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Problem solving skills for schizophrenia (Review)
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[Intervention Review]

Problem solving skills for schizophrenia

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ABSTRACT

Background

The severe and long-lasting symptoms of schizophrenia are often the cause of severe disability. Environmental stress such as life events and the practical problems people face in their daily can worsen the symptoms of schizophrenia. Deficits in problem solving skills in people with schizophrenia affect their independent and interpersonal functioning and impair their quality of life. As a result, therapies such as problem solving therapy have been developed to improve problem solving skills for people with schizophrenia.

Objectives

To review the effectiveness of problem solving therapy compared with other comparable therapies or routine care for those with schizophrenia.

Search methods

We searched the Cochrane Schizophrenia Group's Register (September 2006), which is based on regular searches of BIOSIS, CENTRAL, CINAHL, EMBASE, MEDLINE and PsycINFO. We inspected references of all identified studies for further trials.

Selection criteria

We included all clinical randomised trials comparing problem solving therapy with other comparable therapies or routine care.

Data collection and analysis

We extracted data independently. For homogenous dichotomous data we calculated random effects, relative risk (RR), 95% confidence intervals (CI) and, where appropriate, numbers needed to treat (NNT) on an intention-to-treat basis. For continuous data, we calculated weighted mean differences (WMD) using a random effects statistical model.

Main results

We included only three small trials (n=52) that evaluated problem solving versus routine care, coping skills training or non-specific interaction. Inadequate reporting of data rendered many outcomes unusable. We were unable to undertake meta-analysis. Overall results were limited and inconclusive with no significant differences between treatment groups for hospital admission, mental state, behaviour, social skills or leaving the study early. No data were presented for global state, quality of life or satisfaction.

Authors' conclusions

We found insufficient evidence to confirm or refute the benefits of problem solving therapy as an additional treatment for those with schizophrenia. The small number of participants, the quality of reporting of methods and results were of concern. More trials with adequate

reporting of methods to minimize bias, adequately powered, with validated, reliable and clinically meaningful outcomes are needed to provide robust evidence to guide policy and practice.

PLAIN LANGUAGE SUMMARY

Problem solving skills for schizophrenia

People with schizophrenia often have lack the ability to solve problems arising from day to day living and stressful life events. These deficits can affect their ability to live independently, and contribute to disability and poor quality of life. Problem solving therapy is a psychological intervention designed to improve the ability of people with schizophrenia to approach problems in a systematic way and this therapy can be used in addition to antipsychotic medication and other supportive interventions.

Problem solving therapy involves several key stages: (i) linking symptoms to problems, (ii) defining the problems, (iii) setting achievable goals, (iv) generating and choosing preferred solutions, (v) implementing preferred solutions and (vi) evaluating the result of the solution. If dealing more effectively with the problems of daily life were to reduce stress, it is possible that the risk of a relapse or increase in symptoms could be lowered.

We evaluated the effectiveness of problem solving therapy compared with other comparable therapies or routine care for those with schizophrenia. We included three small randomised trials. The overall results were inconclusive and did not demonstrate a significant advantage for problem solving in affecting hospital admission, mental state, behaviour or social skills. We are currently unable, from the results of this review, to provide guidance to support or discourage the use of problem solving skills training as an additional treatment for people with schizophrenia.

BACKGROUND

Schizophrenia is a chronic, severe and disabling illness which affects approximately 1% of the population. It is a worldwide illness that crosses all cultures and socioeconomic groups (Fortinash 2000). The severe and long lasting symptoms of schizophrenia cause considerable disability. It has been proposed that schizophrenia is an illness that is made worse by environmental stress such as life events (Falloon 1984). Mynors-Wallis 2005 also suggests that the psychological symptoms are often caused by practical problems people face in their daily lives. People with schizophrenia may have deficits in problem-solving skills. This could affect independent and interpersonal functioning and impair quality of life (Revheim 2006; Kelly 1985). Inadequate coping skills often precedes the illness and contributes to its onset, but medication often has little effect on behavioural deficits (Kelly 1985). As a result, there have been programmes developed to improve problem solving skills in schizophrenia, such as problem solving therapy.

Problem solving therapy is commonly understood as a brief, focused form of psychotherapy. It is very relevant in psychiatry, social work and counselling. It takes a problem solving approach to the management of psychological disorders. The underlining theoretical assumption of this approach is that symptoms will improve as problems are resolved (Mynors-Wallis 2005). The therapy involves a few practical sessions where the therapist structures a process with the patients to identify their most immediate problems and develop agreed tasks and ways of solving them. There is both a behavioural and a cognitive aspect to problem solving therapy. It demands a collaborative approach in which therapist and patient actively work together to solve the problem.

Problem solving therapy begins by establishing the link between the symptoms and the practical difficulties and usually involves seven stages: explaining the therapy and its rationale; identification and break down of the problem; establishing achievable goals; generating solutions; evaluating solutions; implementing the chosen solution; and finally evaluating the outcome of the implemented solution (Mynors-Wallis 2005). The therapy teaches people a systematic strategy for approaching problems. It not only solves their immediate problem, but also prepares them to deal with the future problems on their own. The five major goals of the therapy are to increase people's understanding of the link between their symptoms and their problems; to increase their ability to clearly define their current problems and recognize the resources they have for tackling the problems; to teach them a specific procedure to solve the problem in a structured way; to increase their confidence and self control in a problematic situation and to prepare them for future problems (Hawton 1989). The therapy can be delivered by psychiatrists, general practitioners, psychologists and nurses. The length of treatment typically last for four to six sessions. The first two sessions typically last for an hour and subsequent sessions last around 30 minutes. The first three sessions are usually conducted at weekly intervals and the subsequent sessions are spaced at longer intervals (Mynors-Wallis 2005).

The problem solving approach is attractive for both professionals and patients because it is easy to learn and can be applied to a wide range of situations commonly encountered by psychiatric patients (Hawton 1989). It has been widely applied in the

treatment of depressive disorders, emotional disorders, deliberate self-harm, diabetes, obesity, cancer support, palliative care and psychological problems, as well as in supporting carers (Mynors-Wallis 2005). However, it is not as widely applied in the treatment of schizophrenia. Often problem solving therapy is used as a component of family intervention programmes (Pharoah 2006) to clarify the particular problems each family faces and to enhance the family's coping skills (Falloon 1984; Frangou 2000).

OBJECTIVES

To evaluate the effects of problem solving therapy for people with schizophrenia or schizophrenia-like illnesses compared to standard care and other interventions.

METHODS

Criteria for considering studies for this review

Types of studies

We included all relevant randomised controlled trials. If a trial was described as 'double blind, but it was implied that the study was randomised, we included this trial in a sensitivity analysis. If there were no substantive differences within primary outcomes (see 'types of outcome measures') when implied randomised trials were added, then we included these in the final analysis. If we found a substantial difference, then only clearly randomised trials were presented and we described the results of the sensitivity analysis in the text. We excluded quasi-randomised studies, such as those allocating by using alternate days of the week.

Types of participants

We included people with schizophrenia or where the majority (80%) of people in the study were likely to suffer from schizophrenia. In studies where non-specific labels were used, such as "chronic serious mental illness" we assumed that most people suffered from schizophrenia. We were not concerned how diagnoses were made and included trials diagnosing people by any criteria, irrespective of gender, age or nationality.

Types of interventions

1. Problem Solving Therapy

Problem solving therapy as an adjunctive treatment for schizophrenia or schizophrenia-like illnesses. We defined problem solving therapy as a psychological intervention designed to improve the cognitive ability of people with schizophrenia to enable them to approach problems in a systematic way. Daily 'living' problems, for example 'cooking a meal' or 'managing finances' would become less stressful and the risk of a recurrence or increase in symptoms lowered with this intervention. It involves several key stages: (i) linking symptoms to problems, (ii) defining the problems, (iii) setting achievable goals, (iv) generating and choosing preferred solutions, (v) implementing preferred solutions and (vi) evaluating the result of the solution.

2. Coping Skills Therapy

Other cognitive group or individual therapies aiming to help those with schizophrenia cope with their symptoms such as delusions, hallucinations and depression, this is done through teaching cognitive strategies and coping skills. Again, the aim is to reduce stress and its harmful affects for those with schizophrenia. Sessions

are in addition to the routine care the person would normally receive.

3. Psychosocial interventions

In addition to standard care, help with symptoms by psychological and/or social interventions, such as non-directive counselling and supportive therapy and other 'talking therapies'.

4. Standard/routine care

Care that a person with schizophrenia would normally receive had they not been included in the research trial. Also includes 'waiting list control groups'.

5. Non intervention

Untreated control groups.

