TECHNICAL COMMENTARY

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Forensic settings

Introduction

Prevalence quantifies the proportion of individuals in a population who have a disease during a specific time period. Many studies have reported a high prevalence of various health problems, including mental health problems, among people in forensic settings. This summary table presents the available evidence on the prevalence of schizophrenia in forensic settings (such as prisons).

Method

We have included only systematic reviews (systematic literature search, detailed methodology with inclusion/exclusion criteria) published in full text, in English, from the year 2000 that report results separately for people with a diagnosis of schizophrenia, schizoaffective disorder, schizophreniform disorder or first episode schizophrenia. Reviews were identified by searching the databases MEDLINE, EMBASE, CINAHL, Current Contents, PsycINFO and the Cochrane library. Hand searching reference lists of identified reviews was also conducted. When multiple copies of reviews were found, only the most recent version was included. Reviews with pooled data are given priority for inclusion.

Review reporting assessment was guided by the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) checklist that describes a preferred way to present a meta-analysis[1]. Reviews with less than 50% of items checked have been excluded from the library. The PRISMA flow diagram is a suggested way of providing information about studies included and excluded with reasons for exclusion. Where no flow diagram has been presented by individual reviews, but identified studies have been described in the text, reviews have been checked for this item. Note that early reviews may have been guided by less stringent reporting checklists than the PRISMA, and that some reviews may have been limited by journal guidelines.

Evidence was graded using the Grading of Recommendations Assessment, Development and Evaluation (GRADE) Working Group approach where high quality evidence such as that gained from randomised controlled trials (RCTs) may be downgraded to moderate or low if review and study quality is limited, if there is inconsistency in results, indirect comparisons, imprecise or sparse data and high probability of reporting bias. It may also be downgraded if risks associated with the intervention or other matter under review are high. Conversely, low quality evidence such as that gained from observational studies may be upgraded if effect sizes are large, there is a dose dependent response or if results are reasonably consistent, precise and direct with low associated risks (see end of table for an explanation of these terms)[2]. The resulting table represents an objective summary of the available evidence, although the conclusions are solely the opinion of staff of NeuRA (Neuroscience Research Australia).

Results

We found five systematic reviews that met our inclusion criteria[3-7].

- Moderate to high quality evidence suggests the overall prevalence of any psychotic disorder in prisoners is around 3.6%. There were higher prevalence rates in low- to middle-income countries (5.5-6.2%) than in high-income countries (3.5%). The rate of psychotic disorders was 15.8 times higher in prisoners in low and middle-income countries than in the general population.
- Moderate to high quality evidence finds the prevalence of schizophrenia or other psychotic disorders in older prisoners (> 50

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years) is around 5.5%, from studies conducted in the USA, UK, and France.

- Among adolescents in juvenile forensic settings in western countries, high quality evidence finds the prevalence rate of any psychotic disorder is around 3.3% for males and 2.7% for females.
- Among offenders on probation, moderate to low quality evidence finds the prevalence of schizophrenia ranges between 1.7% and 30%.

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Baranyi G, Scholl C, Fazel S, Patel V, Priebe S, Mundt AP

Severe mental illness and substance use disorders in prisoners in low-income and middle-income countries: a systematic review and meta-analysis of prevalence studies

The Lancet Global Health 2019; 7: e461-e71

View review abstract online

Comparison	**Prevalence of non-affective psychosis in prisoners in low and middle-income countries.**
Summary of evidence	**Moderate quality evidence (large sample, inconsistent, some imprecision, direct) finds the overall prevalence rate of non-affective psychosis in prisoners in low and middle-income countries is 6.2%, and the prevalence ratio (compared to general population rates in these countries), is 15.8.**
Prevalence of non-affective psychosis	
22 studies, N = 13,135 1-year prevalence rate of non-affective psychosis = 6.2%, 95%CI 4.0 to 8.6%, I^2 = 96% Prevalence ratio (compared to general population rates) = 15.8, 95%CI 8.7 to 28.9, I^2 = 97% Multivariate model showed higher estimates in samples recruited at prison intake.	
Consistency in results‡	Inconsistent
Precision in results§	Appears precise for rates and imprecise for prevalence ratio.
Directness of results‖	Direct

Di Lorito C, Vollm B, Dening T

Psychiatric disorders among older prisoners: A systematic review and comparison study against older people in the community

