

**Systematic review and meta-analysis of interventions relevant for young offenders  
with mood disorders, anxiety disorders, or self-harm**

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**Abstract**

**Background** Mood and anxiety disorders, and problems with self harm are significant and serious issues that are common in young people in the Criminal Justice System.

**Aims** To examine whether interventions relevant to young offenders with mood or anxiety disorders, or problems with self harm are effective.

**Method** Systematic review and meta-analysis of data from randomised controlled trials relevant to young offenders experiencing these problems.

**Results** An exhaustive search of the worldwide literature (published and unpublished) yielded 10 studies suitable for inclusion in this review. Meta-analysis of data from three studies (with a total population of 171 individuals) revealed that group-based Cognitive Behaviour Therapy (CBT) may help to reduce symptoms of depression in young offenders.

**Conclusions** These preliminary findings suggest that group-based CBT may be useful for young offenders with such mental health problems, but larger high quality RCTs are now needed to bolster the evidence-base.

**Declaration of interest** None

**Key words:**

Young offender; Juvenile delinquent; mood disorder; anxiety disorder; attempted suicide; self harm; systematic review; interventions.

## **Introduction**

Numerous studies have demonstrated that young offenders experience high levels of mental health problems (e.g. Vermeiren, 2003; Chitsabesan *et al*, 2006). Depression, anxiety disorders, and self-harm occur particularly frequently in this population (Vermeiren 2003; Callaghan *et al*, 2003; Stallard *et al*, 2003; Ahrens and Rexford 2002; Dixon *et al*, 2004; Sukhodolsky and Ruchkin 2006; Carswell *et al*, 2004) and with high levels of comorbidity (Axelson and Birmaher 2001). Moreover, there is considerable evidence that young offenders, both incarcerated and in the community, do not receive the referrals and interventions for mood and anxiety disorders, and self-harm that they need (Gunn *et al*, 1991; Stallard *et al*, 2003; Callaghan *et al*, 2003; Carswell *et al*, 2004; Chitsabesan *et al*, 2006), and that such problems predict offending status – the more psychiatric diagnoses a youngster has, the more likely they are to be an offender (Dixon *et al*, 2004).

In order to identify which interventions should be recommended for young offenders experiencing problems with mood or anxiety disorders, or self harm, we have conducted a systematic review of trials of interventions using Cochrane Collaboration methods (Higgins and Green, 2008). A systematic review is a scientific and robust methodology which aims to provide a synthesis of data which is as free from bias as possible (Khan *et al.*, 2003). In particular, it is important that clinical and policy related decisions are made using the highest quality evidence and the systematic review is seen as the gold standard in evidence-based research (Egger *et al.*, 2001). Moreover, evidence-based research and practice helps to ensure that public money is not wasted on interventions which have exaggerated effect sizes due to biases (Schulz *et al.*, 1995), or on interventions which may do more harm than good. This is particularly crucial in the domain of mental health, especially when working with a vulnerable group like young

offenders. It is crucial that decision-making in relation to health services and treatments for this group are based on current best evidence.

The main objective of the review was to determine what interventions are relevant to, and effective in, alleviating the symptoms and behaviours associated with mood and anxiety disorders and self-harm. Where possible we wished to determine whether specific interventions are effective for different types of disorder.

## **METHOD**

### **Search strategy**

We searched the following electronic databases (until August 2007) using Ovid Online: AMED (from 1985), CINAHL (from 1982), EMBASE (from 1980), Ovid Medline ® In-Process and other non-indexed citations and Ovid Medline (from 1950), and PsycINFO (from 1967). Our search strategy included keywords to encompass: (i) specific characteristics of young offenders using person and population-based terms like ‘young offender’ or institution-based terms like ‘prison’, (ii) specific types of literature such as Randomized Controlled Trials (RCTs) and systematic reviews and (iii) specific mood and anxiety disorders (eg. depression) and self harm. To implement the search across all disorders and literature types eight separate strategies were executed based on the information in Figure 1. These were (i) Anxiety and RCT, (ii) Anxiety and Systematic review, (iii) PTSD and RCT, (iv) PTSD and Systematic review, (v) Depression and RCT, (vi) Depression and Systematic review, (vii) Self harm and RCT, (viii) Self Harm and Systematic review. The details of the separate strategies are available from the corresponding author.

Figure 1 about here

We checked reference lists of key papers identified in our searches. In order to identify unpublished studies we: (i) searched the National Research Register (includes details of ESRC and Forensic Mental Health programme grants), the Youth Justice Board reports, Children's Fund grants, The National Electronic Library for Health, Bandolier, Turning Research into Practice (TRIP) and the National Criminal Justice Reference Service (NCJRS), (ii) contacted experts in the field with the list of RCTs identified by our search strategy to see if they knew of any further studies, (iii) searched the ISI Web of Science proceedings to access literature from conferences and meetings, (iv) undertook hand searches of twelve key journals in the field for trials relevant to this review including *International Journal of Law and Psychiatry*, *International Journal of Forensic Mental Health* and *Criminal Behaviour and Mental Health*. The full list of journals hand-searched is available from the corresponding author.

