TECHNICAL COMMENTARY

Suicide and self-harm

Introduction

The World Health Organization estimates that the global age-standardized suicide rate was 11.4 per 100,000 person-years in 2012. Most of these suicides occurred in individuals with mental illness. There has been much research dedicated to determining potential risk factors for suicide, which may have clinically important applications for prevention. Many of the risk factors for suicide in the general population apply to people with schizophrenia, however there are also factors specific to schizophrenia that may contribute to the increased risk of suicide or self-harm.

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 with pooled data were prioritised for inclusion. 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 review topics were found, only the most recent and comprehensive version was included.

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 or if there is a dose dependent response. We have also taken into account sample size and whether results are 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 20 reviews that met inclusion criteria[3-22].

Suicide completion rates

- Moderate to high quality evidence suggests the lifetime risk of suicide in people with schizophrenia is around 5.6%. Among first-admission and new-onset samples, 30.6% of all deaths were due to suicide while 4.9% of deaths were suicides in mixed samples of chronic and recent-onset patients. Clinical risk assessments generally have good predictive value for suicide completion.

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- Moderate to high quality evidence finds a large increased rate of schizophrenia in people who committed suicide. The rate was higher in Australia than in Europe, North America or Asia. Rates of schizophrenia were lower in people who committed suicide than rates of depression, alcohol use disorders or personality disorders.
- Moderate quality evidence finds a large increased rate of suicide in prisoners with schizophrenia compared to prisoners without a psychiatric disorder.
- Moderate to low quality evidence finds the number of hospital admissions per suicide is around 676, and there are 147 suicides per 100,000 inpatient years. Moderate quality evidence suggests the post-discharge suicide rate for people with psychosis is around 599 suicides per 100,000 person-years. Rates were higher in more recent samples, samples with follow-up of a year or less, and samples of suicidal patients. Rates were lower in adolescent patients.

Suicide completion risk factors

- Moderate to high quality evidence finds medium to large effects of the following risk factors for suicide completion; worthlessness, higher IQ, and poor adherence to treatment. Small effects were found for; having a history of tobacco or alcohol use, being male, and younger age. Moderate quality evidence finds medium to large effects of hopelessness, having a history of attempted suicide, shorter illness duration, and being white.
- Moderate quality evidence finds a large association between suicidal ideation and completed suicide in people with schizophrenia, with no association in people with mood disorders.
- Moderate quality evidence finds medium to large effects of increased suicide in inpatients with schizophrenia who are compulsorily detained, but decreased suicide in inpatients with affective disorder who are compulsorily detained. There were large associations between younger inpatients with schizophrenia and suicide, and older inpatients with affective disorder and suicide. There were medium-sized associations between increased suicide in inpatients with schizophrenia on agreed leave, but decreased suicide in inpatients with affective disorder on agreed leave. There was a medium-sized association between increased suicide in inpatients with affective disorder with self-harm history, and no association in inpatients with schizophrenia.
- Moderate to high quality evidence suggests the risk of suicide in patients recently discharged from hospital is associated with prior suicide attempts or ideations, unplanned discharge, depression, hopelessness, current relationship problems, and male gender.

Suicide attempt rates

- Moderate to high quality evidence finds the rate of suicide attempts in people with schizophrenia is around 27%, with rates higher when measured from the start of illness onset (46%) and lower when measured over the previous month or year (both 3%).

Suicide attempt risk factors

- Moderate to high quality evidence finds medium-sized effects of the following risk factors for suicide attempts; more psychiatric hospitalisations, depressive symptoms or a history of depression, hopelessness, and having a family history of suicide. Small effects were found for; younger age at illness onset, being male, being white, living alone, having a comorbid physical illness, using tobacco, and having a family history of psychiatric illness. Moderate quality evidence finds a medium-sized effect of having a history of suicide attempts, and small effects of alcohol or drug use.

Suicide ideation rates

- Moderate quality evidence suggests the lifetime prevalence rate of suicidal ideation is around 25.8% and the lifetime prevalence

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rate of suicide attempts is around 14.6% in patients with schizophrenia in China. Suicide ideation was higher in older Chinese patients, in outpatients, in men, in larger studies, in earlier studies, in studies using standardised questionnaires, in cross-sectional studies, and in studies conducted in eastern China. Suicide attempts were higher in older Chinese patients, in inpatients, in smaller studies, in cohort studies and in studies using unstandardised questionnaires.

Suicide ideation risk factors

- High quality evidence finds medium-sized effects of the following risk factors for suicide ideation; more psychiatric hospitalisations, depressive symptoms, and general schizophrenia symptoms.

Self-harm rates

- Moderate to high quality evidence suggests the overall proportion of patients with first-episode psychosis who report deliberate self-harm (including suicide attempts) is around 18% prior to treatment and 11% after treatment.
- Moderate to low quality evidence finds a larger proportion of cases of self-mutilation have a schizophrenia spectrum disorder than other psychiatric disorders.

Self-harm risk factors

- Moderate to high quality evidence finds a medium-sized increased risk of deliberate self-harm in people with schizophrenia with depressed mood or expressed suicide ideation, and a small effect for alcohol or substance use, younger age at onset or treatment, and longer duration of untreated psychosis. Moderate quality evidence finds a medium to large effect of increased risk of deliberate self-harm in those with a history of self-harm and a small effect in those with greater insight into the illness.

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Arsenault-Lapierre G, Kim C, Turecki G

Psychiatric diagnoses in 3275 suicides: a meta-analysis

BMC Psychiatry 2004; 4 (37): doi:10.1186/1471-244X-4-37

View review abstract online

Comparison	**Frequency of a schizophrenia diagnosis in deceased people who committed suicide vs. deceased people who did not.**
Summary of evidence	**Moderate to high quality evidence (large sample, unable to assess consistency, imprecise, direct) suggests a large increased rate of schizophrenia in people who committed suicide. The rate was higher in Australia than in Europe, North America or Asia. Rates of schizophrenia were lower than rates of depression, alcohol use disorders or personality disorders.**
Odds of schizophrenia	
A large, increased rate of schizophrenia in people who committed suicide; 3 case-control studies, N = 1,714, OR = 5.56, 95%CI 3.12 to 10.24, $p \leq 0.01$ The rate of schizophrenia in people who committed suicide was lower (9.2%) than the rates of affective disorders (43.2%; mostly depression), substance use disorders (25.7%; mostly alcohol) and personality disorders (16.2%). The rate of schizophrenia in people who committed suicide was higher in Australia (24.3%) than in Europe (7.5%), North America (4.2%) or Asia (8.4%). There were no differences in rates between males and females.	
Consistency in results	Unable to assess; no measure of consistency is reported.
Precision in results	Imprecise
Directness of results	Direct