Aging & Mental Health 2018; 22: 1-10

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Comparison	**Prevalence of schizophrenia or other psychotic disorders in**

	older prisoners (>50 years). **4 studies were conducted in the USA, 3 in the UK, and 1 in France.**
Summary of evidence	**Moderate to high quality evidence (large sample, unable to assess consistency, appears precise, direct) finds the overall prevalence of schizophrenia/psychotic disorders in older prisoners was around 5.5%.**
Prevalence of schizophrenia/psychotic disorders	
Schizophrenia/psychoses: 8 studies, N = 2,326, prevalence = 5.5%, 95%CI 5.3% to 5.7% Older prisoners were found to have a higher risk of schizophrenia/psychosis than people in the community, but this increase was not significantly different (RR = 6.0, $p > 0.05$).	
Consistency in results‡	Unable to assess; no measure of consistency is reported.
Precision in results§	Appears precise for prevalence; unable to assess RR (no CIs reported)
Directness of results‖	Direct

Fazel S, Seewald K

Severe mental illness in 33 588 prisoners worldwide: systematic review and meta-regression analysis

British Journal of Psychiatry 2012; 200: 364 - 373

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Comparison	**Prevalence of psychotic disorders in forensic settings.** **Note: samples included mostly schizophrenia spectrum disorders, but also other psychotic disorders.**

Summary of evidence	**Moderate to high quality evidence (large sample, inconsistent, appears precise, direct) suggests the overall prevalence of any psychotic disorder in prisoners is around 3.6%. There was higher prevalence of psychotic disorders in prisoners from low- to middle-income countries (5.5%) vs. prisoners from high-income countries (3.5%), and no differences between males and females (3.6% for males and 3.9% for females), age, study year, inmate status, or diagnostic method.**
Prevalence of psychotic disorders	
Overall prevalence of psychotic disorders in prison populations; 74 studies, N = 30,365, prevalence = 3.6%, 95%CI 3.1% to 4.1%, I^2 = not reported *There was significantly higher prevalence in low- to middle-income countries than in high-income countries ($Q_B p = 0.035$);* Low- to middle-income countries: 5.5% 95%CI 4.2% to 6.8%, I^2 = 87.5%, $p < 0.0001$ High-income countries: 3.5% 95%CI 3.0% to 3.9%, I^2 = 52.3%, $p = 0.05$ *There were no significant differences in prevalence rates between males and females ($Q_B p = 0.80$);* Female prisoners: N = 3,821, 3.9% 95%CI 2.7% to 5.0%, I^2 = 68%, $p < 0.0001$ Male prisoners: N = 26,814, 3.6%, 95%CI 3.1% to 4.2%, I^2 = 83%, $p < 0.0001$ There were also no differences according to age, study year, studies from USA vs. rest of world, inmate status (detainees/remand vs. sentenced), or diagnostic method (ICD vs. DSM).	
Consistency in results	Inconsistent
Precision in results	Appears precise
Directness of results	Direct

Fazel S, Khosla V, Doll H, Geddes J

Mental Disorders Among Adolescents in Juvenile Detention and Correctional Facilities: A Systematic Review and Meta-regression Analysis of 25 Surveys

Journal of the American Academy of Child and Adolescent Psychiatry, 2008; 47(9):1010-1019

View review abstract online

Comparison	**Prevalence of psychotic disorders in adolescents in juvenile detention and correctional facilities in western countries.** **Note: samples included mostly schizophrenia spectrum disorders, but also bipolar disorder and delusional disorder.**
Summary of evidence	**High quality evidence (large sample, consistent, appears precise, direct) suggests overall prevalence of any psychotic disorder is around 3.3% for male adolescents and 2.7% for female adolescents in juvenile forensic settings in western countries.**
Prevalence of psychotic disorders	
12 surveys, N = 14,710 Females: prevalence = 2.7% 95%CI 2.0% to 3.4%, I^2 = 0%, p = 0.51 Males: prevalence = 3.3%, 95%CI 3.0% to 4.6%, I^2 = 42.7%, p = 0.07	
Consistency	Consistent
Precision	Appears precise
Directness	Direct

Sirdifield C

The prevalence of mental health disorders amongst offenders on probation: A literature review

Journal of Mental Health, 2012; 21(5): 485-498

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Comparison	**Prevalence of schizophrenia in offenders on probation.** **Note: some studies included samples with other psychotic disorders.**
Summary of evidence	**Moderate to low quality evidence (large sample, unable to assess consistency or precision, direct) suggests the prevalence rates of schizophrenia among offenders on probation range between 1.7% and 30%.**

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Prevalence of schizophrenia/psychotic disorders	
7 samples, N = 3,635 Prevalence ranged between 1.7% and 30%	
Consistency	Unable to assess; no measure of consistency is reported.
Precision	Unable to assess; no measure of precision is reported.
Directness	Direct

Explanation of acronyms

CI = confidence interval, I^2 = the percentage of the variability in effect estimates that is due to heterogeneity rather than sampling error (chance), N = number of participants, *p* = statistical probability of obtaining that result ($p < 0.05$ generally regarded as significant), Q_B = test for between group differences (heterogeneity between groups of studies for an outcome of interest), RR = risk ratio, vs. = versus

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Explanation of technical terms

* Bias has the potential to affect reviews of both RCT and observational studies. Forms of bias include; reporting bias – selective reporting of results; publication bias - trials that are not formally published tend to show less effect than published trials, further if there are statistically significant differences between groups in a trial, these trial results tend to get published before those of trials without significant differences; language bias – only including English language reports; funding bias - source of funding for the primary research with selective reporting of results within primary studies; outcome variable selection bias; database bias - including reports from some databases and not others; citation bias - preferential citation of authors. Trials can also be subject to bias when evaluators are not blind to treatment condition and selection bias of participants if trial samples are small[8].

