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Childhood adversity and conduct disorder: A developmental pathway to violence in schizophrenia

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ABSTRACT

Background: Both childhood adversity and conduct disorder are over-represented among adult patients with schizophrenia and have been proposed as significant factors that may increase the risk of violence. It is not known how childhood adversity and conduct disorder might interact to contribute towards an increased risk of violence in schizophrenia. This study aimed to explore the relationships between childhood adversity, conduct disorder and violence among men with schizophrenia.

Methods: 54 male patients with schizophrenia from a range of inpatient and outpatient mental health services were assessed for exposure to a variety of childhood adversities, conduct disorder before the age of 15 and later violent behaviour in adulthood.

Results: Exposure to domestic violence during childhood was associated with an increased propensity to violence in adulthood. Symptoms of conduct disorder were associated both with cumulative exposure to childhood adversities and with later propensity to violence. The cumulative number of childhood adversities was associated with adult propensity to violence. This association was significantly attenuated by inclusion of conduct disorder in the model. **Conclusions:** This is the first study to demonstrate an association between childhood exposure to domestic violence and later violent behaviour in schizophrenia. Conduct disorder may mediate the association between cumulative childhood adversities and adult propensity to violence, indicating an indirect pathway. These results indicate a complex interplay between childhood adversity, conduct disorder and later violent behaviour in schizophrenia, and suggest that there may be shared aetiological risk factors on a common developmental pathway to violence.

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1. Introduction

There is good epidemiological evidence to support a modest but significant association between schizophrenia and violence (Arseneault et al., 2000; Douglas et al., 2009; Large and Nielssen, 2011; Walsh et al., 2002) but the origins of this relationship remain unclear. Some argue that little violence risk is attributable to the mental illness itself, with the effects of substance abuse (particularly alcohol) and personality disorders outweighing the role of schizophrenia (Appelbaum, 2008).

It is established that co-morbid substance misuse increases the risk of violence in schizophrenia (Elbogen and Johnson, 2009; Fazel et al., 2009; Swanson et al., 2006). Controversy remains about the true extent of that role. Some studies have cited substance misuse as one of several factors that increase the risk of violent behaviour in patients with psychotic illnesses (Daffern et al., 2005; Dean et al., 2007; Harris et al., 2010; Stompe et al., 2004). Other large epidemiological studies have suggested that there is almost no role for psychosis-specific factors

and that substance misuse is the main driver of violence in schizophrenia (Elbogen and Johnson, 2009; Fazel et al., 2009). However a reanalysis of the data from one of these (Elbogen and Johnson, 2009) found that those patients with severe mental illness, irrespective of substance abuse comorbidity, were significantly more likely to be violent than those with no mental illness (Van Dorn et al., 2012). Equally there is data that patients with schizophrenia without comorbid substance misuse, do have an elevated risk of violence (Short et al., 2013).

Antisocial personality disorder increases the risk for violence in men with schizophrenia (Volavka, 2014). In some patients with schizophrenia, personality pathology, including psychopathy, predicts violence regardless of schizophrenia symptoms (Bo et al., 2011). Taken together these findings have led to the suggestion that violence among patients with schizophrenia may follow at least two distinct pathways, one associated with premorbid conditions, including antisocial behaviour, and another linked with the acute psychotic symptoms of schizophrenia (Bo et al., 2011; Hodgins et al., 2014; Volavka, 2014; Volavka and Citrome, 2011).

Threat/control-override symptoms, principally delusions of persecution and passivity were advanced as a cognitive model for violence in psychosis (Link and Stueve, 1994). Though supporting evidence has remained limited (Appelbaum et al., 2000; Stompe et al., 2004). Other

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studies have concluded that positive psychotic symptoms do increase the risk of violence (Daffern et al., 2005; Hodgins et al., 2003; Krakowski et al., 1999; Swanson et al., 2006). Crucially there are early indicators that psychotic symptoms may be of particular relevance in relation to violence committed by patients with schizophrenia in the absence of preceding conduct disorder (Heads et al., 1997; Swanson et al., 2008).

Childhood physical abuse has been shown to be associated with later violent behaviour in general population (Elbogen and Johnson, 2009), patient (Hoptman et al., 1999; Witt et al., 2013) and prisoner (Sarchiapone et al., 2009) samples. However, less is known about the influence of other forms of childhood trauma on the risk of violence in people with schizophrenia.

Childhood adversity is strongly associated with an increased risk for psychosis and could have a significant aetiological role (Varese et al., 2012). For example, a prospective study in adolescents showed that childhood trauma was strongly predictive of new psychotic experiences and that stopping the trauma stopped the psychotic experiences (Kelleher et al., 2013). There is also evidence that childhood abuse and number of later life events combine synergistically to increase the odds of psychotic experiences beyond the effects of each risk factor alone (Morgan et al., 2014). However, other forms of childhood adversity, such as parental loss or separation also contribute to later psychopathology (Morgan et al., 2007). Hence there is a wider focus on the effects of childhood adversities in psychosis, rather than exclusively childhood trauma (Varese et al., 2012).