Bowers L, Banda T, Nijman H

Suicide inside: a systematic review of inpatient suicides

Journal of Nervous & Mental Disease 2010; 198(5): 315-328

View review abstract online

Comparison	**Association between the proportion of inpatients with schizophrenia or affective disorder and the proportion of inpatient suicides.**
Summary of evidence	**Moderate quality evidence (large samples, unable to assess consistency or precision, direct) suggests medium to large effects of increased suicide in inpatients with schizophrenia who are compulsorily detained, but decreased suicide in inpatients with affective disorder who are compulsorily detained. There were large associations between younger inpatients with schizophrenia and suicide, and older inpatients with affective disorder and suicide. There were medium-sized associations between increased suicide in inpatients with schizophrenia on agreed leave, and decreased suicide in inpatients with affective disorder on agreed leave. There was a medium-sized association between increased suicide in inpatients with affective disorder with self-harm history, with no association in inpatients with schizophrenia.**
Suicide in inpatients	
Overall 98 studies, N = 15,000 *Overall inpatients while in hospital, no associations;* Schizophrenia: 24 studies, r = -0.202, p = 0.344 Affective disorder: 17 studies, r = 0.351, p = 0.167 *Inpatients compulsorily detained, medium to large associations (increased for schizophrenia, decreased for affective disorder);* Schizophrenia: 13 studies, r = 0.646, p = 0.017 Affective disorder: 12 studies, r = -0.772, p = 0.003 *According to age, large associations (younger for schizophrenia, older for affective disorder);* Schizophrenia: 8 studies, r = -0.861, p = 0.006 Affective disorder: 9 studies, r = 0.756, p = 0.018 *Inpatients on agreed leave, medium-sized associations (increased for schizophrenia, decreased for affective disorder);* Schizophrenia: 13 studies, r = 0.520, p = 0.069 Affective disorder: 9 studies, r = -0.683, p = 0.042 *Proportion with self-harm history, medium-sized association for affective disorder only;* Schizophrenia: 12 studies, r = -0.174, p = 0.589 Affective disorder: 10 studies, r = 0.677, p = 0.031 There were no significant associations according to absconding status, % male, unemployment,	

living alone, marital status, or the number of previous admissions.	
Consistency in results	Unable to assess, no measure of consistency is reported.
Precision in results	Unable to assess, no measure of precision is reported.
Directness of results	Direct

Cassidy RM, Yang F, Kapczinski F, Passos IC

Risk Factors for Suicidality in Patients with Schizophrenia: A Systematic Review, Meta-analysis, and Meta-regression of 96 Studies

Schizophrenia Bulletin 2018; 44: 787-97

View review abstract online

Comparison	**Risk factors for suicidality in people with schizophrenia.**
Summary of evidence	**For suicide ideation, high quality evidence (large samples, consistent, precise, direct) finds medium-sized effects of the following risk factors; more psychiatric hospitalisations, depression symptoms and general schizophrenia symptoms.** **For suicide attempts, moderate to high quality evidence (large samples, inconsistent or imprecise, direct) finds medium-sized effects of the following risk factors; more psychiatric hospitalisations, depression symptoms and a history of depression, hopelessness and having a family history of suicide. Small effects were found for; younger age at illness onset, being male, being white, living alone, having a physical illness, using tobacco, and having a family history of psychiatric illness. Moderate quality evidence (inconsistent and imprecise) finds a medium-sized effect of having a history of suicide attempts, and small effects of alcohol or drug use.** **For suicide completion, moderate to high quality evidence (large samples, inconsistent or imprecise, direct) finds medium to large effects of the following risk factors; worthlessness, higher IQ and poor adherence to treatment. Small effects were found for having a history of tobacco or alcohol use, being male, and younger age. Moderate quality evidence (inconsistent and imprecise) finds medium to large effects of hopelessness, having a history of attempted suicide, shorter illness duration, and being white.**

Suicide ideation	
The following risk factors were associated with suicide ideation; More severe depression symptoms (medium-sized effect): 3 studies, N = 1,005, SMD = 0.77, 95%CI 0.63 to 0.92, $p < 0.0001$, $I^2 = 0\%$, $p = 0.99$ More severe general schizophrenia symptoms (medium-sized effect): 4 studies, N = 767, SMD = 0.65, 95%CI 0.48 to 0.82, $p < 0.0001$, $I^2 = 0\%$, $p = 0.39$ More psychiatric hospitalisations (medium-sized effect): 2 studies, N = 453, SMD = 0.46, 95%CI 0.27 to 0.66, $p < 0.0001$, $I^2 = 0\%$, $p = 0.68$ There were no significant associations with; specific schizophrenia symptoms; length of illness; current age or age at illness onset; being male; being white; living alone; being married; being unemployed; IQ; years of education; or having a history of suicide attempts.	
Consistency in results	Consistent
Precision in results	Precise
Directness of results	Direct
Suicide attempts	
The following risk factors were associated with suicide attempts; History of depression (medium-sized effect): 3 studies, N = 489, OR = 4.13, 95%CI 2.61 to 6.54, $p < 0.0001$, $I^2 = 14\%$, $p = 0.32$ More severe depression symptoms (medium-sized effect): 6 studies, N = 672, SMD = 0.54, 95%CI 0.29 to 0.79, $p < 0.0001$, $I^2 = 49\%$, $p = 0.07$ History of attempted suicide (medium-sized effect): 5 studies, N = 28,064, OR = 3.11, 95%CI 1.75 to 5.54, $p < 0.0001$, $I^2 = 85\%$, $p = 0.0002$ More psychiatric hospitalisations (medium-sized effect): 15 studies, N = 2,702, SMD = 0.45, 95%CI 0.30 to 0.60, $p < 0.0001$, $I^2 = 58\%$, $p = 0.0008$ Family history of suicide (medium-sized effect): 10 studies, N = 1,356, OR = 2.11, 95%CI 1.48 to 3.02, $p < 0.0001$, $I^2 = 7\%$, $p = 0.46$ Hopelessness (medium-sized effect): 3 studies, N = 530, OR = 2.17, 95%CI 1.46 to 3.23, $p = 0.0001$, $I^2 = 0\%$, $p = 0.41$ Having a physical illness (small effect): 4 studies, N = 3,157, OR = 1.53, 95%CI 1.27 to 1.84, $p < 0.0001$, $I^2 = 0\%$, $p = 0.41$ Family history of psychiatric illness (small effect):	

