

Sociodemographic, clinical and childhood correlates of adult violent victimisation in a large, national survey sample of people with psychotic disorders

Vera A. Morgan^{1,2,6} · Frank Morgan^{3,4} · Cherrie Galletly⁵ · Giulietta Valuri¹ · Sonal Shah¹ · Assen Jablensky²

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Abstract

Purpose Our aim was to establish the 12-month prevalence of violent victimisation in a large sample of adults with psychotic disorders ($N = 1825$), compare this to population estimates, and examine correlates of violent victimisation.

Methods The Australian national psychosis survey used a two-phase design to draw a representative sample of adults aged 18–64 years with psychotic disorders. Interview questions included psychopathology, cognition, sociodemographics, substance use, criminality, and childhood and adult victimisation. Multivariable logistic regression models were used to examine the independent contributions of known risk factors, clinical profile and childhood abuse, on

risk of violent victimisation. Differences between men and women were examined.

Results Among adults with psychotic disorders, 12-month prevalence of any victimisation was 38.6 % (males 37.4 %, females 40.5 %), and of violent victimisation was 16.4 % (males 15.2 %; females 18.3 %). Violent victimisation was 4.8 times higher than the population rate of 3.4 % (6.5 times higher for women; 3.7 times higher for men). Significant correlates of violent victimisation were established sociodemographic and behavioural risk factors predicting victimisation in the general community: younger age, residence in the most disadvantaged neighbourhoods, homelessness, lifetime alcohol abuse/dependence, and prior criminal offending. Among clinical variables, only mania and self-harm remained significant in the multivariable model. Childhood abuse was independently associated with violent victimisation.

Conclusions Rates of violent victimisation are high for people with psychotic disorders, especially women, compared to population rates. Greater exposure to sociodemographic and behavioural risks may render them particularly vulnerable to victimisation. Social cognition as a valuable treatment target is discussed.

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✉ Vera A. Morgan
vera.morgan@uwa.edu.au

- ¹ Neuropsychiatric Epidemiology Research Unit, School of Psychiatry and Clinical Neurosciences, University of Western Australia, Perth, Australia
- ² Centre for Clinical Research in Neuropsychiatry, School of Psychiatry and Clinical Neurosciences, University of Western Australia, Perth, Australia
- ³ School of Population Health, University of Western Australia, Perth, Australia
- ⁴ Faculty of Law, University of Tasmania, Hobart, Australia
- ⁵ Discipline of Psychiatry, University of Adelaide, Adelaide, Australia
- ⁶ The University of Western Australia School of Psychiatry and Clinical Neurosciences, Level 3 Medical Research Foundation Building, Rear 50 Murray Street, Perth, WA 6000, Australia

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Introduction

Many studies have reported an association between severe mental illness and criminal offending [1], especially violent offending [2, 3] although underlying causal factors remain poorly understood [4, 5]. There are, however, comparatively few studies on criminal victimisation of

adults with severe mental illness, with great variation in methodology, settings, definitions of victimisation, and timeframes in those that have been published. Many have relied on small, highly selected samples and lack sufficient breadth of data to advance our understanding of potential mechanisms. Despite this variation, most studies report high rates of victimisation in people with severe mental illness. A 2008 review article reported rates of violent victimisation ranging from 8.2 to 44.1 %, narrowing to 25.3–35.0 % for 1-year prevalence in treated samples [6]; most rates reported since then have been within the latter range. Well-designed studies that have been able to include community comparisons indicate that rates of any victimisation [7, 8] as well as violent victimisation [7–9] are well above population rates [7–9]. A number of studies have also been able to show, within the one sample, that people with severe mental illness are at greater risk of being victims than perpetrators of violent crime [5, 6, 10].

Studies examining risk factors for adult victimisation have reported that many risk factors for adult victimisation in the general community are also risk factors for people with severe mental illness. The most consistently reported of these include homelessness, substance abuse and a history of criminal offending [11, 12]. Studies in samples of people with severe mental illness have not always observed the same age and gender patterns found in the general population, where risk of victimisation reduces dramatically as age increases and is lower for women compared with men. Few studies have reported on sex differences in victimisation rates in people with severe mental illness. However, most report a much smaller gap, if any, in rates between men and women (see, for example, [7, 13, 14]), in contrast with community samples. Findings with respect to illness-related factors have been inconsistent: associations have been reported most commonly for comorbid personality disorder [14, 15], symptom severity [11, 12] and age at onset [13]. The relationship between severe mental illness and adult victimisation may be confounded by experience of childhood abuse which is associated both with risk of mental illness [16, 17] and with vulnerability to further victimisation in adulthood [14, 18]. One study that looked at childhood abuse and adult victimisation contemporaneously in a large sample of people with severe mental illness found childhood abuse was independently associated with adult victimisation in a multivariable model that also included sociodemographic and clinical factors [13].