### **Inclusion criteria**

Studies were eligible for inclusion in the study if they (i) examined interventions relevant to the treatment of mood or anxiety disorders, or self-harm, in young offenders; (ii) included participants with a mean age of 19 years or under (which is in line with the current structure of the UK Youth Justice system (Youth Justice Board, 2006); (iii) included a specific mental health assessment which measured suicidality, anxiety symptoms or depressive symptoms; (iv) were randomised controlled trials or systematic reviews of randomised controlled trials. Where studies also included non-offenders we included those trials where 75% of the sample was young offenders.

### **Selection of studies and data extraction**

Two authors independently screened potential studies for inclusion in the review. Data extraction for key outcome variables was completed separately by two authors and any

disagreements were resolved by consensus and, where needed, a third reviewer's decision was sought. Data extraction forms were standardised and included the information on baseline, post-treatment and follow-up outcome measures (means, standard deviations, and proportions), participant information and information about interventions and the setting of the study (see Tables 1 and 2 for full details of information extracted).

### **Assessment of the quality of studies**

This was carried out independently by two reviewers (blind to authorship and publication information) using a standardised form. The form used for randomised controlled trials was based on the criteria described in the Cochrane Collaboration Handbook (Higgins and Green, 2008), which focus on the relationship between concealment of allocation to treatment, and the strength and direction of the treatment effect (Shulz *et al*, 1995). We also examined blinding of assessors and withdrawals after randomisation.

## **RESULTS**

We identified 708 papers for potential inclusion in this review. Of these, 10 studies reported in 12 papers were evaluated as suitable for inclusion in this review. The flow of trials in this review is shown in the Quorum Diagram in Figure 2. This diagram describes how trials identified in the searches are handled through the review process with the aim of using review methods that are transparent and reproducible (Moher *et al.*, 1999).

Figure 2 about here.

## **Interventions**

A range of interventions were examined in the studies included in this review. Some studies focussed on young offenders with a diagnosis of a particular mental health problem (e.g. PTSD), whilst others did not impose diagnostic inclusion criteria. Brief details about the participants, settings and interventions of each of the studies included in this review are shown in Tables 1 and 2. In this review we have included outcomes relating to each of the mental health problems under investigation. It should be noted that a range of other outcomes (e.g. recidivism) were also reported in trials which are not included here as our focus in this review is on mental health outcomes.

Tables 1 and 2 about here

## **Quality assessment**

A key aspect of trial quality is the adequacy of the allocation of participants to treatment groups. Allocation concealment ensures that a researcher cannot influence which arm of a trial a given participant is allocated to. An example of adequate concealment would be the use of an off-site trial unit which generates the allocation sequence independent of the research team. Where a trial is found to have used inadequate allocation concealment (e.g. alternation) effect sizes are found to be considerably inflated (Schulz *et al.*, 1995). We used Cochrane Collaboration criteria to evaluate the allocation concealment methods used in the studies included in this review (Higgins and Green, 2008). In two trials additional pre-existing control groups were reported as a second control group (Taylor *et al.*, 1967; Rohde *et al.*, 2004a), but because participants were not

randomised to these groups they were excluded from the review. We contacted the authors of trials where allocation concealment was unclear in the report of the trial. In one case this changed the allocation score from 'unclear' to 'adequate' (Rohde *et al*, 2004b) (randomisation had been carried out by a data analyst who had no contact with any of the participants in the trials). However, in one case (Biggam and Power 2002) the further information provided did not clarify the adequacy of allocation concealment. The assessment of quality of concealment of allocation resulted in four trials (40%) being rated as 'A' quality (the highest rating - for adequate concealment), five trials (50%) being rated as B (for unclear concealment), and one trial (10%) being rated as C (inadequate concealment).

The quality scores in terms of allocation concealment, blinding of assessors, withdrawals after randomization and length of follow-up period may be viewed in Table 3 (summarized as per Khan *et al*, 2003).

Table 3 about here

### **Effectiveness of the interventions included in this review**

1) *Effectiveness in individual studies.* Here we report the results of the effectiveness of each trial in terms of the descriptive statistics and significance levels as reported in the original trials (see Table 4). As is standard practice in systematic reviews we selected the longest follow-up point from each trial (Higgins and Green, 2008). In the eight trials in which depression was measured as an outcome, significant improvements in depressive symptoms were seen in those receiving experimental interventions as compared to control groups in five trials (see Table 4). In the six trials that measured anxiety outcomes, significant improvements in anxiety symptoms were seen in those randomised to experimental interventions as compared to those in control groups in

three trials (see Table 4). Only one trial measured self harm as an outcome and reported no significant reduction in the experimental group as compared to a control group (Rohde *et al.*, 2004a).

It is interesting to note that in the Rohde *et al.*, (2004b) study some significant differences were found between treatment groups immediately post treatment, leading the authors to conclude that their group-based CBT intervention is a useful acute treatment for the youth offending population.

