

Associations Between Clinical Insight and History of Severe Violence in Patients With Psychosis

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Background and Hypothesis: Violence is more prevalent in patients with psychotic disorders compared to the general population. Hence, adequate violence risk assessment is of high clinical importance. Impaired insight is suggested as a risk factor for violence in psychosis, but studies have yielded conflicting results. We hypothesized that impaired insight was associated with a history of severe violence in patients with psychotic disorders. **Study Design:** Clinical insight was assessed both using the Birchwood Insight Scale (BIS) and the Positive and Negative Symptom Scale (PANSS) item G12 (lack of judgment and insight). The degree of impaired clinical insight was compared between psychosis patients with ($N = 51$) and without ($N = 178$) a history of severe violence. Multiple linear regression analyses were performed to investigate the effects of putative confounders. **Study Results:** We found that a history of severe violence was significantly associated with lower insight in one of the three BIS components (the relabeling of symptoms) ($P = .03$, $R^2 = 0.02$) and the PANSS item G12 ($P = .03$, $R^2 = 0.02$) also after controlling for putative confounders. **Conclusions:** The results suggest there is an association between impaired insight and severe violence in psychosis patients. We propose that examination of insight by validated instruments comprising different components may add useful information to clinical violence risk assessment in psychosis patients.

Key words: Severe violence/psychosis/insight/aggression/schizophrenia/bipolar disorder

Introduction

Severe violence is more prevalent in individuals with psychotic disorders, although the great majority will

never behave violently.¹ Each severe act of violence committed by a person suffering from a psychotic disorder constitutes a tragedy both for the victim, the perpetrator, their families, and the mental health care professionals involved in the patient's care and treatment. Furthermore, severe violent assaults usually receive much attention from the media and increase the stigmatization of an already marginalized group.²

While there was little scientific focus on exploring the association between psychotic disorders and an increased propensity for violent behavior until the early 1990s, growing public and academic attention has focused on the relationship between these 2 conditions during the last 30 years.³⁻⁵ The deinstitutionalization of mental health care seen over the past decades and the subsequently increased presence of persons with psychotic disorders in the community could have contributed to this development,^{5,6} although it is unknown if there has been a general rise in community violence that can be ascribed to this patient group.⁷

An association between psychotic disorders, eg, schizophrenia, and violent behavior has been found in several studies and is now widely accepted.^{1,4,8} For example, a systematic review and meta-analysis of population-based studies in developed countries reported that approximately 6.5 % of all homicides were committed by persons with a diagnosis of schizophrenia.⁹ Considering that the 12-month prevalence of schizophrenia spectrum disorders is only approximately 1% in the general population in those countries,¹⁰ the relative risk of committing homicide is considerably elevated among psychosis patients. When it comes to estimates of absolute risk for any kind of violence, register-based studies on male patients with schizophrenia spectrum disorders revealed figures ranging from

2.3% to 24.7% with observation times varying from 1 year up to 35 years.^{1,11} On this background it has been of substantial interest to explore factors associated with violence in psychosis patients. Former violent acts,¹² substance abuse,⁷ childhood trauma,¹³ positive psychotic symptoms (eg, hallucinations, delusions),¹⁴ negative emotions (eg, fear, anger),¹⁵ difficulties in recognizing other people's emotions (impaired social cognitive abilities),¹⁶ and antisocial behavior/traits have all been associated with violence in psychosis patients.¹⁷ In particular, comorbid substance abuse has been shown to moderate violence risk in psychosis patients leading to a nearly threefold increase in pooled odds ratio.¹ Hence, it should be stressed that most patients with psychotic disorders are not violent, and that other factors than psychosis per se may contribute to the elevated cumulative violence risk.

Insight and Violence in Psychosis

There is mixed evidence as to whether insight is an important independent factor contributing to violence risk.^{18,19} Being psychotic implies having distorted experiences- and beliefs about the outer and/or inner reality.²⁰ Furthermore, the ability to reflect on one's own thought processes and behaviors in a critical way is usually also impaired in psychosis. A high proportion of psychosis patients is thus reported to have impaired insight to some degree.^{21,22} Furthermore, impaired insight may be less amenable to therapeutic interventions than previously assumed.²³