There remains, however, a need for studies using large, unbiased samples which have been richly and reliably characterised and that have the capacity to establish, within the one dataset, reliable estimates of victimisation that can be compared to population estimates, and that permit comprehensive modelling of a wide range of covariates of

risk, including stratification by sex to examine differences between men and women.

The aims of this study were to use a very large, nationally representative sample of adults with psychotic disorders ($N = 1825$) to report on 12-month prevalence of adult victimisation generally, and violent victimisation specifically, to compare these rates to general community estimates, and to examine correlates of violent victimisation. We hypothesised that sociodemographic and behavioural risk factors that are predictive of violent victimisation in the general community would be significantly associated with violent victimisation in people with a psychotic disorder, independently of clinical risk factors and exposure to childhood abuse.

Methods

The 2010 Australian national survey of psychosis (Survey of High Impact Psychosis—SHIP) took place across five Australian states, covering an estimated resident population aged 18–64 years of 1,464,923 people, approximately 10 % of Australians in that age range. SHIP is one of the most comprehensive prevalence surveys worldwide of people with psychosis in contact with public treatment services. It comprised people aged 18–64 years, resident in the catchment sites and in contact with public mental health services (inpatient, outpatient and community mental health) and non-government organisations supporting people with mental illness. A two-phase design was employed. In phase 1, all people in contact with these treatment services were screened by the service providers using a psychosis screener [19] in order to identify those individuals likely to meet full diagnostic criteria for a psychotic disorder. In addition to census month enumeration, administrative records for these public mental health services were examined in order to identify individuals with psychosis who were in contact with the service in the 11 months prior to census but not in the census month. There were 7955 people screen-positive for psychosis who met eligibility criteria. In phase 2, 1825 people who were screen-positive in phase 1 were randomly selected, stratified by site and age group (18–34; 35–64 years) and interviewed. The response rate among people contacted for interview from those screen-positive for psychosis and randomised was 44 %. Comparison of screening data for interviewed participants and those selected for interview but not participating for any reason indicated no systematic selection biases [19]. The design and methodology have been described in full elsewhere [19, 20]. The census of people with psychosis was in March 2010. Interviews were conducted between April and December 2010.

Diagnosis

Diagnosis according to international classification of disease, 10th revision was determined using the semi-structured diagnostic interview for psychosis (DIP) [21]. The DIP elicits responses using World Health Organization schedules for clinical assessment in neuropsychiatry [22] questions and probes, and maps these onto the 90 item checklist of the operational criteria checklist for psychotic and affective illness (OPCRIT) [23]. The DIP scores serve as input to a computer algorithm which provides diagnostic classification in accordance with established criteria. Employing the OPCRIT algorithm to assign a diagnosis reduces subjective bias in the interpretation of symptoms and signs.

Clinical variables

Clinical variables selected from the DIP for the current analysis were: diagnosis, course of illness, age at onset of illness, symptoms in past year (hallucinations, delusions, episode of mania, subjective thought disorder, depression, anxiety, suicidal ideation), self-harm in past year, pre-morbid personality disorder, and lack of insight into illness.

Level of functioning

Level of functioning over the past 4 weeks was assessed by interviewers using the multidimensional scale of independent functioning [24]. This instrument assesses role performance across multiple domains: paid and unpaid work, including child care, study and activities of daily living. Here, we report on the global independent functioning scale which reflects overall level of disability, and rates functioning relative to community norms.

Current cognitive ability

Current cognitive ability was assessed using a speed of processing task, the RBANS digit symbol coding task [25], with scores categorised as: within a standard deviation of the sample mean, over a standard deviation above the mean and over a standard deviation below the mean. Data were missing for 11 % of participants who were unable to complete the task. Since they were unlikely to be missing at random and were most likely to have more cognitive dysfunction than those who completed the task, this group was retained as a separate category in analysis.

Childhood abuse

Childhood abuse, a self-reported item, was rated in accordance with standard Australian definitions for sexual

abuse, physical abuse, emotional abuse and neglect [26]. Only abuse which took place before the age of 19 years and before onset of psychotic or major affective illness was included [27].

