In Review

Psychosis and Violence: Stories, Fears, and Reality

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Individuals with psychosis are often feared. In fact, they are themselves likely to be victims of violence; however, the main aim of this review is to provide an overview of the evidence on relations between psychosis and violence to others. The terms psychosis and violence were used in a literature search limited to the Cochrane Library and PubMed, a manual search of 8 journals, and a follow-up of additional references in the articles found. The overview draws on new empirical data and major reviews. Almost all sound epidemiologic data on psychosis and violence dates from 1990. There is consistency on a small but significant relation between schizophrenia and violent acts. Since then there has also been movement toward understanding the nature of associations and progress on strategies for managing individuals who have psychosis and are violent. Public fears about individuals with psychotic illnesses are largely unfounded, although there would be benefit in greater attention to the safety of those in their close social circle. The task for the next 10 years must be the development and application of knowledge to improve specific treatments—that is, interventions that go beyond holding and caring to bring about substantial change.

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Highlights

- There is now enough evidence on the frequency of association between psychosis and violence for rational dialogue about the risks posed by psychosis. The risk of being violent is raised by psychosis, but 95% to 99% of society's violence must be explained otherwise.
- When violence is a problem, individuals in the immediate social circle of an individual suffering from psychosis are most at risk.
- There is evidence for at least 2 main routes by which psychosis is related to violence: in one, individuals have been unremarkable before the onset of illness and their violence is often driven by psychotic symptoms; in the other, conduct and emotional difficulties, and perhaps childhood abuse, preceded the psychosis, and lifestyle and substance misuse may be more prominent factors in the violence.

Key Words: *psychosis, schizophrenia, violence, homicide, epidemiology, clinical explanations, management and treatment*

Mark's gospel (5:3–17) describes a man with "an unclean spirit" who could not be held: "no, not with chains" and was "always . . . cutting himself." Christ sends the spirit into swine, which kills them. Onlookers see the man "clothed and in his right mind," but, afraid, they want rid of Jesus as well as the man.

In 1843, Daniel McNaughton's insanity was allowed as a legal excuse after he killed a public figure. He was safely confined in hospital, but "Justus" wrote furiously to the Times: "If the result of McNaughton's trial satisfies the end of justice … it undoubtedly leaves the security of Her Majesty's subjects from similar murderous attacks in a very unsatisfactory state." The writer continued: "Is there no responsibility on the part of the relatives in leaving such dangerous lunatics at large?"[1, p 7–8] Currently, blame would more likely be focused on clinicians.

Despite growing knowledge about the relation between psychosis and violence, a tendency persists, worldwide, for a single case to drive policy and practice. For example, in Japan, in 2001, a man with schizophrenia ran amok in a school, killing 7 children; by 2003, a new law was enacted, providing the first legal framework for detaining mentally disordered offenders in hospital and a government duty to provide specialist services.[2] In New York, a young man with

schizophrenia pushed a female stranger under a train. This led to Mental Hygiene Law 9.60 (also known as Kendra's Law) and the Assisted Outpatient Treatment Program in the United States.[3] In England, new health and penal services, and government justification for mental health law reform, followed convictions for 2 homicides and an attempted murder by a man with PD after his brief stay in a psychiatric hospital. Although, most landmark cases in the United Kingdom have also been of individuals with psychosis.

One UK case was more influential on knowledge. A man with schizophrenia killed a young male stranger without external provocation.[4] For England and Wales, the Department of Health[5] then stipulated that an independent inquiry into an individual's treatment must be held if they were in contact with health services at the time of the homicide; 97 such reports followed between 1994 and 2002, of varying length, quality, and style.[6] Many are posted on 2 websites.[7,8] Lessons can be learned from them; however, there are selection biases in their commissioning[6,9] as well as counterfactual biases—focusing on the momentary bad outcome rather than periods of satisfactory care and on obvious events detectable in hindsight rather than more subtle, contemporaneously observed issues.[10]

The second approach to studying such events emerged from a UK medical tradition of seeking accurate information on possible clinician contribution to deaths occurring during clinical care—through confidential inquiry. The National Confidential Inquiry into suicide and homicide by individuals with mental illness aims to include every homicide committed in the United Kingdom. The latest report for England and Wales[11] suggests that risk to the public from people with psychosis is small but no longer falling. Stabilization in proportion of individuals with mental disorder in national homicide figures, after a period of decline,[12] has also occurred in New Zealand.[13] Between 1999 and 2003, a constant 9% of English and Welsh homicides were by people in treatment for mental disorder (5% for schizophrenia). The National Confidential Inquiry's report suggested that perhaps 7 of the 52 homicides a year in this group were preventable. Better patient compliance (28%) covered the largest group of factors rated likely to have reduced the risk of homicide; however, 5 service-related factors were cited in 20% or more of cases: closer contact with the patient's family, closer supervision of the patient, improved staff communication, better staff training, and better liaison between different services. More secure services or changes in mental health legislation were seen as least important.

