TECHNICAL COMMENTARY

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SCHIZOPHRENIA LIBRARY

Educational therapies

Introduction

Educational therapies for psychiatric illnesses (psychoeducation) are targeted towards increasing a person's knowledge about their disorder. Educational therapies aim to improve insight and understanding, promote coping and reduce stigma, increase medication adherence, enable behavioural change, and ultimately prevent relapse. Educational sessions can take place individually or in groups, with other patients or with family, and are usually incorporated into an ongoing treatment regimen, in both hospital and community settings. For evidence relating to integrated treatment programs, that may include an educational component, please see our integrated psychosocial treatment topic.

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. We have prioritised reviews with pooled data so that effect sizes can be taken into consideration. Reviews were identified by searching MEDLINE, EMBASE, CINAHL, Current Contents, PsycINFO and the Cochrane Library databases. Hand searching reference lists of identified reviews was also conducted. When multiple copies of reviews were found, only the most recent 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 rated as having less than 50% of checked items 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). 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 fourteen reviews that met inclusion criteria[2-15].

- Moderate quality evidence finds psychoeducation has a medium-sized benefit for reducing relapse and rehospitalisation rates, and for improving treatment adherence. It may also improve familial high expressed emotion (e.g. over-involvement, critical comments) and knowledge about the disorder, and patients' general psychopathology, social functioning and internalised stigma.

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De Silva MJ, Cooper S, Li HL, Lund C, Patel V

Effect of psychosocial interventions on social functioning in depression and schizophrenia: meta-analysis

The British Journal of Psychiatry 2013; 202: 253-260

View review abstract online

Comparison	**Psychoeducation for social functioning in patients with schizophrenia vs. standard care.** **Treatment duration ranged from 1 month to 2 years.**
Summary of evidence	**Moderate quality evidence (medium-sized sample, inconsistent, imprecise, direct) suggests a large effect of improved social functioning following psychoeducation compared to standard care.**
Social functioning	
Significant, large effect of improved social functioning following psychoeducation compared to standard care; 3 RCTs, N = 362, SMD = 1.15, 95%CI 0.06 to 2.25, $p = 0.04$, $I^2 = 95\%$, $p < 0.00001$ Authors state that trials were of poor quality. Two assessed family psychoeducation and one assessed individual psychoeducation, with the effect being largest for individual psychoeducation.	
Consistency in results‡	Inconsistent
Precision in results§	Imprecise
Directness of results‖	Direct

Desplenter FAM, Simoens S, Laekeman G

The impact of informing psychiatric patients about their medication: A systematic review

Pharmacy World and Science 2006; 28(6): 329-341

View review abstract online

Comparison	**Educational programs on illness management in either group or individual outpatient settings vs. standard care.**

Summary of evidence	**Moderate to low quality evidence (small to medium-sized samples, unable to assess consistency or precision, direct) suggests psychoeducation may increase patients' knowledge, but any benefit for treatment adherence was unclear.**
Knowledge about medication	
5 studies (N = 233) assess psychoeducation interventions in people with schizophrenia spectrum disorders. Four studies (N = 169) assessed knowledge gains and all report significant benefits of psychoeducation for increasing knowledge compared to the control group. Two studies (N =120) assessed adherence rates and report no improvement in treatment adherence in the psychoeducation group compared to controls.	
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

Dolder CR, Lacro JP, Leckband S, Jeste DV

Interventions to improve antipsychotic medication adherence: review of recent literature

Journal of Clinical Psychopharmacology 2003; 23(4): 389-399

View review abstract online

Comparison	**Educational interventions for increasing treatment adherence vs. standard care.** **Treatment duration 1-9 sessions.**
Summary of evidence	**Moderate to low quality evidence (small sample, unable to assess precision and consistency, direct) suggests no benefit of psychoeducation for improving treatment adherence, although there may be an improvement in knowledge and insight.**
Treatment adherence **Measured indirectly by pill counting or family/patient/therapist reports; or directly by blood or urine sampling**	

4 RCTs (N = 197) assessed chronically ill schizophrenia patients (both in and out of hospital); Only one of the four studies showed significant improvements in adherence to medication following educational therapies compared to controls, although an increase in knowledge and insight was reported in three studies.	
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

Lincoln TM, Wilhelm K, Nestoriuc Y

Effectiveness of psychoeducation for relapse, symptoms, knowledge, adherence and functioning in psychotic disorders: a meta-analysis

Schizophrenia Research 2007; 96(1-3): 232-45

View review abstract online

Comparison	**Educational programs for illness management and coping in individual or family-oriented settings vs. standard care, waitlist, or a control intervention (supportive therapy, leisure groups).** **Treatment duration range 2 weeks – 2 years.**
Summary of evidence	**Moderate to low quality evidence (large samples, some imprecision, either consistent or unable to assess, indirect) suggests psychoeducation may have significant benefit for reducing relapse and rehospitalisation for up to 12 months post-treatment, particularly if the therapy involves families. It may also be beneficial for increasing patients' knowledge about the disorder. No benefit was found for symptom severity, general functioning or treatment adherence.**

Relapse/rehospitalisation

A significant, medium effect of lower relapse/rehospitalisation rates with psychoeducation, with this effect reducing to small after 12 months;

At the end of treatment: 5 studies, N = 452, *d* = 0.53, 95%CI 0.12 to 0.95, *p* = 0.01, Q = 3.45, *p* not reported

Follow up < 6 months: 4 studies, N = 387, *d* = 0.35, 95%CI 0.14 to 0.55, *p* = 0.00, Q = 4.60, *p* not reported

Follow up 7-12 months: 7 studies, N = 362, *d* = 0.48, 95%CI 0.15 to 0.82, *p* = 0.00, Q = 5.93, *p* not reported

