

Schizophrenia and Crime

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Total word count = 1958

Abstract (113/150)

The comorbid relationship between schizophrenia and crime may prove difficult to accept by some researchers, practitioners, and the public alike. However, over the last 50 years, accumulating evidence from several follow-up studies and retrospective studies of birth cohorts, patients, and incarcerated populations globally, have established the schizophrenia and crime link. This chapter reviews the growing empirical evidence to date on the risk-factors and cures associated with schizophrenia, crime, and for both of these conditions. By understanding the etiology of this comorbid relationship, we can reduce the stigma that is associated with these disabling conditions and importantly, begin to direct more resources into developing preventive interventions for individuals at-risk for developing these disabling conditions.

Keywords Schizophrenia-spectrum disorders; schizophrenia; psychosis; homicide; violence; mental health; crime; developmental.

Introduction

Kraepelin (1913) first documented the link between violent antisocial behaviors and patients with dementia praecox, or what is now known as schizophrenia. Since then, many more studies have established the association between mental illness more broadly and later violent behaviors (Hodgins, 2008; Walsh, Buchannan, & Fahy, 2002). Building on Raine's (2006) comprehensive review of this important body of literature, this chapter will review the comorbid causes and cures to both schizophrenia and crime, by presenting the accumulating evidence on this topic from studies worldwide.

On the one hand, prospective studies of criminals primarily homicide offenders and juvenile delinquents have documented elevated rates of psychosis and schizophrenia-like symptoms compared with the general population (Arseneault et al., 2000; Hodgins, 2008; Lewis, Yeager, Gidlow, & Lewis, 2001; Lindqvist, & Allebeck, 1990; Walsh et al., 2002). In particular, Eronen, Tiihonen, and Hakola (1996) examined 1,594 homicide offenders in England and Wales over a 3-year period and found that 5% of homicide offenders suffered from schizophrenia, 67% of those had been ill for less than 12 months, and 38% experienced intense delusional beliefs in the month before the offense. In Sweden, 20% of all individuals convicted of homicide and attempted homicide between 1988 to 2001 ($N = 2,005$) suffered from a psychotic illness, with only 10% having no diagnosis. Similarly, in Denmark, 44% of female homicide offenders and 20% of male homicide offenders were diagnosed with psychosis (Gottlieb, Gabrielsen, & Kramp, 1987). Together, these findings suggest that the two constructs are inextricably linked.

On the other hand, retrospective studies of schizophrenia patients have also documented higher rates of criminal and violent behaviors compared to the general population (Fazel & Danesh, 2002; Large, Smith, & Nielssen, 2009). Eronen, Hakola and Tiihonen (1996) found that schizophrenia patients were on average 10 times more likely than healthy controls to commit homicides over a 12-year period with male and female patients being on average 8 times and 6.5 times more likely than healthy controls to commit homicides, respectively. In another twin study, male patients were significantly more likely than women to suffer from affective psychosis and to be convicted and to receive a prison sentence (Coid, Lewis, & Reveley, 1993). In a recent meta-analysis of 9 studies ($N = 2,545$) published between 1992 to 2010, patients with first-episode psychosis were more likely to commit an act of violence before their first contact for treatment at rates of 34.5%, 16.6% and 0.6% for any violence, serious violence and severe violence, respectively (Large & Nielssen, 2010). However, what is less well-documented is that schizophrenia patients living in the community were also 14 times more likely to be a victim of crime rather than to be a cause of one (Brekke, Prindle, Bae, & Long, 2001), at high risk for committing suicide (Hor & Taylor, 2010), and more likely to live in socially disorganized neighborhoods (Allardyce & Boydell, 2006).

These studies are consistent with the findings of recent large-scale systematic review and meta-analyses, which have reported an overall medium to large effect ($d = .81$) for the schizophrenia and violence relationship (Brennan & Alden, 2006; Fazel et al., 2009). What is less known however, is why the schizophrenia and crime relationship exists. To address this gap, researchers have adopted a developmental perspective to understand the common risk-factors to both conditions (outlined in the next section). It is argued that by studying the nature of why prodromal conditions such as schizophrenia-spectrum disorders/schizotypal personality are associated with antisocial/aggressive behaviors, we may be better able to understand the more severe schizophrenia-crime relationship (Wong & Raine, 2018).