Sociodemographic variables

Sociodemographic variables used in analysis were selected a priori based on our reading of the criminological literature. These included: sex, age, marital status, completion of final year of schooling, paid employment in the past year, current net income, homelessness in the past year and area-based level of socioeconomic disadvantage. Socioeconomic disadvantage was determined at the postcode level using the index of relative socioeconomic disadvantage derived by the Australian Bureau of Statistics (ABS) by principal components analysis of census data [28]. Quintiles were constructed, with the first quintile representing the most disadvantaged postcodes and the fifth quintile the least disadvantaged. We also included several variables capturing risky behaviours associated with victimisation in the general community, namely, lifetime alcohol abuse/dependence, lifetime cannabis and other substance abuse/dependence, and being charged or arrested in the past year.

The adult victimisation module

The adult victimisation module of the interview schedule was based on the ABS Crime and Safety Survey [29] to allow comparability with general community data. In keeping with the structure of the ABS survey, sequencing and wording of questions were designed to maximise accuracy of self-reporting. Any victimisation included physical assault, robbery, break-ins and other thefts. Violent victimisation covered physical assault (In the last 12 months did anyone, including people you know well, use force or violence against you including where you were pushed, shoved, hit or attacked with a weapon?) and robbery (How many times in the last 12 months while someone was stealing or attempting to steal from you were you physically attacked or threatened with violence, including where you were pushed, shoved, hit or attacked with a weapon?). General community estimates for violent victimisation were provided by the ABS in a special request for data extracts—by age group and sex to match the psychosis survey data—from its Crime Victimization Survey 2009–2010 [30] in which 28,554 people were interviewed.

Analysis was undertaken using IBM SPSS Statistics 21. Logistic regression was used to examine bivariate and multivariable relationships between the independent variables and the dependent variable, violent victimisation. Multivariable modelling was done in three successive

stages. The first model included established risk factors (sociodemographic characteristics and risky behaviours) associated with victimisation in the general community. The second model added psychiatric clinical profile data and cognition. The third model added childhood abuse. This final model was then rerun, stratified by sex, to explore different patterns of association for men and women.

This study was approved by institutional human research ethics committees at each of the study sites. All participants provided written, informed consent prior to participation.

Results

The proportion of adults with a psychotic disorder reporting any victimisation in the 12 months prior to interview was 38.6 % (males 37.4 %, females 40.5 %). The percentage for violent victimisation was 16.4 % (males 15.2 %, females 18.3 %). The percentage of women who had been victimised was higher than the percentage of men for both any and violent victimisation, but the differences were not statistically significant (see Table 1).

Figure 1 compares rates of violent victimisation in the psychosis survey sample with general community estimates by sex and age group. The rate of violent victimisation (16.4 %) was 4.8 times higher among survey participants compared to the general community (3.4 %), and was higher across all age groups, except for women aged 55–64 years where the rate for women with a psychotic illness was fractionally lower than that for women in the community. The differential between the two data sources, however, was greater for women: women with psychotic illness had rates of violent victimisation 6.5 times higher than women in the community, compared to men with psychotic illness who had rates 3.8 times higher than men in the community.

Tables 2 and 3 show the distribution of all the variables used in analysis by violent victimisation status. Odds ratios

with their 95 % confidence intervals indicate the strength of the bivariate relationship between each of these variables and violent victimisation.

Established risk factors (sociodemographic characteristics and risky behaviours) were entered into the first of the multivariable models (Online Resource 1: Supplementary Table 1). Female sex, younger age group, living in the most disadvantaged neighbourhoods, being homeless in the past year, a lifetime history of alcohol abuse/dependence and being charged or arrested in the past year were all significantly associated with violent victimisation. Being indigenous, significant in bivariate analysis, was not significant in this model. In Model 2, variables related to clinical profile were added to the established risk factors. The pattern of significance for the established risk factors remained the same. Of the clinical variables, having a manic episode in the previous year, deliberately self-harming in the previous year and premorbid personality disorder were significantly associated with violent victimisation. Model 3 built on Model 2 by adding experience of childhood abuse as an independent variable. Childhood abuse was significantly associated with violent victimisation. The pattern of significance for known risk factors and clinical profile remained the same as in Model 2, except for female sex and premorbid personality disorder, which dropped out of significance. Data for all three multivariable models are provided in Online Resource 1: Supplementary Table 1. Risk factors significantly associated with victimisation in the final model, Model 3, are summarised in Table 4.