Insight is a multifaceted construct, encompassing complex cognitive and metacognitive processing on a mental level, and different neural circuits and brain regions on a neurobiological level.²⁴ Thus, several approaches to define and measure insight have been developed. Arango et al. were the first to explore possible associations between impaired insight and violence in psychosis patients using validated instruments to assess insight.²⁵ They found a significant association between violence and higher scores on Positive and Negative Syndrome Scale (PANSS) item G12 (lack of judgment and insight)²⁶ and less insight on the Scale to Assess Unawareness of Mental Disorder²⁷ among inpatients with schizophrenia. Other studies revealed conflicting results, dependent on study population, definition of severe violence, and instrument for measurement of insight. Some of the studies failing to show any association were carried out in community settings, presumptively biased towards individuals with generally higher degrees of insight.²⁸ Furthermore, studies assessing insight by only one-dimensional instruments tend to show negative results.²⁹ Schandrin actually showed partly positive correlations between higher degrees of insight and hostility, physical aggressiveness, and anger.³⁰ However, aggressiveness measurement was only based on self-reports. The most extensive review to date assessing the association between impaired insight and violence in psychosis patients included 18 studies and found partial

support for a positive association between impaired insight and violence.³¹ The 8 studies reporting a positive correlation between impaired insight and violence were considered to have higher quality in terms of assessing different dimensions of insight and providing a clear definition of violence. Nonetheless, there is still substantial uncertainty to which extent impaired insight is associated with violence in psychosis patients.³¹

Study Aims

The current study aims to explore the relationship between insight and violence in psychosis by applying both the BIS and the PANSS G12 item for insight in a large sample of psychosis patients with and without a history of severe violence.

We hypothesized that the impairment of clinical insight would be greater in psychosis patients with a history of severe violence than in patients without, for both measures of insight. Moreover, we hypothesized that there would be significant correlations between all 3 components of the BIS, the PANSS item G12 and a history of severe violence in psychosis patients, which would remain also after examining the effects of putative confounders.

Methods

Participants

Participants were included from both out- and in-patient facilities as part of the ongoing multi-center TOP (Thematically organized psychosis) study and the "Violence in psychosis" (sTOP) study at the NORMENT research center, Oslo, Norway, between 2002 and 2019. The Norwegian healthcare system is publicly funded, and catchment-area-based. Recruitment into the study from the hospitals was thus made from a population with a high degree of representativeness. Inclusion criteria for both groups were a psychotic disorder diagnosis (schizophrenia, schizophreniform disorder, schizoaffective disorder, psychosis NOS, or bipolar I disorder with psychotic features) according to the Diagnostic and Statistical Manual of Mental Disorders Fourth Edition,³² age between 18 and 65 years, Norwegian language knowledge to understand the study protocol and procedures, IQ scores above 65, and the ability to give informed consent to study participation.

Written informed consent was obtained from all participants. The work was conducted in accordance with the Declaration of Helsinki. The TOP study is approved by the Regional Ethics Committee, the Norwegian Directory of Health, and the Norwegian Data Protection Authority.

Assessments

All assessments were performed by trained psychologists or medical doctors. Diagnoses were assessed using the Structured Clinical Interview for DSM-IV axis 1 disorders (SCID-I).

Severe violence was defined according to the MacArthur criteria,³³ ie, homicide, attempted homicide, or severe physical assault towards other people, including sexual violence. The assessment of violence was based on a thorough examination of court files, criminal, and hospital records. Patient inclusion was based upon consensus of at least one experienced psychiatrist in the field of forensic psychiatry (T.F.-V., P.A.R., and C.B.) and an experienced researcher in this field (UKH). Patients were not included if there was any doubt about the severity of a violent act.

Current general symptoms and level of functioning were assessed by the Global Assessment of Functioning (GAF), split version.³⁴ Psychotic symptoms were assessed by the Positive and Negative Syndrome Scale (PANSS).²⁶ Depressive symptoms were assessed by the PANSS depressive symptoms subscore (items G1, G2, G3, G4, and G6).³⁵ Alcohol use was investigated by the AUDIT (Alcohol Use Disorders Identification Test),³⁶ and illegal drug use by the DUDIT (Drug Use Disorders Identification Test).³⁷ The Barratt Impulsiveness Scale was used to assess the personality/behavioral construct of impulsiveness.³⁸

Insight was assessed by the Birchwood Insight Scale (BIS) and the PANSS item's lack of judgment and insight (G12). The BIS is a self-report scale and one of the most commonly used measures of insight in clinical research in the field of psychotic disorders.³⁹ It conceptualizes insight as a clinical phenomenon named "Clinical Insight" and consists of eight items which are scored according to a 5-point Likert scale from 0 to 4 (disagree very much – disagree – unsure – agree – agree very much). The single items reflect 3 subscales: awareness of illness (2 items), relabeling of symptoms (2 items), and need for treatment (4 items). Each subscale has a mean score from 0 to 4. The subscale scores can be summarized as a total score (range 0–12), where higher score indicates better insight. Scores ≥ 9 imply good insight.³⁹ The scale has shown good psychometric properties, ie, reliability and validity for both schizophrenia and bipolar I disorder in a previous study from our group.⁴⁰