Types of outcome measures

1. Service utilisation

- 1.1 Days in hospital*
- 1.2 Hospital admission

2. Clinical global response

- 2.1 Relapse
- 2.2 Global state - not improved*
- 2.3 Average change or endpoint score in global state
- 2.4 Leaving the study early
- 2.5 Compliance with medication

3. Mental state and behaviour

- 3.1 Positive symptoms (delusions, hallucinations, disordered thinking)
- 3.2 Negative symptoms (avolition, poor self-care, blunted affect)
- 3.3 No clinically important change in specific symptoms
- 3.4 Average change or endpoint score

4. Social functioning

- 4.1 Average change or endpoint scores
- 4.2 Social impairment
- 4.3 Employment status (employed/unemployed)
- 4.4 Work related activities
- 4.5 Unable to live independently
- 4.6 Imprisonment

5. Quality of life

- 5.1 No clinically important change in quality of life
- 5.2 Not any change in quality of life
- 5.3 Average change or endpoint scores
- 5.4 No clinically important change in specific aspects of quality of life
- 5.5 Not any change in specific aspects of quality of life
- 5.6 Average change or endpoint scores

6. Family outcome

- 6.1 Average score/change in family burden
- 6.2 Patient and family coping abilities
- 6.3 Understanding of the family member with schizophrenia
- 6.4 Family care and maltreatment of the person with schizophrenia
- 6.5 Expressed emotion
- 6.6 Quality of life/satisfaction with care for either recipients of care or their carers
- 6.7 Economic outcomes
- 6.8 Cost of care

7. Satisfaction with treatment

- 7.1 Recipient of treatment not satisfied with therapy
- 7.2 Recipient of treatment average satisfaction score
- 7.3 Recipient of treatment average change in satisfaction scores
- 7.4 Carer not satisfied with treatment
- 7.5 Carer average satisfaction score
- 7.6 Carer average change in satisfaction score

8. Adverse effects/events

- 8.1 No clinically important general adverse effects
- 8.2 Not any general adverse effects
- 8.3 Average change or endpoint general adverse effect scores
- 8.4 No clinically important change in specific adverse effect
- 8.5 Not any change in specific adverse effects
- 8.6 Average change or endpoint specific adverse effects
- 8.7 Suicide and all causes of mortality

* pre-stated primary outcomes.

We divided outcomes into short term (less than six weeks) medium term (six weeks-three months) and long term (more than three months).

Search methods for identification of studies

1. Electronic searches

We searched The Cochrane Schizophrenia Group Trials Register (September 2006) using the phrase:

[(*problem* in title, abstract and index fields in REFERENCE) OR (*problem* or in interventions field in STUDY)]

This register is compiled by systematic searches of major databases, hand searches and conference proceedings (see Group Module).

2. Reference searching

We inspected references of all identified studies (included and excluded) for further relevant trials.

3. Personal contact

We contacted the first authors of all included study for information regarding unpublished trials and extra data on the published trials.

Data collection and analysis

1. Selection of trials

We (JX and CBL) independently inspected citations identified in the search. After identifying potentially relevant abstracts we ordered full papers. CBL re-inspected a random 10% to ensure reliable selection. Once the full papers were obtained we (JX and CBL) decided if they met the review inclusion criteria. We sought to resolve disputes over whether studies met the inclusion criteria by discussion, but if disagreement occurred, these trials were added to the 'awaiting assessment' list until further information became available.

2. Assessment of methodological quality

We assessed the methodological quality of included trials in this review using the criteria described in The Cochrane Handbook (Higgins 2006) and the Jadad Scale (Jadad 1996). The former is based on the evidence of a strong relationship between allocation concealment and direction of effect (Schulz 1995). The categories are defined below:

- A. Low risk of bias (adequate allocation concealment)
- B. Moderated risk of bias (unclear allocation concealment)
- C. High risk of bias (inadequate concealment).

For the purpose of the analysis in this review, we only included trials that met The Cochrane Handbook criteria A or B.

The Jadad Scale measures a wider range of factors that impact on the quality of a trial. The scale includes three items:

1. Was the study described as randomised?
2. Was the study described as double-blind?
3. Was there a description of withdrawals and drop outs?

Each item receives one point if the answer is positive. In addition, a point can be deducted if either the randomisation or the blinding/masking procedures described are inadequate or unclear. For this review we used a cut-off of two points on the Jadad Scale to check the assessment made by The Cochrane Handbook criteria. However we did not use the Jadad scale to exclude trials.

3. Data collection

We independently extracted data from selected trials. JX carried out a separate re-extraction of data to ensure reliability. Again, where disagreement arose, we attempted to resolve this through discussion. If doubt remained we contacted the authors for additional information. While waiting for further information, we added trials to the list of those awaiting assessment.

4. Data synthesis

4.1 Data types

We assessed outcomes using continuous (for example changes on a behaviour scale), categorical (for example, one of three categories on a behaviour scale, such as 'little change', 'moderate change' or 'much change') or dichotomous (for example, either 'no important changes' or 'important changes' in a person's behaviour) measures. Currently RevMan does not support categorical data so we were unable to analyse this.

4.2 Incomplete data

We planned to exclude outcomes from trials if more than 30% of participants in any group were not reported in the final analysis. We carried out an intention to treat analysis. On the condition that more than 70% of people completed the study, we counted everyone allocated to the intervention, whether they completed the follow up or not. We assumed that those who dropped out had the negative outcome, with the exception of death. We analysed the impact of excluding trials with high attrition rates (>30%) in a sensitivity analysis for primary outcomes. If exclusion of data from this latter group resulted in a substantive change in estimates of effect, we reported this.

4.3 Dichotomous data

Where possible, efforts were made to convert outcome measures to dichotomous (yes/no) data. This can be done by identifying cut off points on rating scales and dividing participants accordingly into 'clinically improved' or 'not clinically improved'. If the authors used a predefined cut off point for determining clinical effectiveness we used their definitions. Otherwise we assumed that a 50% reduction in a scale-derived score to be a clinically significant response. Similarly, we considered a rating of 'at least much improved' according to the Clinical Global Impression Scale (Guy 1976) as a clinically significant response.

For dichotomous outcomes we calculated the relative risk (RR) and its 95% confidence interval (CI) based on the random effects model, as this takes into account any differences between studies even if there is no statistically significant heterogeneity. Relative risk is more intuitive (Boissel 1999) than odds ratios which tend to be interpreted as RR by clinicians (Deeks 2000). This misinterpretation then leads to an overestimate of the impression of the effect. We inspected data to see if an analysis using a fixed effects model made any substantive difference in outcomes that were not statistically significantly heterogeneous. When the overall results were significant we calculated the number need to treat (NNT) and the number needed to harm (NNH) as the inverse of the risk difference.

4.4 Continuous data

4.4.1 Normally distributed data: continuous data on clinical and social outcomes are often not normally distributed. To avoid the pitfall of applying parametric tests to non-parametric data, we applied the following standards to all data before inclusion: (a) standard deviations and means were reported in the paper or were obtainable from the authors; (b) when a scale started from the finite number zero, the standard deviation, when multiplied by two, was less than the mean (as otherwise the mean was unlikely to be an appropriate measure of the centre of the distribution, Altman 1996); (c) if a scale started from a positive value (such as PANSS which can have values from 30 to 210) the calculation described above was modified to take the scale starting point into account. In these cases skew is present if $2SD > (S - S_{min})$, where S is the mean score and S_{min} is the minimum score. Endpoint scores on scales often have a finite start and end point and these rules can be applied to them. When continuous data are presented on a scale which includes a possibility of negative values (such as change on a scale), there is no way of telling whether data are non-normally distributed (skewed) or not. It is thus preferable to use scale endpoint data, which typically cannot have negative values. We would have entered skewed data from studies of less than 200 into additional tables rather than into an analysis. Skewed data poses less of a problem when looking at means if the sample size is large and such data can be entered into a synthesis.

If only change data (endpoint minus baseline) are available, the situation is more problematic. In the absence of individual patient data it is likely that the data are skewed but it is impossible to know for certain. After consulting ALLSTAT electronic statistics mailing list, we planned to present change data graphically in order to summarise available information. In doing this we assumed either that data were not skewed or that the analyses could cope with the unknown degree of skew. Without individual patient data it is impossible to test this assumption. Had both change and endpoint data been available for the same outcome category, we would have presented only endpoint data. We acknowledge that by doing this much of the published change data would have been excluded, but argue that endpoint data are more clinically relevant and that if change data were to be presented along with endpoint data, it would be given undeserved equal prominence. We contacted authors of studies reporting only change data for endpoint figures.

4.4.2 Rating scales: A wide range of instruments are available to measure mental health outcomes. These instruments vary in quality and many are not valid, or even ad hoc. For outcome instruments some minimum standards have to be set. It has been shown that the use of rating scales which have not been described

in a peer-reviewed journal (Marshall 2000) are associated with bias, therefore the results of such scales were excluded. Furthermore, we stipulated that the instrument could be considered a global assessment of an area of functioning. It was expected, however, that the therapists would also frequently be the rater; we included such data but it was commented on as 'prone to bias'.

Whenever possible we took the opportunity to make direct comparisons between trials that used the same measurement instrument to quantify specific outcomes. Where continuous data were presented from different scales rating the same effect, we presented both sets of data and inspected the general direction of effect.