We then stratified Model 3 by sex in order to explore different patterns of association for men and women (Online Resource 1: Supplementary Table 2). Stratification changed the pattern of associations somewhat. Being homeless in the past year was significantly associated with violent victimisation for both men and women. Age group was significant for women for all age groups below the referent group of 55–64 years; for men, odds ratios were elevated but significant only for the age group 45–54 years. For men, additional significant variables were: being

Table 1 Prevalence of criminal victimisation in the 12 months prior to interview, by sex (*N*, %)

	National psychosis survey					
	Total (<i>N</i> = 1825)					
	Male		Female		Total	
<i>N</i>	%	<i>N</i>	%	<i>N</i>	%	
Violent victimisation	165	15.2	135	18.3	300	16.4
Any victimisation (physical assault, robbery, break-ins and other theft)	406	37.4	299	40.5	705	38.6

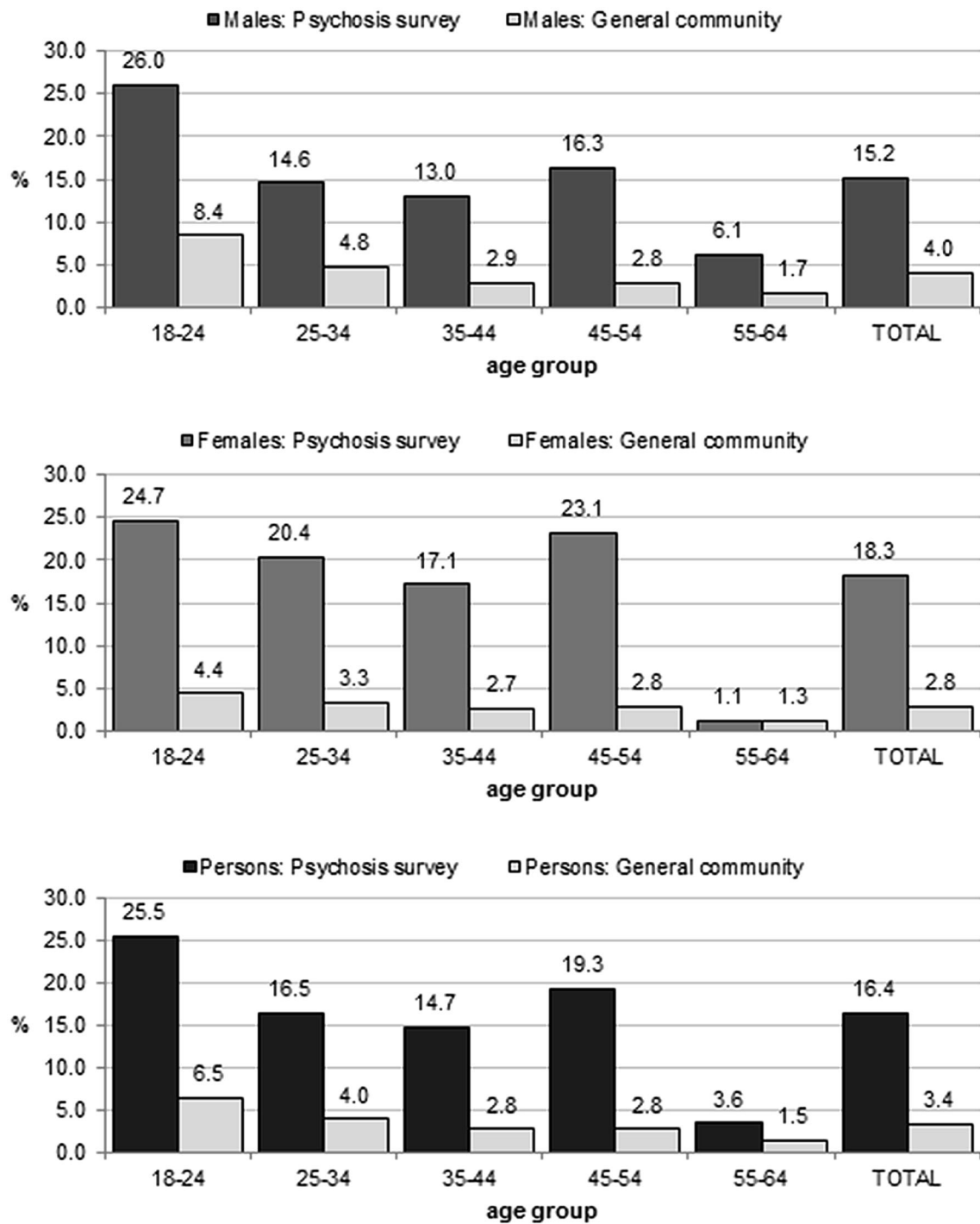


Fig. 1 Violent victimisation in the 12 months prior to interview by sex and age group: national psychosis survey and general community estimates. Data extracted by the Australian Bureau of Statistics (ABS)

from the ABS Crime Victimization Survey 2009–2010 [30] were used as supplied

charged or arrested in the previous year, having a manic episode in the previous year, and childhood abuse. For women, the additional significant variables were: living in the most disadvantaged neighbourhoods, a lifetime history of alcohol abuse/dependence, and deliberately self-harming in the previous year.