Abbreviations used in this article

CBT	cognitive-behavioural therapy
COVR	Classification of Violence Risk
ECA	epidemiologic catchment area
HCR-20	Historical, Clinical and Risk Management 20-item scale
MADS	Maudsley Assessment of Delusions Schedule
PD	personality disorder
PCL-R	Psychopathy Checklist—Revised
RCT	randomized controlled trial
TCO	threat, control-override (symptoms)

It is important to acknowledge that among individuals with psychosis many have suffered childhood abuse relevant to development of their illness and (or) violence (see Bebbington et al[14] and Spauwen et al[15]). As adults with established illness, they are more likely than their peers without schizophrenia to become victims of violence,[16–18] but my article focuses on their propensity for acting violently. The aim is to provide an overview of the field, having conducted a limited literature search with the terms psychosis and violence using the Cochrane Library and PubMed. In addition, I hand-searched *The British Journal of Psychiatry, The American Journal of Psychiatry, Psychological Medicine, Archives of General Psychiatry, Behavioral Sciences and the Law, The International Journal of Forensic Mental Health, The Journal of Forensic Psychiatry and Psychology,* and *Criminal Behaviour and Mental Health* from 2000 to 2007, and followed up any new articles identified in reference lists.

The Frequency of the Relation Between Psychosis and Violence: Reality

As recently as the 1980s, the epidemiology of cooccurring violence and psychosis was unclear.[19] Studies fell into 2 main groups: estimates of the true frequency of violence among individuals defined by treatment of their psychosis, or of true rates of psychosis among individuals defined by treatment of their violence.[20] Specifically, studies of homicide were often general and population-based and had other limitations. For example, all Icelandic homicides were studied; however, in that small country, there were only 52 in the whole period from 1900 to 1979.[21] Häfner and Böker[22] studied all homicides from 1955 to 1964 in West Germany; however, noting an element of chance in whether an attack proves fatal, they included near homicides in the cohort. Was the new dividing line drawn in the right place? Research in this area is challenging.

The 1990s brought good epidemiologic studies, although each has some limitations. Swanson et al[23] used US ECA Survey data on over 10 000 individuals. This is a cross-sectional household survey, not a true community sample, thus excluding some groups of potential interest, such as the homeless or the institutionalized. Longitudinal Scandinavian birth cohort studies[24–27] rely on linking criminal and hospital records.

Tiihonen et al[27] dismissed significant bias, asserting that almost everyone with psychosis in Finland is hospitalized at some stage. A New Zealand birth cohort of more than 1000 individuals is the most complete population survey, continuing to follow people wherever they are; however, findings are limited by the target group's size.[28] At the age of 21 years, the concept of schizophrenia had to be extended to schizophrenia spectrum disorder to find as many as 6 people with a violent criminal conviction, 13 with self-reported violence.

Given differences in methodology and place of study, the consistency of the finding of a greater than chance association between schizophrenia and violence is impressive; there is less consistency for the affective psychoses. For individuals with schizophrenia, there is a 4- to 7-fold elevation in rates of violence, perhaps even higher in developing countries than in North America, Europe, or Australasia.[29] The relation may also be expressed in terms of the amount of violence in any population attributable to people with psychosis. In Sweden, the population-attributable risk between 1988 and 2000 was estimated as 5%; however, in a UK household survey in 2000, it was 1%.[31]

Over time, criminal and mental health laws and policies change; however, the general social climate also changes. During 1975 and 2000, in the state of Victoria, Australia, psychiatric services shifted from mainly institutional- to mainly community-based—later than in some countries but earlier than in others. Wallace et al[32] compared the crime records there of 1689 men and 1172 women with a first psychiatric admission variously in 1975, 1980, 1985, 1990, or 1995, with a same size sample of individuals without any such contact, matched for age, sex, neighbourhood, and year. Overall, individuals with schizophrenia were 4 times more likely to have sustained a violent offence conviction than their peers without schizophrenia. Individuals were more likely to have done so in the later than the earlier cohorts; however, the proportionate increase in offending over time was similar for the groups with and without schizophrenia. Therefore, deinstitutionalization, per se, could not explain the increase in offending rates. An alternative explanation, regardless of health status, was rate of exposure to substances. This had trebled for individuals with schizophrenia, and was associated with a higher rate of criminal convictions (68%:12%), although not the most serious ones.

There is no strictly comparable UK study. However, among all first admissions to English high-security hospitals during a similar 25-year period (from 1975 to 1999), we found increasing rates of alcohol and other substance misuse in the 12 months before admission.[33] The relation with psychosis is interesting. Individuals with so-called pure psychosis—who were unremarkable before onset of their illness—did not show these increases. Those with psychosis as well as comorbid PD were more likely to show increases, even more than those with pure PD.

Pathways to Offending Among Individuals With Psychosis and Comorbidities

Studies of individuals in a first episode of schizophrenia reveal that about 20% were already violent at presentation.[34–36] Longitudinal studies have brought knowledge about routes into crime generally (see Farrington[37] and Loeber et al[38]). The Dunedin birth cohort suggested 2 main pathways for men: early-onset-life-course-persistent offending and late-onset-adolescent-limited offending.[39,40] Could similar patterns apply to individuals with psychosis? No one in the Farrington cohort developed schizophrenia. In the Dunedin cohort, there were too few in the schizophrenia-spectrum-disorder-with-violence group to be confident about pathways; however, only a third of the violence was associated with childhood paranoia; childhood conduct difficulties accounted for an additional effect.[28]

Some Scandinavian[25,41] and some English work[42] has suggested 2 peaks in age at first offending among men with psychosis, but not women. In an English national high-security hospital resident cohort, 2 groups of people with psychosis were apparent: individuals unremarkable until the onset of their illness and individuals with conduct and (or) emotional disorders in childhood, continuous with adult PDs, before developing psychosis.[43] A detailed records study at one such hospital found that the childhood-conduct-disorder group was further subdivided by presence or absence of childhood abuse.[44] This may have therapeutic implications; some individuals need trauma-centred work as well as medications.