Table 4 about here

2) *Data aggregation and meta-analysis.* We aggregated data from three trials included here with respect to the outcome of depression as they had each examined a group-based CBT intervention. Ahrens and Rexford (2002) had examined Cognitive Processing Therapy (CPT) with young offenders with PTSD. Biggam and Power (2002) examined group problem solving with vulnerable young offenders, and Rohde *et al.*, (2004b) investigated group Cognitive Behavioural Therapy (CBT) with young offenders with Major Depressive Disorder (MDD) and Conduct Disorder (CD). Two of the trials examined depression with the Beck Depression Inventory (BDI) (Beck *et al.*, 1996) and one used the Hospital Anxiety and Depression Scale (HADS) (Zigmond and Snaith, 1983). Previous meta-analyses have demonstrated that it is feasible to combine these measures using Standardised Mean Difference (SMD) calculations (Townsend *et al.*, 2001). The SMD is a measure of effect size for continuous data and is used when trials have used different scales to measure the same outcome (Khan *et al.*, 2003). Figure 3 shows the outcome of this analysis, which demonstrates that outcomes for depression were improved in participants who received group-based CBT as compared to those in the control groups [SMD = 0.38 (-0.69, -0.07)].

Figure 3 about here

Insufficient data were available to permit full intention-to-treat analyses of outcome data. We were, however, able to obtain sufficient information to permit an available case analysis (Higgins and Green, (2008). Available case analyses: “Include data on only those whose results are known, using as a denominator the total number of people who had data recorded for the particular outcome in question” (Higgins and Green, 2008, Chapter 16, section 2.2). We have included proportion of participants in each study who did not provide outcome data in Table 2 where this information was provided.

#### **Assessment of heterogeneity**

Examination of the forest plot (which shows measure of effect sizes and confidence intervals for individual studies and data aggregated via meta-analysis (Lewis and Clarke, 2001)) in Figure 3 reveals a degree of heterogeneity with respect to the effectiveness for group CBT interventions for young offenders with any type of mental health problem. There are a number of potential sources of heterogeneity. First, the studies focussed on young offenders with differing mental health problems (MDD, PTSD and DSH). Secondly, there were differences in quality of the studies in terms of the adequacy of allocation concealment. Only one of the studies was found to have adequately concealed the allocation to groups (Rohde *et al*, 2004b). The heterogeneity ( $I^2$ ) for this meta-analysis (which is a measure that quantifies inconsistency) was substantial and significant (see Figure 3). Hence, we conducted a random effects analysis (which assumes that included studies estimate intervention effects which are different, but related in some important way) (Higgins and Green, 2008). This type of analysis is commonly used to explore any observed heterogeneity (Higgins and Green,

(2008), and revealed a non-significant overall effect for group-based CBT [SMD= -0.69 (-1.18, 0.37)].

## **DISCUSSION**

### **Types of studies and interventions**

A thorough search of the worldwide literature revealed that very few high quality studies (RCTs) have been conducted to evaluate the effectiveness of interventions relevant to young offenders experiencing problems with mood and anxiety disorders, or self-harm. The lack of evidence for interventions found here for young offenders has been noted by other researchers (e.g. Sukhodolsky and Ruchkin 2006) and reflects an overall paucity of well-designed trials for children and young people with mental health problems (Shapiro *et al*, 2006). The lack of randomised studies to evaluate the effectiveness of interventions in the criminal justice system in general has been highlighted by Farrington (2003), who argued that individual differences in policy makers is, rather worryingly, the key factor in determining whether RCT-type studies are promoted and funded.

A variety of interventions have been tried which are relevant to young offenders with mood or anxiety disorders, or problems with self harm. Half of the trials identified in this review used a cognitive behavioural approach to intervene with these problems. Three of the 10 studies we identified focussed on young offenders who met criteria for one or two specific disorders (PTSD, co-morbid MDD and CD, and self-harm). Seventy percent of the studies recruited participants from the general juvenile offending population (regardless of their mental health status), but measured mental health outcomes that the intervention had targeted. Eighty percent of the trials had been carried out with incarcerated male young offenders only. This is significant because the vast majority of young offenders are supported in the community, including a large

proportion of those who were previously incarcerated. Moreover, it appears that, although incarcerated young offenders and those in the community have similar mental health needs, those of community-based offenders are not being met to the same degree as those in custodial settings (Chitsabesan *et al*, 2006). Just one study included community-based male and female young offenders (Rohde *et al*, 2004b) and two further studies had examined incarcerated female offenders (Taylor, 1967; Reardon, 1977).

### **Effectiveness of interventions**

Individual trials reported varying degrees of success in terms of the effectiveness of experimental interventions decreasing depression, anxiety or self harm. We aggregated data from three of the trials identified here with respect to the outcome depression, as each trial had examined a group-based CBT intervention with young offenders. The results of this analysis revealed that depressive symptoms were significantly reduced in young offenders receiving a cognitive-behavioural intervention, compared to those receiving 'usual care' or a 'no treatment control'. This is a promising finding and is especially important when viewed in the context of the findings of Barrett *et al*, (2006), who demonstrated that depressed mood in young offenders predicts higher costs in terms of health and educational services used, and Dixon *et al*, (2004), who showed that having multiple psychiatric diagnoses increases the risk of offending behaviour.