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11 studies, N = 2,448, OR = 1.77, 95%CI 1.43 to 2.19, $p < 0.0001$, $I^2 = 9\%$, $p = 0.37$ History of alcohol use (small effect): 19 studies, N = 7,032, OR = 1.66, 95%CI 1.28 to 2.15, $p = 0.0001$, $I^2 = 60\%$, $p < 0.0001$ Younger age of onset (small effect): 26 studies, N = 15,979, SMD = -0.14, 95%CI -0.27 to -0.01, $p = 0.03$, $I^2 = 82\%$, $p < 0.0001$ Being white (small effect): 9 studies, N = 1,914, OR = 1.46, 95%CI 1.15 to 1.86, $p = 0.002$, $I^2 = 0\%$, $p = 0.86$ History of drug use (small effect): 21 studies, N = 7,535, OR = 1.48, 95%CI 1.15 to 1.90, $p = 0.002$, $I^2 = 63\%$, $p < 0.0001$ History of tobacco use (small effect): 11 studies, N = 20,339, OR = 1.38, 95%CI 1.11 to 1.71, $p = 0.003$, $I^2 = 11\%$, $p = 0.24$ Living alone (small effect): 4 studies, N = 1,290, OR = 0.75, 95%CI 0.58 to 0.98, $p = 0.03$, $I^2 = 0\%$, $p = 0.89$ Being male (small effect): 44 studies, N = 38,904, OR = 0.89, 95%CI 0.79 to 1.00, $p = 0.04$, $I^2 = 29\%$, $p = 0.02$ *There were no significant associations between suicide attempts and the following factors;* Schizophrenia symptoms, use or adherence to antipsychotics, being black, length of illness, living in a rural area, being unemployed, being married, current age, years of education, insight, or having a family history of alcohol use, depression or schizophrenia. *Meta-regressions found the following factors influenced the effect sizes;* In people with a physical illness, increased age was associated with increased suicide attempts. In people with a family history of psychiatric disorders, those in Africa were less associated, and those in Oceania were more associated with suicide attempts. In people with a history of drug or tobacco use, increased study quality was associated with more suicide attempts. In males, studies conducted at lower latitudes were associated with increased suicide attempts.	
Consistency in results	Consistent for; history of depression, hopelessness, physical illness, being white, tobacco use, living alone, and having a family history of suicide or psychiatric illness. Inconsistent for; depression symptoms, history of attempted suicide, psychiatric hospitalisations, alcohol use, drug use, younger age at onset, and being male.
Precision in results	Precise for: depression symptoms, psychiatric hospitalisations, younger age of onset, and being male. Imprecise for; history of depression, history of attempted suicide, family history of suicide or psychiatric illness, hopelessness, physical

	illness, being white, living alone, and drug, tobacco or alcohol use.
Directness of results	Direct
Suicide completion	
The following risk factors were associated with suicide completion; Worthlessness (large effect): 2 studies, N = 5,374, OR = 6.32, 95%CI 2.67 to 14.96, $p < 0.0001$, $I^2 = 0\%$, $p = 0.70$ Hopelessness (medium-sized effect): 7 studies, N = 6,099, OR = 4.64, 95%CI 2.24 to 9.63, $p < 0.0001$, $I^2 = 48\%$, $p = 0.07$ History of attempted suicide (medium-sized effect): 24 studies, N = 29,944, OR = 3.36, 95%CI 2.49 to 4.53, $p < 0.0001$, $I^2 = 65\%$, $p < 0.0001$ Shorter illness duration (large effect): 5 studies, N = 26,981, SMD = -2.62, 95%CI -4.52 to -0.72, $p = 0.006$, $I^2 = 99\%$, $p < 0.0001$ Being white (medium-sized effect): 6 studies, N = 1,114, OR = 4.95, 95%CI 1.45 to 16.81, $p = 0.01$, $I^2 = 66\%$, $p = 0.004$ Higher intelligence quotient (medium-sized effect): 2 studies, N = 180, SMD = 0.65, 95%CI 0.35 to 0.95, $p < 0.0001$, $I^2 = 0\%$, $p = 0.87$ Poor adherence to treatment (medium-sized effect): 4 studies, N = 379, OR = 3.01, 95%CI 1.87 to 4.84, $p < 0.0001$, $I^2 = 0\%$, $p = 0.65$ History of tobacco use (small effect): 3 studies, N = 21,756, OR = 1.40, 95%CI 1.06 to 1.85, $p = 0.01$, $I^2 = 0\%$, $p = 0.90$ Being male (small effect): 35 studies, N = 36,722, OR = 1.34, 95%CI 1.14 to 1.58, $p = 0.0005$, $I^2 = 28\%$, $p = 0.05$ History of alcohol use (small effect): 10 studies, N = 5,318, OR = 1.28, 95%CI 1.01 to 1.63, $p = 0.03$, $I^2 = 3\%$, $p = 0.14$ Younger age (small effect): 19 studies, N = 29,660, SMD = -0.24, 95%CI -0.45 to -0.03, $p = 0.02$, $I^2 = 85\%$, $p < 0.0001$ *There were no significant associations between completed suicide and the following factors;* schizophrenia symptoms; number of psychiatric hospitalisations; use of antipsychotics; agitation or aggression; age of illness onset; history of depression; history of suicidal ideation; history of drug use; living in a rural area; having flat affect; being black; being married; having a physical illness; having sleep disturbance; living alone; being unemployed; years of education; or having a family history of alcohol use, depression, of suicide or psychiatric illness. *Meta-regressions found the following factors influenced the effect sizes;*	

In males, increased study quality and studies conducted in Asia were associated with fewer completed suicides. Increased age in males was associated with more completed suicides.	
Consistency in results	Consistent for; worthlessness, higher intelligence quotient, poor adherence to treatment, and history of tobacco or alcohol use. Inconsistent for; hopelessness, history of attempted suicide, shorter illness duration, being white, being male and younger age.
Precision in results	Imprecise, apart from being male and younger age.
Directness of results	Direct

Challis S, Nielssen O, Harris A, Large M

Systematic meta-analysis of the risk factors for deliberate self-harm before and after treatment for first-episode psychosis

Acta Psychiatrica Scandinavica 2013; 127: 442-454

View review abstract online

Comparison	**Rates and risk factors for deliberate self-harm (including suicide attempts) in patients with first-episode psychosis.**
Summary of evidence	**Moderate to high quality evidence (large samples, inconsistent or imprecise, direct) suggests the overall proportion of patients with first-episode psychosis who report deliberate self-harm is around 18% prior to treatment and 11% after treatment. There is a medium-sized effect of increased risk of deliberate self-harm with depressed mood or expressed suicide ideation, and a small effect for alcohol or substance use, younger age at onset or treatment, and longer duration of untreated psychosis. Moderate quality evidence (inconsistent and imprecise) suggests a medium to large effect of increased risk of deliberate self-harm in those with a history of self-harm and a small effect in those with greater insight.**

Deliberate self-harm

Proportion of patients who reported deliberate self-harm prior to treatment for first-episode psychosis;

18 studies, N = 6,962, 18.4%, 95%CI 14.4% to 23.3%, $p < 0.05$, $I^2 = 93.8\%$, $p < 0.05$

