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Day Therapy Programs for Adolescents with Mental Health Problems: A Systematic Review

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ABSTRACT

Day therapy programs are one of many interventions available for adolescents with mental health issues. Day therapy programs utilise a multi-disciplinary community-based approach to the treatment of mental health issues and allow adolescents to remain under the care of their family. To date, no review has specifically investigated the effectiveness of day therapy programs for adolescents. This review aims to investigate both the effectiveness of day therapy programs for adolescents with mental health problems and highlight the key components underpinning these programs. A systematic review of peer- reviewed literature was undertaken, using recognised processes. Eight studies were included in this review, including both interventional and descriptive study designs. All eight studies found positive effects of varying degrees for day therapy programs for adolescents with mental health problems. Most used a multi-modal, multi-disciplinary group-based approach and utilised one or more co-interventions. A frequency of once per week was most commonly used; however, the optimal frequency and duration of day therapy programs remains unclear. Most studies used more than one type of health professional to deliver their intervention. Unsurprisingly, psychologists or psychiatrists were involved in delivering interventions in all but one study. Current research evidence suggests that day therapy programs may be an effective intervention for adolescents with mental health issues. A multimodal and multidisciplinary group-based treatment approach may be most effective, and participants could benefit from the involvement of at least one health professional from a psychology or psychiatric background. However, a range of health professionals may contribute to a day therapy program and a range of locations and settings may be appropriate. Further high-level, high-quality research using standardised outcome measures is required to support these findings and determine key parameters, such as an optimal frequency and duration for day therapy programs.

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BACKGROUND

The World Health Organisation (WHO) defines mental health as *"a state of well-being in which the individual realizes his or her own abilities, can cope with the normal stresses of life, can work productively and fruitfully, and is able to make a contribution to*

his or her community."[1] The impact of mental health issues can be significant and far reaching for individuals and their families. Mental health problems can be broadly classified into mental disorders, mental retardation, substance dependence or personality disorders.[2] Those diagnosed with mental health problems often exhibit poor coping mechanisms and often have difficulties at school and with peer relationships. These difficulties can manifest as personality disorders, mood and eating disorders or obsessive compulsive disorder (OCD).[3,4]

Adolescence has often been considered as a transitional phase from childhood to adulthood. Adolescence involves a sensitive changeover within the individual both physically and mentally. The cognitive and emotional well being of young individuals is influenced by a variety of external factors including society, culture, and their existing level of physical development and education.[5] The WHO, in its European Ministerial Conference report, states that worldwide, up to 20% of adolescents suffer from disabling mental health problems, and 4% of 12 to 17 year-olds as well as 9% of 18-year-olds suffer from depression. Adolescence is clearly a unique and challenging period of life which needs to be thoroughly researched and understood.

For those adolescents who are diagnosed with a mental illness, a range of intervention options are currently available (medication-based, school-based, and family-based interventions). One such intervention is a day therapy program. Day therapy programs provide excellent alternatives to inpatient units and medical wards.[4] Day therapy programs (also known as partial hospitalisation) are intended to provide early and effective rehabilitation for adolescents with mental health problems.[2,4] Day therapy programs allow adolescents to remain under the care of their families, while learning to manage the symptoms of their mental health problem, by attending regular day therapy sessions. These programs are supported and strengthened by a community-based approach and function by maintaining open communication between adolescents, their families and their health care professionals.[6] Day therapy programs utilise a range of clinical approaches, which are usually implemented by a multi-disciplinary team of professionals.[4]

To date, there has been little research undertaken to systematically examine the research evidence underpinning the effectiveness of day therapy programs for adolescents with mental health problems. Previous systematic reviews undertaken in this area have not specifically targeted adolescents and have included participants less than 12 years of age. Given the emerging volume of evidence and the growing importance of mental health in adolescence, there was a need for a comprehensive systematic review evaluating the effectiveness of day therapy programs for adolescents with mental health problems. In addition to evaluating the effectiveness of day therapy programs, this systematic review also aims to deconstruct the key components underpinning various day therapy programs for adolescents with mental health problems, as reported in the literature.

METHODS

Search Strategy

A series of standard, reproducible processes were undertaken for this systematic review. As the first step in this process, the objectives of the review were deconstructed into population, intervention, comparison groups and outcomes (PICO). The PICO format provides a framework for deconstructing review parameters into distinct categories; this is presented in Figure 1.