The only published study using the BIS to assess clinical insight in relation to violence comprised a limited sample size of 29 violent psychosis inpatients from a large state psychiatric hospital and failed to show an association between lower clinical insight and a history of violence.⁴¹ In addition, a PhD thesis on 26 inpatients with schizophrenia who had committed homicide or other severe physical assaults and were sampled from different sites all over Norway, reported no significant differences in the degree of clinical insight measured by the BIS when compared to a group of schizophrenia patients without a history of violence.⁴²

Though the PANSS condenses a complex phenomenon into only one item on insight (G12), it has the advantage of being a well-established instrument for assessing several

aspects of psychosis, both in schizophrenia spectrum and severe affective disorders. Furthermore, self-reported insight measured by the BIS and the observer-rated PANSS item G12 were significantly correlated ($r = -0.55$; $P < .01$) in a sample of patients with schizophrenia spectrum and bipolar disorder in another study conducted at our site.⁴³

Statistics

Statistical analyses were conducted using IBM SPSS Statistics for Windows, Version 27.0 (IBM Corp., 2020). Continuous variables were tested for normality by analyzing normality plots.

Group comparisons for continuous normally distributed variables were evaluated with independent sample *t*-tests, group comparisons for continuous data with skewed distributions were evaluated with Mann–Whitney U-tests, and group comparisons for dichotomous data were evaluated with chi-squared tests. Insight measures between the 2 groups were compared by independent sample *t*-tests. *P*-values were Bonferroni adjusted for multiple comparisons. As the historical violent act may have happened a long time, ie, several years in some cases, previous to the clinical investigation and the levels of insight and clinical state measures as the PANSS may have changed during that period, we performed multiple linear regression analyses to further evaluate the relationship between a history of severe violence and insight as the dependent variable.

Other independent variables were added in the regression based on (1) their potential role as a confounder of the relationship, and (2) a significant association with either history of severe violence or insight in the bivariate analyses (Pearson's correlations). The final model thus included sex, number of years in education, substance abuse disorder diagnosis, GAF-S, PANSS-positive symptoms, and PANSS depressive symptoms subscores. Independent variables were entered hierarchically in separate steps in the following order: Sex, number of years in education, substance abuse disorder diagnosis, GAF-S, PANSS-positive symptoms, and PANSS depressive symptoms subscores, with history of severe violence in the last step. The assumptions of linearity, normality, multicollinearity, and homoscedasticity were evaluated based on examinations of residual plots for each analysis.

Results

Group Characteristics

The sample consisted of 229 individuals (table 1): 184 (80.3 %) patients had schizophrenia, 7 (3.1 %) had schizophreniform disorder, 9 (3.9 %) had schizoaffective disorder (schizophrenia spectrum disorder), 11 (4.8 %) had other psychosis, and 18 (7.9 %) patients had bipolar I disorder (non-schizophrenia spectrum disorder). A substance use disorder was found in 75 (32.8 %).

Table 1. Demographic and Clinical Variables

	PSY-NV (<i>N</i> = 178)	PSY-V (<i>N</i> = 51)	<i>P</i>
Age, mean (SD)	33.6 (8.8)	35.7 (10.9)	.157
Male sex, <i>n</i> (%)	155 (87.1)	51 (100.0)	.003
Non-european ethnicity, <i>n</i> (%)	28 (18.9)	10 (21.3)	.833
Years of education, mean (SD)	13.3 (3.1)	11.9 (2.3)	.002
Schizophrenia spectrum, <i>n</i> (%)	156 (87.6)	44 (86.3)	.813
Substance abuse disorder, <i>n</i> (%)	51 (28.7)	24 (47.1)	.018
GAF-S, mean (SD)	43.6 (12.3)	44.8 (14.4)	.553
GAF-F, mean (SD)	43.9 (12.0)	42.0 (13.1)	.321
PANSS, mean (SD)	63.4 (16.1)	63.4 (19.4)	.982
PANSS positive, mean (SD)	15.62 (5.6)	15.78 (7.1)	.863
PANSS negative, mean (SD)	15.83 (5.9)	17.37 (6.7)	.111
PANSS depression, mean (SD)	12.00 (4.2)	10.02 (4.4)	.004
Audit, median (range)	4 (0–28)	2 (0–20)	.144
Dudit, median (range)	2 (0–20)	7 (0–27)	.003
Impulsiveness, mean (SD)	66.6 (8.3)	67.1 (9.0)	.826

PSY-NV: Nonviolent psychosis patients; PSY-V: Violent psychosis patients; SD: Standard Deviation; GAF: Global Assessment of Functioning; PANSS: Positive and Negative Syndrome Scale; CDSS: Calgary Depression Scale for Schizophrenia.