Proportion of patients committing deliberate self-harm during periods of follow up after treatment (1 to 7 years);

13 studies, N = 4,846, 11.4%, 95%CI 8.3% to15.5%, $p < 0.05$, $I^2 = 89.2\%$, $p < 0.05$
Factors associated with an increased risk of deliberate self-harm (small to medium-sized effects);
History of DSH: OR = 3.94, 95%CI 2.72 to 5.71, $p < 0.001$, $I^2 = 83.7\%$, $p < 0.001$
Suicide ideation: OR = 2.34, 95%CI 1.66 to 3.30, $p < 0.001$, $I^2 = 43\%$, $p < 0.092$
Depressed mood: SMD = 0.49, 95%CI 0.35 to 0.62, $p < 0.001$, $I^2 = 71.1\%$, $p < 0.001$
Greater insight: OR = 1.64, 95%CI 1.23 to 2.56, $p = 0.008$, $I^2 = 61.3\%$, $p = 0.008$
Alcohol abuse: OR = 1.68, 95%CI 1.16 to 2.44, $p = 0.006$, $I^2 = 3.4\%$, $p = 0.412$
Substance use: OR = 1.46, 95%CI 1.14 to 1.88, $p = 0.003$, $I^2 = 23.6\%$, $p = 0.165$
Younger age of onset: SMD = -0.28, 95%CI -0.50 to -0.06, $p = 0.013$, $I^2 = 85.6\%$, $p < 0.001$
Younger age at first treatment: SMD = -0.18, 95%CI -0.31 to -0.04, $p = 0.009$, $I^2 = 41.3.\%$, $p = 0.039$
Duration of untreated psychosis: SMD = 0.20, 95%CI 0.05 to 0.35, $p = 0.008$, $I^2 = 63.2\%$, $p = 0.001$
Younger age at the time of treatment, and a longer duration of untreated psychosis were associated with deliberate self-harm before, but not after treatment.
Sex, marital status, ethnicity, employment status, symptoms and general psychopathology, global and social functioning, involuntary treatment, and diagnosis (schizophrenia vs. schizoaffective disorder) were not associated with rates of deliberate self-harm.
There was a trend for those with more years of education to be at lower risk of deliberate self-harm.

Consistency in results	Consistent for suicide ideation and alcohol and substance use. Inconsistent for overall proportions, history of deliberate self-harm, depressed mood, insight, age at onset or treatment, duration of untreated psychosis.
Precision in results	Precise for depressed mood, age at onset or treatment, duration of untreated psychosis. Imprecise for suicide ideation, alcohol and substance use, history of deliberate self-harm, and insight.
Directness of results	Direct

Chapman CL, Mullin K, Ryan CJ, Kuffel A, Nielssen O, Large MM

Meta-analysis of the association between suicidal ideation and later suicide among patients with either a schizophrenia spectrum psychosis or a mood disorder

Acta Psychiatrica Scandinavica 2015; 131: 162-173

View review abstract online

Comparison	**Association between suicidal ideation and completed suicide**

	among people with schizophrenia or mood disorders.
Summary of evidence	**Moderate quality evidence (large samples, inconsistent, imprecise, direct) suggests a large association between suicidal ideation and completed suicide in people with schizophrenia, but not in people with mood disorders.**
Suicidal ideation	
A significant, large effect of increased suicide among patients with schizophrenia who previously reported suicidal ideation vs. those who did not report suicidal ideation; 14 studies, N = 7,344, OR = 6.49, 95%CI 3.82 to 11.0, $p < 0.001$, $I^2 = 74\%$, $p < 0.001$ *No significant differences among patients with mood disorders;* 11 studies, N = 9,552, OR = 1.49, 95%CI 0.92 to 2.42, $p = 0.10$, $I^2 = 84\%$, $p < 0.001$ Meta-regression found two factors made unique contributions to between-study heterogeneity; diagnostic grouping (the association was apparent only in patients with schizophrenia), and the strength of study reporting (a weaker association was found in studies with stronger reporting). There were no differences to results after excluding studies of patients with schizoaffective disorder.	
Consistency in results	Inconsistent
Precision in results	Imprecise
Directness of results	Direct

Chung DT, Ryan CJ, Hadzi-Pavlovic D, Singh SP, Stanton C, Large MM

Suicide rates after discharge from psychiatric facilities: A systematic review and meta-analysis

JAMA Psychiatry 2017; 74: 694-702

View review abstract online

Comparison	**Rate of suicide post-discharge from psychiatric facilities.**
Summary of evidence	**Moderate quality evidence (large sample, inconsistent, imprecise, direct) suggests the post-discharge suicide rate for people with psychosis is around 599 suicides per 100,000 person-years. Rates were higher in more recent samples, samples with follow-up of a year or less, and samples of suicidal patients. Rates were lower in adolescent patients.**
Suicide rate	

100 studies, N = 17,857 suicides during 4,725,445 person-years All patients: 183 samples, 484 suicides per 100,000 person-years, 95%CI 422 to 555, I^2 = 98% Psychosis: 24 samples, 599 suicides per 100,000 person-years, 95%CI 440 to 834, I^2 = 88% Affective: 18 samples, 524 suicides per 100,000 person-years, 95%CI 370 to 742, I^2 = 95% Mixed other: 141 samples, 463 suicides per 100,000 person-years, 95%CI 393 to 545, I^2 = 99% The post-discharge suicide rate was highest in samples with shorter follow-up (<3 months; 1,132 per 100,000 person years, 3-12 months; 654 per 100,000 person-years, 1-5 years; 494 per 100,000 person-years, 5-10 years; 366 per 100,000 person-years, >10 years; 27 per 100,000 person-years) More recent samples and samples of suicidal patients also reported higher post-discharge suicide rates. Samples of adolescent patients reported lower rates.

Consistency in results	Inconsistent
Precision in results	Imprecise
Directness of results	Direct

Dong M, Wang SB, Wang F, Zhang L, Ungvari GS, Ng CH, Meng X, Yuan Z, Wang G, Xiang YT

Suicide-related behaviours in schizophrenia in China: a comprehensive meta-analysis

Epidemiology and Psychiatric Sciences 2017; 1-10

View review abstract online

Comparison	**Rate of suicidal behaviours in people with schizophrenia in China.**
Summary of evidence	**Moderate quality evidence (large sample, inconsistent, imprecise, direct) suggests the lifetime prevalence rate of suicidal ideation is around 25.8% and the lifetime prevalence rate of suicide attempts is around 14.6% of patients with schizophrenia in China. Suicide ideation is higher in older patients, in outpatients, in men, in larger studies, in earlier studies, in studies using standardised questionnaires, in cross-sectional studies and in studies conducted in eastern regions. Suicide attempts were higher in older patients, in inpatients, in smaller studies, in cohort studies and in studies using unstandardised questionnaires.**