† Different effect measures are reported by different reviews.

Prevalence refers to how many existing cases there are at a particular point in time. Incidence refers to how many new cases there are per population in a specified time period. Incidence is usually reported as the number of new cases per 100,000 people per year. Alternatively some studies present the number of new cases that have accumulated over several years against a person-years denominator. This denominator is the sum of individual units of time that the persons in the population are at risk of becoming a case. It takes into account the size of the underlying population sample and its age structure over the duration of observation.

Reliability and validity refers to how accurate the instrument is. Sensitivity is the proportion of actual positives that are correctly identified (100% sensitivity = correct identification of all actual positives) and specificity is the proportion of negatives that are correctly identified (100% specificity = not identifying anyone as positive if they are truly not).

Weighted mean difference scores refer to mean differences between treatment and comparison groups after treatment (or occasionally pre to post treatment) and in a randomised trial there is an assumption that both groups are comparable on this measure prior to treatment. Standardised mean differences are divided by the pooled standard deviation (or the standard deviation of one group when groups are homogenous) that allows results from different scales to be combined and compared. Each study's mean difference is then given a weighting depending on the size of the sample and the variability in the data. 0.2 represents a small effect, 0.5 a medium effect, and 0.8 and over represents a large effect[8].

Odds ratio (OR) or relative risk (RR) refers to the probability of a reduction (< 1) or an increase (> 1) in a particular outcome in a treatment group, or a group exposed to a risk factor, relative to the comparison group. For example, a RR of 0.75 translates to a reduction in risk of an outcome of 25% relative to those not receiving the treatment or not exposed to the risk factor. Conversely, a RR of 1.25 translates to an increased risk of 25% relative to those not receiving treatment or not having been exposed to a risk factor. A RR or OR of 1.00 means there is no difference between groups. A medium effect is considered if RR > 2 or < 0.5 and a large effect if RR > 5 or < 0.2[9]. lnOR stands for logarithmic OR where a lnOR of 0 shows no difference between groups. Hazard ratios

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measure the effect of an explanatory variable on the hazard or risk of an event.

Correlation coefficients (eg, r) indicate the strength of association or relationship between variables. They can provide an indirect indication of prediction, but do not confirm causality due to possible and often unforseen confounding variables. An r of 0.10 represents a weak association, 0.25 a medium association and 0.40 and over represents a strong association. Unstandardised (*b*) regression coefficients indicate the average change in the dependent variable associated with a 1 unit change in the independent variable, statistically controlling for the other independent variables. Standardised regression coefficients represent the change being in units of standard deviations to allow comparison across different scales.

‡ Inconsistency refers to differing estimates of effect across studies (i.e. heterogeneity or variability in results) that is not explained by subgroup analyses and therefore reduces confidence in the effect estimate. I^2 is the percentage of the variability in effect estimates that is due to heterogeneity rather than sampling error (chance) - 0% to 40%: heterogeneity might not be important, 30% to 60%: may represent moderate heterogeneity, 50% to 90%: may represent considerable heterogeneity and over this is considerable heterogeneity. I^2 can be calculated from Q (chi-square) for the test of heterogeneity with the following formula[8];

$$I^2 = \left(\frac{Q - df}{Q}\right) \times 100\%$$

§ Imprecision refers to wide confidence intervals indicating a lack of confidence in the effect estimate. Based on GRADE recommendations, a result for continuous data (standardised mean differences, not weighted mean differences) is considered imprecise if the upper or lower confidence limit crosses an effect size of 0.5 in either direction, and for binary and correlation data, an effect size of 0.25. GRADE also recommends downgrading the evidence when sample size is smaller than 300 (for binary data) and 400 (for continuous data), although for some topics, these criteria should be relaxed[10].

‖ Indirectness of comparison occurs when a comparison of intervention A versus B is not available but A was compared with C and B was compared with C that allows indirect comparisons of the magnitude of effect of A versus B. Indirectness of population, comparator and/or outcome can also occur when the available evidence regarding a particular population, intervention, comparator, or outcome is not available and is therefore inferred from available evidence. These inferred treatment effect sizes are of lower quality than those gained from head-to-head comparisons of A and B.

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