However, it should be noted that a random effects analysis of the depression data did not yield a significant pooled effect. Hence, the results of this meta-analysis should be interpreted with caution given the significant heterogeneity observed. If heterogeneity was not a problem in the review the results of the fixed and random effects analyses would be identical. Nonetheless, the heterogeneity arising in the meta-analysis was to be expected given that the three trials combined here included

participants who presented with a range of problems (PTSD, depression and self harm), were dealt with in various settings, had different follow-up periods and differed in the adequacy of allocation concealment. Despite these problems we feel that the data aggregation presented is useful clinically, given the paucity of data in the field, and the problems with co-morbidity of mental health problems in the youth offending population.

More research is needed on treatment effectiveness and efficacy to bolster the evidence base, but these preliminary data suggest that group-based CBT interventions may be helpful for young people in the criminal justice system with mental health problems like mood and anxiety disorders, and self harm. As Desai *et al*, (2006) noted, CBT-based interventions are extremely well suited to application in the criminal justice system – especially in secure settings. CBT is short-term, time-limited and focused on current problems, which is ideal for settings where length of stay is short and outcomes need to be as effective as possible. CBT provides clients with a new set of skills and is both collaborative and empowering. Many CBT interventions are manualised, which make them relatively easy to teach to clinicians from a variety of backgrounds.

Indeed, CBT interventions which focus on problem behaviours and reducing recidivism have been extensively researched within criminal justice settings (Lipsey *et al*, 2000). Sukhodolsky and Ruchkin (2006) note that CBT for ‘internalising disorders’ such as mood and anxiety disorders is likely to share techniques with CBT used to tackle aggression and delinquency. This, they suggest, could be a benefit and lead to the development and refinement of interventions for young people with multiple problems. On the other hand, they point out that CBT for internalising disorders may suffer from the limitations of treatments for delinquent behaviour, such as possible negative effects of group-based treatments (Dishion *et al*, 1999). It is noteworthy that most of the CBT-based studies discussed here used a group-based format to deliver treatment to young

offenders. More research is required relating to the effectiveness of group-based CBT treatments as compared to individual CBT treatments in this population. Generally it is acknowledged (in the non-offending literature) that CBT is effective for depressed adolescents (Reinecke *et al*, 1998), and for adolescents with anxiety disorders (Soler and Weatherall 2005).

In non-offending adolescent populations it has been shown that there is no difference in effectiveness of CBT across different delivery formats (e.g. individual, family or group) (James *et al.*, 2005). Moreover, the studies included in the James *et al.*, (2005) systematic review reported significant positive outcomes when measured at longer follow-up periods than in the present review.

It is possible that CBT type interventions for young offenders may not yield the longer term effects seen in other populations and this is likely to be due to the intense emotional difficulties, and co-morbidity of mental disorders evident in this population. However, one study (Rohde *et al* 2004b) highlights the possibility that CBT-based interventions are a useful 'acute' treatment in this group given that outcome measures differed significantly between the experimental and control groups immediately post-treatment.

### **Methodological issues**

Unfortunately, most of the trials included in this review suffer from methodological weaknesses, such as a lack of information about randomisation and blinding procedures, incomplete information about drop-outs, and short follow-up periods. This is unfortunate given that these factors are known to bias the outcomes of trials (Schulz *et al*, 1995) and that there have been repeated calls in the literature for researchers to report studies in a transparent manner (Moher *et al*, 2001).

There were also problems with follow-up periods, with most of the trials reporting outcomes for very short follow-up periods (most trials reported post-treatment data only). This could mean that the long-term effectiveness of these interventions is not clear. Given the small numbers of participants in all of the studies reviewed here it is highly likely that they were underpowered (ie. they did not recruit significant numbers of participants to yield adequately powered statistical tests). In future researchers should conduct power analyses to determine how many participants should be recruited to a trial in order to ensure adequate power for statistical analyses.

Finally, the RCTs included in this review used a wide variety of comparison interventions including no treatment controls, usual care, or another type of intervention. Ideally, experimental interventions in this population should be tested against a control group involving 'usual care' which is fully described.

### **Implications for future research**

The trials included in this review demonstrate is that it is possible to carry out RCTs for mental health problems with young offenders in both incarcerated and non-incarcerated settings. Large (adequately powered), long-term multi-centre RCTs are now urgently required in both incarcerated and community-based settings. There is a particular need to evaluate the impact of interventions in non-incarcerated young offenders. In the UK the vast majority of young offenders are dealt with on community-based orders and incarceration is very much viewed as a last resort. Moreover, the evidence concerning the effectiveness of interventions specifically for female young offenders is especially sparse. This is of concern because prevalence studies estimate female young offenders to experience more mental health problems than males (Jasper *et al*, 1998).

There are a number of pragmatic issues that researchers undertaking RCTs with young offenders should be aware of. Firstly, the engagement of these young people can

be a considerable challenge (which may explain why 80% of studies were solely based in secure units). Secondly, this is a population with considerable heterogeneity in terms of diagnostic comorbidity, offending profiles, and related social and developmental characteristics. Thirdly, it may be that the ‘dose’ of treatment required for this population is greater than in other groups of individuals. Hence, trialists should consider implementing longer treatment durations for this group as effect sizes may diminish significantly after six months in the case of group-based CBT (Rohde et al 2004b). Finally, it can be difficult to control for the environmental and judicial interventions that are imposed on young offenders. Hence, there are a variety of confounding factors facing researchers in this area. However, such problems can be overcome and where possible these factors should be controlled for in analyses within trials.