Suicidal ideation	
Overall prevalence of suicidal ideation; 7 studies, N = 1,017, lifetime prevalence = 25.8%, 95%CI 14.7% to 41.1%, I^2 = 95.49% 3 studies, N = 642, 1-month prevalence = 22.0%, 95%CI 18.2% to 26.4%, I^2 = 12.57% *The lifetime prevalence rate was lower in;* Studies with a mean age ≤35.8 years than >35.8 years: 17.8% vs. 28.8% Studies with ≤145 patients than >145 patients: 17% vs. 40.5% Studies conducted after May 2002 than during or before May 2002: 13.1% vs. 32.4% Studies of inpatients than outpatients: 18.5% vs. 37.4% Studies using unstandardised than standardised questionnaires: 19.7% vs. 44.9% Cohort studies than cross-sectional studies: 20.1% vs. 26.8% Studies of women than men: 24.1% vs. 29.6% Studies conducted in middle-west regions of China than eastern regions: 23.6% vs. 27.3%	
Suicide attempts	
Overall prevalence of suicidal attempts; 13 studies, N = 5,098, lifetime prevalence = 14.6%, 95%CI 9.1% to 22.8%, I^2 = 97.02% *The lifetime prevalence rate was lower in;* Studies with a mean age ≤38 years than >38 years: 11% vs. 16.2% Studies with >194 patients than ≤194 patients: 9.8% vs. 20.8% Studies of outpatients than inpatients: 11.5% vs. 17.6% Studies using standardised than unstandardised questionnaires: 13.6% vs. 22.1% Cross-sectional than cohort studies: 12.9% vs. 15.2% *The lifetime prevalence rate was similar in;* Studies of women and men: 13.8% vs. 13.0% Studies conducted after May 2002 and during or before May 2002: 11.5% vs. 12.0% Studies conducted in middle-west regions of China and eastern regions: 14.5% vs. 14.7%	
Consistency in results	Inconsistent
Precision in results	Imprecise
Directness of results	Direct

Fazel S, Wolf A, Geddes JR

Suicide in prisoners with bipolar disorder and other psychiatric disorders: a systematic review

Bipolar Disorders 2013; 15: 491-495

View review abstract online

Comparison	**Suicide rates in prisoners with schizophrenia compared to prisoners with no psychiatric disorder.**
Summary of evidence	**Moderate quality evidence (unclear sample size, inconsistent, imprecise, direct) suggests a large increased risk of suicide in prisoners with schizophrenia.**
Suicide	
A significant large effect for increased risk of suicide in prisoners with schizophrenia; 5 studies, N = not reported, OR = 5.25, 95%CI 2.50 to 10.81, $p < 0.05$, $I^2 = 69.1\%$, $p = 0.012$	
Consistency in results	Inconsistent
Precision in results	Imprecise
Directness of results	Direct

Knipe D, Williams AJ, Hannam-Swain S, Upton S, Brown K, Bandara P, Chang S, Kapur N

Psychiatric morbidity and suicidal behaviour in low- And middle-income countries: A systematic review and meta-analysis

PLoS Medicine 2019; 16: e1002905

View review abstract online

Comparison	**Suicide rates in people with a schizophrenia spectrum disorder living in low-middle income countries.**

Summary of evidence	**Moderate quality evidence (unclear sample size, inconsistent, precise, direct) finds the rate of fatal suicide in people with schizophrenia in low-middle income countries is around 7%, and the rate of non-fatal suicide attempts is around 5%.**
Suicide	
The rate of fatal suicide in people with a schizophrenia spectrum disorder in low-middle income countries; 15 studies, N = not reported, prevalence = 7%, 95%CI 5% to 9%, I^2 = 88% The prevalence rate was similar in high quality studies (8%). *The rate of non-fatal suicide in people with a schizophrenia spectrum disorder in low-middle income countries;* 55 studies, N = not reported, prevalence = 5%, 95%CI 4% to 6%, I^2 = 95% The prevalence rate was similar in high quality studies (7%).	
Consistency in results	Inconsistent
Precision in results	Precise
Directness of results	Direct

Large M, Babidge N, Andrews D, Storey P, Nielssen O

Self-mutilation in the first episode of psychosis

Schizophrenia Bulletin 2008; 35(5): 1012-1021

View review abstract online

Comparison	**Rates of severe self-mutilation in schizophrenia spectrum psychosis, including schizophrenia, delusional disorder, schizoaffective disorder, schizophreniform disorder, brief psychotic disorder, and psychosis not otherwise specified.** **First episode psychosis patients were defined as those who had never received antipsychotic treatment, or had only recently commenced treatment for the first time, had not had a remission from symptoms and were still in hospital.**
Summary of evidence	**Moderate to low quality evidence (medium sample size, unable to assess consistency or precision, direct) suggests a large proportion of cases of self-mutilation have a schizophrenia**

	spectrum disorder (around 88%).
Major self-mutilation	
Authors state that in this review of published case reports of major self-mutilation, a psychotic illness was documented in 143 of 189 cases (75.6%), of whom 119 of 143 (83.2%) were diagnosed with a schizophrenia spectrum psychosis; Of 101 cases that provided details of diagnosis, 53.5% (95%CI 43.7% to 63.2%) of cases were in their first episode of psychosis. Overall, 88% of cases were diagnosed with schizophrenia, 4% with schizophreniform psychosis, 2% with schizoaffective disorder, 2% with a brief psychotic disorder, 1% with delusional disorder, and 3% were considered psychosis NOS. 87% of cases reported at least 1 psychotic symptom, 82% had a delusional belief, most commonly involving a false belief about the amputated organ.	
Consistency in results	Unable to assess, no measure of consistency is reported.
Precision in results	Unable to assess, no standardised measure of precision is reported.
Directness of results	Direct

Large M, Sharma S, Cannon E, Ryan C, Nielssen O

Risk factors for suicide within a year of discharge from psychiatric hospital: a systematic meta-analysis

Australian and New Zealand Journal of Psychiatry 2011; 45: 619

View review abstract online

Comparison	**Clinical factors associated with increased risk of suicide within the first year of discharge from a psychiatric hospital.**
Summary of evidence	**Moderate to high quality evidence (large sample size, mostly consistent, imprecise, direct) suggests increased risk of suicide in patients recently discharged from hospital may be associated with prior suicide attempts or ideations, unplanned discharge, depression, hopelessness, current relationship problems, and male gender.**
Suicide risk factors post discharge	
Significant associations were reported for;	

Male gender: 5 studies, N = 150,387, OR = 1.58, 95%CI 1.16 to 2.16, $p < 0.05$, $I^2 = 21.2\%$, $p = 0.28$

History of suicide attempt/self-harm: 6 studies, N = 1,706, OR = 3.15, 95%CI 2.28 to 4.33, $p < 0.05$, $I^2 = 15.4\%$, $p = 0.32$