4.4.3 Summary statistic: for continuous outcomes we estimated a weighted mean difference (WMD) between groups, again based on the random effects model, as this takes into account any differences between studies even if there is no statistically significant heterogeneity.

4.2.4 Cluster trials: studies increasingly employ 'cluster randomisation' (such as randomisation by clinician or practice) but analysis and pooling of clustered data poses problems. Firstly, authors often fail to account for intra class correlation in clustered studies, leading to a 'unit of analysis' error (Divine 1992) whereby p values are spuriously low, confidence intervals unduly narrow and statistical significance overestimated. This causes type I errors (Bland 1997; Gulliford 1999).

Where clustering was not accounted for in primary studies, we presented the data in a table, with a (*) symbol to indicate the presence of a probable unit of analysis error. In subsequent versions of this review we will seek to contact first authors of studies to obtain intra class correlation co-efficients of their clustered data and to adjust for this by using accepted methods (Gulliford 1999). Where clustering has been incorporated into the analysis of primary studies, we will also present these data as if from a non-cluster randomised study, but adjusted for the clustering effect.

We have sought statistical advice and have been advised that the binary data as presented in a report should be divided by a 'design effect'. This is calculated using the mean number of participants per cluster (m) and the intra-class correlation co-efficient (ICC) Design effect = $1 + (m-1) \times ICC$ (Donner 2002). If the ICC was not reported it was assumed to be 0.1 (Ukoumunne 1999).

If cluster studies had been appropriately analysed taking into account intra-class correlation co-efficients and relevant data documented in the report, synthesis with other studies would have been possible using the generic inverse variance technique.

5. Investigation for heterogeneity

Firstly, we considered all the included studies within any comparison to judge for clinical heterogeneity. Then we visually inspected graphs to investigate the possibility of statistical heterogeneity. We supplemented this by using primarily the I-squared statistic. This provides an estimate of the percentage of variability due to heterogeneity rather than chance alone. Where the I-squared estimate was greater than or equal to 50%, we interpreted this as indicating the presence of considerable levels of heterogeneity (Higgins 2003). When heterogeneous results were found, we investigated the reasons for this; where heterogeneity substantially altered we did not summate the results of these data,

but presented the data separately and investigated reasons for heterogeneity.

6. Addressing publication bias

Where possible we entered data from all included studies into a funnel graph (trial effect against trial size) in an attempt to investigate the likelihood of overt publication bias (Egger 1997).

7. Sensitivity analyses

Again, where possible we analysed the effects of excluding studies with high attrition rates in a sensitivity analysis (see above), comparing primary outcomes for trials where randomisation was implied, rather than described, with those that were clearly randomised.

8. General

Where possible, we entered data in such a way that the area to the left of the line of no effect indicated a favourable outcome for problem solving skills therapy.

RESULTS

Description of studies

For more detailed descriptions of each study please see the Included and Excluded Studies tables.

1. Excluded studies

We excluded 13 studies. After consulting the full text we confirmed that eight of them did not use problem solving therapy (Bark 2001, Granholm 2005, Fiorillo 2004, Leclercs 2000, Liberman 1981, Norman 2002, Morken 2005 and Medalia 2001). For two of the studies less than 80% of the participants had schizophrenia or similar severe mental illness (Blumberg 2001, May 1985). Tarrrier 1996 is a not a trial but a review of other studies and no usable data were reported. We excluded McLatchie 1981 due to a lack of usable data, and Tarrrier 1998 because problem solving therapy was not an independently randomised treatment arm in this study, but was given as an element of the intensive cognitive behaviour therapy together with coping strategy enhancement.

2. Awaiting assessment

No studies are currently awaiting assessment.

3. Ongoing

We are not aware of any ongoing studies.

4. Included

We were able to include three studies (Bradshaw 1993, Mayang 1990 and Tarrrier 1993). All were randomised and all except one (Mayang 1990, not stated) were open label.

4.1 Length of trials

Studies ranged from a short-term duration of one month (Mayang 1990) to seven months (Tarrrier 1993) and one year (Bradshaw 1993).

4.2 Participants

All participants in Bradshaw 1993 and Tarrrier 1993 were diagnosed with schizophrenia using the DSM-III-R. Participants in Mayang 1990 were diagnosed with schizophrenia but the operational criteria used to make the diagnosis were not stated. Mayang 1990 randomised only females. The age range of participants was 16 - 65 years.

4.3 Setting

[Bradshaw 1993](#) and [Mayang 1990](#) took place in hospitals while [Tarrrier 1993](#) used a community setting.

4.4 Study size

Study sizes were small with all three trials randomising less than 30 people each ([Bradshaw 1993](#) with 16, [Mayang 1990](#) with 18, and [Tarrrier 1993](#) with 27).

4.5 Intervention

4.5.1 Intervention group

All three studies used a similar form of problem solving therapy where sessions administered by a trained therapist were in addition to routine care. Problem solving involved the key stages of (i) linking symptoms to problems, (ii) defining the problems, (iii) setting achievable goals, (iv) generating and choosing preferred solutions, (v) implementing preferred solutions and (vi) evaluating the result of the solution. [Mayang 1990](#) used individual sessions and videos to demonstrate 'situations'. Role-play with therapists was used if necessary.

4.5.2 Control group

[Bradshaw 1993](#) compared problem solving therapy to coping skills therapy. The two treatments are very similar in that they both use cognitive and behavioural methods to tackle problems but coping skills differs in its concentration of coping with a person's distressing symptoms that cause anxiety, while problem solving concentrates on solving daily problems that cause anxiety and exacerbate symptoms. [Tarrrier 1993](#) and [Mayang 1990](#) compared problem solving therapy to routine care. [Mayang 1990](#) had an additional treatment group that was allocated to therapy sessions that not involve any interaction with the therapist.

4.6 Outcomes

4.6.1 Outcome scales: Although the trials used several scales to collect data, none of the scale data presented could be analysed in this review, for reasons mentioned in the 'Included Studies Table' under 'Outcomes'.

Risk of bias in included studies

1. Randomisation

All three studies were stated to be randomised, but none described the randomisation procedure. Trials were evenly balanced with similar numbers of participants in each treatment arm. We therefore classified all studies as category B (unclear allocation concealment) with a moderate risk of overestimating the estimate of effect.

2. Blinding

[Tarrrier 1993](#) and [Bradshaw 1993](#) were open label; [Mayang 1990](#) did not state blindness.

3. Loss to follow up

Overall follow up was good in all studies with few or no participants lost to follow up.

4. Data reporting

Overall data reporting were very poor. No usable scale data were presented. Reasons ranged from not reporting usable data, or reporting means without standard deviations, to use of non validated scales or presentation of subscale data only. Some data reported by trials were also likely to be skewed with $2XSD > \text{mean}$.

Effects of interventions

1. The search

We found over 2000 citations from the search; the vast majority were not relevant to this review and are not listed in detail. We were only able to include three trials and excluded 13 studies.

2. COMPARISON 01: PROBLEM SOLVING versus ROUTINE CARE

Only one study ([Mayang 1990](#)) compared problem solving therapy to routine care. Only 12 participants were randomised and results based on such small numbers are inconclusive.

2.1 Mental state, behaviour and social skills: improvement in observed behaviours

[Mayang 1990](#) used staff observation of participant behaviours to rate improvement. Participants were given a 'mark' for each observed behaviour and rated as 'worse', 'same' or 'better'. If a participant did not have at least one mark for 'better' behaviour we considered this to be no improvement. For 'problem solving ability' we found no significant difference between groups post treatment (1 RCT n=12, RR 0.20 CI 0.03 to 1.2). Again, no differences between groups were observed by staff for 'aggressive behaviours' (1 RCT n=12, RR 0.09 CI 0.01 to 1.35), 'interaction with staff' (1 RCT n=12, RR 0.09 CI 0.01 to 1.35) or 'interaction with peers' (1 RCT n=12, RR 0.54 CI 0.22 to 1.11).

2.2 Leaving the study early

[Mayang 1990](#) reported on attrition, and none of the participants (n=12) left the study early.

3. COMPARISON 02: PROBLEM SOLVING versus COPING SKILLS

Two studies ([Bradshaw 1993](#) and [Tarrrier 1993](#)) compared problem solving therapy to coping skills therapy. The two studies were both small with a total of only 43 participants.

3.1 Service utilisation: number of admissions.

[Bradshaw 1993](#) reported admissions to hospital. We found no significant difference between treatment groups (1 RCT n=14, RR 3.00 CI 0.14 to 63.15).

3.2 Mental state: BPRS.

[Tarrrier 1993](#) used a 50% reduction in total severity scores on the BPRS as an indication of 'marked improvement' in mental state. We found post-treatment data were not significantly different between groups (1 RCT n=27, RR 0.42 CI 0.14 to 1.21). Also at six month follow up, we found no significant difference between groups (1 RCT n=23, RR 0.87 CI 0.31 to 2.44).

3.3 Leaving the study early

Short-term results were reported by [Bradshaw 1993](#) and we found no significant differences in the number of participants leaving the study early (1 RCT n=16, RR 1.00 CI 0.07 to 13.37). Longer term follow up at six months were equivocal ([Tarrrier 1993](#), n=27, RR 0.42 CI 0.05 to 3.51).