Causes: Risk Factors

Neurobiological Correlates. Gourion (2006) argued that focusing on the common developmental pathways between schizophrenia and antisocial criminal behaviors can facilitate new insights into the biological, cognitive and clinical determinants that underlie both conditions. In particular, there is growing consensus that prefrontal dysfunctions underlying volitional intent and planning are associated with delusions/hallucinations in psychosis (Pontius, 2004). The same dysfunctional prefrontal cortex is also associated with the lack of control over impulsive, violent, and aggressive behaviors observed in criminal offenders (Schug, & Raine, 2009; Yang & Raine, 2009). However, these findings have been mixed.

Naudts and Hodgins (2005) found that comparing schizophrenia patients without a history of violent and aggressive behaviors, the male schizophrenia patients with a childhood history of violent and aggressive behaviors were the ones who had superior executive functions and poorer orbitofrontal functioning, fewer neurological soft signs, reduced amygdalae volumes, and more structural and white matter abnormalities of the orbitofrontal system, a region responsible for decision-making and impulse control. In another study, laminar abnormalities in sensorimotor cortices were found to be related to violent behaviors observed in *both* individuals with antisocial personality disorder and schizophrenia, even though while regional cortical thinning was found only in individuals with violent antisocial personality disorder (Narayan et al., 2007).

While the majority of studies are based on patients, one community adult study does exist and has replicated the above findings. Lam, Yang, Raine, and Lee (2015) assessed the gray matter volumes of five prefrontal brain regions (superior, middle, inferior, orbitofrontal and rectal gyral) in 90 adults from the community using structural magnetic resonance imaging. They found that the orbitofrontal cortex (OFC) significantly mediated the antisocial behavior and schizotypal personality relationship, explaining 53.5% of the variance. This suggests that associated functions of the OFC which includes impulse control and inhibition, emotion processing and decision-making may contribute to the comorbidity of the schizotypal-antisocial behavior link.

Theory of mind (ToM) deficits. ToM deficits are commonly associated with patients with schizophrenia. Compared with patients with personality disorders, violent patients with schizophrenia have no ToM deficits at the first order but performed worse on second-order theory of mind tasks (Murphy, 1998). Similarly, when patients with paranoid schizophrenia were divided into violent versus non-violent groups, violent patients performed worse on tasks involving empathic inferencing but performed better at inferring cognitive-mental states in others compared to nonviolent paranoid schizophrenics (Abu-Akel & Abushua'leh, 2004). Conversely, a study of undergraduates demonstrated that ToM moderated the negative effect of peer victimization on the schizotypal-aggression relationship, particularly reactive aggression (Lam, Raine, & Lee, 2016). Together these findings highlight the importance of the prefrontal cortex in the regulation of both schizophrenic-like symptoms and antisocial violent behaviors.

Childhood adversity. Childhood adversity and abuse is a widely replicated risk-factor for many disorders; however, few studies have examined its effects on both violence and psychosis. A recent prospective longitudinal study of a large Mauritian sample, Wong, Raine and Venables (2018) demonstrated that children left home alone at age 3 years exhibited more psychotic symptoms and antisocial behaviors at age 17 years and schizotypal personality and criminal behaviors at age 23 years compared with children reared by siblings/relatives, and children looked after by mothers. This finding was not accounted for by cognitive impairments but related to both parental supervision and early social environment. This is the first study to

suggest an early common psychosocial denominator to the two comorbid conditions of antisocial behavior and schizotypal personality. In a separate cross-sectional study, suspicious children from the UK and Hong Kong (N = 1,498) reported significantly more concurrent aggressive behaviors, callous-unemotional traits, and internalizing problem behaviors compared to their non-suspicious peers (Wong, Freeman, & Hughes, 2014). At 6- and 12-month follow-up, the excessively suspicious children also reported more hostile attributions and experiences of negative peer victimization compared with non-suspicious controls (Wong, 2015), suggesting that childhood psychosocial adversities may have both immediate and long-term effects on psychotic-like experiences and rule-breaking behaviors. There is also initial twin-study evidence to suggest that childhood paranoia is also heritable (Zhou et al., 2018).