Follow up > 12 months: 3 studies, N = 144, *d* = 0.21, 95%CI -0.07 to 0.49, *p* = 0.07, Q = 0.15, *p* not reported *Subgroup analysis at 7 to 12 months revealed only family sessions were effective;* Individual sessions: 2 studies, N = 101, *d* = 0.18, 95%CI −0.47 to 0.82, *p* = 0.30, Q = 1.72, *p* = 0.19 Family sessions: 6 studies, N = 322, *d* = 0.48, 95%CI −0.10 to 0.85 *p* = 0.00, Q = 4.78, *p* = 0.44 Individual vs. family: Q_B = 10.6, *p* = 0.00 *Subgroup analyses revealed no clear trend for higher effects of the control intervention (supportive therapy, leisure groups) compared to the standard care control conditions.*
Knowledge
Participants receiving psychoeducation also showed significant, medium sized effect of greater knowledge levels post-treatment; 4 studies, N = 278, *d* = 0.48, 95%CI 0.12 to 0.83, *p* = 0.00, Q = 3.31, *p* not reported
Symptom severity
No significant difference was reported between groups post-treatment, although the effect was more favourable in patients receiving family sessions compared to individual sessions; All sessions: 6 studies, N = 313, *d* = 0.29, 95%CI -0.13 to 0.70, *p* = 0.08, Q = 5.38, *p* not reported Individual sessions: 3 studies, N = 117, *d* = 0.24, 95%CI -0.39 to 0.86, *p* = 0.23, Q = 3.86, *p* = 0.15 Family sessions: 3 studies, N = 196, *d* = 0.33, 95%CI -0.26 to 0.93 *p* = 0.14, Q = 0.58, *p* = 0.75 *Individual vs. family*: Q_B = 11.4, *p* = 0.00
Medication adherence
No significant difference in medication adherence was reported between groups post-treatment; 2 studies, N = 171, *d* = -0.25, 95%CI -1.25 to 0.75, *p* = 0.31, Q = 1.00, *p* not reported
Functional outcomes
No significant difference were reported between groups post-treatment; 3 studies, N = 210, *d* = -0.03, 95%CI -0.84 to 0.78, *p* = 0.97, Q = 2.82, *p* not reported

Consistency in results	Consistent in subgroup analysis, unable to assess otherwise.
Precision in results	Precise for all except functional outcomes, medication adherence and subgroup analyses.
Directness of results	Indirect comparison (mixed control conditions combined).

Merinder LB

Patient education in schizophrenia: a review

Acta Psychiatrica Scandinavica 2000; 102(2): 98-106

View review abstract online

Comparison	**Educational programs for illness management and coping in individual or group settings vs. unspecified control in people with schizophrenia spectrum disorders.** **Treatment frequency range 1-75 sessions.**
Summary of evidence	**Moderate quality evidence (medium-sized samples, unable to assess consistency or precision, direct) suggests some benefit of psychoeducation for increasing patients' knowledge levels, but the benefits were unclear for treatment adherence, relapse, symptom severity, social function, insight and quality of life.**

Global outcomes

Seven RCT (N = 618) and four observational studies (N = 385) assessed educational programs compared to controls in people with schizophrenia spectrum disorders;

Six RCT (N = 582) and one observational study (N = 31) showed significantly greater increases in participant knowledge following education programs compared to control. One RCT (N = 36) showed no difference between groups.

Only two of five RCT (N = 272) and one naturalistic study (N = 160) showed any improvement in levels of treatment adherence following education programs compared to control.

One RCT (N = 64) showed improved insight following education, but one RCT (N = 46) showed no difference between groups.

One RCT (N = 114) and one observational study (N =29) showed improvements in quality of life following education programs compared to control.

Mental state

Seven RCT (N = 618) and four observational studies (N = 385) assessed educational programs compared to controls in people with schizophrenia spectrum disorders;

One RCT (N = 236) and one naturalistic study (N = 165) showed reduced *rate of relapse* in the education group, but two RCT (N = 84) showed no difference between groups in rates of relapse.

Two RCT (N = 296) showed improvements in symptom severity, but three RCT (N = 180) and one observational study (N = 29) showed no difference between groups in symptoms following treatment.

Two RCT (N = 350) showed improvements in social function following education, but a further 2 RCT (N = 66) showed no difference between groups.

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

Morriss R, Vinjamuri I, Faizal MA, Bolton CA, McCarthy JP

Training to recognise the early signs of recurrence in schizophrenia

Cochrane Database of Systematic Reviews 2013, Issue 2. Art. No.: CD005147. DOI: 10.1002/14651858.CD005147.pub2

View review abstract online

Comparison	**Early warning signs of relapse training (patient, carer and/or health professional) + standard care vs. standard care.**
Summary of evidence	**Moderate to high quality evidence (consistent, precise, direct, medium to large sample) suggests a small to medium-sized effect of improved medication adherence, and fewer relapses and rehospitalisations with early warning signs training. Moderate quality evidence (small to medium-sized samples) suggests a small effect of reduced risk of unemployment, and no consistent improvements in symptoms.**

Relapse and rehospitalisation

A significant medium-sized effect of reduced risk of relapse with early warning signs training;

16 RCTs, N = 1,502, RR 0.53, 95%CI 0.36 to 0.79, $p = 0.0018$, $I^2 = 81\%$, $p < 0.00001$

A trend for reduced time to relapse with early warning signs training;

6 RCTs, N = 550, HR 0.53, 95%CI 0.27 to 1.06, $p = 0.075$, $I^2 = 72\%$, $p = 0.003$

A significant medium-sized effect of reduced rehospitalisation with early warning signs training;

15 RCTs, N = 1,457, RR 0.48, 95%CI 0.35 to 0.66, $p < 0.00001$, $I^2 = 62\%$, $p = 0.00089$

A trend for reduced time to rehospitalisation;

6 RCTs, N = 1,149, HR 0.58, 95%CI 0.33 to 1.04, $p = 0.068$, $I^2 = 83\%$, $p = 0.00002$

Mental state

Measured by BPRS, PANSS, SAPS, SANS

A significant effect of reduced overall symptoms with early warning signs training on the BPRS but not the PANSS total scores;

BPRS: 10 RCTs, N not reported, MD -4.55, 95%CI -8.21 to -0.90, $p = 0.015$, $I^2 = 93\%$, $p < 0.00001$