4. COMPARISON 03: PROBLEM SOLVING VERSUS INTERACTION

[Mayang 1990](#) compared sessions of problem solving therapy to sessions with a therapists that involved no interaction. Again numbers for the two treatment groups are small (n=12)

4.1 Mental state, behaviour and social skills: improvement in observed behaviours.

As above [Mayang 1990](#) used staff observation of participant behaviour to rate improvement. Participant were given a 'mark'

for each observed behaviour and rated as 'worse', 'same' or 'better'. If a participant did not have at least one mark for 'better' behaviour we considered this to be no improvement. We found no significant differences between treatment groups for 'problem solving ability' (1 RCT n=12, RR 0.25 CI 0.04 to 1.63), 'aggressive behaviour' (1 RCT, n=12, RR 0.11 CI 0.01 to 1.7), interaction with staff (1 RCT n=12, RR 0.14 CI 0.01 to 2.28) or interaction with peers (1 RCT n=12, RR 0.6 CI 0.25 to 1.44).

4.2 Leaving the study early
 No participants left the study early.

DISCUSSION

1. General

We were only able to include three studies for this review. All studies reported the technique relatively well and used typical problem solving therapy involving key stages of explaining the purpose of the therapy, identifying problems, brain storming for solution, evaluation and chose the best solution and implementing the chosen solution.

2. Strength of evidence

The trials included were of moderate quality. All studies were stated to be randomised, but none reported on randomisation methods or allocation concealment. It is not clear whether intention-to-treat analyses were used in any of the studies. Overall, there is a moderate risk of bias in the included studies.

3. Lack of data

We are unable to reach any firm conclusions about the effectiveness of problem solving therapy due to a lack of data. Firstly, we could only include three trials and these were small. Adding to this the poor presentation of data, particularly scale data. Some data were not presented at all in the papers and many were not presented with mean and SD. JX contacted trialists for additional information about the missing SDs, allocation concealment and method of randomisation, but did not receive any reply. Unfortunately no scale data could be entered into our analysis and our results are therefore further limited.

3 COMPARISON 01: PROBLEM SOLVING versus ROUTINE CARE

Overall no real effects were found with no real differences between groups for any outcome. No data were available regarding days in hospital, one of our primary outcomes.

3.1 Mental state, behaviour and social skills

Staff observation of behaviours after therapy sessions were used to rate improvement. For some outcomes, such as aggressive behaviour and interaction with staff, the point estimate of effect favoured problem solving therapy but the differences between groups just failed to reach significance. The numbers in each treatment group, however, were small (n=6) and finding robust effects with such few data is difficult. Further replication of the study, with larger study size is needed.

3.2 Leaving the study early
 No one left the study early in [Mayang 1990](#).

4 COMPARISON 02. PROBLEM SOLVING THERAPY versus COPING SKILLS

4.1 Service utilisation: number of admissions

[Bradshaw 1993](#) gave admission details. One person was admitted from problem solving therapy group and none of the coping skills training group was admitted. Nevertheless, the differences were not significant, which indicate that the two treatments were equivocal when assessed against hospital admission. Again, numbers are small (n=16) making it difficult to draw firm conclusions.

4.2 Mental state: marked improvement

[Bradshaw 1993](#) used a 50% reduction in BPRS scores as an indication of 'marked improvement in mental state. Post treatment results were not significant, but did suggest a trend favouring coping skills. If a larger sample had been used then the result may have been significant. It is possible that a trial with an adequate sample size (see Table 01) would provide conclusive answers. At a six month follow up, however, this early trend with problem solving was not apparent. This could suggest inadequate power to detect significant differences or the need for booster sessions to maintain the early benefits.

4.3 Leaving the study early.

Attrition rates for both groups were similar both for post treatment and six month follow ups.

5 COMPARISON 03. PROBLEM SOLVING versus INTERACTION

[Mayang 1990](#) also compared problem solving therapy to sessions with a therapist that did not involve any interaction.

5.1 Mental state, behaviour and social skills: observed improvements

Again, although slight effects, favouring problem solving therapy were observed for some outcomes, these differences were not significant for 'problem solving ability', 'aggressive behaviour', interaction with staff or interaction with peers. Again small numbers make it difficult to comment on these results.

5.2 Leaving the study early.

No one left early.

AUTHORS' CONCLUSIONS

Implications for practice

1. For people with schizophrenia

The data in this review are inconclusive and there is no evidence to support or refute the use of problem solving therapy. Those with schizophrenia may wish to be involved in future studies to help resolve this lack of evidence, but the research needs to be of high methodological quality with all clinically relevant data recorded clearly.

2. For clinicians

At the moment there is no reason for clinicians to either encourage or discourage the use of problem solving therapy.

3. For policy makers/managers

Until there is more data, this review provides no evidence to support change in policy.

Implications for research

1. General

Clear descriptions of randomisation would have reassured users of these trials that selection bias had been minimised. Well-described

and tested blinding could have encouraged confidence in the control of performance and detection bias. Overall, there is room for improvement regarding the quality of reporting of the studies. For suggested design of future studies please see [Table 1](#).

As with all similar studies, public registration of a study before anyone is randomised would ensure that participants could be confident that people would know that the study had at least taken place. Unique study numbers would help researchers to identify single studies from multiple publications and reduce the risk of duplicating the reporting of data. Compliance with CONSORT ([Moher 2001](#)), both on the part of authors and editors, would help to clarify methodology and many outcomes. Failure to comply results in both loss of data and confusion in the results, neither of which help clinicians, patients or managers.

Intention-to-treat analysis should be performed on all outcomes and all trial data should be made easily accessible. A minimal requirement should be that all data should, at least, be presented as numbers. In addition, continuous data should be presented with means, standard deviations (or standard errors) and the number of participants. Data from graphs, 'p' values of differences

and statements of significant or non-significant differences are of limited value. Unfortunately, in the light of the small numbers of participants randomised, we were unable to use considerable data in the trials included in this review due to poor data reporting.

2. Specific

Several researchers have recognised the need of a clinical trial assessing the beneficial effect of problem solving therapy and indeed they have conducted trials for this purpose. However, in order to draw any conclusion, larger trials over longer periods are needed ([Table 01](#)). More emphasis should be put on the result reporting. Endpoints scores with standard deviations or standard errors should always be reported when scales are used. Information on patients and family satisfaction, as well as economic costs of the treatment are also useful outcomes to report.

ACKNOWLEDGEMENTS

The authors would like to thank Judy Wright for the trial search, Tessa Grant for the editorial assistance and Clive Adams and Claire Joy for their expert advice.

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CHARACTERISTICS OF STUDIES

Characteristics of included studies [ordered by study ID]

Bradshaw 1993

Methods	Allocation: randomised (no further details). Blinding: not stated. Duration: 6 months treatment, with an additional follow up at 1 year. Setting: day hospital in San Diego, USA.
Participants	Diagnosis: schizophrenia (DSM-III-R). N=16. Age: mean ~ 30 years. Sex: 7M, 9F. History: mean number of hospitalisations in the previous two years ~5, receiving neuroleptic medication, living independently. Exclusions: not stated.
Interventions	1. Problem solving: weekly group sessions with a trained therapist; sessions designed to help tackle daily living problems and involved four steps i. identification of a 'daily living' problem, ii. brainstorming possible solutions, iii. choosing a course of action, and iv. implementing and monitoring plan. N=8. 2. Coping skills: weekly group sessions with a trained therapists; training consisted of four modules, aiming to help manage stressors such as anxiety by i. managing physiological arousal, ii. practicing time management, iii. using cognitive restructuring as a technique for coping with negative or unusual thoughts, and iv. teaching and practicing of social skills. N=8.
Outcomes	Service utilisation: number of hospitalisations. Leaving the study early. Unable to use - Goal state: GAS (no SD). Service utilisation: mean number of days in hospital (no SD).

Notes

Risk of bias

Bias	Authors' judgement	Support for judgement
Allocation concealment (selection bias)	Unclear risk	B - Unclear

Mayang 1990

Methods	Allocation: randomised (no further details). Blind: not blind. Duration: 4 weeks. Setting: hospital, Michigan, USA.
Participants	Diagnosis: schizophrenia. N=18. Age: 20-55 years. Sex: all female. History: hospitalised, recent history of physical or verbal aggression, frequently secluded or restrained because of aggressive behaviour, deficient in adaptive problem solving. Exclusion: not stated.