Subsequent studies identifying a subgroup of individuals with schizophrenia who apparently start offending before the onset of their psychosis have confirmed their likelihood of childhood behavioural problems (see Laajasalo and Häkkänen[45] and Fresán et al[46]). However, onset of illness is difficult to determine. Most studies equate it with first presentation to psychiatric services; however, some studies show that psychotic symptoms are widespread among the wider public (see Mojtabai[47]).

In Denmark, psychiatric and crime registers were linked to study 4691 individuals with schizophrenia born on or after January 11, 1963; 17% had at least one violent conviction.[48,49] Most of the men (58%) and some of the women (20%) sustained their first such conviction before any psychiatric contact; however, those with criminal convictions were older at such contact than their nonoffending peers. Perhaps antisocial behaviour had distanced them from services? Another records-linking prospective study of all individuals aged 15 to 19 years in contact with the Danish Probation and Prisons service in 1992 (732 men; 48 women)

found that 3% had schizophrenia (4.5% any psychosis); 394 men and 15 women had sustained a violence conviction.[50] Previous hospitalization and previous violence were independently related to a diagnosis of schizophrenia and (or) psychosis, suggesting that many individuals with dual problems may present and be treated differently from an early stage.

Childhood behavioural disorder commonly, but not invariably, leads to adult PD.[51,52] There is no reason to presume that individuals with schizophrenia would be exempt from this; however, it used to be anathema to diagnose psychosis and PD in the same individual.[53] Further, diagnostic manuals consistently suggest that schizophrenia is a PD. For example: "The disturbance involves the more basic functions that give the normal person a feeling of individuality, uniqueness and self-direction."[54, p 86] As schizotypal PD commonly progresses to schizophrenia, but not to other illnesses, it has been suggested that the 2 may just be variants of the same condition.[55]

Notwithstanding diagnostic difficulties, several studies have reported cooccurrence of psychosis and PD. People with psychosis attending psychiatric services in 4 cities in the UK700 cohort were assessed using the Personality Assessment Schedule[56]; 28% had a comorbid PD, which was associated with a nearly doubled likelihood of violence and independently associated with substance misuse.[57] This PD estimate is higher than in some offender patient samples, and it is likely that such findings depend in part not only on the measures adopted but also on the type of psychosis. Among English high-security hospital patients, a study placing strict emphasis on childhood history as well as on fit with the categorical criteria of International Classification of Diseases, 10th Revision for PD identified it in 20% of the residents, more with schizoaffective illness than schizophrenia.[43] In a smaller sample from Scotland and England using dimensional personality measures, psychosis–PD comorbidity was almost invariable.[58] In the United States, Nestor[59] suggested 4 personality dimensions as principally relevant to violence among men with psychosis: impulse control, affect regulation, narcissism, and paranoid cognitive personality. Tengström et al[60] used a modified PCL-R[61] with a group of psychotic male offenders, with and without substance misuse, and men with PD alone. Between these studies, there are pointers for future research. The Tengström group found that high PCL-R scores were independent of substance misuse, with the former better accounting for quantity of violence among schizophrenic men. Nestor's group, working with homicidal men, focused on the relative independence of psychotic symptom scores from PCL-R scores.[62] However, neither asked about possible similarities between schizophrenic incongruity of affect and the PCL-R's affective dimension.

The language of so-called dual diagnosis became popular in the 1990s, typically referring to the cooccurrence of psychosis and substance misuse diagnoses. This became especially important after Swanson et al,[23] using the US ECA data, demonstrated a very significantly increased risk of violence among individuals with psychosis who also abused substances, compared with those who did not, a frequently replicated finding. There is little contrary evidence (see Vevera et al,[63] Modestin et al,[64] and Erkiran et al[65]). Tiihonen and Swartz[66] developed a list of possible explanations, among them the possibility that substance misuse is, here, just a proxy measure for PD. Although Tengström et al[60] found that substance abuse and PD were independent factors in the context of psychosis, a Finnish study of people who had killed,[67] showed that all those individuals with major mental illness and PD also had a substance misuse disorder. However, substance misuse disorders have generally been treated in these studies as if they are one disorder, when different substances have different effects on disease development, on acute mental state change, and on propensity for violence. There is much more to be learned in this area.