There were no significant differences between the violence and nonviolence groups for diagnostic group (schizophrenia spectrum vs bipolar I disorder), age, GAF-S, GAF-F, total PANSS, or impulsiveness measured by the Barrett Impulsiveness Scale. The violence group consisted of men only, had fewer years of education, lower depression scores, and higher DUDIT scores (table 1).

Clinical Insight

The violence group scored significantly lower ($t(227) = 2.838, P < .05$) than the nonviolence group on the BIS Total score as well as on the subscale Relabeling of symptoms ($t(227) = 2.946, P < .05$). The PANSS G12-score was significantly ($t(227) = -3.046, P < .05$) higher (indicating less clinical insight) in the violence group. There was also a trend towards significance for the BIS components' Awareness of illness and Need for treatment, which however did not remain significant after adjustment for multiple comparisons (table 2).

Multivariate Linear Regressions

After adjustment for confounders, the association between violence and clinical insight remained significant for the BIS component Relabeling of symptoms (table 3) and PANSS G12 (table 4), but not for the other BIS components or the BIS Total score ($\beta = -0.12, t(227) = -1.74, P = .08$). The GAF-S, the PANSS-positive symptoms and the depressive subscores of the PANSS contributed to the final models. There were no significant associations between the insight measures and sex, number of years in education, or diagnosis.

A history of severe violence explained 2% of the variance in both insight measures (Relabeling of symptoms and PANSS G12).

Discussion

We explored the associations between insight and a history of severe violence in a well-described and comparatively large group of patients with psychotic disorder. Our key finding was that patients with a history of severe violence had lower levels of clinical insight on the total score of the BIS, the Relabeling of symptoms component of the BIS, and on the G12 item of the PANSS. When controlling for putative confounders, the association remained significant for the Relabeling of symptoms component of the BIS and the G12 item of the PANSS (figure 1).

The findings corroborate trends found in previous studies of an association between violence and insight in psychosis patients,³¹ and indicate that insight is a significant factor in the complex interplay of risk factors of severe violence. Insight has been shown to be correlated with cognitive flexibility in persons with severe mental disorders.⁴⁴ Thus, it is conceivable that impaired insight also mirrors a reduced ability to perform a realistic assessment of perceived threats and consequently this lowers the threshold to act violently. Furthermore, impaired insight may constitute a mediator for other associated factors⁴⁵ that are strongly linked to violence, such as medication nonadherence.¹² Of note, adequate medication with antipsychotics is found to reduce violent behavior in psychosis patients.^{46,47}

In the regression models, the association between clinical insight and a history of severe violence remained significant for the Relabeling of symptoms component of clinical insight, an area that presumptively demands quite

Table 2. Insight in Illness (IS) Subcomponents and History of Violence

	PSY-NV	PSY-V	<i>P</i> *	Cohen's <i>d</i> (CI)
BIS, Need for treatment, mean (SD)	2.77 (0.84)	2.50 (0.92)	.225	
BIS, Awareness of illness, mean (SD)	2.50 (1.01)	2.17 (1.09)	.215	
BIS, Relabeling symptoms, mean (SD)	2.63 (0.87)	2.20 (1.10)	.020	0.47 (0.15;0.78)
BIS, Total score, mean (SD)	7.90 (2.23)	6.86 (2.57)	.025	0.45 (0.14;0.76)
PANSS G12	2.74 (1.42)	3.47 (1.78)	.010	0.49 (−0.80;−0.17)

Notes: *t*-tests, equal variances. BIS: Birchwood Insight Scale. PANSS: Positive and Negative Syndrome Scale. SD: Standard Deviation. *Bonferroni adjusted.