Discussion

Our nationally representative sample of 1825 adults with a psychotic disorder constitutes, to our knowledge, the largest interview-based study of adult victimisation in severe mental illness to date. It is one of only a few studies able to

Table 2 Bivariate analyses: prevalence of known sociodemographic and behavioural risk factors for violent victimisation by victim status (*N*, %), and unadjusted odds ratios (uOR) with 95 % confidence intervals (CI) for the association of victimisation with these known risk factors

Known risk factors (sociodemographic and behavioural)	No violent victimisation (<i>N</i> = 1525)		Violent victimisation (<i>N</i> = 300)		uOR	95 % CI
	<i>N</i>	%	<i>N</i>	%		
Female sex	603	39.5	135	45.0	1.25	0.98–1.61
Age group						
18–24	152	10.0	52	17.3	9.29	3.88–22.26 ^a
25–34	475	31.1	94	31.3	5.38	2.31–12.51 ^a
35–44	422	27.7	73	24.3	4.70	2.01–11.01 ^a
45–54	313	20.5	75	25.0	6.51	2.77–15.27 ^a
55–64	163	10.7	6	2.0	REF	
Indigenous	67	4.4	23	7.7	1.81	1.11–2.95 ^a
Marital status						
Single, never married	931	61.0	186	62.0	REF	
Currently married or defacto	265	17.4	47	15.7	0.89	0.63–1.26
Currently separated, divorced, widowed	329	21.6	67	22.3	1.02	0.75–1.38
Did not complete final year of school	1043	68.4	208	69.3	1.04	0.80–1.37
Did not have paid employment in the past year	1030	67.5	199	66.3	0.95	0.73–1.23
Current net income						
Less than \$300 per fortnight	140	9.2	25	8.3	0.86	0.46–1.58
Between \$300–\$499 per fortnight	172	11.3	37	12.3	1.03	0.59–1.81
Between \$500–\$799 per fortnight	899	59.0	181	60.3	0.96	0.60–1.54
Between \$800–\$1000 per fortnight	199	13.0	33	11.0	0.80	0.45–1.41
More than \$1000 per fortnight	115	7.5	24	8.0	REF	
Socioeconomic status of neighbourhood						
1st quintile: most disadvantaged	302	19.8	73	24.5	1.68	1.04–2.71 ^a
2nd	350	23.0	68	22.8	1.35	0.84–2.19
3rd	439	28.8	84	28.2	1.33	0.84–2.12
4th	244	16.0	46	15.4	1.31	0.79–2.19
5th quintile: least disadvantaged	188	12.3	27	9.1	REF	
Homeless, past year	158	10.4	75	25.0	2.88	2.12–3.93 ^a
Alcohol abuse/dependence, lifetime	728	47.7	193	64.3	1.98	1.53–2.55 ^a
Cannabis, other substance abuse/dependence, lifetime	800	52.5	195	65.0	1.68	1.30–2.18 ^a
Charged or arrested, past year	133	8.7	74	24.7	3.43	2.50–4.71 ^a

^a The confidence interval does not cross unity

draw population comparisons and, together with Walsh et al. [15], one of the most comprehensive with regard to the variables available for analysis.

We found that more than one in three (38.6 %) adults with a psychotic disorder had been victimised over a 12-month period and 16.4 % had experienced violent victimisation. The experience of violent victimisation was 4.8 times higher than the Australian general community estimate of 3.4 % for the same time period and age group. By comparison, offending rates for the psychosis survey sample over the same time period were markedly lower than their victimisation rates: 11.3 % of participants had

been charged or arrested for any offence [19], and 2.0 % of participants had committed a violent crime (unpublished data).