PANSS: 5 RCTs, N = 385, MD -5.89, 95%CI -15.86 to 4.09, p = 0.25, I^2 = 91%, p < 0.00001
A significant effect of reduced positive symptoms with early warning signs training on the SAPS, but not the BPRS or PANSS;
SAPS: 1 RCT, N = 104, MD -2.04, 95%CI -3.22 to -0.86, p = 0.00067
BPRS: 1 RCT, N = 64, MD -0.90, 95%CI -3.52 to 1.72, p = 0.50
PANSS: 6 RCTs, N = 508, MD -0.41, 95%CI -2.70 to 1.87, p = 0.72, I^2 = 86%, p < 0.00001
No differences in negative symptoms on the SANS or PANSS;
SANS: 3 RCTs, N = 194, MD -3.95, 95%CI -15.25 to 7.35, p = 0.49, I^2 = 99%, p < 0.00001
PANSS: 6 RCTs, N = 508, MD -0.74, 95%CI -3.13 to 1.64, p = 0.54, I^2 = 86%, p < 0.00001
Medication adherence
A significant small to medium size effect of reduced risk of medication non-adherence with early warning signs training;
4 RCTs, N = 374, RR 0.57, 95%CI 0.42 to 0.77, p = 0.00024, I^2 = 0%, p = 0.51
Functioning
A significant small size effect of reduced risk of being unemployed with early warning signs training;
2 RCTs, N = 185, RR 0.68, 95%CI 0.57 to 0.82, p = 0.00004, I^2 = 0%, p = 0.92
No significant differences were reported in social functioning, quality of life, satisfaction with care or burden of care or knowledge.

Consistency in results	Consistent for medication adherence and unemployment, inconsistent for relapse and rehospitalisation, mental state.
Precision in results	Precise for medication adherence, relapse and rehospitalisation, and unemployment. Unable to assess MDs.
Directness of results	Direct

Pfammatter M, Junghan UM, Brenner HD

Efficacy of psychological therapy in schizophrenia: conclusions from meta-analyses

Schizophrenia Bulletin 2006; 32(Suppl 1): S64-80

View review abstract online

Comparison	**Psychoeducational coping-oriented interventions involving families and relatives vs. unspecified control groups.**

Educational therapies

Summary of evidence	**Moderate quality evidence (medium to large samples, indirect, consistent, precise) shows family psychoeducation has a medium-sized benefit for reduced familial expressed emotion and a small benefit for increasing relatives' knowledge about the disorder. Patients reported fewer relapses and hospitalisations (small to medium-sized effects), fewer days in hospital if hospitalised (small to large effects), and improved social functioning (medium-sized effect). Moderate to low quality evidence also shows small benefits for patients' general psychopathology.**
Family knowledge and expressed emotion (over-involvement, hostility, critical comments)	
A significant, medium-sized effect of reduced familial high-expressed emotion in the education group; 7 RCTs, patient N = 284, *g* = 0.59, 95%CI 0.36 to 0.83, *p* < 0.05, Q = 3.56, *p* = 0.74 *A significant, small increase in relatives' knowledge about the disorder in the education group;* 8 RCTs, patient N = 3,662, *g* = 0.39, 95%CI 0.31 to 0.46, *p* < 0.05, Q = 2.04, *p* = 0.96	
Patient's social functioning	
A significant, small effect of improved social functioning in patients in the education group; 6 RCTs, patient N = 3,362, *g* = 0.38, 95%CI 0.30 to 0.46, *p* < 0.05, Q = 2.84, *p* = 0.72	
Patient's mental state, relapse and hospitalisation rates	
At 6-12 months follow up, there was a small effect of reduced relapse rates in the education group; 14 RCTs, patient N = 3,838, *g* = 0.42, 95%CI 0.35 to 0.49, *p* < 0.05, Q = 16.58, *p* = 0.22 *At 6-12 months follow up, there was a small effect of reduced hospitalisation rates in the education group;* 13 RCTs, patient N = 3,789, *g* = 0.22, 95%CI 0.14 to 0.29, *p* < 0.05, Q = 12.35, *p* = 0.42 *At 18-24 months follow up, there was a medium-sized effect of reduced hospitalisation rates in the education group;* 8 RCTs, N = 445, *g* = 0.51, 95%CI 0.32 to 0.70, *p* < 0.05, Q = 6.83, *p* = 0.45 *Post-treatment, there was a significant, small effect of fewer days in hospital in the education group;* 3 RCTs, patient N = 3,197, *g* = 0.27, 95%CI 0.18 to 0.36, *p* < 0.05, Q = 0.39, *p* = 0.82 *At < 6 months follow up, there was a large effect of fewer days in hospital in the education group;* 2 RCTs, patient N = 127, *g* = 0.71, 95%CI 0.35 to 1.06, *p* < 0.05, Q = 1.70, *p* = 0.19 *At < 6 months follow up, there was a small effect of greater improvement in patients' general psychopathology in the education group;* 4 RCTs, patient N = 178, *g* = 0.40, 95%CI 0.10 to 0.70, *p* < 0.05, Q = 2.10, *p* = 0.56	

Consistency in results	Consistent
Precision in results	Precise
Directness of results	Indirect comparison (mixed control conditions combined).

Rathbone J, Variend H, Mehta H

Cannabis and schizophrenia

Cochrane Database of Systematic Reviews 2008, Issue 3. Art. No.: CD004837. DOI: 10.1002/14651858.CD004837.pub2.

View review abstract online

Comparison	**Cannabis and Psychosis Therapy (CAP), consisting of 3 months of individually delivered CBT orientated programme aimed at improving symptoms and reducing existing cannabis use vs. Psychoeducaton (PE).** **The sample were all in their first episode of psychosis.**
Summary of evidence	**Moderate to low quality evidence (1 small RCT, imprecise, direct) is unclear as to the benefit of CAP for patients in their first episode of psychosis who are using cannabis.**
Substance use **Cannabis and Substance Use Assessment Schedule (CASUS)**	
No significant differences between groups; At 3 months (immediately post treatment): 1 RCT, N = 47, RR = 1.04, 95%CI = 0.62 to 1.74, *p* = 0.87 By 9 months (6 months after treatment): 1 RCT, N = 47, RR = 1.30, 95%CI = 0.79 to 2.15, *p* = 0.30	
Knowledge About Psychosis Questionnaire (KAPQ)	
No significant differences between groups; At 3 months: 1 RCT, N = 47, WMD = 0.80, 95%CI = -1.78 to 3.38, *p* = 0.54 By 9 months: 1 RCT, N = 47, WMD = 0.90, 95%CI = -1.42 to 3.22, *p* = 0.45	
Brief Psychiatric Rating Scale-E (BPRS-E)	