Table 3. Linear Regression of Birchwood Insight Scale: Relabeling of Symptoms as Dependent Variable

Block No. Variable	Block Model Summary for Each Step			Contribution of Separate Variables for Last Step			
	R ² Change	F Change	Beta	t	<i>P</i> Value	95% CI of B	
						Lower	Upper
Constant	...	...		3.482	<.00	0.88	3.19
1. Sex	0.00	0.08	−0.09	−1.33	.19	−0.67	0.13
2. Number of years in education	0.02	5.36	0.08	1.18	.24	−0.02	0.07
3. Substance abuse disorder	0.00	0.27	0.01	0.14	.89	−0.24	0.28
4. GAF-S	0.04	9.78	0.18	2.05	.04	0.00	0.03
5. PANSS-positive symptoms	0.01	1.44	−0.14	−1.56	.12	−0.05	0.01
6. PANSS depressive symptoms	0.02	4.77	0.13	1.71	.09	−0.00	0.06
7. History of violence	0.02	4.63	−0.15	−2.15	.03	−0.63	−0.03

Adjusted R square of final model: .08

well-preserved metacognitive abilities. This is in line with findings in studies exploring the significance of impaired metacognitive self-reflectivity for violence risk in psychosis patients.^{48–50} Moreover, it is conceivable that the socially desirable response bias may have led to concurring answers regarding the more general questions about insight into the BIS components Need for treatment and Awareness of illness in both groups.⁵¹ In contrary, the observer-rated PANSS item G12 may be less susceptible to that effect.

More severe symptoms in terms of lower GAF-S and higher PANSS-positive symptoms were significantly associated with poor clinical insight in both measures whereas previous studies have shown inconsistent results.⁵² However, PANSS depressive symptoms had by far the strongest association with preserved clinical insight as measured by the BIS total score. This is in line

with the “insight paradox,” namely the well-established relationship between increased depressive symptoms and higher levels of insight in psychosis patients.^{53,54}

Negative findings in other studies with similar designs assessing differences between the BIS and violence may be due to small sample sizes and too low power. The only two other studies using the BIS to measure impaired insight consisted of only 29⁴¹ and 26 individuals⁴² in the case group, respectively. Furthermore, some of the former studies assessed clinical insight by only one-dimensional measure, namely the HCR 20 item C1 or the PANSS item G12,^{29,55,56} in which subtle differences within the insight construct may be lost.

Our results are in line with findings in a previous meta-analytic review in this field,⁵⁷ and although a history of severe violence explained not more than 2% of the

Table 4. Linear Regression With PANSS G12 as Dependent Variable

N = 227

Block No. Variable	Block Model Summary for Each Step		Contribution of Separate Variables for Last Step				
	R ² Change	F Change	Beta	<i>t</i>	<i>P</i> value	95% CI of B	
						Lower	Upper
Constant	...	...	...	3.66	.00	1.48	4.92
1. Sex	0.01	1.04	0.01	0.01	.99	-0.59	0.60
2. Number of years in education	0.01	2.59	0.02	0.32	.75	-0.05	0.07
3. Substance abuse disorder	0.02	3.38	0.07	1.09	.28	-0.18	0.61
4. GAF-S	0.12	30.94	-0.23	-2.75	.01	-0.05	-0.01
5. PANSS-positive symptoms	0.04	11.18	0.34	4.04	.00	0.04	0.13
6. PANSS depressive symptoms	0.04	11.82	-0.20	-2.95	.00	-0.19	-0.02
7. History of violence	0.02	4.59	0.13	2.14	.03	0.04	0.94

Adjusted R square of final model:0.22

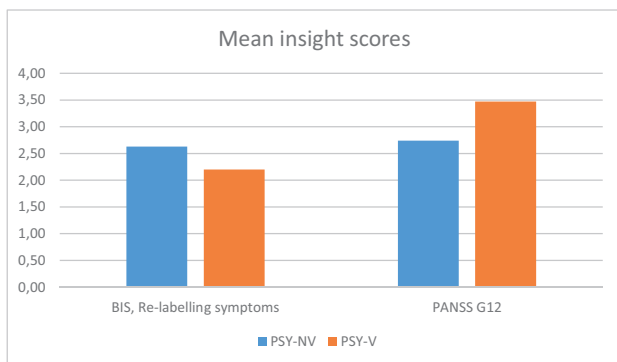


Figure 1: Graphical representation of mean insight scores.

variance in the Relabeling of symptoms component of the BIS and the PANSS item G12, the results support the inclusion of poor insight as risk factor in complex and comprehensive violence risk assessments.

Strengths and limitations

The main strengths of the present study are the rigorous definition of severe violence, the assessment of clinical insight by 2 well-established instruments, and the relatively high number of individuals included in the violence group. The study has some limitations. First, the index violent acts often were committed long time prior to study inclusion. The degree of insight and state measures as PANSS may have changed during that period.

The retrospective case-control design with assessments at only one-time point does not allow making inferences about a causal relationship between impaired insight and severe violence.