Our annual rate of violent victimisation (16.4 %) is close to the 17.9 % reported in the first Australian psychosis survey in 1997 [31]. Many [7, 9, 32], but not all [8, 15], high quality, comparable studies have reported similar rates. A number of studies have been able to utilise a representative sample of people with severe mental illness and survey them using comparable questions to permit comparison with population data. A recent study based on the Crime Survey of England [7] reported a prevalence of

Table 3 Bivariate analyses: prevalence of clinical factors and childhood abuse by victim status (*N*, %), and unadjusted odds ratios (uOR) with 95 % confidence intervals (CI) for the association of victimisation with clinical factors and childhood abuse

	No violent victimisation (<i>N</i> = 1525)		Violent victimisation (<i>N</i> = 300)		uOR	95 % CI
	<i>N</i>	%	<i>N</i>	%		
<i>Clinical profile</i>						
<i>Diagnosis</i>						
Schizophrenia	736	48.3	121	40.3	REF	
Schizoaffective	239	15.7	54	18.0	1.37	0.97–1.96
Bipolar disorder with psychotic features	258	16.9	61	20.3	1.44	1.02–2.02 ^c
Depressive psychosis	63	4.1	18	6.0	1.74	0.99–3.04
Delusional and other nonorganic psychosis	73	4.8	19	6.3	1.58	0.92–2.72
Symptomatic but did not meet full ICD-10 criteria	156	10.2	27	9.0	1.05	0.67–1.65
<i>Course of disorder</i>						
Single episode	125	8.2	22	7.3	REF	
Multiple episodes: good recovery in between	467	30.6	75	25.0	0.91	0.54–1.53
Multiple episodes: partial recovery in between	476	31.2	104	34.7	1.24	0.75–2.05
Continuous chronic illness	304	19.9	72	24.0	1.35	0.80–2.27
Continuous chronic illness with deterioration	153	10.0	27	9.0	1.00	0.54–1.85
<i>Onset age group</i>						
Under 20 years	585	38.6	134	44.8	1.86	1.16–2.99 ^c
20–34 years	744	49.1	142	47.5	1.55	0.97–2.48
35–64 years	187	12.3	23	7.7	REF	
Hallucinations, past year	819	53.7	200	66.7	1.72	1.33–2.24 ^c
Delusions, past year	902	59.1	209	69.7	1.59	1.22–2.07 ^c
Manic episode, past year	318	20.9	110	36.7	2.20	1.68–2.86 ^c
Subjective thought disorder, past year	479	31.4	111	37.0	1.28	0.99–1.66
Depression, past year	789	51.7	206	69.7	2.04	1.57–2.66 ^c
Anxiety, past year	889	58.3	203	68.7	1.50	1.15–1.95 ^c
Suicidal ideation, past year	408	26.8	127	42.3	2.01	1.56–2.60 ^c
Deliberate self-harm, past year	213	14.0	90	30.0	2.64	1.98–3.52 ^c
Premorbid personality disorder	190	12.5	62	20.7	1.83	1.33–2.52 ^c
Lack of insight	360	23.6	76	25.3	1.10	0.82–1.46
<i>Global independent functioning,^a past year</i>						
No or only mild disability	374	24.5	64	21.3	REF	
Somewhat disabled	403	26.4	67	22.3	0.97	0.67–1.41
Moderately disabled	410	26.9	92	30.7	1.31	0.92–1.86
Significantly, extremely, totally disabled	338	22.2	77	25.7	1.33	0.93–1.91
<i>Current cognitive function^b</i>						
Unable to complete test	170	11.1	36	12.0	1.11	0.68–1.81
>1 standard deviation below mean	200	13.1	33	11.0	0.86	0.53–1.42
Within 1 standard deviation of mean	935	61.3	189	63.0	1.06	0.74–1.53
>1 standard deviation above mean	220	14.4	42	14.0	REF	
<i>Childhood abuse</i>						
Childhood abuse prior to illness onset	423	27.7	135	45.0	2.13	1.65–2.75 ^c

^a Multidimensional scale of independent functioning [24]^b Digit symbol coding task [25]^c The confidence interval does not cross unity

Table 4 Multivariable analyses: adjusted odds ratios (aOR) and 95 % confidence intervals (CI) for significant correlates of violent victimisation in the 12 months prior to interview from the final model (Model 3) including known risk factors, clinical profile and childhood abuse

	Final model for known risk factors, clinical profile, childhood abuse	
	aOR	95 % CI
Age group		
18–24	5.92	2.23–15.71 ^a
25–34	3.47	1.40–8.63 ^a
35–44	3.36	1.37–8.24 ^a
45–54	6.02	2.47–14.67 ^a
55–64	REF	
Socioeconomic status of neighbourhood		
1st quintile: most disadvantaged	2.06	1.19–3.54 ^a
2nd	1.61	0.94–2.77
3rd	1.72	1.02–2.91 ^a
4th	1.47	0.83–2.59
5th quintile: least disadvantaged	REF	
Homeless, past year	1.97	1.38–2.82 ^a
Alcohol abuse/dependence, lifetime	1.52	1.10–2.10 ^a
Charged or arrested, past year	2.74	1.90–3.94 ^a
Manic episode, past year	1.80	1.28–2.52 ^a
Deliberate self-harm, past year	1.55	1.07–2.26 ^a
Childhood abuse prior to illness onset	1.69	1.25–2.27 ^a