No significant differences between groups; At 3 months: 1 RCT, N = 47, WMD = -3.60, 95%CI = -12.81 to 5.61, *p* = 0.44 By 9 months: 1 RCT, N = 47, WMD = 0.80, 95%CI = -7.47 to 9.07, *p* = 0.85	
Social and Occupational Functioning Assessment Scale (SOFAS)	
No significant differences between groups; At 3 months: 1 RCT, N = 47, WMD = -0.80, 95%CI = -9.95 to 8.35, *p* = 0.86 By 9 months: 1 RCT, N =47, WMD = -4.70, 95%CI = -14.52 to 5.12, *p* = 0.35	
Consistency in results	Not applicable (1 RCT).
Precision in results	Imprecise
Directness of results	Direct

Tsang HWH, Ching SC, Tang KH, Lam HT, Law PYY, Wan CN

Therapeutic intervention for internalized stigma of severe mental illness: A systematic review and meta-analysis

Schizophrenia Research 2016; 173: 45-53

View review abstract online

Comparison	**Psychoeducation for reducing internalised stigma vs. standard care for people with schizophrenia spectrum disorders. Some studies also included people with bipolar disorder or depression.** **Therapy duration ranged from 3 weeks to 3 months.**
Summary of evidence	**Moderate quality evidence (consistent, precise, indirect, medium-sized sample) finds improved internalised stigma with psychoeducation.**
Internalised stigma **Measured using the Internalized Stigma of Mental Illness scale**	
Significant, medium-sized effect of reduced internalised stigma with psychoeducation; 1 RCT + 2 controlled trials, N = 274, *d* = -0.40, 95%CI -0.64 to -0.16, *p* = 0.001, I^2 = 17%, *p* = 0.30	
Consistency in results	Consistent
Precision in results	Precise

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Directness of results	Indirect; mixed samples

Turner DT, van der Gaag M, Karyotaki E,Cuijpers P

Psychological Interventions for Psychosis: A Meta-Analysis of Comparative Outcome Studies

American Journal of Psychiatry 2014; 171: 523-538

View review abstract online

Comparison	**Psychoeducation vs. any other psychosocial intervention.**
Summary of evidence	**Moderate to high quality evidence (consistent, precise, indirect, large samples) suggests no differences between psychoeducation and other psychosocial interventions for specific symptoms.**
Overall symptoms	
No significant differences between groups; All studies: 8 RCTs, N = 500, g = 0.10, 95%CI -0.27 to 0.11, $p > 0.05$, $I^2 = 12.66\%$, $p > 0.05$ Excluding studies with a high risk of bias: 6 studies, g = -0.13, 95%CI -0.41 to 0.14, $p > 0.05$, $I^2 = 32.67\%$, $p > 0.05$	
Positive symptoms	
No significant differences between groups; Excluding studies with a high risk of bias: 4 RCTs, g = 0.19, 95%CI -0.06 to 0.44, $p > 0.05$, $I^2 = 0\%$, $p > 0.05$	
Negative symptoms	
No significant differences between groups; All studies: 5 RCTs, g = 0.02, 95%CI -0.22 to 0.25, $p < 0.05$, $I^2 = 0\%$, $p > 0.05$ Excluding studies with a high risk of bias: 4 studies, g = 0.03, 95%CI -0.22 to 0.28, $p > 0.05$, $I^2 = 0\%$, $p > 0.05$	
Consistency in results	Consistent
Precision in results	Precise
Directness of results	Indirect comparison (mixed control conditions combined)

Välimäki M, Hätönen H, Lahti M, Kuosmanen L, Adams CE

Information and communication technology in patient education and support for people with schizophrenia

Cochrane Database of Systematic Reviews 2012, Issue 10. Art. No.: CD007198. DOI: 10.1002/14651858.CD007198.pub2

View review abstract online

Comparison 1	**Psychoeducation delivered via Information and Communication Technology (ICT) vs. standard care.**
Summary of evidence	**Moderate to low quality evidence (small samples, some imprecision, authors report risk of bias within trials, direct) is unable to ascertain whether ICT is more beneficial than standard care for study retention, global state, knowledge, insight, perceived social support and mental state.**

Mental state

Technology-mediated psychoeducation showed a very small effect of improved mental state in the short-term;

BPRS: 1 RCT, N = 84, RR 0.75, 95%CI 0.56 to 1.00, p = 0.053 (trend)

Psychological distress: 1 RCT, N = 30, MD -0.51, 95% CI -0.90 to -0.12, p = 0.00097

Note: authors report risk of publication bias and that randomisation methods were not described.

Leaving the study early

No differences were found between groups for leaving the study early in the short- or long-term;

2 RCTs (1 < 12 weeks, 1 > 26 weeks), N = 116, RR 1.24, 95%CI 0.81 to 1.88, p = 0.32, I^2 0%, p = 0.63

Note: authors report risk of publication bias and that randomization methods were not described.

Global state

No differences between groups for global state;

GAF: 1 RCT, N = 84, RR 1.07, 95%CI 0.82 to 1.42, p = 0.61

No differences between groups for knowledge;

KISS: 1 RCT, N = 84, RR 0.77, 95%CI 0.58 to 1.03, p = 0.07

No differences between groups for insight;