Ideally, there would have been more individuals in the psychosis patients (PSY)-V group. However, psychosis patients with a history of severe violence are generally reluctant towards participating in clinical studies. It is

challenging to recruit enough participants and even more difficult to retain them in prospective studies with longer duration.⁵⁸ Prospective studies have thus tended to include individuals with a less severe history of violence,^{59,60} resulting in a heightened threshold for detecting group differences. Finally, we lacked data on psychopathy in the nonviolence group. This made it impossible to investigate the influence of psychopathy on the association between clinical insight and severe violence.³¹ Interestingly, in a PSY-V subgroup we found a negative correlation between psychopathy and the Need for treatment component of the BIS (*n* = 18, *r* = -0.623 (CI -0.844, -0.220), *P* = .006).

In conclusion, we found significantly lower levels of insight in psychosis patients with a history of severe violence compared to nonviolent psychosis patients. The results indicate that impaired insight measured by quite easily accessible clinical instruments may be an eligible factor in comprehensive violence risk assessment. However, the predictive qualities of clinical insight are yet to be shown in independent samples.

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References

1. Whiting D, Lichtenstein P, Fazel S. Violence and mental disorders: a structured review of associations by individual diagnoses, risk factors, and risk assessment. *Lancet Psychiatry*. 2021;8(2):150–161.
2. Bowen M, Kinderman P, Cooke A. Stigma: a linguistic analysis of the UK red-top tabloids press' representation of schizophrenia. *Perspect Public Health*. 2019;139(3):147–152.
3. Tiihonen J, Isohanni M, Räsänen P, Koironen M, Moring J. Specific major mental disorders and criminality: a 26-year prospective study of the 1966 northern Finland birth cohort. *Am J Psychiatry*. 1997;154(6):840–845.
4. Walsh E, Buchanan A, Fahy T. Violence and schizophrenia: examining the evidence. *Br J Psychiatry*. 2002;180:490–495.
5. Fuller Torrey E. Deinstitutionalization and the rise of violence. In: Warburton KD, Stahl SM, eds. *Violence in Psychiatry*. Cambridge; 2016:1–9.
6. Hodgins S, Müller-Isberner R. Schizophrenia and violence. *Nervenarzt*. 2014;85(3):273–276. 273–278.
7. Fazel S, Gulati G, Linsell L, Geddes JR, Grann M. Schizophrenia and violence: systematic review and meta-analysis. *PLoS Med*. 2009;6(8):e1000120.
8. Fleischman A, Werbeloff N, Yoffe R, Davidson M, Weiser M. Schizophrenia and violent crime: a population-based study. *Psychol Med*. 2014;44(14):3051–3057.
9. Large M, Smith G, Nielssen O. The relationship between the rate of homicide by those with schizophrenia and the overall homicide rate: a systematic review and meta-analysis. *Schizophr Res*. 2009;112(1–3):123–129.
10. Wittchen HU, Jacobi F, Rehm J, et al. The size and burden of mental disorders and other disorders of the brain in Europe 2010. *Eur Neuropsychopharmacol*. 2011;21(9):655–679.
11. Sariaslan A, Arseneault L, Larsson H, Lichtenstein P, Fazel S. Risk of subjection to violence and perpetration of violence in persons with psychiatric disorders in Sweden. *JAMA Psychiatry*. 2020;77(4):359–367.
12. Witt K, van Dorn R, Fazel S. Risk factors for violence in psychosis: systematic review and meta-regression analysis of 110 studies. *PLoS One*. 2013;8(2):e55942–e55942.
13. Green K, Browne K, Chou S. The relationship between childhood maltreatment and violence to others in individuals with psychosis: a systematic review and meta-analysis. *Trauma Violence Abuse*. 2019;20(3):358–373.
14. Coid JW, Ullrich S, Kallis C, et al. The relationship between delusions and violence: findings from the East London first episode psychosis study. *JAMA Psychiatry*. 2013;70(5):465–471.
15. Ullrich S, Keers R, Coid JW. Delusions, anger, and serious violence: new findings from the MacArthur Violence Risk Assessment Study. *Schizophr Bull*. 2014;40(5):1174–1181.
