TECHNICAL COMMENTARY

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SCHIZOPHRENIA LIBRARY

Sex differences

Introduction

Prevalence quantifies the proportion of individuals in a population who have a disease during a specific time-period, while incidence refers to the number of new cases of disease that develop in a population during a specific time-period. In disorders of short duration, incidence and prevalence rates may be similar, however with disorders of long duration such as with schizophrenia there can be variation between the two.

Method

We have included only systematic reviews with detailed literature search, methodology, and inclusion/exclusion criteria that were published in full text, in English, from the year 2000. Reviews were identified by searching the databases MEDLINE, EMBASE, and PsycINFO. Reviews with pooled data are prioritized for inclusion. Reviews reporting fewer than 50% of items on the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA[1]) checklist have been excluded from the library. The evidence was graded guided by the Grading of Recommendations Assessment, Development and Evaluation (GRADE) Working Group approach[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 four systematic reviews that met our inclusion criteria[3-6].

- Moderate quality evidence suggests no differences in the overall prevalence of schizophrenia between males and females.
- Moderate to high quality evidence found the prevalence of any psychotic disorder was similar in male and female adolescents in juvenile detention (2.7% vs. 2.9%).
- Moderate quality evidence found similar prevalence rates of schizophrenia in homeless males and females in St Louis and Madrid. However, there were higher prevalence rates of schizophrenia in homeless women than in homeless men in Melbourne, Munich, Baltimore, and Philadelphia.

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Beaudry G, Yu R, Langstrom N, Fazel S

An Updated Systematic Review and Meta-regression Analysis: Mental Disorders Among Adolescents in Juvenile Detention and Correctional Facilities

Journal of the American Academy of Child and Adolescent Psychiatry 2021; 60(1): 46-60

View review abstract online

Comparison	**Prevalence of psychotic disorders in adolescents in juvenile detention and correctional facilities.** **Samples included schizophrenia spectrum disorders as well as other psychotic disorders.**
Summary of evidence	**Moderate to high quality evidence (large sample, some inconsistency, precise, direct) suggests the prevalence of any psychotic disorder is around 2.7% for male adolescents and 2.9% for female adolescents in juvenile forensic settings.**
Prevalence of psychotic disorders	
21 studies, N = 27,801 Females: prevalence = 2.9% 95%CI 2.4% to 3.5%, I^2 = 0%, p = 0.916 Males: prevalence = 2.7%, 95%CI 2.0% to 3.4%, I^2 = 76%, p < 0.001 There were no moderating effects of study characteristics.	
Consistency in results‡	Consistent for females, inconsistent for males
Precision in results§	Precise
Directness of results‖	Direct

Folsom D, Jeste DV

Schizophrenia in homeless persons: a systematic review of the literature

Acta Psychiatrica Scandinavica 2002; 105(6): 404-413

View review abstract online

Sex differences

Comparison	**Prevalence of schizophrenia and related psychotic disorders in homeless males vs. females.**
Summary of evidence	**Moderate quality evidence (large sample, inconsistent, unable to assess precision, direct) suggests higher prevalence rates of schizophrenia in homeless women than in homeless men in Melbourne, Munich, Baltimore, and Philadelphia. Prevalence rates were similar between males and females in St Louis and Madrid.**
Prevalence of schizophrenia	
10 studies, N = 3,805 *Schizophrenia was more common in homeless women than in homeless men in;* Melbourne: 35% of the homeless women were diagnosed with schizophrenia vs. 8% of men Munich: 34% of the homeless women were diagnosed with schizophrenia vs. 12% of men Baltimore: 17% of homeless women were diagnosed with schizophrenia vs.12% of men Philadelphia: 11% of homeless women received treatment for schizophrenia vs. 7% of men *Prevalence rates were similar in;* St Louis: 4% of the homeless women were diagnosed with schizophrenia vs. 6% of men Madrid: there were similar rates of schizophrenia in women and men	
Consistency in results	Appears inconsistent
Precision in results	No measure of precision is reported.
Directness of results	Direct

Goldner EM, Hsu L, Waraich P, Somers JM

Prevalence and incidence studies of schizophrenic disorders: a systematic review of the literature