ITAQ: 1 RCT, N = 84, RR 0.89, 95%CI 0.68 to 1.15, p = 0.36

People allocated to technology-mediated psychoeducation perceived that they received more social

support; 1 RCT, N = 30, MD 0.42, 95%CI 0.04 to 0.80, *p* = 0.03 Note: authors report risk of publication bias and that randomisation methods were not described.	
Consistency in results	Consistent where applicable (leaving the study early)
Precision in results	Precise for BPRS, ITAQ, KISS, and GAF, imprecise for all other outcomes or unable to assess (MD)
Directness of results	Direct
Comparison 2	**Psychoeducation delivered via Information and Communication Technology (ICT) + standard care vs. standard care alone.**
Summary of evidence	**Moderate to low quality evidence (small samples, some imprecision, authors report risk of bias within trials, direct) is unable to ascertain whether ICT + standard care is more beneficial than standard care alone for study retention, global state, knowledge, insight, quality of life, satisfaction with treatment and mental state.**
Mental state	
Technology-mediated psychoeducation showed more improved mental state as measured by PANSS total scores over the long-term; PANSS general: 1 RCT, N = 71, MD -11.90, 95% CI -14.93 to -8.87, *p* = 0.00001 *However, no differences were reported on PANSS positive and negative symptom scales;* PANSS positive: 1 RCT, N = 363, MD -0.75, 95% CI -1.96 to -0.46, *p* = 0.23 PANSS negative: 1 RCT, N = 363, MD -0.45, 95% CI -1.77 to -0.87, *p* = 0.51 *No differences were also reported on the BPRS;* BPRS: 1 RCT, N = 56, RR 0.86, 95%CI 0.63 to 1.19, *p* = 0.37 Note: authors report risk of publication bias and that randomisation methods were not described.	
Adherence with medication	
People allocated to technology-mediated psychoeducation showed a medium effect of more adherence with medication; 1 RCT, N = 71, RR 0.45, 95%CI 0.27 to 0.77, *p* = 0.0037 Note: authors report risk of publication bias and that randomisation methods were not adequately described.	
Leaving the study early	
No differences were reported for leaving the study early in the short- or long-term;	

Short term: 3 RCTs, N = 291, RR 0.81, 95%CI 0.55 to 1.19, *p* = 0.29, I^2 51%, *p* = 0.15 Long term: 2 RCTs, N = 434, RR 0.70, 95%CI 0.39 to 1.25, *p* = 0.23, I^2 0%, *p* = 0.60
Global state
Technology-mediated psychoeducation improved global state as measured by SDSS; SDSS: 1 RCT, N = 71, MD -4.60, 95%CI -5.95 to -3.25, *p* = 0.00001 *However, no differences were reported for global state as measured by GAF;* GAF: 1 RCT, N = 56, RR 1.15, 95%CI 0.86 to 1.54, *p* = 0.35 *Technology-mediated psychoeducation reported more satisfaction with treatment as measured by CSQ-8;* CSQ-8: 1 RCT, N = 363, MD 0.92, 95%CI 0.10 to 1.74, *p* = 0.027 *However, no differences in satisfaction with treatment were reported as measured by PSS-Fin;* PSS-Fin: 1 RCT, N = 145, MD -0.02, 95%CI -0.19 to 0.15, *p* = 0.81 Note: this study also compared ICT + standard care with non-ICT psychoeducation on satisfaction with treatment and reported similar results. *Technology-mediated psychoeducation showed a small effect of improved knowledge;* KISS: 1 RCT, N = 56, RR 0.64, 95%CI 0.42 to 0.97, *p* = 0.03 *No differences in insight;* ITAQ: 1 RCT, N = 56, RR 1.00, 95%CI 0.76 to 1.31, *p* = 1.00 *No differences in quality of life;* MANSA: 1 RCT, N = 56, MD 0.12, 95%CI 0.00 to 0.24, *p* = 0.057 (trend) *No differences in health and social needs;* CANSAS: 1 RCT, N = 363, MD -0.41, 95%CI -0.89 to 0.07, *p* = 0.093 Note: authors report risk of publication bias and that randomisation methods were not described.

Consistency in results	Consistent where applicable (leaving the study early).
Precision in results	Imprecise or unable to assess (MD).
Directness of results	Direct

Xia J, Merinder LB, Belgamwar MR

Psychoeducation for schizophrenia

Cochrane Database of Systematic Reviews, 2011(6): CD002831

View review abstract online

Educational therapies

Comparison	**Psychoeducation for illness management and coping with family plus standard care vs. standard care alone.** **Treatment duration range 1 session – 5 years, median 12 weeks.**
Summary of evidence	**Moderate to high quality evidence (large samples, consistent, precise, risk of bias in primary studies, direct) shows psychoeducation has a medium-sized benefit for increases in treatment adherence in the short to medium term.** **Moderate quality evidence (either inconsistent, imprecise or unable to assess) suggests psychoeducation may have some benefit for increasing knowledge, improving symptoms, quality of life, and social functioning, reducing relapses (large effect), the number of days in hospital and high familial expressed emotion (large effect in the short term).**
Treatment adherence	
Psychoeducation was associated with a medium effect of higher levels of treatment adherence; Short term (< 12 weeks): 10 RCTs (N = 1400), RR = 0.52, 95%CI 0.40 to 0.67, $p < 0.0001$, Q = 9.08, $p = 0.43$, $I^2 = 1\%$ Medium term (13 – 52 weeks): 6 RCTs (N = 781), RR = 0.36, 95%CI 0.27 to 0.49, $p < 0.0001$, Q = 4.99, $p = 0.42$, $I^2 = 0\%$ Long term (> 52 weeks): 3 RCTs (N = 282), RR = 0.48, 95%CI 0.31 to 0.75, $p = 0.001$, Q = 9.23, $p = 0.01$, $I^2 = 78\%$ Authors report possible risk of bias in primary studies.	
Relapse, hospitalisation, and mental state	
A large significant effect of lower rates of relapse were shown in the psychoeducation group compared to control; Medium term: 11 RCTs, N = 1214, RR = 0.70, 95%CI 0.61 to 0.81, $p < 0.00001$, Q = 24.27, $p = 0.01$, $I^2 = 59\%$ Long term <5 years: 5 RCTs, (N = 790), RR = 0.73, 95%CI 0.62 to 0.85, $p = 0.00006$, Q = 7.22, $p = 0.20$, $I^2 = 31\%$ Long term 5 years: 1 RCT, (N = 124), RR = 0.89, 95%CI 0.73 to 1.08, $p = 0.24$ Long term 7 years: 1 RCT, (N = 48), RR = 0.62, 95%CI 0.42 to 0.92, $p = 0.018$ *The psychoeducation group had fewer days in hospital by end of treatment compared to control;* Short term: 2 RCTs (N = 200), WMD = -3.23, 95%CI -5.44 to -1.01, $p = 0.0043$, Q = 13.89, $p = 0.00019$, $I^2 = 93\%$ Medium term: 1 RCT (N = 84), WMD = -8.40, 95%CI -10.44 to -6.36, $p < 0.00001$ *The psychoeducation group showed lower symptom severity endpoint scores compared to standard care;*	