Figure 1. PICO

Population	Adolescents with serious and significant mental health disorders 12 to 18 years old (mean age)
Intervention	Day programs (which include as a major component; group therapy, transitional rehabilitation, activity/recreational therapy, positive behavioural support, cognitive behavioural therapy (CBT), psycho education, multi systemic therapy, emotional regulation, sensory education, art therapy or behavioural therapy)
Comparison	Usual care/no care/hospital care/ individual case and group management therapy
Outcome	A range of outcomes including engagement with school or community, connection with family, self esteem, quality of life, hospital treatment re-admission, recovery from offending behaviour, medication adherence

Literature searches were undertaken from 1998 to December 2008 on the following databases: Ovid, Ageline, Embase, AMED, EBSCOHost, IPAB, MEDLINE, Web of knowledge, PubMed, Scopus, and Cochrane Controlled Trials Register (DARE and CCRCT). Key words utilised were "adolescent or teenager," "mental health," "day therapy," "community based intervention," and

"case management," with appropriate truncation symbols. Reference lists from retrieved studies were reviewed to identify additional studies. Duplicate articles were removed to create a final list of identified studies.

Selection of studies

All primary literature published in the English language that reported on day therapy programs for adolescents with mental health problems was included in this review. Literature that did not focus primarily on day therapy programs or that focused on school-based programs was excluded.

Quality evaluation

The quality evaluation of included studies was conducted using a quantitative critical appraisal tool developed by Law et al.[7] This generic critical appraisal tool was modified by two authors [ZM, LP] to contain a score for all fifteen criteria, each representing key elements of the methodological quality of a research study. The original appraisal tool, in criterion three, included a range of research designs. This was replaced, in the modified version of the tool, to determine if the research design was appropriate and the response type was dichotomous (yes/no). Therefore, each criterion represented one question from the appraisal tool and was given a score of one if it was fulfilled. Studies were appraised by two independent reviewers [YD, LP] and provided with a quality score. Any disagreements were resolved through discussions until consensus was achieved. The modified McMaster Critical Appraisal tool is provided in Appendix 1.

As this systematic review asked a question relating to the effectiveness of an intervention, the National Health and Medical Research Council (NHMRC) hierarchy of evidence was also used to evaluate the overall strength of retrieved literature (refer to Appendix 2).[8] The NHMRC hierarchy of evidence provides a clear summary of the relative strength of each study, according to study design.[9]

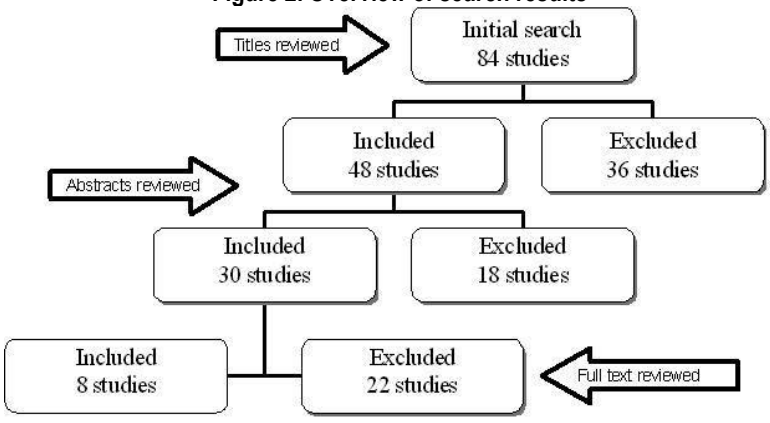
To address the primary aim of this review, data was extracted according to the population studied, the outcome measure used and the overall effectiveness of the intervention. To address the secondary aim of this review, data relating to the components of the day therapy program was extracted in two categories: *service components* and *service provision.* Service components included the type of intervention (including whether the intervention was group-based or individually supervised), the frequency and duration of intervention, and any co-intervention. Service provision included the mental health problem addressed, the service providers, and the location of service.

RESULTS

Search strategy

The initial search identified 84 potentially relevant studies. After reviewing study titles, 36 studies were excluded. After reviewing abstracts, a further 18 studies were excluded. After reviewing the full text of studies and applying inclusion and exclusion criteria, another 22 studies were excluded. The most common reasons for final exclusion were populations included young adults and/or children, program was school-based, or the day program was not the primary focus of the study. Ultimately, 8 studies were identified as fulfilling the inclusion criteria for this systematic review.[10-17] Figure 2 provides an overview of these search findings.

