Childhood trauma and psychosis: Evidence, pathways, and implications

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ABSTRACT

There is currently a growing body of research examining environmental factors in the etiology of psychosis. Much recent interest has focused on the relationship between childhood trauma and the risk of developing psychotic experiences later in life. Numerous studies of psychiatric patients where the majority are diagnosed psychotic indicate that the prevalence of traumatic experiences in this group is high. This body of research now includes many large-scale population-based studies controlling for possible mediating variables, which together provide persuasive evidence of a dose-response association and are indicative of a causal relationship. Several psychological and biological models have been proposed which offer credible accounts of the processes by which trauma may increase risk of psychotic experience. Clinically it is imperative to routinely enquire about traumatic experiences, to respond appropriately and to offer psychosocial treatments to those who report traumatic life events in the context of psychotic experiences.

"Childhood trauma" is a term that is used to refer to a range of negative life experiences including physical, sexual, and emotional abuse as well as physical and emotional neglect. This has been the subject of a considerable body of research that has repeatedly documented strong associations between childhood trauma and numerous negative mental health, physical health, and social outcomes in childhood and later life.[1-6] Childhood abuse has been causally linked to numerous adult psychiatric disorders including depression, anxiety disorders, substance misuse and eating disorders, post-traumatic stress disorder (PTSD), sexual dysfunction, personality disorders, dissociation, and suicidality.[7-15] Unsurprisingly, victims of childhood abuse are also more likely to require psychiatric treatment as adults.[16,17] Despite the strong body of evidence that childhood trauma is associated with various nonpsychotic outcomes, the contribution of childhood trauma to psychosis has been long overlooked in favor of the dominant biogenetic paradigm.[18] While the cross-sectional, usually correlational, survey data is plentiful and remarkably consistent overall in finding strong associations between childhood trauma and psychotic experience, it does not allow us to draw firm conclusions about causation.[6] It cannot, for example, establish whether the effects of a specific type of trauma are independent from other risk factors for psychosis. More recently, however, several well-designed large-scale population-based studies have been reported, including important prospective studies focusing on the relationship between childhood trauma and the risk of experiencing psychotic phenomena.[16,19-26]

The aim of this review, therefore, is to re-examine the hypothesis that childhood trauma increases the risk for psychotic experience in the light of these recent large-scale research studies, to draw some conclusions and to reflect on the clinical implications of these findings.

Childhood Trauma and Health-Related Outcomes

A recent interdisciplinary review examined literature from a variety of different disciplines published from 1997 to 2003 and concluded that childhood trauma was associated with numerous adverse outcomes in the long-term, including eating disorders, substance abuse, phobias, multiple personality disorders, irritable bowel syndrome, rheumatoid arthritis, and autoimmune disorders.[4] In addition, a dose-response

relationship has been documented in several recent publications arising from the adverse childhood experiences study (ACE). This large-scale epidemiological study assessed the cumulative effects of various types of childhood abuse and household dysfunction on a broad range of health-related behaviors and outcomes from adolescence to adulthood in a cohort of 17,337 adults. The study assessed eight ACEs including abuse, serious household dysfunction and witnessing domestic violence, and utilized regression models to adjust for sociodemographic variables. Several publications from the ACE study have repeatedly documented a positively graded relationship between the number of types of ACEs experienced and the severity of mental health difficulties, attempted suicide, somatic, substance misuse, memory, sexual, and aggression-related problems later in life.[5,27,28] Results from this important study also suggest that those who report childhood sexual abuse (CSA) are also likely to have suffered multiple other ACEs. Dong and colleagues again report a significant positively graded relationship between severity, duration and frequency of CSA and the likelihood of experiencing multiple other forms of ACEs.[29] Those who experienced CSA are more likely to have also experienced other types of childhood trauma. This is noteworthy because the relationship between cumulative trauma exposure and negative physical, mental and social outcomes has been consistently reported in the literature.[5,26,27,29]

Childhood Trauma and Psychosis

A recent review of the North American psychiatric literature over the past 40 years concluded that potential social causes of psychosis, including schizophrenia, have been neglected in favor of the advancement of genetic and biological etiologies.[30] However, Kraeplinian conceptualizations of psychotic experiences as merely the symptoms of a disordered brain have been challenged by prominent academicians such as Richard Bentall and others who question the validity and utility of schizophrenia as a conceptual and diagnostic entity, and argue that psychotic experiences lie on a continuum with "normal" functioning and suggest that contemporary conceptualizations of "schizophrenia," "bipolar disorder," and associated complaints should take into account the role of adverse environmental factors.[31] Furthermore, in the last ten years there has been renewed interest and a growing body of literature examining the role of social and environmental factors in the etiology of psychosis and schizophrenia. Much of this research has specifically focused on the relationship between childhood trauma, psychosis, and schizophrenia.