Personality Disorder. Individuals who are violent and suffer from schizophrenia often have comorbid diagnoses of a personality disorder, with particular links with early schizophrenia-spectrum disorder. Based on psychiatric assessments of incarcerated homicide offenders, Fazel and Grann (2004) found that 54% of criminals had a personality disorder as a primary or secondary diagnosis with the largest group in the personality not otherwise specified (NOS), followed by Cluster B, Cluster A, and Cluster C. In the Danish birth cohort study, there was some evidence that controlling for personality disorder partially reduced the schizophrenia and violent crime link for both males and females, though the relationship remained significant (Brennan & Alden, 2006). Putkonen, Kotilainen, Joyal, and Tiihonen (2004) conducted a retrospective study assessing the lifetime prevalence rate of 90 homicide offenders and found that 51% had a comorbid personality disorder, 47% with an antisocial personality disorder, and only 25% did not have a comorbid disorder. Equally striking was the finding that all offenders who had a personality disorder also had a comorbid substance related disorder.

Substance Abuse. The prevalence rates for comorbid substance abuse in schizophrenia patients and criminals is well documented (Goethals, Vorstenbosch, & van Marle, 2008; Putkonen, Kotilainen, Joyal, & Tiihonen, 2004). According to a review by Smith and Hucker (1994), schizophrenia patients who abuse drugs and alcohol were more likely to behave violently, and in follow-up studies, found to be 9.5 times more likely to recidivate if they were also alcohol abusers. Comparing a group of violent male schizophrenia patients with non-violent patients, Steinert, Hermer, and Faust (1996) found that substance abusers were present in 70% of the aggressive male schizophrenia patients compared with 13% of the schizophrenia patients without a history of violence, with comparable findings replicated at 50% of younger male samples (Blanchard, Brown, Horan, & Sherwood, 2000). Still other studies have reported that 34% of patients with psychosis used alcohol, 22% used alcohol and cannabis, 12% used cannabis-only, and 24% used other stimulants (Miles et al., 2003), with no real differentiation between substance type for patients with schizophrenia and patients with personality disorders (Corbett, Duggan, & Larkin, 1998). Against this backdrop, a more recent systematic review has found that the risk for homicide was increased in individuals with psychosis (with and without comorbid substance abuse) compared to the general population; however, risks were comparable to individuals with substance abuse but without psychosis (Fazel et al., 2009). This suggests that public health strategies for violence reduction should also consider intervening on substance abuse.

Cures.

The literature on the cures of *both* schizophrenia and crime is scant and not surprisingly, predicated on our understanding of the risk-factors from the previous section. Despite this, some progress has been made over the last two decades and researchers are continually working

towards a better understanding of the etiology of the schizophrenia and crime relationship, primarily taking an interest in biosocial non-invasive preventive interventions.

Early environmental enrichment. To date, one promising study has been shown to be successful at reducing antisocial behavior and schizotypal personality traits. Raine, Liu, Venables, and Mednick (2006) selected 100 children to receive an early environmental enrichment program compared to 1,695 controls in the Mauritius cohort study using a stratified random sampling technique. This 2-year program at age 3 years consisted of three key elements: nutrition, education, and physical exercise (see detailed description in Raine et al., 2001). Compared to controls, children from the enrichment group showed significant reductions in psychotic symptoms, conduct problems, motor difficulties and schizotypal traits at 17 years and reduced self-reported crime (23.6% vs. 36.1%) and official crime records (3.6% vs 9.9%). While this program was successful at reducing schizotypal personality traits not schizophrenia itself, the sustained developmental benefits may inform intervention efforts at preventing or delaying the onset of schizophrenia as schizotypal personality disorder is often seen as a prodrome stage of schizophrenia (Raine Lencz, & Mednick, 1995). Other non-invasive yet promising methods that have been shown to reduce antisocial aggressive behaviors in both aggressive youths and prisoners involve increasing their omega-3 intake (Meyer et al., 2016; Raine et al., 2015). It seems then that treatment for both symptoms of schizophrenia and antisocial behaviors ought to begin early in development.

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