Figure 2. Overview of search results



Critical appraisal

Of the eight included studies, 4 were comparative studies with concurrent controls design (Level III-2 and III-3)[13,15-17], 2 were case study designs (Level IV), and 2 were randomised control trials (Level II).[10-12,14] Although many of the studies included in this review represented lower level research on the NHMRC hierarchy, the methodological quality of several studies was good. Modified McMaster critical appraisal scores ranged from 8 to 14 out of 15 (refer to Appendix 3). Consistently, studies failed to justify their sample size, and avoid co-intervention. Of the three lowest scoring studies (scoring 9 or below), all were either of a descriptive or non-controlled design.

Effectiveness of day therapy programs

All eight studies reported one or more positive outcomes from day therapy programs for adolescents with mental health problems. Mental health problems addressed in the eight studies included OCD, social phobias, anger management issues, behavioural issues, severe disruptive issues, and emotional disturbances.

Long term follow-up

While there were favourable outcomes reported in every study in the short-term, only two studies reported long-term outcomes. Hayward et al reported a reduction in relapse of depression in adolescents with social phobias at one year post-intervention but not at one year follow up.[14] Rey et al reported better functioning and increased satisfaction with treatment at three years post-intervention for adolescents with behavioural problems.[16] The effectiveness of day therapy programs in the long term is yet to be established.

Interventions

A range of interventions were reported in studies. The specific interventions used varied according to the mental health problem addressed. Cognitive behavioural therapy (CBT) featured in four studies.[11,14,16,17] Anger management featured in two studies.[13,15] The remaining two studies used a social skills training program and brief intervention program respectively.[13,15]

Outcome measures

A wide range of outcome measures were utilised within the included studies. No one outcome measure featured consistently in all studies. However, the Social Phobia and Anxiety Inventory (SPAI), the Anxiety Disorders Interview Schedule for Children (ADIS-C), and the Child Behaviour Checklist (CBC) were each used in more than one study.

The SPAI and the ADIS-C featured in two studies, both of which targeted adolescents with social phobias.[11,14] The SPAI is a self-report instrument that assesses various dimensions of social anxiety. The ADIS-C is a semi-structured interview protocol used to assess child and adolescent anxiety disorders, using Diagnostic and Statistical Manual of Mental Disorders 4th edition (DSM-IV) criteria. Both studies found significant improved results in pre and post intervention for SPAI scores compared to controls ($p<0.05$).

The CBC is an outcome measure which identifies perceptions of children's general behaviour issues. The CBC was used in three studies.[13,16,17] Sample populations in these studies included adolescents with OCD, anger management issues, disruptive issues and conflicts at school. Two studies reported significantly improved CBC scores ($p<0.05$) immediately post-intervention.[16,17] Another study also demonstrated sustained improvements at 3 years follow up ($p<0.05$).[16] However another study did not find any significant difference in CBC scores pre and post-intervention.[13] Parents' and teachers' perspectives were reported for the following domains; satisfaction with treatment, stress and adolescent behaviour. Table 1 provides a summary of the interventions and outcome measures used in each study.

Table 1. Overview of studies

Study	Sample and gender	Age of adolescents (years)	Intervention	Outcome Measures
Al-Ansari & Hafeed 1998[10]	8 (all males)	10-14	Social skills training program	SSC (for teachers & parents)
Baer & Garland 2005[11]	12 (7 males 5 females)	13-18	Cognitive behavioural therapy	ADIS-C SPAI BDI
Crisp & O'Donnell 1998[12]	101 (both genders)	13-18	Brief intervention program	YSR ACS CSEI LEQ Teacher report Case manager feedback Behavioural status
Dalton et al. 2003[13]	79 (58 males 29 females)	13-18	Anger management therapy	CBC YSR
Hayward et al. 2000[14]	35 (all females)	14-17	Cognitive behavioural therapy	SPAI ADIS (child & parent version) Diagnostic interviews (DSM-IV criteria)
Kellner & Bry 1999[15]	7 (6 males 1 female)	17-18	Anger management therapy	CTRS CPRS Number of incidents of physical aggression by students
Rey et al. 1998[16]	73 (61 males 12 females)	13-16	Cognitive behavioural therapy	CBC GAF
Thienemann et al. 2001[17]	18 (12 males 6 females)	13-17	Cognitive behavioural therapy	CY_BOCS NIMH-CGI CDI MASC CBC PSI