16. Fullam R, Dolan M. Emotional information processing in violent patients with schizophrenia: association with psychopathy and symptomatology. *Psychiatry Res*. 2006;141(1):29–37.
17. Fazel SP, Wolf AM, Larsson HP, Lichtenstein PP, Mallett SD, Fanshawe TRP. Identification of low risk of violent crime in severe mental illness with a clinical prediction tool (Oxford Mental Illness and Violence tool [OxMIV]): a derivation and validation study. *Lancet Psychiatry*. 2017;4(6):461–468.
18. Bjorkly S. Empirical evidence of a relationship between insight and risk of violence in the mentally ill – A review of the literature. *Aggress Violent Behav*. 2006;11:414–423.
19. Rund BR. A review of factors associated with severe violence in schizophrenia. *Nord J Psychiatry*. 2018;72(8):561–571.
20. Grønning L, Haukvik UKH, Melle KH. Criminal insanity, psychosis and impaired reality testing in norwegian law. *Bergen J Crim Law Crim Justice*. 2019;7:27–59.
21. Amador XF, David AS. *Insight and psychosis*. New York: Oxford University Press; 1998.
22. Mintz AR, Dobson KS, Romney DM. Insight in schizophrenia: a meta-analysis. *Schizophr Res*. 2003;61(1):75–88.
23. Phahladira L, Asmal L, Kilian S, et al. Changes in insight over the first 24 months of treatment in schizophrenia spectrum disorders. *Schizophr Res*. 2019;206:394–399.
24. Pijnenborg GHM, Larabi DI, Xu P, et al. Brain areas associated with clinical and cognitive insight in psychotic disorders: a systematic review and meta-analysis. *Neurosci Biobehav Rev*. 2020;116:301–336.
25. Arango C, Calcedo Barba A, Gonzalez-Salvador T, Calcedo Ordonez A. Violence in inpatients with schizophrenia: a prospective study. *Schizophr Bull*. 1999;25(3):493–503.
26. Kay SR, Fiszbein A, Opler LA. The positive and negative syndrome scale (PANSS) for schizophrenia. *Schizophr Bull*. 1987;13(2):261–276.
27. Amador XF, Strauss DH, Yale SA, Flaum MM, Endicott J, Gorman JM. Assessment of insight in psychosis. *Am J Psychiatry*. 1993;150(6):873–879.
28. Swanson JW, Swartz MS, Van Dorn RA, et al. A national study of violent behavior in persons with schizophrenia. *Arch Gen Psychiatry*. 2006;63(5):490–499.
29. Lincoln TM, Hodgins S. Is lack of insight associated with physically aggressive behavior among people with schizophrenia living in the community? *J Nerv Ment Dis*. 2008;196(1):62–66.
30. Schandrin A, Norton J, Raffard S, et al. A multi-dimensional approach to the relationship between insight and aggressiveness in schizophrenia: findings from the FACE-SZ cohort. *Schizophr Res*. Vol 204. Netherlands: Netherlands: Elsevier B.V; 2019:38–45.
31. Smith KJ, Macpherson G, O'Rourke S, Kelly C. The relationship between insight and violence in psychosis: a systematic literature review. *J Forensic Psychiatry Psychol*. 2020;31(2):183–221.
32. American Psychiatric Association. *Diagnostic and statistical manual of mental disorders: DSM-IV*. 4th ed. Washington, D.C: American Psychiatric Association Publishing; 1994.
33. Appelbaum PS, Robbins PC, Monahan J. Violence and delusions: data from the MacArthur Violence Risk Assessment Study. *Am J Psychiatry*. 2000;157(4):566–572.
34. Karterud S, Pedersen G, Løv Dahl H, Friis S. Global assessment of functioning: split version: background and scoring guidelines. *Oslo, Norway, Klinikk for Psykiatri, Ullevål sykehus*. 1998.
35. Shafer A, Dazzi F. Meta-analysis of the positive and Negative Syndrome Scale (PANSS) factor structure. *J Psychiatr Res*. 2019;115:113–120.
36. Saunders J, Babor T. AUDIT questionnaire. *Addiction*. 1993;88(791–803):1–2.
37. Berman AH, Bergman H, Palmstierna T, Schlyter F. Evaluation of the Drug Use Disorders Identification Test (DUDIT) in criminal justice and detoxification settings and in a Swedish population sample. *Eur Addict Res*. 2005;11(1):22–31.
38. Patton JH, Stanford MS, Barratt ES. Factor structure of the Barratt Impulsiveness Scale. *J Clin Psychol*. 1995;51(6):768–774.