Symptoms, Other Illness Factors, and Violence

Most studies of the relation between psychotic symptoms and violence focus on delusions or on auditory command hallucinations. There is otherwise only a little literature on gustatory and (or) olfactory hallucinations in the context of delusions of being poisoned.[68,69]

Hallucinations

There have been 2 substantial reviews of the literature on command hallucinations.[70,71] The latter considered studies during 1971 to 2006 in 3 groups: those testing for an association between command content and compliance in general psychiatric samples; the same in offender-patient samples; and those seeking to understand the relation between command and compliance. Three of 17 studies of command hallucinations referred to harm to others.[72–74] Factors associated with greater likelihood of harmful action on hallucinations included beliefs about the hallucinations (such as the likely consequences of not complying), knowing the identity of the voice, attitude to the voice(s), or seriousness of the command, concurrent mood, and more social factors such as placement (in the community rather than in hospital) or self-perceived social rank. However, in treated populations, the role of command hallucinations in violence might have been underestimated. If anyone reports hallucinations commanding harm to self or others, a management strategy is usually implemented to contain the risk.[74] During a 1-year follow-up of a mixed diagnosis sample of more than 1000 individuals discharged after a brief general psychiatric hospital admission in the

United States, the MacArthur risk study, a weak relation was found between hallucinations and violence.[75]

Delusions and TCO Symptoms

By definition, beliefs require acceptance that a proposition is true in the absence of evidence for it. Most people have beliefs, so this alone is not pathological. Kräupl Taylor's[76] definition of a pathological belief, or psychotic delusion, has stood the test of time: a belief based on an absolute conviction of the truth of a proposition that is idiosyncratic, incorrigible, ego-involved, and often preoccupying. This element of incorrigibility is consistent throughout the literature,[77,78] and reiterated in the DSM-IV.[79] There is a growing number of schedules to facilitate reliable determination of a delusion.[80] A closely related, but possibly not fully coterminous concept is that of TCO symptoms. Link and Stueve[81] first highlighted this cluster as strongly correlated with violence. TCO symptoms are 3-fold as rated on the Psychiatric Epidemiologic Research Interview[82]:

- feeling that one's mind is dominated by forces beyond one's control;
- feeling that thoughts are being put into one's mind that are not one's own;
- feeling that there are people who wish to do one harm.

Use of the word feeling has raised doubts about whether these symptoms are truly the respective equivalents of passivity delusions, thought insertion, and persecutory delusions; however, researchers generally treat them as if they are. The most commonly researched question about delusions and violence has been about overall frequency of association. Attention to more complex questions about proximity in time, attribution, and pathways in the relation is unusual.

In a study of pretrial male prisoners in England, most interviewed within a month of the index offence, I found that almost all of those with psychosis had been symptomatic at the time of the offence, regardless of offence type.[83] In the US MacArthur risk sample, a significant relation was found between delusions and violence over the follow-up year.[75] A reanalysis of these data confirmed the association for the men but not the women, specifically in relation to threat delusions.[84] In a different, nationwide US study of over 1400 patients,[85] it was found, as among English prisoners,[83] that delusions were associated with serious violence rather than lesser assaults.

A comparison of patients and never-treated community control subjects in New York showed that TCO symptoms best differentiated individuals who had been violent from those who had not, regardless of demographic characteristics or patient status[81]; however, symptoms and violence were measured at different times. The relation was further tested using the US ECA data, for the year prior to interview and for whole lifetime, confirming a relation at both periods.[86] There have been further confirmations in Israel,[87] Norway,[88] and Austria.[89] In a prospective study of men from 3 European countries and Canada, after controlling for PD, it was shown that severe positive symptoms were associated with violence in the community.[90]

Rare, apparently dissenting studies may not be measuring true delusions and (or) are not primarily testing associations between delusions and violence but rather the role of delusions as a risk factor. For example, no evidence was found of an association between TCO symptoms and violence in an American emergency department cohort (n = 132) followed for 6 months; however, selection was based on a criterion of high risk and the cohort was diagnostically heterogeneous.[91] Psychosis emerged as a protective factor against violence; therefore, the case mix probably prevented adequate assessment of the question association between TCO symptoms and violence. A Finnish study[92] found no association between psychotic symptoms and excessive violence.

Link and Stueve's[81] finding with TCO symptoms raises a question about the extent to which delusions, per se, are endemic in the general population and individuals are predisposed to violence, regardless of clinical diagnosis. In a national household survey on drug abuse with 38 132 Americans, 5% reported psychotic experiences that included hearing voices; ideas of reference, passivity, and persecution; and having thoughts stolen or inserted.[47] Individuals reporting any such experience were more than 5 times more likely to also report having attacked someone and (or) to have been arrested for an aggravated assault.

Therefore, there is consistent evidence of a general association between delusions and violence, but what about attribution? From well-documented individual cases, such as Daniel McNaughton,[1] through historical samples unselected for violence,[93] to more recent criminal[22] or clinical samples,[94] there have been explicit reports of violence following from delusions. Among pretrial prisoners,[83] most men who had psychotic symptoms at the time of their index offence reported acting on rational motives—such as material gain; however, 40% attributed their actions to delusions, without necessarily recognizing them as such; being symptomatic did not necessarily directly trigger offending. However, there was a significant relation between delusional drive and seriousness of violence. Accordingly, in samples selected for serious violence, a much higher proportion attribute their violence to delusions (75% in our high-security hospital cohort[43]).