A number of significant reviews of the literature examining the relationship between childhood trauma, psychosis and schizophrenia have been published in the last few years.[18,32-34] A review by Read *et al.*[6] summarized research studies and examined other review papers addressing the relationship between childhood trauma, psychosis and schizophrenia. This review examined studies of psychiatric inpatients and outpatients where at least 50% were diagnosed with a psychotic condition. Studies that were included were required to have used interview protocols or questionnaire measures that specified examples of abusive acts to determine abuse, therefore chart

reviews were excluded. The review produced weighted averages from 51 studies and reported that the majority of female patients (69%) reported either childhood sexual abuse (CSA) (48%) or childhood physical abuse (CPA) (48%). The majority of male patients (59%) reported either CSA (28%) or CPA (50%). The authors of this review point out that these rates are likely to be underestimates as child abuse is generally under-reported[35] especially by people who are inpatients[36,37] and men in particular.[38] The bulk of the evidence considered in this review, however, was from studies using cross-sectional designs or uncontrolled group comparisons, which the authors concede can give us useful estimates of the prevalence of childhood trauma in clinical populations, but tell us little about whether the relationship between childhood trauma and psychosis is causal. Consequently, Read and colleagues also examined data from four large-scale studies with more sophisticated methodologies which represent a more robust test of the hypothesis that childhood trauma plays a causal role in psychosis.

The first of these was a prospective study of 1612 documented CSA cases.[16] The authors compared subsequent treatment rates for a range of diagnoses in these individuals with treatment rates for a large population-based control sample (3,139,745). Their findings suggested that males who had experienced abuse were 1.3 times more likely to be treated for a "schizophrenic disorder" than the general population, with females 1.5 times more likely. While this association was not statistically significant, there were a number of major methodological limitations which significantly handicapped the potential for this study to detect positive associations between CSA and "schizophrenic disorders." One important limitation is that much sexual abuse remains undisclosed or unrecognized and therefore the CSA cases in the general population-based control sample will have served to reduce any difference between the control group and the CSA group. Also, subjects were in their early 20s and therefore not yet beyond the peak years of incidence for developing "schizophrenic and related disorders." Of fundamental importance was the fact that those cases of abuse included in the study were verified by and subject to intervention by the state. The children concerned would most likely be at significantly reduced risk of ongoing abuse and some would have been removed from the home environment and offered professional support and/or therapy which would likely have had a protective effect. Indeed, it has been argued that far from demonstrating the absence of a relationship between childhood trauma and psychosis this important study actually demonstrated, albeit inadvertently, that early intervention for abused children can reduce the risk of subsequent psychosis.[39]

In the second of these studies, Bebbington and colleagues[19] utilized data obtained from interviews with 8580 adults from the British National Survey of Psychiatric Morbidity and found that the 60 participants who met the criteria for definite or probable psychosis were 15.5 times more likely to have been sexually abused than those who did not. When the interrelationship between other negative life events and level of depression were controlled, the relative odds were reduced (Adj. OR: 2.9) but still highly significant ($P = 0.008$), with sexual abuse the

most strongly associated of all the victimization experiences to psychosis. A limitation recognized by the authors was that participants were not required to provide information that would allow a determination to be made about the timing or severity of the adverse life events and consequently, while the authors suggest that sexual abuse might be expected to be a childhood phenomenon in those with psychiatric disorders, it is possible that some of the abusive experiences may have occurred in adult life. Nonetheless, the authors concluded that their findings were suggestive of a social contribution to etiology in psychosis.