SSC: Social Skill Checklist **ADIS-C:** Anxiety Disorders Interview Schedule for Children **SPAI:** Social Phobia & Anxiety Inventory **BDI:** Beck Depression Inventory **YSR:** Youth Self Report **ADIS:** Anxiety Disorders Interview Schedule **ACS:** Adolescent Coping Scale **CSEI:** Coopersmith Self Esteem Inventory **LEQ:** Life Effectiveness Questionnaire **CBC:** Child Behaviour Checklist **DSM-IV:** Diagnostic and Statistical Manual of Mental Disorders Fourth Edition **CTRS**: Conners Teacher Rating scale **CPRS**: Conners Parent Rating Scale **GAF:** Ratings of Global Assessment of Functioning (subscale of DSM-III-R) **CY_BOCS:** Children's Yale- Brown Obsessive Compulsive Scale **NIMH-CGI:** National Institute of Mental Health-Clinical Global Impression Scale **CDI:** Children's Depression Inventory **MASC:** Multidimensional Anxiety Scale for Children **PSI:** Parenting Stress Index

Statistical analysis

Despite all eight studies reporting that day therapy programs were effective in some way, the majority of studies did not support their findings with statistical analysis. All but one study supported their conclusions with a measure of statistical significance.[12] However most studies did not report measures of variance. Only one study calculated an effect size.[11] This study reported a large effect (d=0.85) for a day therapy program for adolescents with social phobias. Table 2 provides an overview of the statistical analysis and key findings of each study.

Table 2. Overview of study findings

Study	Statistical analysis	Key findings
Al-Ansari & Hafeed 1998[10]	Significant increase in the frequency of use of desirable social skills [p <0.0001]	Partial community-based social skills program may be effective in improving frequency of desired social skills at home and at school.
Baer & Garland 2005[11]	Statistically significant change in ADIS-C (d=1.63, p=0.030) and SPAI (d= 0.85, p=0.050) compared to control group. No significant change in BDI	Community-based simplified cognitive behavioural therapy may be effective in reducing anxiety but not depression in adolescents with social phobia.
Crisp & O'Donnell 1998[12]	No statistical analysis presented. Reduction in general psychopathology and an increase in self-esteem. Reduction in school refusal rates (34% to 6%). Reduction in self-reported behavioural difficulties (31% to 5%)	Community-based brief intervention program may aid in treatment of behavioural difficulties in adolescents with serious psychiatric problems.
Dalton et al. 2003[13]	Statistically significant decrease in negative behaviours; YSR (p=0.026). No significant change (pre and post test) in CBC scores. The three intervention groups could not be differentiated by pre -and post-test changes	Community-based anger management therapy may be effective in decreasing negative behaviours in adolescents.
Hayward et al. 2000[14]	Statistically significant change in SPAI scores post-intervention (p=.048), but not significant at 1 year follow up (p=0.4). Statistically significant change in ADIS scores for both parent (p=0.031) and child (p=0.003). No statistically significant change in those meeting criteria for major depression	Community-based cognitive behavioural therapy may be effective in reducing levels of social phobia and anxiety in the short term, but are not effective in reducing depression.
Kellner & Bry 1999[15]	Statistically significant change in the Conduct subscale of CTRS (p<0.03). Statistically significant change in the Conduct subscale of the CPRS (p<0.04). No statistically significant change in the mean number of incidents of physical aggression (p<0.06).	Community-based anger management program effective in improving some aspects of aggressive behaviour in adolescents. Not effective in reducing incidents of physical aggression.
Rey et al. 1998[16]	Statistically significant change in GAF scores between intervention and control groups (p<0.01). Statistically significant pre-post reduction in CBC scores (p<0.05). No statistically significant change in 'delinquent' and 'withdrawn' sub groups. Satisfaction with treatment: Parents (p<0.05), adolescents (p<0.05).	Partial community-based cognitive behavioural therapy can improve disruptive behaviour at school and at home for some adolescents.
Thienemann et al. 2001[17]	Statistically significant changes in CY_BOCS, NIMH-CGI, CDI, MASC and CBC (p<0.05). No statistically significant change in PSI index.	Community-based cognitive behavioural therapy effective in improving OCD symptoms in adolescents.

ADIS-C: Anxiety Disorders Interview Schedule for Children **SPAI:** Social Phobia & Anxiety Inventory **BDI:** Beck Depression Inventory **YSR:** Youth Self Report **CBC:** Child Behaviour Checklist **CTRS**: Conners Teacher Rating scale **CPRS**: Conners Parent Rating Scale **GAF:** Ratings of Global Assessment of Functioning **CY_BOCS:** Children's Yale- Brown Obsessive Compulsive Scale **NIMH-CGI:** National Institute of Mental Health-Clinical Global Impression Scale **PSI:** Parenting Stress Index

Constructs underpinning day therapy programs

The secondary aim of this review was to identify the key constructs underpinning day therapy programs for adolescents with mental health problems. Tables 3 and 4 provide an overview of the components underpinning day therapy programs.