There is growing evidence that the course of delusions has some bearing on their association with violent actions. In the US MacArthur risk study,[75] delusions were relieved for at

least part of the 1-year follow-up for about a third of the psychotic patients.[95] Persistence of delusions was associated with increased likelihood of acting violently in that time. Junginger[96] was interested not only in consistency of presence or absence of delusions but also in consistency of their characteristics. In his small series ($n = 54$) of delusional patients, 40 reported at least one violent act coinciding with a delusion, 16 of them motivated by it. Eight had committed at least 2 delusionally motivated acts, separated in time. On each of these occasions, the delusion had the same characteristics. Junginger proposed a simple method for characterizing such delusions, based on gaining a detailed narrative of the experience and then questioning each element: Who? What? Where? When? Why? How? This is how it might work if applied to Daniel McNaughton's case[1, p 66–77]:

- He said he was persecuted by a system [who? or what?] at Glasgow, Edinburgh, Liverpool, London, Boulogne [where?] … destroying his health [why?]
- It was grinding his mind [how?]
- He observed people [who?] … pointing at him [what?] … perpetually [when?]
- He stopped going out after dark [response] and applied to an English Member of Parliament and the Scottish court for protection [response].
- The person he shot [response] was part of the system.

Such rating of narrative can provide a more objective measure of the degree to which delusions are similar at each presentation, and of their escalation and deescalation.

Fundamental to Junginger's characterization is a concept of delusion development. What factors contribute to this? What factors may increase the likelihood of violent action on them? The MADS[97] evaluates delusions along 9 dimensions, including belief maintenance and development factors. Among 83 general psychiatric patients, 60% acted on their belief in some way; violent acts had occurred in about 25% of cases in just one 28-day period.[98] Qualities associated with such violent action included: first, having already acted on it in a specific, nonthreatening way—by seeking evidence for it—and, often, then holding the belief of having found the evidence; second, being distressed, especially frightened by the belief; and, third, the nature of response to hypothetical challenge to the belief.[99] No one abandoned their belief when offered contrary hypothetical evidence; some ignored it, but others became more convinced of its validity, or developed it further; they were more likely to have acted violently.

The MADS findings hinted at 3 possible pathways to violence in the context of delusions: a primary delusional effect; a reaction to resultant affective distress, whether directly from a delusion or possibly through difficult social interactions about the delusion; and, a pathway of modification of the belief through social interaction to a form that makes action imperative. A primary delusional effect here would imply that the entire pathway to action is internally driven. Some quality of the delusion, perhaps its content, the mechanism of delusion formation, or its duration, is the key to action. Concerning content, in the pretrial prisoner study, the significant associations were with passivity delusions or religious delusions.[100,101] Paranoid delusions were more common but occurred at a similar rate in violent and nonviolent groups. It may be that in the TCO cluster, it is the passivity element that endorses violent actions on a belief in being threatened.

Three hypotheses of delusion formation have been proposed.[102] There is evidence for each, although it is not fully consistent. Delusions may: be secondary to primary perceptual anomalies; follow from abnormalities in cognitive processes; be due to motivational processes. In the first case, the delusion may follow from impaired perception, for example, hearing loss,[103] or, conversely, hyperacuity and (or) excessive attention to negative or threatening information.[104] Concerning abnormal cognition, experiments have shown that individuals with delusions tend to have a jumping-to-conclusions bias, compared with individuals without.[105] The motivational route to delusion formation refers to a mechanism for restoring or maintaining self-esteem.[106] It may be that future research on understanding pathways between delusions and violence should select individuals by likely mechanism of delusion formation. Two of these mechanisms were taken into account in a study of hypothetical challenge to delusions.[107] Individuals who rejected it regarded their delusions as more truthful, and appeared to base them mainly on perceptual experiences; individuals who accepted it were more likely to report that their delusion had interfered with their lives and affected their behaviour. Need for social compliance is another possible factor in acting on delusions.[108] In younger individuals, impaired insight, as measured on the Positive and Negative Syndrome Scale,[109] was found to distinguish assaultive men ($n = 94$) and women ($n = 21$) from a similar-sized nonviolent group with psychosis.[110]

The MADS incorporates the gentlest of challenges to the responder's self-designated, most important belief; however, how, and under what circumstances do people routinely talk about their delusions? What responses do they get? To what extent is the affective response to the belief influenced by this? Almost nothing is known about the nature and quality of social interactions about delusions, whether in a chosen social circle or in a clinical encounter. However, according to patient reports, most discuss their beliefs with someone.[97] Unfortunately, this may not be with clinicians, who tend to be avoidant in talking about such symptoms, even when patients appear to want to do so.[111]

Such difficulties in communication may contribute to violence. A comparison of staff and patient observations of the same incidents in a Swedish hospital found that staff identified less than one-half of the factors that patients reported as provocative.[112] In a qualitative English hospital study, lack of staff engagement with patients was a striking theme, with staff unable to see the world through patients' eyes.[113] In another English study, 96 of 100 patients with persecutory delusions had adopted at least one safety behaviour in the month before assessment, in effect acting on their delusions.[114] The commonest was avoidance of threatening situations, but safety behaviours were associated with distress, and suicidal and violent acts.