In the same year an important prospective study of 4045 adults in the Netherlands was published.[20] It which assessed childhood abuse at baseline and then first episode psychotic symptoms at two-year follow-up. They found that reported childhood abuse (sexual, physical, emotional abuse, and neglect before age 16) predicted the development of positive psychotic symptoms during the period of the study on three separate measures of psychosis. The group with the most severe level of "Need-based psychosis" was 11.5 times more likely to experience psychosis during the study period than those participants who did not report abuse. This association was robust and remained statistically significant after controlling for a number of demographic variables, reported risk factors and the presence of any lifetime psychiatric diagnosis (Adj OR: 7.3). In addition, a dose-response association was reported. Those who had experienced the most severe abuse were 48.4 times more likely to develop "Pathology level" psychosis than those who had not been abused. Those reporting moderately severe abuse were 10.6 times more likely to develop psychosis than non-abused individuals, and those reporting the least severe abuse were only 2.0 times more likely. It is important to note the stringent definition for abuse exposure utilized in this study; only those who reported abuse experiences as "regular," "often" "or very often" were defined as exposed. Those reporting abuse experiences "once" or "sometimes" were not included in the abuse cohort.

The fourth study utilized the largest sample to date and analyzed survey data from 17,337 Californian adults to test the hypothesis that the relationship between the total numbers of ACEs to the risk of hallucinations would be cumulative and graded.[21] They found that all eight of the ACEs assessed (including CSA, CPA, and childhood emotional abuse) significantly increased the risk of hallucinations. A dose-response finding was again reported, and after controlling for age, gender, race, education and educational attainment and substance use/misuse, compared with those who reported no ACEs, those who had experienced seven or more different types of ACEs were 4.7 times more likely to report hallucinations. These results add weight to the findings of previous studies which have reported that childhood trauma predicts the experience of hallucinations in adults, adolescents, children and patients with bipolar affective disorder.[40-44]

A Paradigm Shift?

From their review of the evidence, Read and colleagues concluded that childhood abuse is a causal factor for psychosis and "schizophrenia." They went on to suggest that child abuse is a causal factor for hallucinations, in particular, command hallucinations and voices commenting. The review has proved a catalyst for debate and a growing body of interest in this area. Oliver James, a respected British clinical psychologist and writer suggested on the eve of the publication of this review that, "The psychiatric establishment is about to experience an earthquake that will shake its intellectual foundations." He went on in that article for the *Guardian* newspaper to describe the review as presenting "tectonic plate-shifting evidence."[45] Critics have, however, questioned the validity of these claims and have pointed to the modest number of large-scale studies and to methodological limitations which they suggest limit the conclusions that can be drawn from this data.[34]

The Balance of Evidence 2005-2008

In the brief period that has followed, five large-scale studies which add weight to the conclusions of the 2005 review, have been published. The first of these is a prospective study of 2524 adolescents and young adults.[22] Participants provided self-reports on psychological trauma (from a list of nine events including "sexual abuse, " "rape," "natural catastrophe" and "witnessing a terrible event to another") and psychosis-proneness at baseline and subsequently (on average 42 months later) and were interviewed to assess for presence of psychotic symptoms. Those who reported any lifetime trauma at baseline were 2.6 times more likely to experience three or more psychotic symptoms at follow-up. After controlling for gender, socioeconomic status, urbanicity, cannabis use, baseline DSM-IV mental disorders, and psychosis proneness, the adjusted odds ratio (OR) was 1.9 but still statistically significant (95% confidence intervals (CI): 1.16-3.08). Those who reported "sexual abuse" at baseline were significantly more likely to report three or more psychotic symptoms at follow-up compared with those who were not exposed to sexual abuse (Adj. OR: 1.6). The association between trauma and the presence of any psychotic symptoms at follow-up increased in a positively graded fashion with the number of traumatic events. The adjusted OR for one event was 1.78 (95% CI: 1.05-3.03, $P = 0.033$) and for two events it was 2.30 (95% CI: 1.02-5.18, $P = 0.045$). However, when trauma meeting DSM-IV criterion A2 (indicating the presence of intense fear, helplessness, and horror) were specified, the adjusted OR for one event was 1.76 (95% CI: 1.00-3.09, $P = 0.033$) and 3.12 (95% CI: 1.37-7.10, $P = 0.007$) for two events. The measure of trauma utilized in this study was basic and did not provide data on timing, severity, or duration of trauma. Once again this makes it likely that traumatized participants will have been included in the nontraumatized group, which means the potential of the study to assess the strength of the relationship between trauma and psychosis in this study will have been reduced. The authors concluded, "The dose-response relationship demonstrated in this paper suggests causality. Exposure to trauma in childhood and adolescence thus may modify the trajectory and outcome of psychosis proneness. As psychosis proneness has a continuous expression in the population, many of those exposed could have their risk of later psychosis altered" (p. 531).