39. Birchwood M, Smith J, Drury V, Healy J, Macmillan F, Slade M. A self-report Insight Scale for psychosis: reliability, validity and sensitivity to change. *Acta Psychiatr Scand.* 1994;89(1):62–67.
40. Jónsdóttir H, Engh JA, Friis S, et al. Measurement of insight in patients with bipolar disorder: are self-rated scales developed for patients with schizophrenia applicable? *J Nerv Ment Dis.* 2008;196(4):333–335.
41. Waldheter EJ, Jones NT, Johnson ER, Penn DL. Utility of social cognition and insight in the prediction of inpatient violence among individuals with a severe mental illness. *J Nerv Ment Dis.* 2005;193(9):609–618.
42. Engelstad KN. *Psychological Traits of Homicide Offenders with Schizophrenia.* Oslo: Research Department Vestre Viken Hospital Trust and Department of Psychology, University of Oslo, Universitetet i Oslo; 2019.
43. Büchmann CB, Pedersen G, Aminoff SR, et al. Validity of the Birchwood insight scale in patients with schizophrenia spectrum- and bipolar disorders. *Psychiatry Res.* 2019;272:715–722.
44. Trevisi M, Talamo A, Bandinelli PL, et al. Insight and awareness as related to psychopathology and cognition. *Psychopathology.* 2012;45(4):235–243.
45. Jónsdóttir H, Opjordsmoen S, Birkenaes AB, et al. Predictors of medication adherence in patients with schizophrenia and bipolar disorder. *Acta Psychiatr Scand.* 2013;127(1):23–33.
46. Faay MDM, Czobor P, Sommer IEC. Efficacy of typical and atypical antipsychotic medication on hostility in patients with psychosis-spectrum disorders: a review and meta-analysis. *Neuropsychopharmacology.* 2018;43(12):2340–2349.
47. Strømme MF, Bartz-Johannessen C, Kroken RA, Mehlum L, Johnsen E. Overactive, aggressive, disruptive and agitated behavior associated with the use of psychotropic medications in schizophrenia. *Schizophr Res.* 2022;248:35–41.
48. de Jong S, van Donkersgoed R, Renard S, et al. Social-cognitive risk factors for violence in psychosis: a discriminant function analysis. *Psychiatry Res.* 2018;265:93–99.
49. Pousa E, Ochoa S, Cobo J, et al.; Insight Barcelona Research Group. A deeper view of insight in schizophrenia: insight dimensions, unawareness and misattribution of particular symptoms and its relation with psychopathological factors. *Schizophr Res.* 2017;189:61–68.
50. Bo S, Kongerslev M, Dimaggio G, Lysaker PH, Abu-Akel A. Metacognition and general functioning in patients with schizophrenia and a history of criminal behavior. *Psychiatry Res.* 2014;225(3):247–253.
51. DeVylder JE, Hilimire MR. Screening for psychotic experiences: social desirability biases in a non-clinical sample. *Early Interv Psychiatry.* 2015;9(4):331–334.
52. Hasson-Ohayon I, Scholte-Stalenhof AN, Schirmbeck F, et al.; For GROUP. Insight, personality, and symptoms among individuals with psychosis: cross-sectional and longitudinal relationships. *Schizophr Res.* 2020;222:243–250.
53. Belvederi Murri M, Amore M, Calcagno P, et al. The “Insight Paradox” in schizophrenia: magnitude, moderators and mediators of the association between insight and depression. *Schizophr Bull.* 2016;42(5):1225–1233.
54. Amore M, Murri MB, Calcagno P, et al.; Italian Network for Research on Psychoses. The association between insight and depressive symptoms in schizophrenia: undirected and Bayesian network analyses. *Eur Psychiatry.* 2020;63(1):1–21.
55. Krakowski MI, Czobor P. The denial of aggression in violent patients with schizophrenia. *Schizophr Res.* 2012;141:228–233.
56. Cheung P, Schweitzer I, Crowley K, Tuckwell V. Violence in schizophrenia: role of hallucinations and delusions. *Schizophr Res.* 1997;26(2–3):181–190.
57. Reinharth J, Reynolds G, Dill C, Serper M. Cognitive predictors of violence in schizophrenia: a meta-analytic review. *Schizophr Res Cogn.* 2014;1:101–111.
58. Bjørkly S, Laake P, Roaldset JO, Douglas KS. The safe pilot study: a prospective naturalistic study with repeated measures design to test the psychosis - violence link in and after discharge from forensic facilities. *Psychiatry Res.* 2021;298:113793–113793.
59. Yen CF, Yeh ML, Chen CS, Chung HH. Predictive value of insight for suicide, violence, hospitalization, and social adjustment for outpatients with schizophrenia: a prospective study. *Compr Psychiatry.* 2002;43(6):443–447.
60. Arango C, Bombín I, González-Salvador T, García-Cabeza I, Bobes J. Randomised clinical trial comparing oral versus depot formulations of zuclopenthixol in patients with schizophrenia and previous violence. *Eur Psychiatry.* 2006;21(1):34–40.