Problem solving skills for schizophrenia (Review)

Mayang 1990 (Continued)

Interventions	<p>1. Problem solving: weekly 45 min individual sessions with trained psychology graduate; sessions involved use of videos showing i. problem identification, ii. problem articulation, iii. formulation of solutions, iv. identification of best solution, v. evaluation of solution and translate into action, additional help from trainer in form of feedback and role play situations. N=6.</p> <p>2. Interaction group: weekly 45 min individual sessions with trainer but receive no problem solving training. N=6.</p> <p>3. Routine care: no additional sessions with trainer. N=6.</p>
Outcomes	<p>Mental state: problem solving ability improved/not improved (staff rated). Behaviour: improved/not improved (staff rated). Social interaction: improved/not improved (staff rated). Leaving the study early.</p> <p>Unable to use - Mental state: problem solving ability score (scoring system used not peer reviewed). Behaviour: number of hours in seclusion (no SD).</p>

Notes

Risk of bias

Bias	Authors' judgement	Support for judgement
Allocation concealment (selection bias)	Unclear risk	B - Unclear

Tarrier 1993

Methods	<p>Allocation: randomised (no further details). Blindness: not blind (assessor independent of treatment delivery but not blinded to group allocation). Duration: 5 weeks treatment, with additional follow up at 6 weeks and 6 months. Setting: community, UK.</p>
Participants	<p>Diagnosis: schizophrenia (DSM-III-R). N=27. Age: 16 - 65 years, mean ~ 43 years. Sex: male and female, numbers not stated. History: experiencing symptoms for a least 6 months prior to study, not responding to regular neuroleptic treatment. Exclusion: other organic brain pathology.</p>
Interventions	<p>1. Problem solving: psychology led, help with daily living problems, five main stages i. explain rationale of treatment; ii. identify problems/difficulties, iii. generate solutions, iv. chose best alternative, and v. implement chosen strategy to an abstract situation and/or apply strategy to actual problems in participant's own life. N=12.</p> <p>2. Coping skills: psychology led, help to recognise symptoms and learn to cope with these, use of CBT strategies, four main stages i. identification of symptom causing anxiety, ii. teaching of cognitive strategies such as attention switching and/or narrowing, self-instruction, iii. teaching of behavioural strategies such as increasing social interactions, reality testing, and iv. teaching strategies to produce a physiological change such as relaxation and breathing exercises. N=15.</p>
Outcomes	<p>Mental state: improved/not improved. Leaving study early.</p> <p>Unable to use -</p>

Problem solving skills for schizophrenia (Review)

Tarrier 1993 (Continued)

Mental state: PSE & BPRS number of symptoms, severity of symptoms (subscore data), PAS anxiety/depression (subscore data).
 Social functioning: SFS (no data presented).
 ANOVA results of improvement on specific skills.

Notes

*Half of each treatment group were also allocated to a 'waiting period' before treatment started. In addition, half of each group given 'enhanced expectations'. As with the trialists, we have not reported on the effects of waiting list or 'high expectations'.

Risk of bias

Bias	Authors' judgement	Support for judgement
Allocation concealment (selection bias)	Unclear risk	B - Unclear

CBT - cognitive behavioural treatment

DSM-III - Diagnostic and Statistical Manual of Mental Disorder, 3rd edition.

DSM-III-R - Diagnostic and Statistical Manual of Mental Disorder, 3rd edition, revised.

GAS - Goal Attainment Scale

PAS - Psychiatric Assessment Scale

PSE - Present State Examination

SFS - Social Functioning Scale

Characteristics of excluded studies [ordered by study ID]

Study	Reason for exclusion
Bark 2001	Allocation: randomised. Participants: people with psychosis. Intervention: memory exercises versus problem solving computer exercises (no problem solving therapy used).
Blumberg 2001	Allocation: randomised. Participants: people with schizophrenia, severe anxiety disorder, depressive disorder (less than 80% had schizophrenia).
Fiorillo 2004	Allocation: not stated. Participants: people with schizophrenia and family members. Intervention: psychoeducational training (no problem solving therapy used).
Granholm 2005	Allocation: randomised. Participants: people with schizophrenia or schizoaffective disorder. Intervention: cognitive behavioural social skills training with routine care versus routine care (no problem solving therapy used).
Leclercs 2000	Allocation: randomised. Participants: people with schizophrenia. Intervention: coping skills therapy with neuroleptic medication versus neuroleptic medication.
Lieberman 1981	Allocation: not stated. Participants: people with schizophrenia and families with schizophrenia patients. Intervention: social skills training with drug treatment versus holistic health therapy with drug treatment.
May 1985	Allocation: not clear.

Study	Reason for exclusion
	Participants: people with depression, schizophrenia, personality disorder, anxiety disorder, schizoaffective disorder, paranoia (less than 80% of participants with schizophrenia).
McLatchie 1981	Allocation: randomised. participants: people with schizophrenia. Intervention: problem solving training versus relaxation therapy. Outcome: PIP subscale (no usable data).
Medalia 2001	Allocation: randomised. Participants: people with schizophrenia or schizoaffective disorder. Intervention: problem solving training versus control (no problem solving therapy used).
Morken 2005	Allocation: randomised. Participants: people with schizophrenia. Intervention: standard treatment versus integrated treatment (no problem solving therapy used).
Norman 2002	Allocation: randomised. Participants: people with schizophrenia. Intervention: stress management program (no problem solving therapy used).
Tarrier 1996	Allocation: not stated. Participants: people with schizophrenia. Intervention: review of several related studies. Outcome: no usable data.
Tarrier 1998	Allocation: randomised. Participants: people with schizophrenia. Intervention: (Intensive cognitive behaviour therapy + routine care) versus (supportive counseling + routine care) versus routine care; problem solving therapy is not an independently randomised treatment arm, it is given as an element of the intensive cognitive behaviour therapy together with coping strategy enhancement.

PIP - Psychotic Inpatient Profile

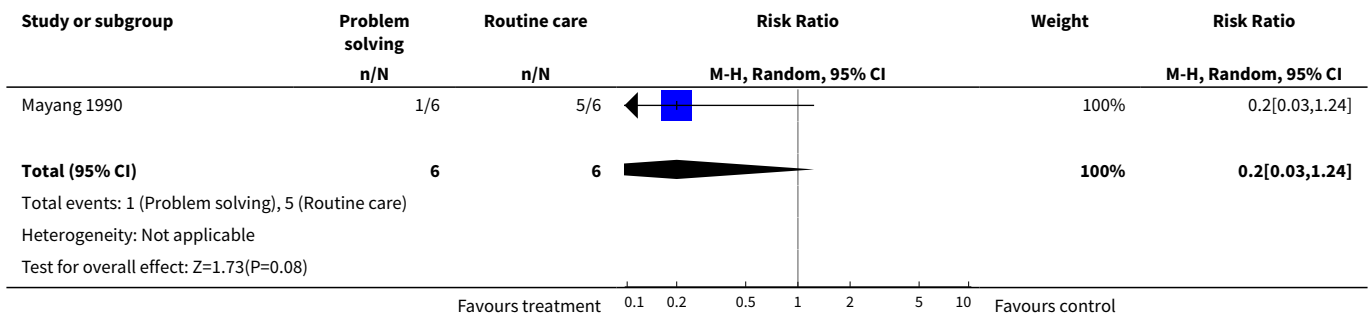
DATA AND ANALYSES

Comparison 1. PROBLEM SOLVING vs ROUTINE CARE

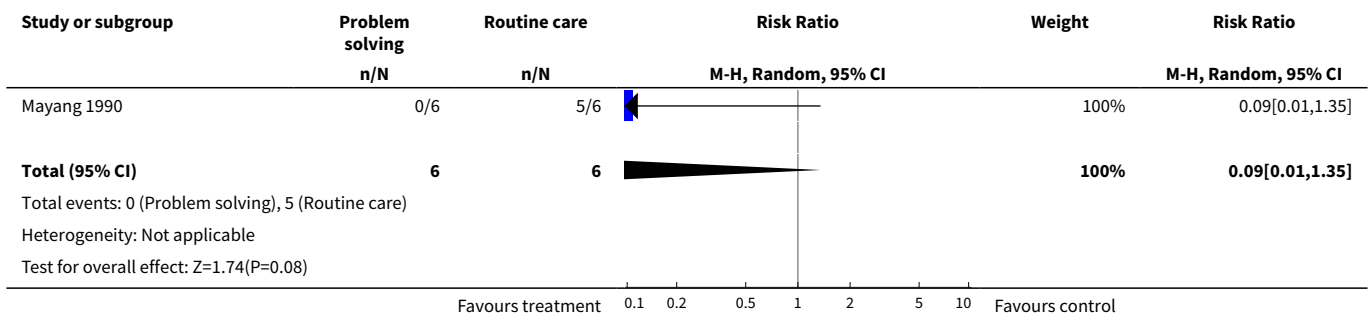
Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Mental state: did not have at least one problem solving ability improvement (staff rated)	1	12	Risk Ratio (M-H, Random, 95% CI)	0.2 [0.03, 1.24]
2 Behaviour: 1. Did not show at least one improvement in aggressive behaviour (staff rated)	1	12	Risk Ratio (M-H, Random, 95% CI)	0.09 [0.01, 1.35]
3 Behaviour: 2. Mean number of seclusion hours (no SD)			Other data	No numeric data
4 Social skill: 1. Did not have at least one improved interaction with staff (staff rated)	1	12	Risk Ratio (M-H, Random, 95% CI)	0.09 [0.01, 1.35]

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
5 Social skill: 2. Did not have at least one improved interaction with peers (staff rated)	1	12	Risk Ratio (M-H, Random, 95% CI)	0.54 [0.25, 1.16]
6 Leaving the study early	1	12	Risk Ratio (M-H, Random, 95% CI)	0.0 [0.0, 0.0]

Analysis 1.1. Comparison 1 PROBLEM SOLVING vs ROUTINE CARE, Outcome 1 Mental state: did not have at least one problem solving ability improvement (staff rated).