In a similar line of enquiry, another general population study

of 1290 adolescents[24] found that even after controlling for age, gender, and socioeconomic status, nonclinical psychotic experiences were strongly and independently associated with both being bullied (OR = 2.9, 95% CI: 1.8-4.8) and sexual trauma (OR = 4.8, 95% CI: 2.3-10.1). Again, a strong dose-response association was evident between frequency of bullying experiences and nonclinical psychotic experiences. Furthermore, a dose-response relationship was present between nonclinical psychotic experiences and both being bullied and sexual trauma which the authors suggest is indicative of causality. The study could have benefited from a more detailed trauma measure assessing frequency. Unsurprisingly, the authors reach strikingly similar conclusions to those of Spauwen and colleagues in suggesting that the association between victimization in childhood and nonclinical psychotic experiences in early adolescence may, "shape risk for psychotic disorder later in life" (p. 426).

Shelvin and colleagues used data from the National Comorbidity Survey (NCS) and the British Psychiatric Morbidity Survey (BPMS) to estimate the effect of cumulative traumatic experiences on psychosis.[26] Full survey data from 5782 Americans between the ages of 15 and 54 years was available from the NCS sample, while the BPMS provided survey data on 8580 adults between the ages of 16 and 74 years. Data analysis was conducted by means of binary logistic regression with psychosis diagnosis as the dependent variable. Background demographics, as well as depression and alcohol/drug dependence were entered into one block of the equation and a single variable relating to the number of traumas experienced in the second. The results of this study indicate that the experience of two or more types of trauma significantly predicted psychosis in both samples and that yet again a dose-response relationship was in evidence. Odds ratios for two traumas were 3.4 (95% CI: 1.21-9.33; $P <$ 0.05) for NCS and 4.3 (95% CI: 2.10-8.87; $P < 0.01$) for BPMS. The ORs increased as the number of traumas increased for the NCS with the OR for those reporting five traumas being 30.2 (95% CI: 7.23-125.7; $P < 0.01$). For the BPMS, the ORs for three traumas was higher than that for four traumas but the OR for five traumas was the highest reported at 193.0 (95% CI: 50.58-736.18; $P < 0.01$).

For the NCS sample, sexual molestation and physical abuse were most significantly associated with psychosis, while for the BPMS sample, sexual abuse was most strongly associated with psychosis. This finding adds to the already considerable weight of evidence linking childhood sexual and physical abuse with psychosis in both clinical and nonclinical samples.[6] The findings of this study clearly illustrate that risk of developing psychosis increases with multiple trauma exposure. In terms of limitations, the measure of trauma was relatively basic and did not specify when a traumatic event occurred, or allow for the respondent to report multiple occurrences of the same trauma. The severity of each trauma type was not assessed and therefore the relative impact of various types of traumas on the risk of developing psychosis is assumed to be equal in the analysis.

In another publication by the same group, analyses were conducted using data from the NCS to estimate the relationship between childhood trauma and self-reports of hallucinations in 5877 Americans.[23] After controlling for sex, age, depression, family history of depression, urbanicity, income, drug, and alcohol dependence, they found that childhood rape (before age 16) was significantly associated with visual (Adj OR: 2.37), auditory (Adj OR: 1.75), and tactile hallucinations (Adj OR: 1.75). Childhood molestation was also significantly associated with visual (Adj OR: 1.62), auditory (Adj OR: 1.93), and tactile hallucinations (Adj OR: 1.85). Numerous studies have also shown a significant relationship between childhood abuse and hallucinations[6,41-44] and, consistent with previous research, this study reported a specific association between childhood sexual trauma and auditory hallucinations.[6,40,44,46] A dose-response relationship between experiencing multiple types of trauma and an increased likelihood of experiencing auditory and visual hallucinations was also evident. Adjusted ORs for visual hallucinations were 2.04 for one trauma, 2.66 for two, and 3.39 for three. For auditory hallucinations, they were 1.62 for one trauma, 2.36 for two, and 4.15 for three traumas.