To summarize, the results presented here suggests group-based cognitive-behavioural interventions appear to be useful for young offenders experiencing depression, anxiety disorders or problems with self harm. Future studies should be careful to adopt adequate randomisation procedures, compare experimental treatments to ‘usual care’ (which should be fully described) and evaluate outcomes (with blind assessment) over a 12-month follow-up period with dropouts fully described. This evidence is crucial given the high unmet needs in relation to these problems in young offenders (Chitsabesan *et al*, 2006), and that such problems are associated with increased rates of recidivism and suicidality (Vermeiren 2003).

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**Figure 1. Complete electronic search strategy****A) Young offender****Person specification:**

1. Child\*
2. Juv\*
3. Youth\*
4. Adoles\*
5. young people
6. young person\*
7. teen\*
8. #1 or #2 or #3 or #4 or #5 or #6 or #7

**Population/ Institution:**

9. Offend\*
10. Delinqu\*
11. Crim\*
12. Convic\*
13. Detention\*
14. Facility\*
15. Prison\*
16. Incarcerat\*
17. Court\*
18. Correctional
19. Borstal
20. Reformato\*
21. 'youth offending team'
22. YOT\*
23. Probation
24. CAMHS
25. #9 or #10 or #11 or #12 or #13 #14 or #15 or #16 or #17 or #18 or #19 or #20 or #21 or #22 or #23 or #24 or #25
26. #8 and #25
27. Remove duplicates.

**B) Literature Type****i) Systematic review**

28. review-academic trial
29. review-tutorial trial
30. meta-analys\*
31. meta analys\*
32. systematic review\* trial\*

**ii) RCT**

28. randomized control trial
29. randomised control trial
30. randomized-control trial\*
31. randomised-control trial\*
32. controlled clinical trial\*
33. random allocation\*
34. double blind method
35. single blind method
36. clinical trial\*

37. ([#28 or #29 or #30 or #31 or #32] or #33 or #34 or #35 or #36)
38. #27 and #37
39. Remove duplicates.

**C) Specific disorders****1) Anxiety**

40. Anxiety\*
41. Anx\* dis\*
42. General\* anx\*
43. #40 or #41 or #42
44. #39 and #43
45. Remove duplicates

**2) Deliberate Self-Harm**

40. deliberate self harm\*
41. self harm\*
42. self destructive behave\*
43. self injur\*
44. DSH
44. self-harm\*
46. suicid\*
47. parasuicid\*
48. suicidal behav\*
49. attempted suicid\*
50. completed suicid\*
51. #40 or #41 or #42 or #43 or #44 or #45 or #46 or #47 or #48 or #49 or #50
52. #39 and #51
53. Remove duplicates