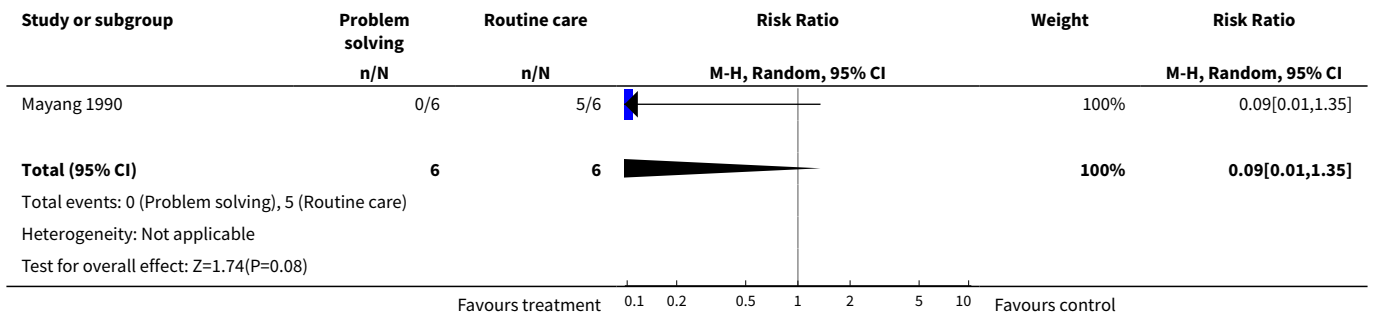
Analysis 1.2. Comparison 1 PROBLEM SOLVING vs ROUTINE CARE, Outcome 2 Behaviour: 1. Did not show at least one improvement in aggressive behaviour (staff rated).



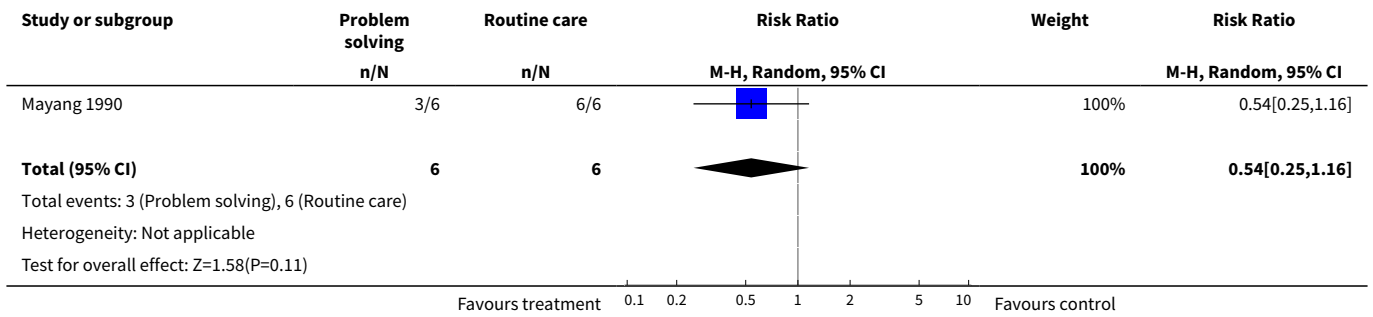
Analysis 1.3. Comparison 1 PROBLEM SOLVING vs ROUTINE CARE, Outcome 3 Behaviour: 2. Mean number of seclusion hours (no SD).

Study	Intervention	Behaviour: 2. Mean number of seclusion hours (no SD)		
		Before treatment	During treatment	After treatment
Mayang 1990	Problem solving	7.25	1.50	4.67
Mayang 1990	Routine care	11.66	2.67	4.25

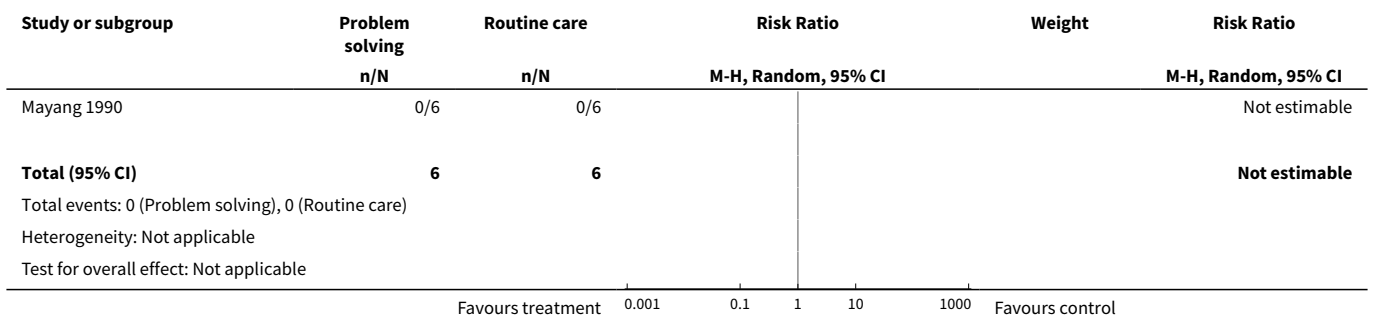
Analysis 1.4. Comparison 1 PROBLEM SOLVING vs ROUTINE CARE, Outcome 4 Social skill: 1. Did not have at least one improved interaction with staff (staff rated).



Analysis 1.5. Comparison 1 PROBLEM SOLVING vs ROUTINE CARE, Outcome 5 Social skill: 2. Did not have at least one improved interaction with peers (staff rated).



Analysis 1.6. Comparison 1 PROBLEM SOLVING vs ROUTINE CARE, Outcome 6 Leaving the study early.

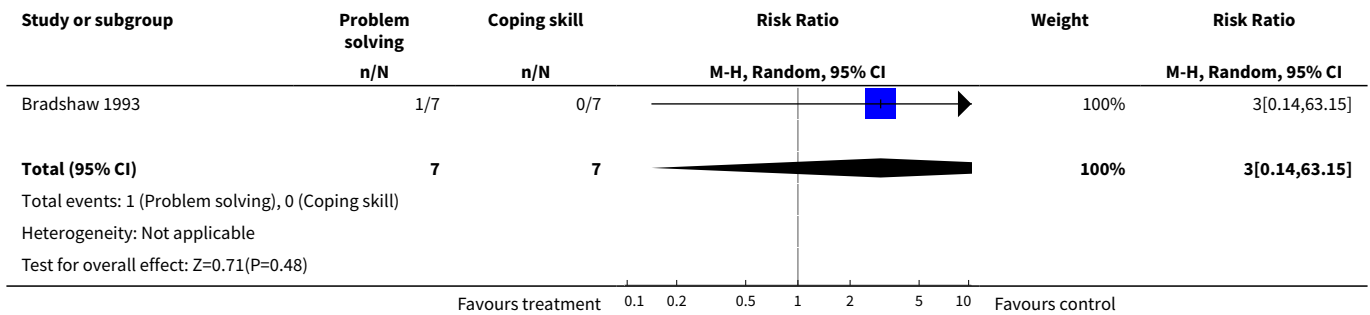


Comparison 2. PROBLEM SOLVING vs COPING SKILLS

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Service utilisation: 1. Number of admissions	1	14	Risk Ratio (M-H, Random, 95% CI)	3.0 [0.14, 63.15]

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
2 Service utilisation: 2. Mean time in hospital (no SD)			Other data	No numeric data
3 Mental state: 1. Marked improvement (marked improvement = >50% reduction in total BPRS score)	1		Risk Ratio (M-H, Random, 95% CI)	Subtotals only
3.1 post treatment	1	27	Risk Ratio (M-H, Random, 95% CI)	0.42 [0.14, 1.21]
3.2 six month follow up	1	23	Risk Ratio (M-H, Random, 95% CI)	0.87 [0.31, 2.44]
4 Leaving the study early	2	43	Risk Ratio (M-H, Random, 95% CI)	0.59 [0.11, 3.08]
4.1 short term, (at 2 weeks)	1	16	Risk Ratio (M-H, Random, 95% CI)	1.0 [0.07, 13.37]
4.2 long term (at six months)	1	27	Risk Ratio (M-H, Random, 95% CI)	0.42 [0.05, 3.51]