Recent social difficulty: 4 studies, N = 1,375, OR = 2.23, 95%CI 1.40 to 3.54, $p < 0.05$, $I^2 = 0\%$, $p = 0.66$

Depression symptoms: 4 studies, N = 913, OR = 2.70, 95%CI 1.63 to 4.48, $p < 0.05$, $I^2 = 18.3\%$, $p = 0.30$

Major depression: 7 studies, N = 150,235, OR = 1.91, 95%CI 1.46 to 2.51, $p < 0.05$, $I^2 = 41.4\%$, $p = 0.10$

Hopelessness: 2 studies, N = 1,141, OR = 2.31, 95%CI 1.39 to 3.87, $p < 0.05$, $I^2 = 0\%$, $p = 0.99$

Suicidal ideation: 6 studies, N = 1,019, OR = 2.47, 95%CI 1.76 to 3.46, $p < 0.05$, $I^2 = 29.5\%$, $p = 0.21$

Unplanned discharge: 7 studies, N = 2,523, OR = 2.44, 95%CI 1.71 to 3.47, $p < 0.05$, $I^2 = 0\%$, $p = 0.83$

Less contact with services decreased risk: 7 studies, N = 123,455, OR = 0.69, 95%CI 0.51 to 0.94, $p < 0.05$, $I^2 = 81.3\%$, $p < 0.001$

Patients categorized as high-risk on the basis of multiple risk factors had a medium increased risk;

4 studies, N = 1,845, OR = 3.94, 95%CI 2.70 to 5.74, $p < 0.05$, $I^2 = 0\%$, $p = 0.68$

Authors report low positive predictive value for this categorisation (3% of all estimated suicides).

No significant associations were found with age, marital status, living alone, employment status, ethnicity, education, a history of criminal conduct or violence, a family history of mental illness, co-existing physical illness, substance misuse, a diagnosis of bipolar disorder or schizophrenia, a long duration of illness or prior hospitalisation, antidepressant, antipsychotic, mood stabilizing medication, a reduction dose of medication, poor adherence to medication, interrupted care, or hospital re-admissions.

Consistency in results	Mostly consistent
Precision in results	Imprecise
Directness of results	Direct

Large M, Kaneson M, Myles N, Myles H, Gunaratne P, Ryan C

Meta-analysis of longitudinal cohort studies of suicide risk assessment among psychiatric patients: heterogeneity in results and lack of improvement over time

PLOS ONE 2016; 11(6): e0156322. doi:10.1371/journal.pone.0156322

View review abstract online	
Comparison	**Rate of suicide in psychiatric patients assessed as being at high risk of suicide vs. low risk of suicide.** **The sample includes patients with psychotic and affective disorders. Studies varied as to how the high-risk group was categorised, however the following risk factors were most common; suicide attempt or ideation, self-harm, substance abuse, depressed or anxious mood, financial or social stress.**
Summary of evidence	**Moderate quality evidence (large sample, inconsistent, imprecise, direct) suggests people with a psychiatric disorder who are deemed at high risk of suicide have a large increased risk of committing suicide.**
Suicide rates	
A significant, large effect of increased risk of suicide in people deemed at high risk of suicide compared to people deemed at low risk of suicide; 53 samples, N = 315,309, OR = 4.84, 95%CI 3.79 to 6.20, $p < 0.001$, $I^2 = 93.3\%$, $p < 0.001$ *Adjustment for potential publication bias resulted in similar results;* OR = 3.18, 95%CI 2.55 to 3.99, $p < 0.05$ Sensitivity of a high-risk categorisation = 56% (moderate sensitivity), indicating just over half of the suicides occurred in the high-risk groups, and the sensitivity of a lower-risk categorisation = 79%, indicating that four in five of the survivors were in the low risk group (good sensitivity). There were no significant differences in effect size according to; year of publication, study type (validation vs. exploratory studies), history of suicide attempt, base rate of suicide, study quality, length of follow up, or the number of variables in the high-risk model.	
Consistency in results	Inconsistent
Precision in results	Imprecise
Directness of results	Direct

Large M, Myles N, Myles H, Corderoy A, Weiser M, Davidson M, Ryan CJ

Suicide risk assessment among psychiatric inpatients: a systematic review and meta-analysis of high-risk categories

Psychological Medicine 2017; doi:10.1017/S0033291717002537

View review abstract online	
Comparison	**Rate of suicide in psychiatric inpatients (including those on leave) assessed as being at high risk of suicide vs. low risk of suicide.** **The sample includes patients with psychotic and affective disorders. Studies varied as to how the high-risk group was categorised; however, a history of suicidal behaviour and depressive symptoms or affective disorder was included in the majority of high-risk models.**
Summary of evidence	**Moderate quality evidence (large sample, inconsistent, imprecise, direct) suggests psychiatric inpatients who are deemed at high risk of suicide have a large increased risk of suicide.**
Suicide rates	
A significant, large effect of increased risk of suicide in inpatients deemed at high risk of suicide compared to inpatients deemed at low risk of suicide; 18 samples, N = 191,944, OR = 7.10, 95%CI 4.20 to 12.20, $p < 0.05$, $I^2 = 88.1\%$, $p < 0.001$ *Adjustment for potential publication bias resulted in similar results;* OR = 5.10, 95%CI 3.10 to 8.60, $p < 0.05$ Sensitivity of a high-risk categorisation = 53.1% indicating moderate sensitivity Sensitivity of a lower-risk categorisation = 84.2% indicating good sensitivity The AUC suggests an 83% chance that an inpatient who died by suicide would have been deemed at higher risk of suicide than an inpatient who did not suicide. There were no significant differences in the effect size according to year of publication, the number of variables in the model, the number of variables in the high-risk model, or how high-risk groups were categorised.	
Consistency in results	Inconsistent
Precision in results	Imprecise
Directness of results	Direct

Lu L, Dong M, Zhang L, Zhu XM, Ungvari GS, Ng CH, Wang G, Xiang YT

Prevalence of suicide attempts in individuals with schizophrenia: A meta-analysis of observational studies

Epidemiology and Psychiatric Sciences 2019; 29: e39

View review abstract online

Comparison	**Suicide attempt rates in people with a schizophrenia spectrum disorder.**
Summary of evidence	**Moderate to high quality evidence (large sample, mostly inconsistent, precise, direct) finds the rate of suicide attempts is around 27%, with rates higher since illness onset (46%) and lower over 1-month and 1-year (3%).**
Suicide attempts	
35 studies, N = 16,747 *The pooled lifetime prevalence rate of suicide attempts;* 26.8%, 95%CI 22.1% to 31.9%, I^2 = 97% *The prevalence rate of suicide attempts since illness onset;* 45.9%, 95%CI 42.1% to 49.9%, I^2 = 0% *The 1-year prevalence rate of suicide attempts;* 3.0%, 95%CI 2.3% to 3.7%, I^2 = 96% *The 1-month prevalence rate of suicide attempts;* 2.7%, 95%CI 2.1% to 3.4%, I^2 = 79% Earlier age of onset, studies conducted in high-income countries, and studies conducted in North America, Europe, and Central Asia were significantly associated with higher prevalence rates.	
Consistency in results	Inconsistent, apart from prevalence since illness onset.
Precision in results	Appears precise
Directness of results	Direct