Canadian Journal of Psychiatry 2002; 47(9): 833-843

View review abstract online

Comparison	**Sex differences in worldwide prevalence rates.**
Summary of evidence	**Moderate quality evidence (large samples, inconsistent, unable to assess precision, direct) suggests no differences in the**

	prevalence of schizophrenia.
Prevalence of schizophrenia	
Lifetime prevalence rates per 100 persons 10 community surveys (N ranged from 500 to 20,000) Males: 0.12 in Hong Kong to 1.9 in Puerto Rico Females: 0.07 in Taiwan to 2.6 in US	
Consistency in results	Appears inconsistent
Precision in results	No measure of precision is reported.
Directness of results	Direct

Saha S, Chant D, Welham J, McGrath J

A systematic review of the prevalence of schizophrenia

PLoS Medicine / Public Library of Science 010709 2005; 2(5): e141

View review abstract online

Comparison	**Distribution rates of the prevalence of schizophrenia with influence of sex.**
Summary of evidence	**Moderate quality evidence (large samples, unable to assess consistency or precision, direct) suggests no differences in the prevalence of schizophrenia.**
Prevalence of schizophrenia	
42 population-level studies *No difference in the distribution of the prevalence estimates for schizophrenia between males and females;* $F_{1,72} = 0.68$, $p = 0.41$ Median rate ratio (10% and 90% quantiles) = 1.11 (0.50 to 1.69)	
Consistency in results	Unable to assess; no measure of consistency is reported.
Precision in results	Unable to assess (quantiles)

Sex differences

Directness of results	Direct

Explanation of acronyms

CI = confidence interval, F = F-test of difference in variance between groups, N = number of participants, *p* = probability of obtaining that result ($p < 0.05$ generally regarded as significant)

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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[7].

† Different effect measures are reported by different reviews.

Prevalence; how many people have a particular disorder or event at a particular point in time. Incidence; how many new cases of a disorder or event per population in a specified time period.

Median rate ratio refers to the ratio between prevalence or incidence rates of two groups, based on the median rather than the mean. The median is often used as a better measure of central tendency than the mean when data are skewed. Harmonic means are also used when data are skewed and are appropriate for rate data.

Reliability and validity refers to how accurate the instrument is. Sensitivity is the proportion of actual positives that are correctly identified - 100% sensitivity = predict all people who are at high risk as developing psychosis and specificity is the proportion of negatives that are correctly identified - 100% specificity = not predicting anyone as being at high risk 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[7].

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[8]. lnOR stands for logarithmic OR where a lnOR of 0 shows no difference between groups. Hazard ratios measure the effect of an explanatory variable on the hazard or risk of an event.

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Correlation coefficients (eg, r) indicate the strength of association or relationship between variables. They are an 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 treatment effect across trials (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 be 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;

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

§ 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, this criteria should be relaxed[9].

‖ 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 so is 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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References

1. Moher D, Liberati A, Tetzlaff J, Altman DG, PRISMAGroup (2009): Preferred reporting items for systematic reviews and meta-analyses: the PRISMA statement. *British Medical Journal* 151: 264-9.
2. GRADEWorkingGroup (2004): Grading quality of evidence and strength of recommendations. *British Medical Journal* 328: 1490.
3. Goldner EM, Hsu L, Waraich P, Somers JM (2002): Prevalence and incidence studies of schizophrenic disorders: a systematic review of the literature. *Canadian Journal of Psychiatry - Revue Canadienne de Psychiatrie* 47: 833-43.
4. Saha S, Chant D, Welham J, McGrath J (2005): A systematic review of the prevalence of schizophrenia. *PLoS Medicine* 2: e141.
5. Beaudry G, Yu R, Langstrom N, Fazel S (2021): An Updated Systematic Review and Meta-regression Analysis: Mental Disorders Among Adolescents in Juvenile Detention and Correctional Facilities. *Journal of the American Academy of Child and Adolescent Psychiatry* 60(1): 46-60.
6. Folsom D, Jeste DV (2002): Schizophrenia in homeless persons: a systematic review of the literature. *Acta Psychiatrica Scandinavica* 105: 404-13.
7. CochraneCollaboration (2008): Cochrane Handbook for Systematic Reviews of Interventions. Accessed 24/06/2011.
8. Rosenthal JA (1996): Qualitative Descriptors of Strength of Association and Effect Size. *Journal of Social Service Research* 21: 37-59.
9. GRADEpro (2008): [Computer program]. Jan Brozek, Andrew Oxman, Holger Schünemann. *Version 32 for Windows*