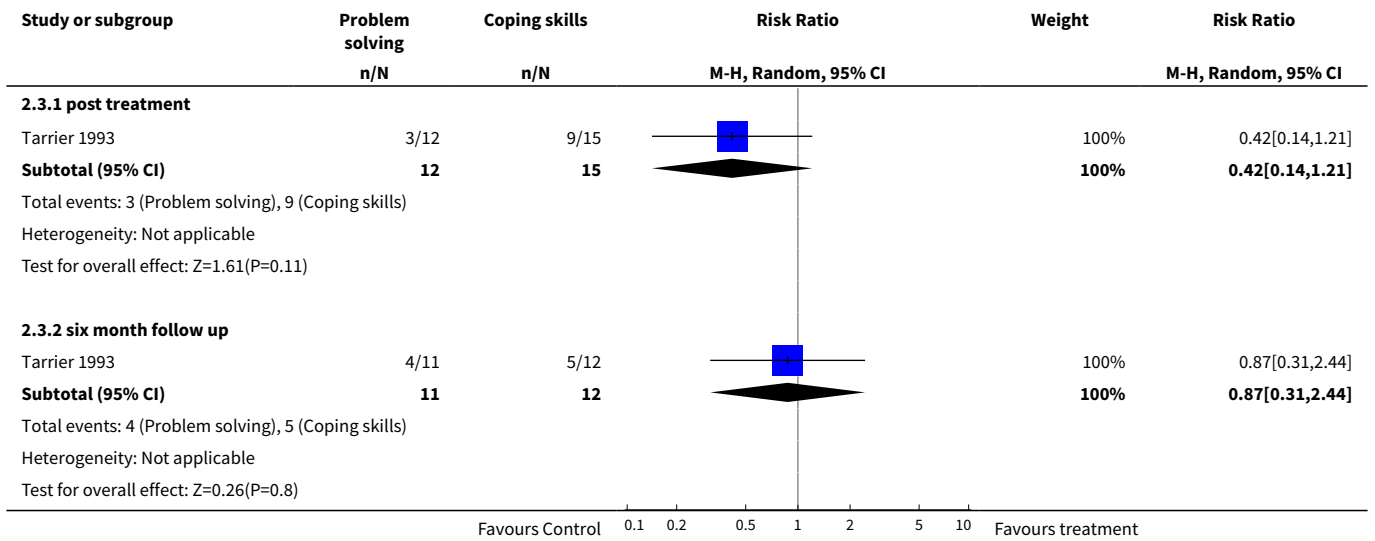
Analysis 2.1. Comparison 2 PROBLEM SOLVING vs COPING SKILLS, Outcome 1 Service utilisation: 1. Number of admissions.



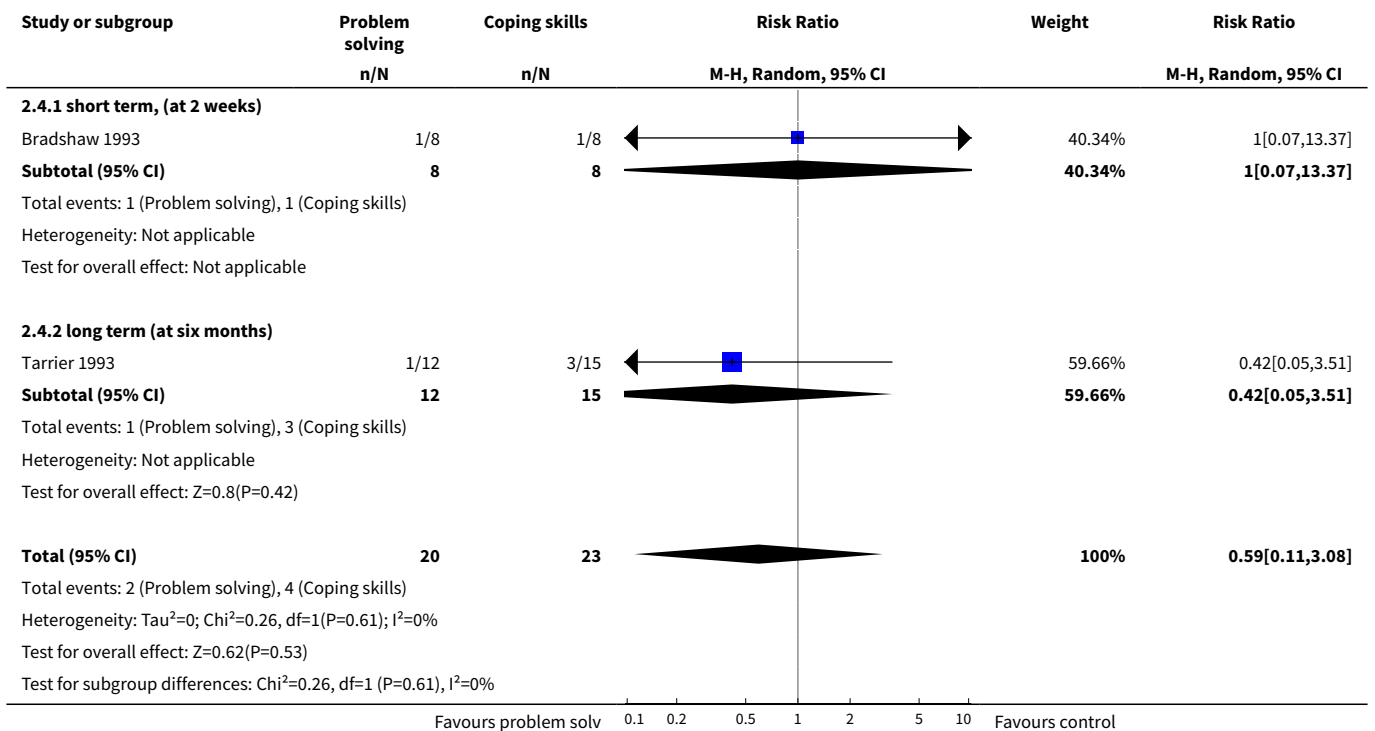
Analysis 2.2. Comparison 2 PROBLEM SOLVING vs COPING SKILLS, Outcome 2 Service utilisation: 2. Mean time in hospital (no SD).

Study	Service utilisation: 2. Mean time in hospital (no SD)		N
	Intervention	Days in hospital	
Bradshaw 1993	Problem solving	7	7
Bradshaw 1993	Coping skills training	0	7

**Analysis 2.3. Comparison 2 PROBLEM SOLVING vs COPING SKILLS, Outcome 3 Mental state:
1. Marked improvement (marked improvement = >50% reduction in total BPRS score).**



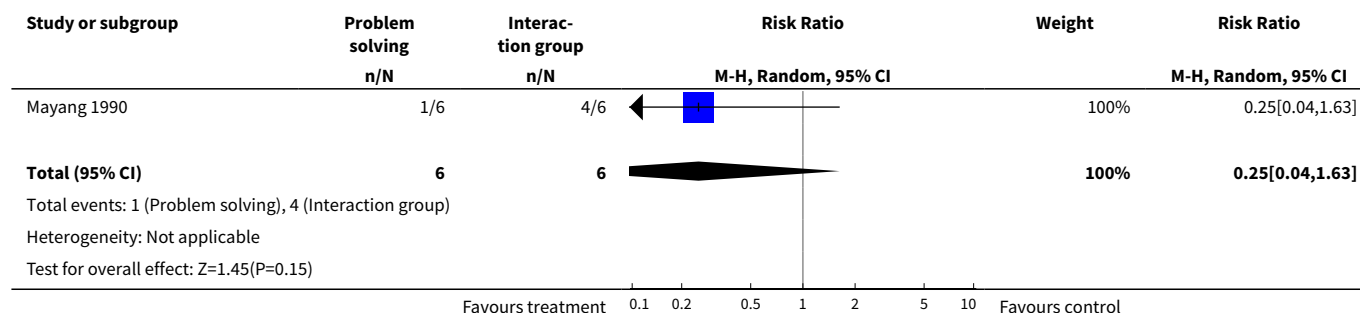
Analysis 2.4. Comparison 2 PROBLEM SOLVING vs COPING SKILLS, Outcome 4 Leaving the study early.