Given that so much of the violence perpetrated by individuals with psychosis is within the family, it is surprising that so little is known about social interactions about symptoms. In Sweden, among all 48 homicide offenders with schizophrenia from 1992 to 2000, those killing family members were more likely to have been delusional than intoxicated or established criminals.[115] In an earlier, more heterogeneous group, family members were at greatest risk for serious or fatal injuries.[116] This was also true in our English high-security hospital study.[117] Earlier studies are consistent on the vulnerability of relatives and household members, especially mothers.[118–123] The sequencing of symptomatology and conflict is unclear; however, 2 aspects of relationships seem important: individuals who are closely related and physically proximate to the psychosis sufferer over longer periods are more likely to become victims than the more socially distant; and emotional climate. Proximity creates opportunities for dialogue about delusions; however, this has not been systematically studied. The mood of the individual with psychosis had a more powerful effect on relatives' well-being than either positive psychotic symptoms or any threatening behaviours[124]; however, Estroff and colleagues[119,120,125] also found cycles of hostility. These can also be seen among clinical staff. Development of a tense, critical management style can arise with chronically symptomatic and (or) irritable patients.[126,127] Critical style was not typical of the staff concerned but rather specifically responsive. This may also be what happens among relatives. Family burden from psychotic illness receives little attention, although potentially useful ways of assessing this are available.[128]

Risk Assessment for Individuals With a Psychotic Illness

An essential introduction to risk assessment emphasizes that the future, by definition, is uncertain and that any prediction about human behaviour must take account of other human behaviour.[129] However, for many clinicians the central debate is about the relative merits of clinical and actuarial judgments. The first focuses on the individual, while the latter predicts group membership; loss of precision when actuarial measures are applied to the individual were demonstrated statistically[130]; however, in clinical practice, neither clinical nor actuarial methodology is very satisfactory, even in groups. A systematic review of 21 prospective studies of risk assessment among adults with mental disorder, published from 1970 to 2000, showed a significant advantage for actuarial assessment, but overall sensitivity was hardly better than chance (0.52; 95%CI, 0.43 to 0.62), with overall specificity only slightly more (0.68; 95%CI, 0.59 to 0.76).[131] The positive predictive value was 0.17 (95%CI, 0.14 to 0.19), founded on a generous base rate of 9.5% of violence; for low base rate crimes like homicide it would be much lower. Szmukler[132] discussed concerns about the implications of such assessments, with response biases toward detention after finding risk. Reliance on scores can be disastrous in the other direction, too.[133]

Although risk assessment literature is prolific, research has almost invariably been with diagnostically heterogeneous samples, and suggestions from North American studies that schizophrenia and (or) psychosis is protective. Given the established association between psychosis and violence, such studies, and perhaps the tools they promote, must be treated cautiously for the specific task of risk assessment among individuals with psychosis. A survey of randomly selected Mental Health Trusts in England confirmed uncertainty in practice about how to proceed.[134]

The Violence Risk Appraisal Guide[135] is one tool used in specialist clinical practice, founded in data analysis from a Canadian cohort of high-security hospital patients. The HCR-20[136] is based on statistical analysis of the risk literature. There are prospective trials of the former confirming that it can adequately predict violence group membership in mixed clinical samples in North America[137] and Europe[138,139]; however, clinicians have concerns about its completion time, and its reliance on fixed, historical factors. The HCR-20 is also time-consuming; however, it has greater clinical face validity, having clinical and dynamic domains that add to its predictive value[140] and are susceptible to change over time.[141] Time for the HCR-20 can be reduced by omitting the short version of the PCL (PCL-SV), which does not add to the predictive value.[142] Stephen Hart maintains an HCR-20 research website that is regularly updated.[143]

Briefer structured assessments are being developed.[144,145] One—the COVR[146]—was derived from iterative analysis of data from the US multicentre prospective MacArthur study,[75] and to some extent mimics clinical decision making. Decisions about which factors are essential to assessment in a case are contingent on answers to earlier, broader questions. COVR software has been developed to support clinicians

with such assessments within 10 minutes and with little training. In prospective evaluation of its performance only at extremes of risk prediction, after 20 weeks, it was found that in the group predicted to contain 1% of violent people, 9% were violent, and in the 64% group, 35% to 49% were violent.[147] Again, however, the tool was neither developed specifically for people with psychosis nor validated specifically among them.

Risk assessment is, of course, not sufficient in itself. That assessment must be communicated adequately and appropriately, and lead to effective preventive action. Monahan et al[148] studied qualities in risk language with 324 forensic and 466 general psychologists. A frequency format (for example, "of every 100 patients similar to Mr. Jones, 20 will…") rather than a probability format (for example, "patients similar to Mr. Jones have a 20% probability of…") drew forensic but not general clinical psychologists towards more conservative management (for example, "do not discharge now"). Heilbrun et al[149] asked randomly selected clinical (n = 500) and forensic (n = 500) psychologists to rate 6 approaches to communicating risk on a Likert scale. The preferred style involved identifying individual risk factors and specifying interventions to reduce risk. It is important to know how data from the risk assessment laboratory translates into real clinical practice. A study of application of predictive scales to head injury cases suggested that they did bring about management changes, increasing use of intensive care for patients with a predicted good outcome and decreasing its use for those with a predicted poor outcome.[150] In psychiatry, does evidence of a brief change in diagnosis from psychosis to PD imply prediction of poor outcome, justifying withdrawal of treatment? Data from UK independent homicide inquiry cases indicate that systematic research into this possibility would be worthwhile.[4,151]