Malik S, Kanwar A, Sim LA, Prokop LJ, Wang Z, Benkhadra K, Murad MH

The association between sleep disturbances and suicidal behaviors in

patients with psychiatric diagnoses: a systematic review and meta-analysis **Systematic Reviews 2014; 3: 18** View review abstract online	
Comparison	**Risk of suicidal behaviours in people with schizophrenia with sleep disturbances vs. psychiatric controls with no sleep disturbances.**
Summary of evidence	**Low quality evidence (1 small study, imprecise) is unable to determine the association between sleep disturbances and suicidal behaviour in patients with schizophrenia.**
Suicide rates	
A significant large effect of increased suicidal behaviour in patients with sleep disturbances; 1 study, N = 40, OR 12.66, 95%CI 1.40 to 114.44, *p* = 0.02	
Consistency in results	N/A - 1 study
Precision in results	Very imprecise
Directness of results	Direct

McGinty J, Sayeed Haque M, Upthegrove R

Depression during first episode psychosis and subsequent suicide risk: A systematic review and meta-analysis of longitudinal studies **Schizophrenia Research 2018; 195: 58-66** View review abstract online	
Comparison	**Suicidality in people with first-episode psychosis and depressive symptoms vs. people with first-episode psychosis without depressive symptoms.** **Suicidality is defined as deliberate self-harm, suicide attempts, thoughts, plans and completed suicide.**
Summary of evidence	**Moderate quality evidence (large sample, inconsistent, imprecise, direct) suggests a small, significant effect of increased suicidality in people with first-episode psychosis and**

	depressive symptoms.
Suicidality	
A small, significant effect of increased suicidality in people with first-episode psychosis and depressive symptoms; 13 studies, N = 3,002, OR = 1.59, 95% CI 1.14 to 2.21, $p < 0.05$, $I^2 = 50\%$, $p = 0.02$ There was no influence of length of follow-up on the results.	
Consistency in results	Inconsistent
Precision in results	Imprecise
Directness of results	Direct

Palmer, BA, Pankratz, S, Botswick, JM

The Lifetime Risk of Suicide in Schizophrenia. A re-examination

Archives of General Psychiatry 2005; 62: 247-253

View review abstract online

Comparison	**Lifetime risk of suicide in schizophrenia patients.**
Summary of evidence	**Moderate to high quality evidence (large samples, unable to assess consistency, appears precise, direct) suggests the lifetime risk of suicide in people with schizophrenia is around 5.6%. Among first-admission and new-onset samples, 30.6% of the deaths were due to suicide, while 4.9% of deaths were suicides in mixed samples of chronic and recent-onset patients.**
Suicide rates	
61 studies in total (N = 48,176) The lifetime suicide prevalence was 5.6% among cohorts observed from illness onset (29 studies, N = 22,598, 95%CI 3.7% to 8.5%) compared to 1.8% in mixed cohorts observed from any illness point (32 studies, N = 25,578, 95%CI 1.4% to 2.3%). Among first-admission and new-onset samples, 30.6% of the deaths were due to suicide, while 4.9% of deaths were suicides in mixed samples of chronic and recent-onset patients.	
Consistency in results	Unable to assess; no measure of consistency is reported.

Precision in results	Appears precise
Directness of results	Direct

Veeder TA, Leo RJ

Male genital self-mutilation: a systematic review of psychiatric disorders and psychosocial factors

General Hospital Psychiatry 2017; 44: 43-50

View review abstract online

Comparison	**Rates of genital self-mutilation in males with schizophrenia vs. males with other psychiatric disorders.**
Summary of evidence	**Moderate to low quality evidence (medium sample size, unable to assess consistency or precision, direct) suggests the proportion of cases of genital self-mutilation is higher in males with a schizophrenia spectrum disorder than in males with other psychiatric disorders (mostly substance use disorder, personality disorder or gender dysphoria).**
Male genital mutilation	
Among 157 cases, the most common diagnosis was a schizophrenia spectrum disorder (49%, n = 77), followed by a substance use disorder (18.5%; n = 29), personality disorder (15.9%, n = 25), and gender dysphoria (15.3%, n = 24).	
Consistency in results	Unable to assess, no measure of consistency is reported.
Precision in results	Unable to assess, no measure of precision is reported.
Directness of results	Direct

Walsh G, Sara G, Ryan CJ, Large M

Meta-analysis of suicide rates among psychiatric in-patients

Acta Psychiatrica Scandinavica 2014; 131(3): 174-184

View review abstract online

Comparison	**Rates of psychiatric inpatient suicides.**
Summary of evidence	**Moderate to low quality evidence (large samples, inconsistent, appears precise, some indirectness, possible publication bias) suggests the number of admissions per suicide is around 676, and there are 147 suicides per 100,000 inpatient years (the total number of years spent in psychiatric hospitals across all samples).**
Suicide rates	
Number of hospital admissions per suicide; 39 studies, 6,832,071 admissions, pooled estimate per suicide = 676, 95%CI 604 to 755, I^2 = 94.1% Meta-regression suggested a non-linear association between the year the suicide occurred and the number of admissions per suicide, with rates generally increasing over time. This variable accounted for less than 1% of the observed variance (94.1%). There was a trend for studies conducted in places with higher national suicide rates to report smaller numbers of admissions per suicide. There were no associations between the probability of suicide per admission and the average length of hospital stay or the use of coronial records. *Suicide rates per 100,000 inpatient years;* 27 studies, 5,766 suicides, pooled estimate per suicide = 147, 95%CI 138 to 156, I^2 = 98% Multiple meta-regression showed that rates of suicide per 100,000 inpatient years tended to be higher in more recent samples, in samples from regions with a higher population suicide rate, in samples from settings with a shorter average length of hospital stay, and in studies using coronial records to define suicide. This model accounted for 16% of the observed variance (98%). These results may be subject to publication bias.	
Consistency in results	Inconsistent
Precision in results	Appears precise
Directness of results	Direct for inpatient suicide rates, indirect for community rates (based on national rates).