One important influence on the later effects of childhood adversity may be conduct disorder. Childhood abuse is associated with a wide range of later psychopathology (McCrory et al., 2012). Childhood adversity, including neglect and physical and sexual abuse, increases the risk of conduct disorder (Afifi et al., 2011; Foley et al., 2004; Maniglio, 2015; Villodas et al., 2014); while conduct disorder (CD) is over-represented in patients who later develop schizophrenia (Hodgins et al., 2008). Finally childhood CD is associated with an increased risk of violent behaviour in both the adult general population (Blair et al., 2014) and in those with schizophrenia (Arseneault et al., 2000; Hodgins et al., 2008; Swanson et al., 2008; Tengström et al., 2004).

In summary, there is emerging evidence that childhood adversity is associated with psychosis, CD and the risk of violence. However, it remains unclear how childhood adversity might interact with CD to contribute towards the increased risk of violence in schizophrenia. This study, therefore, sought to examine the association between childhood adversity and violence among men with schizophrenia and whether this varied on the basis of prior CD. Patients with schizophrenia are more likely to have been exposed to a variety of adverse childhood events including physical and sexual abuse; parental divorce, parental death; domestic violence; and foster care (Bennouna-Greene et al., 2011; Gibbon et al., 2009; Rosenberg et al., 2007). Therefore this study considered three types of childhood adversity: childhood abuse (physical or sexual); separation from either parent (due to reasons such as divorce, death, or being taken into foster care); and exposure to domestic violence. We hypothesised that among men with schizophrenia, those with prior CD would be more likely to (i) report childhood adversities and (ii) have a significantly greater history of violence, as compared to those without CD. We further hypothesised that childhood adversities would be associated with violence and that CD would be a mediator of the relationship between childhood adversities and violence.

2. Methods

2.1. Recruitment

After NHS Research Ethics Committee approval, male patients of working age with schizophrenia were recruited from four large National Health Service Mental Health Trusts and one independent sector provider. The sites had a range of mental health services for men with schizophrenia, including outpatient clinics and inpatient wards in

acute as well as secure units. This approach offered representative sampling of male patients with schizophrenia in their respective catchment areas, across a wide geographical region of England, encompassing socially and ethnically diverse populations. Potential candidates were identified and referred by their consultant psychiatrist. Participants were excluded if they had a history of: epilepsy, significant head injury, learning/intellectual disability or dementia, neurological disorder, mania or hypomania or current active substance abuse/dependence. All participants gave their written informed consent after a full description of the study aims and procedures.

2.2. Clinical assessment

Diagnoses of schizophrenia and lifetime substance use disorders were established using the Structured Clinical Interview for DSM-IV Axis I disorders (SCID-I) (First et al., 2002). Psychotic symptoms were assessed using the Positive and Negative Syndrome Scale (PANSS) (Kay et al., 1987). Current antipsychotic load was calculated from the patients' prescription (Gardner et al., 2010). CD and antisocial personality disorder (ASPD) were assessed using the Structured Clinical Interview for DSM-IV Axis II disorders (SCID-II) (First et al., 1997). The Psychopathy Checklist Screening Version (PCL:SV) (Hart et al., 1995) was also rated, which is a screening tool for psychopathy which is robustly related to the full Psychopathy Checklist Revised (PCL-R) (Guy and Douglas, 2006).

The Childhood Experiences of Care and Abuse Questionnaire (CECA-Q) (Bifulco et al., 2005) assesses retrospective reports of childhood maltreatment and is reliable in people with psychotic disorders (Fisher et al., 2011). A modified version of the CECA-Q was employed (Hepgul et al., 2012), in which the interview was also augmented to ask participants about exposure to domestic violence between parental figures or family members in their childhood home. In light of the experimental hypotheses, the analyses focused on the presence of the following three types of childhood adversity before the age of 17: childhood abuse, which was dichotomized to indicate the presence of physical or sexual abuse or both; separation from either parent for 6 months or more; and exposure to domestic violence.

2.3. Assessment of violence

All participants were asked about their history of violent behaviour based on the MacArthur Community Violence Instrument (Steadman et al., 1998). Participants indicated how many times over their adult lifetime they had engaged in each type of aggressive behaviour. Self-report using this instrument is reliable and valid, in the original study patients reported 5 times more violent acts than those documented in official records (Steadman et al., 1998). Collateral information was obtained from medical records for all participants and family informants where available. Participants were also asked about any contact with the police and criminal justice system.

We sought to capture each participant's lifetime propensity to violence and based on our review (Harris et al., 2013), we selected the Gunn–Robertson Scale, which rates nine different types of offending behaviours (including violence) on a five point scale (Gunn and Robertson, 1976). The Gunn–Robertson Violence Scale (GRVS) incorporates data on several facets of violence including frequency, severity, victim injury and legal consequences. Two authors (CO and SH) independently rated all participants using the GRVS and cases of disagreement were resolved after case review to reach a consensus rating.

2.4. Statistical analyses

All statistical analyses were conducted in SPSS 18. A significance level of $p < 0.05$ was adopted throughout. Chi-square was used to test for differences between groups with and without prior CD. As the GRVS is an ordinal scale, ordinal logistic regression was used to

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