Partridge (1996)	120 individuals admitted to a general psychiatric hospital	<i>Childhood Sexual Abuse:</i> Self administered questionnaire	46% CSA

Note: All studies took place within the US unless otherwise noted. Childhood abuse was assessed with respect to acts that occurred prior to age 16 unless otherwise noted.

Table 2**Prevalence of PTSD among Individuals with SMI**

Study	Sample	Assessment of PTSD	Findings
Calhoun et al., 2007	165 men admitted to a single Veterans Affairs' psychiatric inpatient unit with a schizophrenia spectrum disorder	Posttraumatic Stress Disorder Checklist (PCL) using DSM-IV decision rule	Given CSA, 33% current PTSD Given ASA, 24% current PTSD, Given CPA, 72% current PTSD Given APA, 90% current PTSD,
Cusack, Frueh, & Brady (2004)	505 community mental health center patients with SMI in South Carolina (316 women)	PCL, no cut-off specified, and clinical interview	19% current PTSD 6% primary PTSD diagnosis
Cusack, Grubaugh, Knapp, & Frueh (2006)	142 participants with SMI in a psychosocial rehabilitation program at a single CMHC (63 women)	PCL, cut-off score of 45 and 50, and DSM-IV scoring method	30% current PTSD (cut-off = 45) 19% current PTSD (cut-off = 50) 30% current PTSD (DSM scoring)
Ford & Fournier (2007)	35 patients with SMI at a single CMHC	Clinician Administered PTSD Scale (CAPS), no cut-off specified	44% current PTSD 53% lifetime PTSD
Gearon, Kaltman, Brown, & Bellack (2003)	54 female outpatients with a schizophrenia spectrum disorder and active substance abuse or dependence receiving services at two community-based clinics	Clinician Administered PTSD Scale (CAPS), cut-off score of 45	46% current PTSD Given CSA, 61% current PTSD Given ASA, 59% current PTSD Given CPA, 65% current PTSD Given APA, 50% current PTSD Given revictimization, 61% current PTSD
Goldberg & Gamo (2004)	100 patients with a bipolar disorder who sought treatment from a single bipolar-specific clinic (49 women)	Structured Clinical Interview for the DSM-IV (SCID-IV)	24% current PTSD Given severe child abuse, 35% current PTSD Given ASA, 41% current PTSD Given APA, 29% current PTSD
Goodman et al. (1999)	50 patients with SMI using a single CMHC (29 women)	PCL, "moderately severe" symptoms were classified as present	37% current PTSD
Kilcommons & Morrison (2005)	32 patients with a schizophrenia spectrum disorder who used CMHCs in a restricted geographic area of England (7 women)	Posttraumatic Stress Disorder Symptom Scale (PSS), cut-off score of 18 for frequency of symptoms	53% current PTSD
McFarlane, Bookless, & Air (2001)	141 psychiatric inpatients at a single hospital (97 women)	Diagnostic Interview Schedule (DIS)	28% lifetime PTSD
McFarlane, Schrader, Bookless, & Browne (2006)	130 psychiatric inpatients who were admitted to a single hospital in Australia (61 women)	Composite International Diagnostic Interview	28% current PTSD 40% lifetime PTSD
Meade et al. (2009b)	90 patients with comorbid bipolar disorder and substance use disorder at a single hospital (41 women)	SCID-IV	28% lifetime PTSD
Mueser et al. (1998)	275 inpatients and outpatients with SMI in 2 states (153 women)	PCL-S, "moderately severe" symptoms were classified as present	43% current PTSD
Mueser et al. (2001)	30 outpatients with SMI from a single mental health center interviewed at 2 time points (2 weeks apart) (16 women)	PCL, "moderately severe" symptoms were classified as present CAPS, "standard" diagnostic cut-off (i.e., frequency of 1, severity of 2) and cut-off of 65	50% current PTSD at Time 1, 43% at Time 2 40% CAPS-positive (standard cut-off) at Time 1, 35% at Time 2 27% CAPS-positive (cut-off = 65) at Time 1, 21% at Time 2

Study	Sample	Assessment of PTSD	Findings
Mueser et al. (2004)	782 patients with SMI receiving public inpatient or outpatient mental health services in 4 states (321 women)	PCL, "moderately severe" symptoms were classified as present, using DSM-IV decision rule	35% current PTSD
Mueser et al. (2007)	80 patients with SMI and comorbid PTSD who completed the baseline assessment for participation in a trauma-focused group therapy in a single city (63 women)	PCL, no cut-off specified	Baseline $M = 64.10$ [Range of PCL 17-85; ≥ 45 or 50 usually indicative of PTSD]
Neria, Bromet, Sievers, Lavelle, & Fochtmann (2002)	426 patients with SMI and a first admission for psychosis in a restricted geographic area (171 women)	DSM-III-R PTSD module from the National Comorbidity Survey (NCS)	14% lifetime PTSD in entire sample 27% lifetime PTSD for those who reported trauma exposure
Resnick, Bond, & Mueser (2003)	47 patients with schizophrenia spectrum disorder from 4 CMHCs in a restricted geographic area (30 women)	CAPS standard diagnostic cut-off	13% current PTSD