Organic Brain Studies of Individuals With Psychosis Who Are Violent

Progress in identifying structural and functional brain abnormalities among men with psychosis or violence has been considerable, but little of the research is about individuals with schizophrenia as well as violent propensities. Work focusing on organic brain correlates of psychotic symptoms which have been implicated in violence may be indirectly relevant, for example the demonstration of differences in brain activation during particular tasks between individuals with and without delusions (see Blackwood et al[152]) or evidence of white matter changes in patients with auditory hallucinations (see Hubl et al[153]). In the tiny group of directly relevant studies, performance on emotional recognition tasks was compared between 35 individuals with schizophrenia who had been violent, 35 who had not, and 46 control participants.[154] The violent individuals with schizophrenia performed less well than the controls, and differently from their nonviolent peers on recognizing intensity of emotions. Distinctive neuropsychological profiles according to high psychosis–low psychopathy, compared with low psychosis–high psychopathy classifications, were shown among 26 homicide cases.[62] However, high PCL-R scores may reflect interpersonal affective difficulties similar to those with the incongruous or flattened affect of schizophrenia.

Our group has studied neuropsychological,[155] brain volume,[156] and brain functional distinctions[157,158] among men with schizophrenia with (n = 13) and without a violence history (n = 15), violent men with PD (n = 13), and healthy nonviolent men (n = 15). On structural and functional measures, the schizophrenia groups showed more deficits than the others, with a tendency, regardless of measure, for the violent men with schizophrenia to show most dysfunction or damage.

Treatment Models

Despite progress in understanding relations between violence and psychosis, and in development of special services and new treatments, outcome for individuals with both problems seems to have changed little over time—at least in terms of reoffending.[11,159] Although this is low, the goal for researchers and clinicians alike is to reduce it.

One difficulty is that individuals with psychosis who become violent tend to have multiple diagnoses and complex problems. Do models of treatment delivery make a difference? Literature on inpatient violence considers environmental and staff factors as well as more specifically patient-centred strategies (see Taylor and Schanda[160]). A systematic literature review of outpatient treatment for individuals with psychosis and PD identified only 2 satisfactory UK trials—early community intervention, compared with hospitalization, and community-focused care, compared with standard care.[161] Comorbid groups fared worse in the community. In the United States, using the MacArthur study[75] multisite risk study cohort, patient perceptions of their treatment need, treatment adherence, and treatment effectiveness were each associated with reduced odds of violence during 6 months as outpatients.[162] Individuals with psychosis had an advantage over other diagnostic groups on these measures. Similar findings emerged in a smaller (n = 228) UK sample in which individuals with poor insight, a poor relationship with the prescribing psychiatrist, and experiencing any coercion in their treatment were more likely to have a negative attitude to that treatment.[163] A systematic review of the literature on strategies to improve treatment adherence found psychoeducation popular but ineffective; problem solving or motivational techniques directed at treatment adherence were more effective.[164]

An optimal treatment model, fully meeting all identified needs and reducing violent and sexually inappropriate behaviour over 4 years among violence-prone individuals with schizophrenia, was described.[165] However, managed care was shown to have no advantage over more ad hoc arrangements.[166] In the United States, where Mental Health Courts have been established,[167,168] evidence increasingly favours coerced treatment. A review of US-based civil outpatient commitments (similar to UK community treatment orders)[169] found that, in naturalistic studies, outpatient commitment performed as well as involuntary hospitalization, while the one RCT, [170] comparing enforced outpatient commitment with voluntary treatment, found outpatient commitment had advantages for patients and participants and safety of the general public. In addition to such basic coercion in the United States, benefits, including disability income or housing, may be made dependent on treatment adherence. Such approaches require ethical debate as well as evidence of effectiveness[171]; however, among 200 US outpatients, those for whom housing was used as leverage were more likely than others to believe this effective in helping individuals to stay well.[172]

Community reentry models have been considered for individuals leaving jail[173] or secure hospitals.[174] The latter study, after interviews with a range of clinicians and nonclinicians involved in discharge decisions, led to a substantive theory of a continuum between pathological dependence and healthy independence, with professional roles facilitated along it towards healthy independence. Reoffending entered the model as a factor terminating independence. Our theory could offer a way of improving treatment outcome measures in complex cases.

Specific Treatments

In part, treatment models provide a framework in which specific treatments can be delivered. Evidence about treatments for people with psychosis who have been violent is limited. The gold standard for treatment trials is the RCT, but such trials are so focused on average compliant cases that their findings may be irrelevant to offender patients. About 409 RCTs "relevant to the management of violent and aggressive people"[175, p 185] were identified from 1953 to 2000, most referring to people with psychosis (at least 59%), and most currently available within the Cochrane Controlled Trials Register, but rated of modest quality.[175]

Drug Treatments

Up to 1998, when the Research Unit at the Royal College of Psychiatrists conducted a systematic review of the acute management of violence, there was only one double-blinded RCT of medication with over 20 participants in each group, adequate outcome measures, and an 80% completion rate.[176] There have been 2 since, on rapid tranquilization,[177,178] cautiously favouring a parenteral neuroleptic (haloperidol) benzodiazepine (lorazepam) mix.

A metaanalysis of RCTs of antipsychotic medication, from 1953 to 2002, not confined to the acute situation and without specific reference to violence, included 124 participants comparing efficacy of conventional and atypical antipsychotics, and 18 comparisons of atypicals.[179] Clozapine, amisulpiride, risperidone, and olanzapine had significantly greater ESs than conventional antipsychotics, but the other 6 atypicals investigated no advantage. In a similar study over a shorter period (from 1996 to 2002), the question was varied to cover relapse prevention.[180] Eleven studies were found (of more than 2000 patients) that compared atypicals with placebo or conventional antipsychotics, favouring atypicals, but ESs were small.