^a The confidence interval does not cross unity

18.8 % for severe mental illness, a fivefold increase over community rates—figures very similar to our own. However, differences in prevalences used in denominators and numerators have resulted in some very different rate ratios. Kamperman et al. using the crime victimisation scale from the Dutch Crime and Victimisation Survey reported very similar relative rates to us (4.85) but their reported prevalences for people with severe mental illness and the general population were much lower. Conversely, Teplin et al. [9], using the United States Bureau of Justice Statistics National Crime Victimization Survey, reported a similar annual prevalence of physical assault but their high prevalence ratio of 13.5 reflects a much lower community prevalence.

In keeping with our hypothesis, we found a number of sociodemographic and behavioural risk factors that are predictive of violent victimisation in the general community were significantly associated with violent victimisation in our sample of adults with a psychotic disorder, independently of clinical risk factors and exposure to childhood abuse. These included: younger age group; living in the most disadvantaged neighbourhoods; being homeless in the past year; a lifetime history of alcohol abuse/dependence; and being charged or arrested in the past year. Surprisingly, despite their significance in bivariate analyses, very few clinical variables remained significant in the multivariable

model, other than an episode of mania in the previous year and deliberate self-harming in the previous year. Overall independent global functioning and cognitive function were not significant in either bivariate or multivariable analyses. Consistent with Goodman et al. [13], childhood abuse was independently associated with adult victimisation.

These data highlight that, just as social disadvantage and engagement in risky lifestyle behaviours are important risk factors for victimisation for the general community, so too they are for people with a psychotic disorder. However, people with psychotic disorders are much more likely to be exposed to these risk factors compared to the general community. We have previously reported that this sample of people with psychotic illness were less likely to be employed (32.7 % over 1 year compared to 72.4 % for the general community for a 1-month period), and more likely to be currently homeless (5.2 % compared to 0.5 %), not to have completed schooling (31.5 % compared to 53.0 %), to have a lifetime history of alcohol abuse/dependence (50.5 % compared to 24.7 %) or a history of illicit substance abuse/dependence (54.5 % compared to 8.9 %) [19].

Similar to many [7, 9], but not all [13], studies that have compared men and women with severe mental illness, we found that women were at increased risk of victimisation. This is in contrast to general community data which show

lower levels of victimisation for women compared to men. Of particular concern was the very large differential between women in our survey and women in the general community, with a concomitant narrowing of the gap in rates between men and women with psychotic disorders. One key mechanism may be the greatly increased exposure of women with severe mental illness to sociodemographic and behavioural factors associated with risk of victimisation compared to women in the general community. For example, women in our survey were 2.8 times as likely as women in the general community to have lifetime alcohol abuse/dependence and 7.2 times as likely to have lifetime substance abuse/dependence; the respective figures for men were 1.7 and 5.3 [19]. Some important differences emerged when the analyses were stratified by sex: prior criminal offending over the past 12 months and exposure to abuse in childhood were no longer associated with adult victimisation for women although they remained significant for men. Younger age, homelessness, residence in disadvantaged areas, alcohol abuse/dependence and self-harming were significant correlates of victimisation for women. Of concern for women were the high odds ratios for victimisation for all age groups below the reference group of 55–64 years. This was also apparent for men, but less strikingly so. This pattern is out of keeping with general community data that show strong attenuation of risk with increasing age. It suggests that potentially protective structural and/or behavioural mechanisms that come into play relatively early in the life course in the general population may not operate for people with severe mental illness until much later. Homelessness doubled the odds of victimisation for both men and women (odds ratio 1.95, 95 % confidence interval 1.22–3.13 for men; odds ratio 2.15, 95 % confidence interval 1.16–4.01 for women). The rate of homelessness in our sample was tenfold the population rate [19]. As such, it remains a key vulnerability factor, highlighting a critical role for mental health services in providing access to adequate accommodation for those under their care.