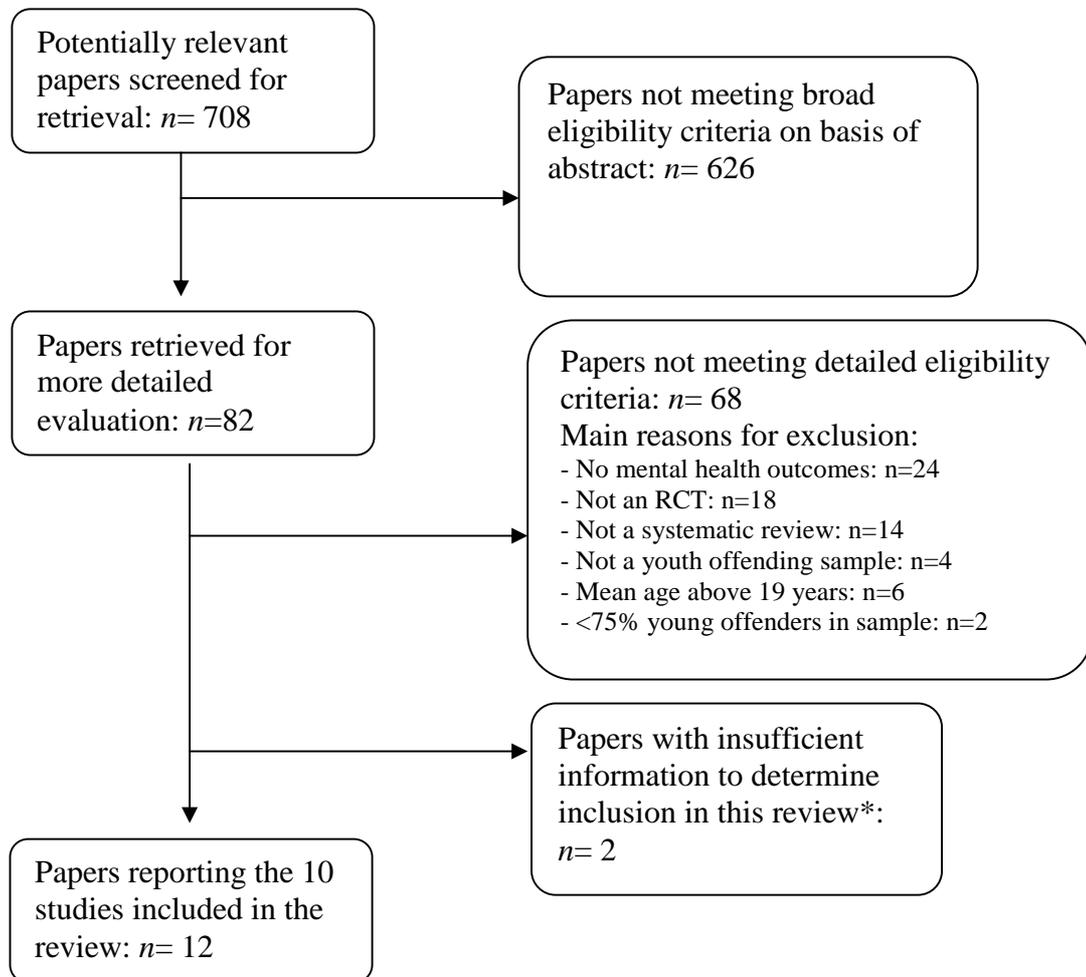
**3) Depression**

40. depress\*
41. unipolar depress\*
42. bipolar disorder\*
43. bipolar mood disorder\*
44. manic depress\*
45. major depress\*
46. mania
47. #40 or #41 or #42 or #43 or #44 or #45 or #46
48. #39 and #47
49. Remove duplicates

**4) PTSD**

40. post traumatic stress disorder\*
41. 'post traumatic'
42. trauma\*
43. 'post traumatic behav\*
44. PTSD
45. #40 or #41 or #42 or #43 or #44
46. #39 and #45
47. Remove duplicates

**Figure 2** Quorum diagram detailing flow of papers into this review



\*Further information is being sought about these studies which have proved to be unobtainable to date.

**Table 1. Participants and setting of studies included in review**

Study and diagnostic inclusion criteria	Number randomised/ Gender	Ethnicity	AGE (years)	Country and setting	Offences	Length of sentence
Gleser et al. (1965) No diagnosis specified	N=46 100% male	100% Caucasian.	14-16 (no mean given)	Incarcerated (USA)	Antisocial or delinquent behaviour.	Not stated.
Taylor (1967)* No diagnosis specified	N = 22 <sup>1</sup> 100% female	75.8% Maori, 21.2%, European, 3% Rarotongan	Mean = 17.4	Incarcerated (New Zealand)	Theft/burglary =19, Incest = 11, Idle disorder = 6, Receiving = 3, Car conversion = 2, Assault = 1.	At least 40 weeks.
Jesness (1975) No diagnosis specified	N=983 100% male	56% Caucasian, 13% Mexican, 28% Black, 2% Other	Median= 16.6	Incarcerated (USA)	Burglary and car theft most common.	7-12 months.
Reardon and Tosi (1977)* No diagnosis specified	N=32 100% female.	Not stated	Mean = 16	Incarcerated and community (USA)	Mainly truancy, running away and sexual delinquency.	Not stated.
Shivrattan (1988) No diagnosis specified.	N=45 100% male	Not stated	15-17 (no mean given)	Incarcerated (USA)	Not stated.	Not stated.
Ahrens and Rexford (2002) Disorder: PTSD	N =38. 100 % male.	60.5% Caucasian, 26.5% African American, 5.2% Hispanic, 5.2% Native American, 2.6% Other	Mean = 16.4	Incarcerated (USA)	50% assault, 50% other.	Not stated.
Biggam and Power (2002) Disorder: Self harm	N=46 100% male	Not stated	Mean = 19.3	Incarcerated (UK: Scotland)	43.4% violence, 10.8% murder, 10.8% dishonesty (mainly theft), 4.3% vandalism/arson, 17.3% indecency, 10.8% car offences, 2.1% breach of community service	Mean = 4.44 (SD 2.04).
Rohde <i>et al.</i> , (2004a) <sup>1</sup> No diagnosis specified	N=76 100% male	64.2% Caucasian. 6.7% African American. 14.2% Hispanic. 2.2% Asian. 10.4% Native American. 2.2% Other.	Mean = 16.5	Incarcerated (USA)	Not stated.	Not stated.
Nakaya <i>et al.</i> , (2004) No diagnosis specified	N=16 100% male	100% Japanese	Mean = 16.0	Incarcerated (Japan)	Not stated.	Not stated.
Rohde <i>et al.</i> , (2004b) CD and MDD	N=93 55% male	80.6% Caucasian (no further ethnicity statistics given).	Mean = 15.1	Community (USA)	Not stated.	Not stated.

<sup>1</sup> A second control group was reported but participants were not randomised to conditions. \*Where possible data were also extracted from the PhD theses that these reports were based on.