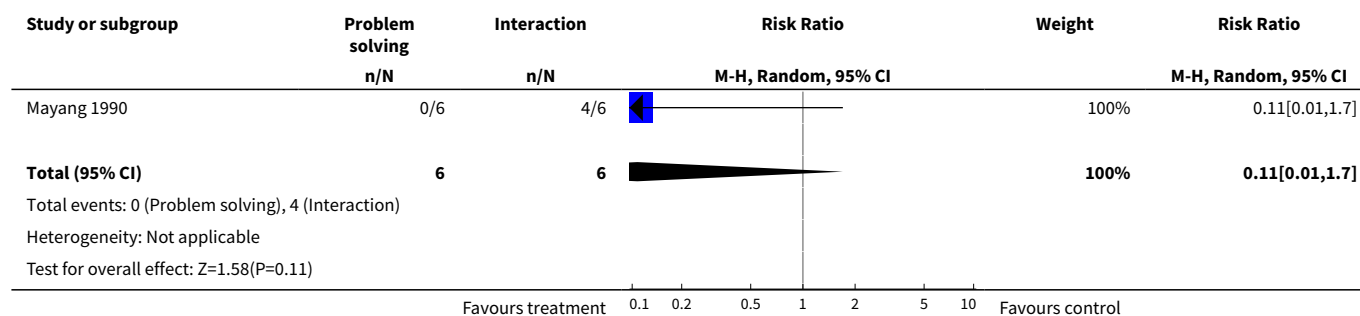
Comparison 3. PROBLEM SOLVING vs INTERACTION

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Mental state: problem solving ability not improved (staff rated)	1	12	Risk Ratio (M-H, Random, 95% CI)	0.25 [0.04, 1.63]
2 Behaviour: 1. Aggressive behaviours not improved (staff rated)	1	12	Risk Ratio (M-H, Random, 95% CI)	0.11 [0.01, 1.70]
3 Behaviour: 2. Mean number of seclusion hours (no SD)			Other data	No numeric data
4 Social skill: 1. Interaction with staff not improved (staff rated)	1	12	Risk Ratio (M-H, Random, 95% CI)	0.14 [0.01, 2.28]
5 Social skill: 2. Interaction with peers not improved (staff rated)	1	12	Risk Ratio (M-H, Random, 95% CI)	0.6 [0.25, 1.44]
6 Leaving the study early	1	12	Risk Ratio (M-H, Random, 95% CI)	0.0 [0.0, 0.0]

Analysis 3.1. Comparison 3 PROBLEM SOLVING vs INTERACTION, Outcome 1 Mental state: problem solving ability not improved (staff rated).



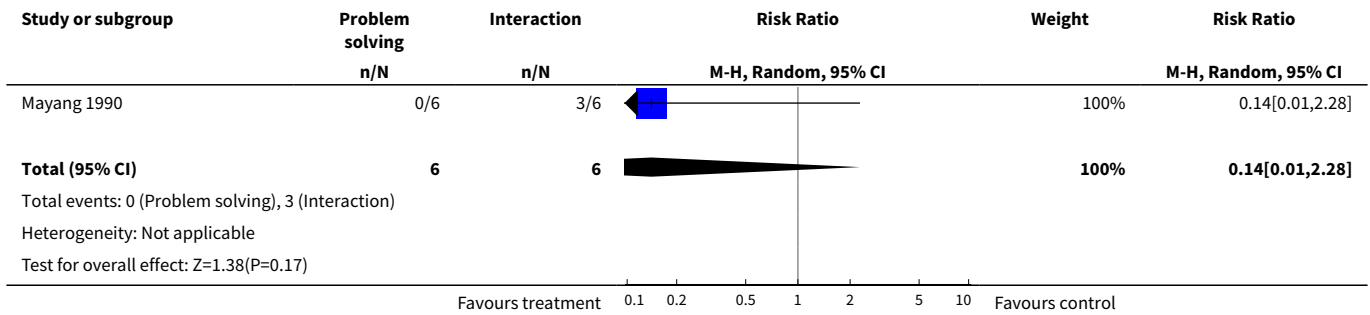
Analysis 3.2. Comparison 3 PROBLEM SOLVING vs INTERACTION, Outcome 2 Behaviour: 1. Aggressive behaviours not improved (staff rated).



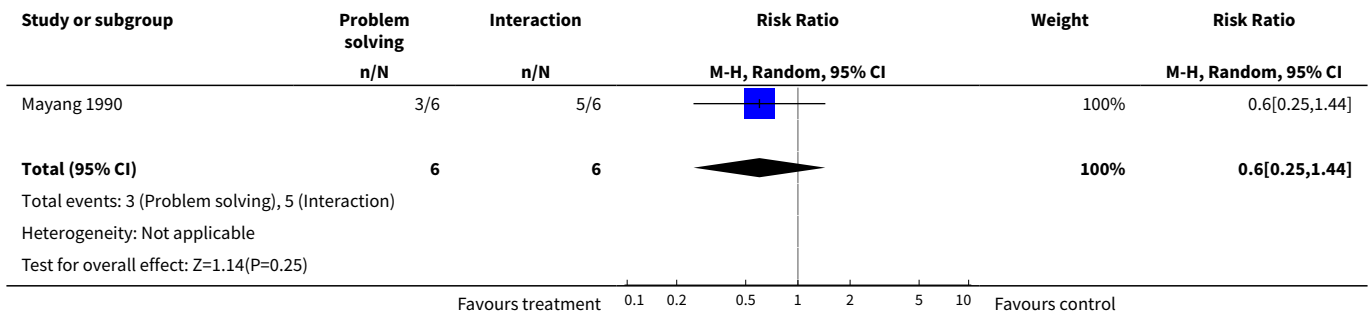
Analysis 3.3. Comparison 3 PROBLEM SOLVING vs INTERACTION, Outcome 3 Behaviour: 2. Mean number of seclusion hours (no SD).

Study	Intervention	Behaviour: 2. Mean number of seclusion hours (no SD)		
		Before treatment	During treatment	After treatment
Mayang 1990	Problem Solving	7.25	1.5	4.67
Mayang 1990	Interaction Group	84.34	25.42	5.25

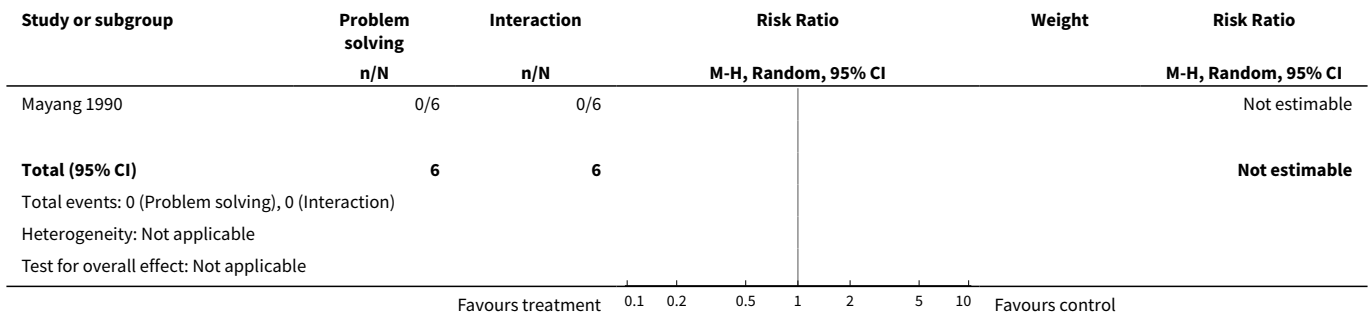
Analysis 3.4. Comparison 3 PROBLEM SOLVING vs INTERACTION, Outcome 4 Social skill: 1. Interaction with staff not improved (staff rated).



Analysis 3.5. Comparison 3 PROBLEM SOLVING vs INTERACTION, Outcome 5 Social skill: 2. Interaction with peers not improved (staff rated).



Analysis 3.6. Comparison 3 PROBLEM SOLVING vs INTERACTION, Outcome 6 Leaving the study early.



ADDITIONAL TABLES

Table 1. Suggested design of study

Type of study	Patients	Interventions	Outcomes	Notes
Allocation: random Blinding: blind or independent raters. Duration: minimum one year follow-up at .	Diagnosis: people with schizophrenia or related disorders. Age: over 16 years of age . Sex: male and female. N=300.*	1. Problem solving therapy: strictly following the stages of problem solving therapy as described in the literature. 2. Standard care.	Mental state**: leaving the study early, behaviour. Clinical global response. Adverse effects. Social functioning: social impairment, employment status, independent living. Service utilisation: hospital admission, length of stay, change in legal status. Quality of life. Satisfaction with treatment. Carer outcomes: burden, satisfaction with care. Economic costing.	* Size of study with sufficient power to highlight about a 10% difference between groups ** Primary outcomes.

WHAT'S NEW

Date	Event	Description
3 May 2012	Amended	ddAdditional table linked to text.

HISTORY

Protocol first published: Issue 4, 2006

Review first published: Issue 2, 2007

Date	Event	Description
5 October 2011	Amended	Contact details updated.
19 January 2011	Amended	Contact details updated.
10 November 2010	Amended	Contact details updated.
14 April 2010	Amended	Contact details updated.
11 November 2009	Amended	Contact details updated.
23 April 2008	Amended	Converted to new review format.
19 February 2007	New citation required and conclusions have changed	Substantive amendment

CONTRIBUTIONS OF AUTHORS

Jun Xia - protocol production, study selection, data extraction, writing up of the review

Problem solving skills for schizophrenia (Review)

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Chunbo Li - study selection, data extraction.

DECLARATIONS OF INTEREST

Jun Xia - no known conflict of interest

ChunBo Li - no known conflict of interest

SOURCES OF SUPPORT

Internal sources

- Tongji Hospital of Tonji University, Shanghai, China.

External sources

- Priorities & Needs, NHS R&D, UK.

INDEX TERMS

Medical Subject Headings (MeSH)

*Problem Solving; *Schizophrenic Psychology; Randomized Controlled Trials as Topic; Schizophrenia [*therapy]

MeSH check words

Humans