Most recently, 10,641 adult respondents from the Australian National Survey of Mental Health and Wellbeing were assessed for delusional experiences in the previous 12 months, and exposure to a range of traumatic events and the presence of PTSD.[25] The study utilized a design which allowed for potential confounding variables, such as diagnosis of schizophrenia in the past, cannabis and alcohol dependence and demographic factors commonly associated with delusional experience to be controlled in the analyses. The results indicate that endorsement of any delusional experience was significantly more likely in those exposed to any of the listed traumatic events in the lifetime (relative risk 2.68, 95% CI: 2.18-3.30). The relative risk of endorsing delusional experiences increased significantly in those who met criteria for PTSD (relative risk 9.24, 95% CI: 6.95-12.27) and remained significant after adjusting for factors associated with psychotic symptoms.

Yet again a significant dose-response relationship was in evidence between numbers of different types of traumas experienced and increased endorsement of delusional experiences (χ^2 = 26.74, df = 2, $P < 0.001$). These findings remained significant after adjusting for potential confounding factors and the association was significant for each of the types of trauma examined. These included traumatic experiences usually associated with childhood, such as "Sexual molestation." The strongest association reported here was between "Rape" and the endorsement of delusional experience, which is consistent with the findings of other studies which have shown strong associations between sexual abuse and psychosis.[6,19,23,26] One weakness of the study is that no time-frame for the trauma was identified, so it is not possible to establish whether trauma preceded the development of delusional experiences.

The findings of these large general population studies are extended by research which indicates that psychosocial functioning is poorer *within* samples of people diagnosed psychotic or "schizophrenic." In one recent survey of 569 adults diagnosed with schizophrenia, increased exposure to childhood trauma was strongly associated with suicidal thinking, distress,

hospital admission, PTSD, substance misuse, physical health problems, utilization of medical services, homelessness, and involvement in the criminal justice system.[47]

Conclusions

Since the major review in 2005[6] five large-scale studies including one prospective study have been published. All of these controlled for potentially confounding factors and all found a significant dose effect was present between number of traumas experienced and increased risk of experiencing psychotic phenomena. This dose effect had already been repeatedly reported by earlier studies, most significantly by the Janssen and Whitfield studies.[20,21] Together they provide further support for the assertion that childhood trauma is a causal factor in positive psychotic phenomena and specifically hallucinations. Although the evidence for an association between childhood trauma and delusional experience may seem less conclusive, the findings of the Australian study[25] support those of the earlier prospective study by Janssen and colleagues, which found delusions to be as strongly related to childhood abuse as hallucinations.

Overall, the body of research reviewed indicates a convergence of evidence across multiple studies and, while not without limitations, suggests that childhood trauma is a causal factor in psychosis, and for specific experiences considered indicative of psychosis and schizophrenia. However, more research is clearly required which specifically addresses the methodological weaknesses of some of the studies highlighted in this review and others [6,34] before a more detailed understanding of the underlying mechanisms linking trauma and psychosis can be achieved. It would also be helpful for future research to focus on trauma and the individual symptoms in psychosis rather than broadly heterogeneous diagnostic groups.

Pathways from Childhood Trauma to Psychosis

Clearly trauma, particularly in childhood, exerts a powerful environmental influence on the expression of psychosis. However, until recently, theoretical models of psychosis which acknowledge the etiological significance of trauma have struggled to find credence. However, recent cognitive and biological theories have been proposed which provide plausible models of the relationship between trauma and psychotic phenomena.