Short term BPRS: 10 RCTs, N = 1107, WMD = -1.00, 95%CI -1.38 to -0.63, $p < 0.00001$, Q = 83.43, $p = 0.00001$, $I^2 = 88\%$ Medium term BPRS: 7 RCTs, N = 760, WMD = -4.73, 95%CI -5.55 to -3.91, $p < 0.00001$, Q = 29.01, $p = 0.00006$, $I^2 = 79\%$ Medium term PANSS: 2 RCTs, N = 163, WMD = -2.52, 95%CI -5.01 to -0.04, $p = 0.046$, Q = 2.67, $p = 0.10$, $I^2 = 63\%$ Long term (up to 2 years) BPRS: 3 RCTs, N = 370, WMD = -6.89, 95%CI -8.55 to 5.23, $p = 0.0001$, Q = 0.70, $p = 0.70$, $I^2 = 0\%$ Authors report possible risk of bias in primary studies.
Behaviour, social functioning and global state
3 RCT favoured standard care over psychoeducation for improving behaviour (NOSIE scale); Short term: 2 RCTs (N = 202), WMD = 16.85, 95%CI 11.90 to 21.80, $p < 0.00001$, Q = 0.06, $p = 0.81$, $I^2 = 0\%$ Medium term: 1 RCT (N = 73), WMD = 14.00, 95%CI 3.03 to 24.97, $p = 0.012$ Long term: 1 RCT (N = 70), WMD = 41.33, 95%CI 31.02 to 51.64, $p = 0.00001$ *1 RCT (N = 118) found greater degree of change in social function in standard care over psychoeducation;* Medium term MRSS: WMD = 13.68, 95%CI 12.51 to 14.85, $p = 0.00001$ Medium term SDSS: WMD = 1.96, 95%CI 1.83 to 2.09, $p = 0.00001$ *However, most favoured psychoeducation for social function endpoint scores;* Short term IPROS: 1 RCT (N = 116), WMD = -6.64, 95%CI -11.02 to -2.26, $p = 0.0030$ Short term SAS: 3 RCTs (N = 378), WMD = -8.53, 95%CI -10.50 to -6.55, $p = 0.00001$, Q = 136.03, $p = 0.00001$, $I^2 = 99\%$ Medium term SDSS: 1 RCT (N = 85), WMD = -3.74, 95%CI -6.05 to -1.43, $p = 0.0015$ Short term SDS: 3 RCTs (N = 378), WMD = -5.60, 95%CI -7.55 to -3.65, $p < 0.0001$, Q = 2.40, $p = 0.30$, $I^2 = 17\%$ *Medium effect size suggests that fewer participants in the psychoeducation group showed no clinically significant improvement in global function compared to control;* Medium term GAS/GAF: 2 RCTs (N = 178), RR = 0.59, 95%CI 0.43 to 0.82, $p = 0.0013$, Q = 3.26, $p = 0.07$, $I^2 = 69\%$ *However, global function endpoint scores favoured the standard care control group;* Medium term GAF/GAS: 4 RCTs (N = 318), WMD = -5.44, 95%CI -8.51 to -2.38, $p = 0.00051$, Q = 9.43, $p = 0.02$, $I^2 = 68\%$ Long term GAS: 1 RCT (N = 59), WMD = -6.70, 95%CI -13.38 to -0.02, $p = 0.049$ Authors report possible risk of bias in primary studies.
Family expressed emotion

Psychoeducation showed a large effect of reduced family levels of high expressed emotion in the short term, but this effect was lost by 9 months;
Short term: 2 RCTs, N = 282, RR = 0.84, 95%CI 0.76 to 0.94, *p* = 0.0027, Q = 1.09, *p* = 0.30, I^2 = 8%
Medium term (9-12 months): 1 RCT (N = 46), RR = 1.07, 95%CI 0.64 to 1.78, *p* = 0.80
Authors report possible risk of bias in primary studies.
Knowledge and insight
Participants receiving psychoeducation showed significantly greater levels of knowledge (endpoint scores) compared to control, on the KQ, ITAQ and SKQ scales;
Short term KQ: 1 RCT, (N = 75), WMD = -12.00, 95%CI -17.67 to -6.33, *p* = 0.000034
Long term KQ: 1 RCT, (N = 75), WMD = -8.00, 95%CI -14.64 to -1.36, *p* = 0.018
Short term SKQ: 1 RCT, (N = 19), WMD = -16.26, 95%CI -22.72 to -9.80, *p* = 0.00001
Short term ITAQ: 3 RCTs, (N = 295), WMD = 5.53, 95%CI 4.56 to 6.49, *p* = 0.00001, Q = 2.72, *p* = 0.26, I^2 = 26%
Medium term ITAQ: 1 RCT, (N = 73), WMD = 4.83, 95%CI 1.51 to 8.15, *p* = 0.0044
However, the KASQ scale showed no benefit of psychoeducation;
Short term KASQ: 1 RCT, (N = 71), WMD = 0.20, 95%CI -2.12 to 2.52, *p* = 0.87
Medium term KASQ: 1 RCT, (N = 61), WMD = 1.60, 95%CI -0.84 to 4.04, *p* = 0.20
There were no differences between groups in levels of insight;
Short term SAUMD: 2 RCTs, (N = 161), WMD = -0.63, 95%CI -1.86 to 0.61, *p* = 0.32, Q = 11.55, *p* = 0.00068, I^2 = 91%
Medium term RAQ: 1 RCT, (N = 56), WMD = 1.80, 95%CI -0.85 to 4.45, *p* = 0.18
Authors report possible risk of bias in primary studies.
Quality of life
Psychoeducation improved quality of life in the medium term, but not in the short term;
Short term GQOLI-74: 1 RCT (N = 62), WMD = 0.63, 95%CI -0.79 to 2.05 *p* = 0.38
Short term FBIS: 1 RCT (N = 84), WMD = -4.70, 95%CI -7.19 to -2.21 *p* = 0.00022
Short term PGWB: 1 RCT, N = 71, WMD = 2.00, 95%CI -6.08 to 10.08, *p* = 0.63
Medium term PGWB: 1 RCT, N = 61, WMD = 2.80, 95%CI -5.40 to 11.00, *p* = 0.50
Medium term QOL: 1 RCT (N = 108), WMD = -9.70, 95%CI -17.22 to -2.18 *p* = 0.012
Medium term FAD: 1 RCT (N = 62), WMD = -6.79, 95%CI -11.67 to -1.91 *p* = 0.0064
Medium term GQOLI-74: 1 RCT (N = 62), WMD = 2.13, 95%CI 1.03 to 3.23 *p* = 0.00015
Medium term FBIS: 2 RCTs (N = 241), WMD = -6.24, 95%CI -7.80 to -4.68, *p* < 0.0001, Q = 4.20, *p* = 0.04, I^2 = 76%