Understanding the mechanism of vulnerability for victimisation is important to the development of risk reducing strategies. Consistent with routine activities theory in criminology [33, 34], our sample is at higher risk of victimisation than the general community through exposure to adverse personal events and unsatisfactory living arrangements, including the risky situational effects of homelessness and living in close geographic proximity to offender populations. This results in the convergence in space and time of people with psychotic disorders with motivated offenders, with an absence of capable guardians to protect them. Their attraction as so-called “suitable targets” (convenient, desirable and vincible) is enhanced as a result of: their high rates of substance abuse; likelihood of an

arrest history that raises the possibility of retaliatory action and reduces the propensity to report victimisation to police; a tendency to be alone; and illness-associated risky behaviours. Furthermore, many people in the community have both the resilience and resources to take effective precautions to decrease their exposure to risky situations, thereby gaining ‘immunity’ from further victimisation [35, 36]. However, it is likely that immunity will elude people with severe mental illness, whose exposure to the risk factors described above increases their liability for further victimisation. Finally, collective efficacy is an important protective factor in the criminological literature capturing social control and cohesion at the community level [37]. However, people with psychotic disorders are less likely to live in communities with strong collective efficacy. These theories have special relevance for women with severe mental illness [11]: their illness appears to increase markedly their exposure to criminological factors, greatly increasing their risk of victimisation relative to women in the community and narrowing the gap between them and men with severe mental illness. From a clinical perspective, aspects of poor social cognition associated with psychotic illness such as poor social cue identification and emotion regulation [38] may reduce the capacity of a person with a psychotic disorder to protect themselves from victimisation. Mania and self-harm, the latter in as much as it may be indicative of borderline personality traits, are associated with impulsivity and risky behaviours, thereby increasing likelihood of victimisation of those affected. A final important clinical consideration is the enduring impact of childhood abuse, a potential risk factor for adult victimisation [13] and one that is highly prevalent among people with psychotic disorders [17, 27]. In combination, situational vulnerability, lack of immunity, reduced collective efficacy and illness-related factors may render people with psychotic disorders, in the words of Silver et al. [5], unable to engage in alert self-protection and self-defence and, as a consequence, particularly vulnerable to victimisation.

Advantages and limitations

This study has a number of advantages over previously published work. It is one of the largest interview-based studies to date and one of the most comprehensive worldwide, with over 1500 items collected contemporaneously available for modelling risk factors for victimisation. In addition, the use of an epidemiological sampling protocol to draw a representative sample ensures findings are generalisable to adults with psychotic disorders in contact with public mental health treatment services in developed countries. Ratings on clinical variables were made by interviewers who were mental health

professionals, experienced in assessing psychopathology and further trained in the other assessment instruments. Victimization data were based on self-report. An advantage of self-reported data is that they capture incidents which are not reported to police leading to under-reporting on official police records. While self-reported data are prone to recall biases and other inaccuracies, we used questions from ABS Crime and Safety Survey [29] structured and sequenced to maximise recall and minimise reporting errors. Studies examining self-reports in victims with mental illness have found stable reporting over time [14, 39] with a tendency to under- rather than over-report [9]. An important disadvantage is that it has not been possible to examine causality and potential bi-directionality in these cross-sectional data. In addition, more details on the circumstances of a victimisation event, including active symptomatology at the time, may provide greater insight into context-specific risk factors for victimisation and clinical targets for intervention. Finally, although we were able to get comparative data on population rates based on the same ABS questions, we were unable to examine and compare risk factors within a community sample.

Clinical implications

Our findings have important clinical implications. Almost two in five people with a psychotic disorder are victimised annually. Victimization impacts on psychopathology, course of illness and quality of life [11], and high rates of post-traumatic stress disorder have been reported for victimised adults [40, 41]. However, neither childhood nor adult victimisation, nor their sequelae, especially post-traumatic stress disorder, are well recognised in clinical practice, leading to poor management and treatment of these problems in affected people with severe mental illness [5, 14, 16, 40, 42]. Finally, psychosocial therapies, such as therapies to improve social cognition, are needed to help people with severe mental illness recognise and manage potentially threatening situations and adopt self-protective behaviours in order to reduce their risk of victimisation.

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Compliance with ethical standards

Ethical standards The authors confirm that this study was approved by the appropriate institutional human research ethics committees at each of the study sites, and have therefore been performed in accordance with the ethical standards laid down in the 1964 Declaration of Helsinki and its later amendments. All participants provided written, informed consent prior to participation.

Conflict of interest V. Morgan, F. Morgan, S. Shah, G. Valuri and A. Jablensky declare that they have no conflict of interest. C. Galletly has received speaker honoraria and conference support from Lundbeck, conference support from Servier and advisory panel fees from Janssen Cilag. She is/has been involved in clinical trials with Lundbeck, Forum Pharmaceuticals and Janssen Cilag.

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