Cognitive models have highlighted a number of cognitive and behavioral mechanisms which could account for the vulnerability to psychosis contributed by traumatic experience. One theory highlights the shared developmental and maintenance factors which operate in both PTSD and psychotic presentations.[33] This theory builds on the work of Morrison's integrative cognitive approach to hallucinations and delusions[48] and suggests that far from being distinct diagnostic entities, these two conditions may both represent different points on a spectrum of responses to trauma mediated by shared mechanisms such as dissociation, attributional style, or interpretations of intrusions. Central to this theory is the notion that the experience of trauma can lead to negative beliefs about the self, world, and others

such as "I am vulnerable," "Others can't be trusted," and "the world is dangerous." These kinds of beliefs make potentially distressing interpretations of ambiguous everyday events more likely and have been shown to be associated with psychosis.[48-50] A recent study has demonstrated that beliefs such as these, specifically formed as a consequence of trauma, are associated with psychotic experiences.[51] Furthermore, it is suggested that it may be the transparency of the link between the traumatic event and the content and form of psychotic experience that determines whether or not a person is regarded as psychotic or suffering from the effects of past trauma.[33,52]

The traumagenic neurodevelopmental model[53] incorporates biological, psychological, and social factors in an account that suggests that the neurodevelopmental abnormalities which underpin the heightened sensitivity to stressors widely accepted as a prominent feature of "schizophrenia"[54] are shaped by early traumatic experiences. This model proposes that traumatized children who later develop this heightened sensitivity have over-reactivity and dysregulation of the hypothalamic-pituitary-adrenal (HPA) axis, which may account for the dopaminergic abnormalities considered central to biological accounts of psychosis.[53] Other researchers are also examining the role of dissociative processes,[55] attachment styles,[56,57] and trauma-related cognitive biases[58] to try to better understand precisely how childhood trauma can lead to psychosis later in life.

Clinical Implications

As we have seen, childhood trauma and abuse have been linked to numerous negative mental health, physical health, and social outcomes in childhood and later life. It is imperative that we enquire routinely about trauma and abuse when we try to assist people experiencing psychotic or unusual and distressing experiences. The case for routine assessment of trauma is further strengthened by research that indicates that even within samples of people diagnosed psychotic or schizophrenic, child abuse has been shown to be related to a range of clinical and social deficits. These include higher levels of homelessness, lower ability to maintain intimacy, greater proneness to worry and emotional instability, greater service usage and cost of care, poorer attendance in rehabilitation, and impairment in flexibility of abstract thought.[59-61] Furthermore, psychiatric patients who have suffered childhood physical or sexual abuse are far more likely to try to kill themselves than psychiatric patients who have not experienced such abuse.[62,63] Little childhood abuse is identified by mental health workers in routine practice,[64,65] but when people are asked about these experiences, disclosure rates rise dramatically.[64] Training for staff is vital and sound guidelines for why, when, and how to ask, have been recently published.[37,66]

The evidence reviewed here may also have important implications for the early intervention for psychosis paradigm. The identification, monitoring, and intervention with those deemed to have "at risk mental states" with the aim of preventing transition to clinical manifestations of psychosis is a key component of this approach. It would be reasonable to suggest that assessments which determine who is "at risk" of psychosis might include a comprehensive assessment of trauma history.

Treatment

A range of evidence-based psychosocial treatments are available for psychosis and these should be offered to everyone experiencing psychotic phenomena.[67-69]

Some researchers and clinicians are beginning to develop and evaluate specific treatment approaches for those people who are experiencing psychosis and have suffered trauma.[52,70-73] While the overlap between the symptoms of PTSD, dissociative disorders, psychosis, and other psychiatric presentations can be potentially problematic for those seeking to diagnose and prescribe treatment, routine enquiry about trauma and abuse, done thoughtfully and systematically,[37,66] can reveal important links between psychotic symptoms and real traumatic events in a person's life. This can allow the clinician to properly conceptualize the presenting problems and offer the appropriate combination of psychosocial and biological interventions.

Whatever etiological model one adopts, there is clearly an excess of traumatic experience in people who experience psychosis, schizophrenia, and other psychiatric conditions. It is, therefore, fundamentally important to routinely assess for childhood and subsequent trauma when assisting people who report experiencing psychotic or psychotic-like phenomena. Our growing theoretical understanding of the biological and psychosocial pathways which may lead from trauma to psychosis can inform an integrative approach to assessment, conceptualization and treatment which appropriately values psychological, social, and biological interventions.

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