Authors report possible risk of bias in primary studies.
Study attrition
There were no differences between groups for study attrition; Short term: 2 RCTs (N = 87), RR = 3.04, 95%CI 0.36 to 25.67, *p* = 0.31, Q = 0.00, *p* = 0.99, I^2 = 0% Medium term: 4 RCTs (N = 318), RR = 0.56, 95%CI 0.29 to 1.10, *p* = 0.091, Q = 2.75, *p* = 0.43, I^2 = 0% Long term: 2 RCTs (N = 206), RR = 0.63, 95%CI 0.38 to 1.04, *p* = 0.068, Q = 0.33, *p* = 0.56, I^2 = 0% Authors report possible risk of bias in primary studies.

Consistency in results	Consistent where applicable except for relapse, BPRS, SAUMD, FBIS, GAS/GAF, and long term treatment adherence.
Precision in results	Precise for all except study attrition and long-term expressed emotion, unable to assess WMD.
Directness of results	Direct

Zhao S, Sampson S, Xia J, Jayaram MB

Psychoeducation (brief) for people with serious mental illness

Cochrane Database of Systematic Reviews 2015, Issue 4. Art. No.: CD010823. DOI: 10.1002/14651858.CD010823.pub2

View review abstract online

Comparison 1	**Brief psychoeducation (10 sessions or less) vs. standard care.**
Summary of evidence	**Moderate to high quality evidence (large samples, consistent, precise, risk of bias in primary studies, direct) shows a small effect of reduced relapse rates for up to 1 year after brief psychoeducation, with no differences by 5 years. Moderate quality evidence (imprecise) suggests a small effect of reduced non-adherence for up to 12 weeks after brief psychoeducation.** **Moderate to low quality evidence (small sample, unable to assess precision, direct) is uncertain as to the benefit of brief psychoeducation for global state, mental state, knowledge, social functioning or quality of life.**
Medication adherence	
A significant, small effect of reduced non-adherence for up to 12 weeks after brief psychoeducation,	

and a large effect for up to 1 year;
Short term (up to 12 weeks): 3 RCTs, N = 448, RR = 0.63, 95%CI 0.41 to 0.96, $p < 0.05$, $I^2 = 0\%$, $p = 0.82$
Medium term (12-52 weeks): 1 RCT, N = 118, RR = 0.17, 95%CI 0.05 to 0.54, $p < 0.05$
Authors report possible risk of bias in primary studies, particularly in the medium term results.
Relapse
A significant, small effect of reduced relapse rates for up to 1 year after brief psychoeducation, with no differences between groups by 5 years;
Medium term (12-52 weeks): 4 RCTs, N = 406, RR = 0.70, 95%CI 0.52 to 0.93, $p < 0.05$, $I^2 = 13\%$, $p = 0.33$
Long term (5 years): 1 RCT, N = 124, RR = 0.89, 95%CI 0.73 to 1.08, $p > 0.05$
Authors report possible risk of bias in primary studies.
Global and mental state
A significant effect of improved global state by 2 years, with no differences between groups in the shorter or longer term;
Global state, long term (2 years): 1 RCT, N = 59, MD -6.70, 95%CI -13.38 to -0.02, $p < 0.05$
Note: authors report no significant differences in the short term, medium term, or by 5 years.
A significant effect of improved mental state for up to 1 year;
Mental state, short term (up to 12 weeks): 1 RCT, N = 60, MD -2.70, 95%CI -4.84 to -0.56, $p < 0.05$
Mental state, medium term (12-52 weeks): 1 RCT, N = 60, MD -5.36, 95%CI -6.77 to -3.95, $p < 0.05$
Authors report possible risk of bias in primary studies.
Knowledge, social functioning, and quality of life
A significant effect of improved knowledge for up to 1 year;
Short term (up to 12 weeks): 2 RCTs, N = 97, MD 7.39, 95%CI 4.94 to 9.83, $p < 0.05$, $I^2 = 0\%$, $p = 0.84$
Medium term (12-52 weeks): 1 RCT, N = 73, MD 4.83, 95%CI 1.51 to 8.15, $p < 0.05$
A significant effect of improved social functioning for up to 1 year;
Rehabilitation status, medium term (12-52 weeks): 1 RCT, N = 118, MD -13.68, 95%CI -14.85 to -12.51, $p < 0.05$
Social disability, medium term (12-52 weeks): 1 RCT, N = 118, MD -1.96, 95%CI -2.09 to -1.83, $p < 0.05$
No differences between groups for quality of life;
Short term (up to 12 weeks): 1 RCT N = 62, MD 0.63, 95%CI -0.79 to 2.05, $p > 0.05$
Authors report possible risk of bias in primary studies.