In Finland, 2230 consecutive hospital discharges were followed for an average of 3.6 years in a national, naturalistic outcome study of 10 antipsychotic medications, from conventional and atypical groups.[181] Any medication reduced mortality. Depot perphenazine, olanzapine, and clozapine were the 3 associated with lowest rehospitalization rates. By contrast, findings from a UK study of 227 individuals with schizophreniform psychoses already medicated, but needing a change because of response failure or side effects, did not favour atypicals.[182] The new prescription was randomized between conventional or atypical antipsychotic groups, although the treating clinician could choose within group and regular blind assessments were made for a year. In 2001 and 2002, a group of us tried to extend this trial into one of the English high-security hospitals, but treating clinicians were avoidant in the face of risk of serious violence. Ethical approval was obtained, extensive liaison work was done, but not one patient was referred.

Studies with individuals with psychosis as well as violence tend to follow a naturalistic design,[183] and they continue to emerge (see Kraus and Sheitman[184]) and tend to favour clozapine specifically. One double-blind RCT compared 2 atypical antipsychotics (clozapine and olanzapine) with a conventional one (haloperidol) among 110 patients (80% men) with schizophreniform psychosis.[185] The drugs had equivalent effect on psychotic symptoms, but the atypicals had an advantage in reducing assaultive behaviour, with clozapine performing best.

Cognitive-Behavioural Therapy

Even after varying drug type and dosages, and ensuring compliance, in some individuals psychosis and (or) violence remain refractory. Since the 1990s, especially in the United Kingdom, optimism has grown about psychological treatments, mainly CBT. Among 62 patients, 42 completed an

RCT of CBT for refactory psychotic symptoms.[186] Initial advantage for CBT in relieving hallucinations and improving insight was not sustained. Scrupulously designed in most respects, the study includes no measure of violence or aggression—even as an exclusion criterion. This is typical of the body of work on CBT for schizophrenia. Jones et al[187] identified 19 RCTs (2154 participants) of CBT for "correction of misperceptions, irrational beliefs and reasoning biases."[187, p 6] The collective evidence was of medium term, modest improvement in global mental state, and possible reduction in length of inpatient stay, but there was no reference to any violence. Some studies explicitly excluded individuals with perceived violence risk; however, at a conservative estimate that 10% of individuals with psychosis are violent during a 12-month period, complete absence of violence among more than 2000 individuals in 2 years seems unlikely. There is reason to believe that attempts to modify some kinds of delusions through CBT may be risky[188]; however, there are anecdotal reports of success among people with psychosis who have been violent.[189]

Broadly related work, but directed at offending behaviour, has been proposed for persistent offenders with psychosis.[190,191] There is evidence that such programs reduce offending by individuals without psychosis[192] but, although there is at least one trial under way for offender patients, there are no published data yet.

Conclusions

Since 1990, sound epidemiologic research has left no doubt about a significant relation between psychosis and violence, although one accounting for little of society's violence. Among the most seriously violent people with psychosis, psychotic symptoms tend to drive that violence. There are still more questions than answers about mechanisms, but the study of brain structure and function as well as the nature of social interactions about delusions are ripe for further research. For others—perhaps mainly the more repetitive but less seriously violent—personality factors, with or without histories of early childhood disadvantage or abuse, and a tendency to substance misuse, may outweigh psychotic symptoms as explanations for violence. However, both groups are likely to need a structured, possibly coercive, treatment framework for at least some phases of their treatment, and medication. There is more to learn about psychosocial treatments to supplement medication in dealing with traumatic experiences, perhaps criminal thinking, and psychotic symptoms, too—all with the goal of delivering healthy independence as well as desistance from offending.

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Résumé : Psychose et violence : histoires, craintes et réalité

Les personnes souffrant de psychose sont souvent craintes. En fait, elles sont elles-mêmes susceptibles d'être victimes de violence; cependant, le principal objectif de cette étude est d'offrir une vue d'ensemble des données probantes sur les relations qui existent entre la psychose et la violence faite aux autres. Les termes psychose et violence ont été utilisés dans une recherche de la documentation limitée à la Cochrane Library et à PubMed, à une recherche manuelle de 8 revues, et à un suivi des références additionnelles dans les articles trouvés. Cette vue d'ensemble est tirée de nouvelles données empiriques et des principales études. Presque toutes les données épidémiologiques fiables sur la psychose et la violence datent de 1990. Il y a cohésion dans une relation modeste mais significative entre la schizophrénie et les actes de violence. Depuis lors, il y a aussi eu un mouvement vers une compréhension de la nature des associations et un progrès des stratégies de prise en charge des personnes qui souffrent de psychose et sont violentes. Les craintes du public à l'endroit des personnes qui souffrent de maladies psychotiques sont largement non fondées, mais il serait profitable qu'on porte plus d'attention à la sécurité des proches. La tâche des 10 prochaines années doit consister à développer et à appliquer les connaissances pour améliorer les traitements spécifiques, c'est-à-dire, les interventions qui vont au-delà des soins compatissants pour entraîner un changement véritable.