Yates K, Lang U, Cederlof M, Boland F, Taylor P, Cannon M, McNicholas F, Devylder J, Kelleher I

Association of Psychotic Experiences with Subsequent Risk of Suicidal Ideation, Suicide Attempts, and Suicide Deaths: A Systematic Review and Meta-analysis of Longitudinal Population Studies

JAMA Psychiatry 76: 180-9 View review abstract online	
Comparison	**Rates of suicide completion in people reporting subclinical psychotic experiences.**
Summary of evidence	**Moderate to low quality evidence (large samples, inconsistent, imprecise, direct) suggests a small to medium-sized increased odds of suicide ideation, attempts, and completion after psychotic experiences.**
Suicide risk	
People who reported psychotic experiences had small to medium-sized increases in the odds of; Suicidal ideation: 5 studies, N = 56,191, OR = 2.39, 95%CI 1.62 to 3.51, I^2 = 92% Suicide attempts: 8 studies, N = 66,967, OR = 3.15, 95%CI 2.23 to 4.45, I^2 = 77% Suicide death: 1 study, N = 15,049, OR = 4.39, 95%CI 1.63 to 11.78 The increase in suicide ideation (OR = 1.59) and suicide attempts (OR = 2.68) remained significant after controlling for co-occurring psychopathology.	
Consistency in results	Inconsistent where applicable
Precision in results	Imprecise
Directness of results	Direct

Explanation of acronyms

CI = confidence interval, I^2 = proportion of heterogeneity across study results, N = number of participants, OR = odds ratio, *p* = statistical probability of obtaining that result ($p < 0.05$ generally regarded as significant), Q = Q statistic for the test of heterogeneity, vs. = versus

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 [23].

† 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. Less than 0.4 represents a small effect, around 0.5 a medium effect, and over 0.8 represents a large effect.[23]

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[24]. 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.

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;[23]

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

§ 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.

‖ 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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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. Bowers L, Banda T, Nijman H (2010): Suicide inside: a systematic review of inpatient suicides. *Journal of Nervous & Mental Disease* 198: 315-28.
4. Arsenault-Lapierre G, Kim C, Turecki G (2004): Psychiatric diagnoses in 3275 suicides: A meta-analysis. *BMC Psychiatry* 4.
5. Palmer BA, Pankratz VS, Bostwick JM (2005): The lifetime risk of suicide in schizophrenia: a reexamination.[see comment]. *Archives of General Psychiatry* 62: 247-53.
6. Large M, Babidge N, Andrews D, Storey P, Nielssen O (2008): Major Self-mutilation in the First Episode of Psychosis. *Schizophrenia Bulletin* 35: 1012-21.
7. Large M, Sharma S, Cannon E, Ryan C, Nielssen O (2011b): Risk factors for suicide within a year of discharge from psychiatric hospital: a systematic meta-analysis. *Australian and New Zealand Journal of Psychiatry* 45: 619-28.
8. Challis S, Nielssen O, Harris A, Large M (2013): Systematic meta-analysis of the risk factors for deliberate self-harm before and after treatment for first-episode psychosis. *Acta Psychiatrica Scandinavica* 127: 442-54.
9. Fazel S, Wolf A, Geddes JR (2013): Suicide in prisoners with bipolar disorder and other psychiatric disorders: a systematic review. *Bipolar Disorders* 15: 491-5.
10. Walsh G SG, Ryan CJ, Large M. (2014): Meta-analysis of suicide rates among psychiatric in-patients. *Acta Psychiatrica Scandinavica* 131: 174-84.
11. Chapman CL, Mullin K, Ryan CJ, Kuffel A, Nielssen O, Large MM (2015): Meta-analysis of the association between suicidal ideation and later suicide among patients with either a schizophrenia spectrum psychosis or a mood disorder. *Acta Psychiatrica Scandinavica* 131: 162-73.
12. Malik S, Kanwar A, Sim LA, Prokop LJ, Wang Z, Benkhadra K*, et al.* (2014): The association between sleep disturbances and suicidal behaviors in patients with psychiatric diagnoses: a systematic review and meta-analysis. *Systematic reviews* 3: 18.
13. Large M, Kaneson M, Myles N, Myles H, Gunaratne P, Ryan C (2016): Meta-Analysis of Longitudinal Cohort Studies of Suicide Risk Assessment among Psychiatric Patients: Heterogeneity in Results and Lack of Improvement over Time. *PLoS One* 11: e0156322.
14. Large M, Myles N, Myles H, Corderoy A, Weiser M, Davidson M*, et al.* (2017): Suicide risk assessment among psychiatric inpatients: a systematic review and meta-analysis of high-risk categories. *Psychological Medicine* doi:10.1017/S0033291717002537: 1-12.
15. Cassidy RM, Yang F, Kapczinski F, Passos IC (2018): Risk Factors for Suicidality in Patients with Schizophrenia: A Systematic Review, Meta-analysis, and Meta-regression of 96 Studies. *Schizophrenia Bulletin* 44: 787-97.
16. Chung DT, Ryan CJ, Hadzi-Pavlovic D, Singh SP, Stanton C, Large MM (2017): Suicide rates after discharge from psychiatric facilities: A systematic review and meta-analysis. *JAMA Psychiatry* 74: 694-702.
17. Dong M, Wang SB, Wang F, Zhang L, Ungvari GS, Ng CH*, et al.* (2017): Suicide-related behaviours in schizophrenia in China: a comprehensive meta-analysis. *Epidemiology and Psychiatric Sciences*: 1-10.
18. McGinty J, Sayeed Haque M, Upthegrove R (2018): Depression during first episode psychosis and subsequent suicide risk: A systematic review and meta-analysis of longitudinal studies. *Schizophrenia Research* 195: 58-66.
19. Veeder TA, Leo RJ (2017): Male genital self-mutilation: a systematic review of psychiatric disorders and psychosocial factors. *General Hospital Psychiatry* 44: 43-50.
20. Knipe D, Williams AJ, Hannam-Swain S, Upton S, Brown K, Bandara P*, et al.* (2019): Psychiatric morbidity and suicidal behaviour in low- And middle-income countries: A systematic review and meta-analysis. *PLoS Medicine* 16: e1002905.

21. Lu L, Dong M, Zhang L, Zhu XM, Ungvari GS, Ng CH*, et al.* (2019): Prevalence of suicide attempts in individuals with schizophrenia: A meta-analysis of observational studies. *Epidemiology and Psychiatric Sciences* 29.
22. Yates K, Lang U, Cederlof M, Boland F, Taylor P, Cannon M*, et al.* (2019): Association of Psychotic Experiences with Subsequent Risk of Suicidal Ideation, Suicide Attempts, and Suicide Deaths: A Systematic Review and Meta-analysis of Longitudinal Population Studies. *JAMA Psychiatry* 76: 180-9.
23. CochraneCollaboration (2008): Cochrane Handbook for Systematic Reviews of Interventions. Accessed 24/06/2011.
24. Rosenthal JA (1996): Qualitative Descriptors of Strength of Association and Effect Size. *Journal of Social Service Research* 21: 37-59.