**Table 2 (continued). Interventions and outcomes of studies included in review**

Study and diagnostic inclusion criteria	Interventions	Treatment duration	Follow-up period	Intervention delivered by	Outcomes (relevant to mood, anxiety or self harm), and timing of outcome measurement.	Format of assessment	Assessment conducted by
Gleser (1965)  No diagnosis specified	Ex: Oral Chlordiazepoxide (Librium) over two days (N=22) Con: Placebo (N=24)	Two days	Post-treatment (12-18 hours after 1 <sup>st</sup> drug intake)	Not stated.	(1) Content analysis of verbal sample for anxiety (2) IPAT Anxiety scale Outcome data available for 20/22 participants immediately post-treatment.	Not stated.	Not stated
Taylor (1967)  No diagnosis specified	Ex: Group Psychotherapy (N=9) Con: Untreated control (N=11) (A second counselling control group was reported but this group was not randomised)	Weekly sessions of 1.75 hours over 40 weeks	Post-treatment data only for depression	PhD student delivered experimental intervention.	(1) Minnesota Multiphasic Personality Inventory (MMPI), Scale two (Depression) measured at post-treatment. Number of participants with outcome data available not stated.	Not stated.	PhD student
Jesness (1975)  No diagnosis specified	Ex 1: Transactional analysis (N randomised not stated) Ex 2: Behaviour modification (N randomised not stated).	7 months- 2 years	Post-treatment assessment only.	All staff (Senior Youth Workers, Night Supervisors, Social Workers).	(1) Jesness Inventory: Withdrawal-depression and social anxiety scales. Outcome data available for 963/963 participants at post-treatment.	Questionnaire	PhD student
Reardon (1977)  No diagnosis specified	Ex 1: (N=8) Rational Stage Directed Imagery (cognitive behavioural approach). Ex 2: (N=8) Rational Cognitive Restructuring Treatment. Placebo: (N=8) (Reflective and non-directive therapy) Control: (N=8). No treatment	Six sessions over six weeks.	2 months	Two doctoral students in counsellor training delivered all interventions. Adherence to specific treatment protocols rated by independent assessors.	(1) Tennessee Self-Concept Scale (TSCS): general maladjustment and neurosis. (2) Multiple Affect Adjective Check List (MAACL). anxiety and depression. Measured at 2 month follow-up. Number of participants with outcome data available not stated.	Not stated	PhD student
Shivrattan (1988)	Ex1: Social Interaction Skills program (N=14) Ex2: Stress Management Training Program (N=14): Con: No treatment control (N=17).	Eight, one-hour sessions	Post-treatment assessment only for depression	Two teachers (1 had psychology BA one was an elementary school teacher). (Both received 8 hours of formal training from the author).	(1) Minnesota Multiphasic Personality Inventory (MMPI) – scale 2 (Depression). Outcome data available for 43/45 participants at post-treatment.	Self report questionnaire.	Two teachers

<b>Study and diagnostic inclusion criteria</b>	<b>Interventions</b>	<b>Treatment duration</b>	<b>Follow-up period</b>	<b>Intervention delivered by</b>	<b>Outcomes (relevant to mood, anxiety or self harm) and timing of outcome measurement</b>	<b>Format of assessment</b>	<b>Assessment conducted by</b>
Ahrens and Rexford (2002)  Disorder: PTSD	Ex: (N=19) Cognitive Processing therapy for PTSD. Con: (N=19) Wait list.	8, 60 minute sessions over 7 weeks.	4 weeks	PhD student. Female psychologist.	(1) Depression (BDI). (2) PTSD symptom checklist. (3) Impact of Events Scale (self report). Outcome data available for 38/38 participants at 4 week follow up.	Questionnaire (self report).	PhD student and psychologist.
Biggam and Power (2002)  Disorder: Self harm	Ex: (N=23) Brief Problem Solving Group therapy Con: (N=23) No treatment.	5 weeks	3 months	Researcher – no qualifications stated.	(1) Depression (HADS), (2) Anxiety (HADS). Outcome data available for 46/46 participants at 3 month follow-up.	Interview and questionnaire (self report).	Researcher.
Rohde <i>et al.</i> , (2004a)  No diagnosis specified	Ex: (N=46) Coping course (group based on problem solving and coping skills). Con: (N=30) Usual care (varied) Duration: 8 weeks.	8 weeks	Post-treatment only	Therapists (2 PhD level and 2 masters level).	1) Internalising and externalising (YAS). (2) Life Attitudes Scale. (3) Suicidal Behaviour Outcome data available for 76/76 participants at post-treatment.	Questionnaire (self report).	Not stated.
Nakaya <i>et al.</i> , (2004)  No diagnosis specified	Ex: (N=8) Muscle relaxation therapy. Con: (N=8) No treatment.	4 weeks	Post-treatment only	'Outside practitioners, with knowledge and experience' (p.177)	Psychological stress (anxiety, depression). Outcome data available for 16/16 participants at post-treatment.	Questionnaire (self report).	Two psychologists.
Rohde <i>et al.</i> , (2004b)  CD and MDD	Ex: (N=45) CWD-A (Adolescent Coping with Depression Course) Con: (N=48) Life Skills Tutoring.	8 weeks	12 months	CWD- A delivered by individuals with masters level degrees in mental health. (Received 60 hours training).  Life-skills tutoring delivered by: High school teacher plus 5 adult leaders and 5 student helpers.	(1) Depression: MDD (K-SADS), (2) BDI-II, (3) Hamilton Depression Rating Scale (4) Conduct Disorder: (K-SADS Outcome data available for 93/93 participants at 12 month follow-up.	Interviews and questionnaires.	Researchers.