Consistency in results	Consistent where appropriate (> 1 RCT; medication adherence, relapse, knowledge).
Precision in results	Imprecise for medication adherence, precise for relapse, unable to assess MDs (not standardised).
Directness of results	Direct
Comparison 2	**Brief psychoeducation (10 sessions or less) vs. cognitive behavioural therapy.**
Summary of evidence	**Moderate to low quality evidence (small samples, unable to assess precision, direct) is uncertain as to the benefit of brief psychoeducation over cognitive behavioural therapy.**
Medication adherence	
No differences between groups; Short term (up to 12 weeks): 1 RCT, N = 88, MD = -0.20, 95%CI -0.42 to 0.02, $p > 0.05$ Medium term (12-52 weeks): 1 RCT, N = 88, MD = -0.30, 95%CI -0.70 to 0.10, $p > 0.05$ Long term (> 1 year): 1 RCT, N = 41, MD = -0.50, 95%CI -1.05 to 0.05, $p > 0.05$	
Relapse and hospitalisation	
No differences between groups; Relapse, medium term (12-52 weeks): 1 RCT, N = 88, RR = 1.67, 95%CI 0.62 to 4.48, $p > 0.05$ Hospitalisation, long term (> 1 year): 1 RCT, N = 43, RR = 1.58, 95%CI 0.78 to 3.20, $p > 0.05$ Authors also report no differences on PANSS scores.	
Quality of life	
No differences between groups; Short term (up to 12 weeks): 1 RCT, N = 63, MD = 1.80, 95%CI -10.17 to 13.77, $p > 0.05$ Medium term (12-52 weeks): 1 RCT, N = 61, MD = 4.50, 95%CI -6.66 to 15.66, $p > 0.05$	
Consistency in results	Not applicable (all 1 RCT).
Precision in results	Imprecise for relapse and hospitalisation, unable to assess MDs.
Directness of results	Direct

Zou H, Li Z, Nolan MT, Arthur D, Wang H, Hu L

Self-management education interventions for persons with schizophrenia: A meta-analysis

International Journal of Mental Health Nursing 2013; 22: 256-271

View review abstract online

Comparison	**Self-management education in medication management, recognition of early warning signs of relapse, development of a relapse prevention plan, and coping skills for dealing with persistent symptoms vs. standard care.** **Treatment was given over 7 to 48 sessions.**
Summary of evidence	**Moderate to high quality evidence (medium to large samples inconsistent or imprecise, direct) suggests self-management education improves mental state, reduces relapse and rehospitalisation, and increases adherence to medication.**

Mental state

Measured by BPRS and PANSS

Self-management education showed improved symptoms;

PANSS positive: 3 RCTs, N = 257, WMD = -2.65, 95%CI -3.62 to -1.67, $p < 0.001$, $I^2 = 78.7\%$

PANSS negative: 3 RCTs, N = 257, WMD = -4.01, 95%CI -5.23 to -2.79, $p < 0.001$, $I^2 = 86.4\%$

PANSS general: 3 RCTs, N = 257, WMD = -3.39, 95%CI -4.50 to -2.29, $p < 0.001$, $I^2 = 62.3\%$

BPRS 5 RCTs, N = 409, WMD = -4.19, 95%CI -5.84 to -2.54, $p < 0.001$, I^2 not reported, authors state BPRS data is homogenous

Relapse and rehospitalisation

Self-management education showed a small to medium effect of reduced relapse and rehospitalisation;

Relapse: 5 RCTs, N = 534, OR = 0.54, 95%CI 0.36 to 0.83, $p = 0.004$, $I^2 = 0\%$

Rehospitalisation: 7 RCTs, N = 771, OR = 0.55, 95%CI 0.39 to 0.77, $p < 0.001$, $I^2 = 0\%$

Results were similar in subgroup analysis of studies with < 10 or > 10 sessions.

Adherence to medication

Self-management education showed a medium effect of increased adherence with medication;

4 RCTs, N = 435, OR = 2.57, 95%CI 1.57 to 4.19, $p < 0.001$, I^2 not reported, authors state data is homogenous

Educational therapies

Consistency in results	Inconsistent for PANSS scores only.
Precision in results	Precise for relapse and rehospitalisation, imprecise for adherence to medication, unable to assess mental state (WMD not standardised).
Directness of results	Direct

Explanation of acronyms

BPRS = Brief Psychiatric Rating Scale, CANSAS = Camberwell Assessment of Need - Short Appraisal Schedule, CGI = Clinical Global Impression, CI = Confidence Interval, CSQ-8 = Client Satisfaction Questionnaire , *d* or *g* = Standardized mean difference, FAD = Family Assessment Device, FBIS = Family Burden Interview Schedule, GAF = Global Assessment of Functioning, GAS = Global Assessment Scale, GQOLI-74 = General Quality of Life Inventory -74, HR = hazard ratio, I^2 = the percentage of the variability in effect estimates that is due to heterogeneity rather than sampling error (chance), IPROS = Inpatient Psychiatric Rehabilitation Outcome Scale, ITAQ = Insight Treatment Attitude Questionnaire, KASQ = Knowledge About Schizophrenia Questionnaire, KISS = Knowledge and Information about Schizophrenia Schedule, KQ = Knowledge Questionnaire, MANSA - Manchester Short Assessment of Quality of Life, MD = mean difference, MRSS = Morningside Rehabilitation Status Scale, N = number of participants, NOSIE -30 = Nurse Observation Scale for Inpatient Evaluation -30, *p* = statistical probability of obtaining that result ($p < 0.05$ generally regarded as significant), PANSS = Positive and Negative Syndrome Scale, PSS-Fin - Patient Satisfaction Scale, Q = Q statistic for the test of heterogeneity, RAQ = Recovery Attitudes Questionnaire, RCT = randomized controlled trial, RR = relative risk, SANS = scale for the assessment of negative symptoms, SAPS = scale for the assessment of positive symptoms, SAS = Zung Self-Rating Anxiety Scale, SAS II = Social Adjustment Scale II, SAUMD = The Scale to Assess Unawareness of Mental Disorder, SDS = Zung Self-Rating Depression Scale, SDSS = Social Disability Screening Schedule, SKQ = Schizophrenia Knowledge Questionnaire, vs. = versus, WMD = weighted mean difference

Educational therapies

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.

† 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 have been divided by the pooled standard deviation (or the standard deviation of one group when groups are homogenous) which 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[16].

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[16]. 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

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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[16]. 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[17]. 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;

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

§ Imprecision refers to wide confidence intervals indicating a lack of confidence in the effect estimate[17]. 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[17].

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