**Table 3 Summary of results of quality assessments performed in this review**

Author	Randomization (concealment)	Blinding of assessors	Description of withdrawals	Outcome 1-year long follow-up	Rank*
Gleser (1965)	Unclear	Inadequate	Adequate	Inadequate	6
Taylor (1967)	Adequate <sup>†</sup>	Inadequate	Adequate	Inadequate	4
Jesness (1975)	Adequate	Unclear	Adequate	Inadequate	2=
Reardon (1977)	Inadequate	Unclear	Unclear	Inadequate	10
Shivrattan (1988)	Unclear	Inadequate	Inadequate	Inadequate	9
Ahrens (2002)	Unclear	Unclear	Unclear	Inadequate	7=
Biggam (2002)	Unclear	Unclear	Unclear	Inadequate	7=
Nakaya (2004)	Unclear	Unclear	Adequate	Inadequate	5
Rohde (2004a)	Adequate	Unclear	Adequate	Inadequate	2=
Rohde (2004b)	Adequate	Inadequate	Adequate	Adequate	1

\* Based on proportion of total items they comply with (after Khan *et al*, 2003). Studies with deficiencies in areas with increased bias (e.g. lack of concealment allocation) were ranked lower than studies with deficiencies in other areas (e.g. lack of information about withdrawals).

<sup>†</sup> Based on the two groups that were randomised (with adequate concealment) in this trial. An additional pre-existing, non-randomised control group was included in this trial but was excluded from this review.

**Table 4 Effectiveness of interventions examined in studies included in this review<sup>2</sup>**

Study/Outcome measure	Experimental group outcomes		Control group outcomes		Statistical significance
	Mean (SD), N		Mean (SD), N		
<b>Gleser (1965)</b> Anxiety – from verbal sample IPAT Anxiety	1.78 (NS), 21 37.47 (NS), 21		2.22 (NS), 24 38.28 (NS), 24		$p=0.08$ <i>Not significant (ns)</i>
<b>Taylor (1967)<sup>3</sup></b> Depression (MMPI scale 2)	59.97 (7.01), 98		62.27 (3.77), 11		$p<0.05$
<b>Jesness (1975)</b> Withdrawal-depression (JI) Social Anxiety (JI)	48.70 (NS), NS 41.30 (NS), NS		50.60 (NS), NS 50.60 (NS), NS		$p<0.05$ $p<0.01$
<b>Reardon (1977)<sup>3</sup></b> Depression (MAACL) Anxiety (MAACL)	<u>Ex 1) RSDI</u> 6.63 (NS), 8 <u>Ex 2) RSDT</u> 13.38 (NS), 8 7.25 (NS), 8		<u>Con 1) Placebo</u> 15.00 (NS), 8 8.38 (NS), 8 <u>Con 2) No treatment</u> 18.38 (NS), 8 8.75 (NS), 8		$p<0.01^{\dagger}$ <i>ns</i>
<b>Shivrattan (1988)<sup>3</sup></b> Depression (MMPI scale 2)	<u>Ex1) Social skills training</u> 59.03 (NS), 14 <u>Ex 2) Stress management</u> 59.72 (NS), 14		56.63 (NS), 15		<i>ns</i>
<b>Ahrens (2002)<sup>3</sup></b> Depression (BDI) PTSD symptoms Impact of Events	6.88 (7.14), 19 7.82 (10.00), 19 23.41 (6.88), 19		17.94 (8.22), 19 20.38 (10.46), 19 33.50 (6.29), 19		$p=0.002$ $p=0.0001$ $p=0.0001$
<b>Biggam (2002)</b> Depression (HADS) Anxiety (HADS)	5.10 (2.90), 23 6.90 (3.10), 23		8.40 (3.60), 23 9.60 (3.50), 23		$p<0.05$ $p<0.05$
<b>Rohde et al, (2004a)</b> Suicide ideation/behaviour	0.8 (2.2), 46		1.5 (3.0), 30		$p=0.254$
<b>Nakaya et al, (2004):</b> Depression (Psychological Stress Response Scale (PSRS)) Anxiety (PSRS)	8.4 (8.3), 8 8.0 (7.1), 8		4.5 (4.1), 8 5.9 (6.1), 8		<i>ns</i> <i>ns</i>
<b>Rohde et al, (2004b)</b> Depression: BDI-II Depression: Hamilton  Depression: MDD (K-SADS) Conduct Disorder: (K-SADS)	9.9 (1.04), 41 5.6 (6.40), 41  n/N (%) 15/41 (36.6) 24/41 (58.5)		7.5 (8.00), 46 4.1 (5.10), 46  n/N (%) 17/46 (37.8) 28/46 (62.2)		$p=.821$ $p=.594$  <i>ns</i> <i>ns</i>

<sup>2</sup> Descriptive statistics (and significance level) from original papers are reported. Where data were missing from the original report this is indicated by 'NS' (Not stated).

<sup>3</sup> N= Original number randomised (precise number available for analysis not stated in report).

<sup>†</sup> RSDI was significantly different to each of the other groups

**Figure 3 Effectiveness of CBT group-based interventions in young offenders (with any disorder) with respect to depression**

Review: Interventions for mood and anxiety disorders, and self harm in young offenders (copy 01)  
 Comparison: 06 Group CBT for any disorder vs. control  
 Outcome: 01 Depression