Table 3. Service components

Study	Type of program	Frequency (sessions per week)	Duration (time in minutes)	Duration (number of weeks)	Co-intervention
Al-Ansari & Hafeed 1998[10]	Social skills training program (group)	2	45	6	NR
Baer & Garland 2005[11]	Cognitive behavioural therapy (group)	1	90	12	Homework tasks Continue regular medication
Crisp & O'Donnell 1998[12]	Brief intervention program- multiple therapies (group)	1-2	30-120	10	Homework tasks Parent attendance
Dalton et al. 2003[13]	Anger management therapy (group)	NR	NR	6-8	Parent attendance Continue regular medication
Hayward et al. 2000[14]	Cognitive behavioural therapy (group)	1	90	16	Homework tasks
Kellner & Bry 1999[15]	Anger management program (group)	1	30	10	Continue regular medication
Rey et al. 1998[16]	Cognitive behavioural therapy (individual)	4	NR	25	Prescription of medication
Thienemann et al. 2001[17]	Cognitive behavioural therapy (group)	1	120	14	Homework tasks Parent attendance

Table 4. Service provision

Study	Health issue addressed	Who provided therapy	Where therapy was provided
Al-Ansari & Hafeed 1998[10]	Behavioural problems	Nurses Psychologist	Day care facility (n=5) Inpatient (n =3)
Baer & Garland 2005[11]	Social phobia	Psychiatric social worker Child and adolescent psychiatrists Peer volunteers	Community outpatient psychiatric setting
Crisp & O'Donnell 1998[12]	Emotional, behavioural and psychiatric problems	Psychologist Occupational therapist Social worker Special education teachers Psychology registrar Wilderness therapy trainee	Day therapy centre Wilderness setting
Dalton et al. 2003[13]	Behavioural problems	Psychologist	Community mental health centre
Hayward et al. 2000[14]	Social phobia	Psychologist Psychiatrist Research assistant	Community outpatient psychiatric setting
Kellner & Bry 1999[15]	Emotional problems	Social workers	Day therapy centre
Rey et al. 1998[16]	Behavioural problems	Mental health nurses Family therapist Consultant psychiatrists	Inpatient Outpatient Day therapy
Thienemann et al. 2001[17]	Obsessive compulsive disorder	Psychiatrist Psychologist Research assistant	Community outpatient psychiatric setting

Service components

Seven of the 8 studies included in this review utilised a multimodal intervention approach, whereby day therapy programs were complemented by other interventions such as homework tasks and medication (Table 1). All but one study utilised a group approach.[16] Homework tasks featured in four out of eight studies.[11,12,14,17] Medication was used in the remaining four studies.[11,13,15,16] Parental involvement (as attendance at day therapy programs) was also reported in three studies.[12,13,17]

A great deal of variability was noted in the frequency (per week) of day therapy programs. Frequency ranged from once a week to four times a week. However, once a week was the most common frequency. Very little supportive information from the literature was provided by studies to justify the frequency of their day therapy programs. Similarly, variability was noted in the duration (per session and overall program) of interventions. Duration ranged from 30 to 120 minutes, with no clear trend emerging. Some day therapy programs were undertaken over six weeks, while one was conducted over 25 weeks.[16] Due to the high level of variability in duration of day therapy programs, and lack of justification on how these components were determined, the optimal duration of day therapy programs is unclear.

Service provision

A range of health professionals was used to deliver day therapy programs, including psychologists, psychiatrists, social workers, nurses and occupational therapists. All but two studies used more than one type of health professional to deliver their interventions.[13,15] Not surprisingly, psychologists and psychiatrists were the health professionals of choice for delivery of day therapy programs in all but one study, which utilised only social workers.[15] A range of diverse settings was used to deliver day therapy programs. These ranged from the outdoor environment, to community outpatient psychiatric settings to hospital outpatient settings. The drivers for such diversity are not clear as justification of settings was not made in any of the studies. Only two studies conducted their day therapy program in a hospital setting.[10,12]

DISCUSSION

Effectiveness of day therapy programs

While this review was limited by the scarcity of high level, high quality controlled trials, this review provides emerging evidence to support clinical opinions that day therapy programs can contribute to positive outcomes for adolescents with mental health problems. All eight studies included in this review provided some evidence that day therapy programs were effective, over a range of interventions and for a range of mental health problems. These improvements were reported across a range of behavioural, emotional and educational outcomes.

Heterogeneity

Due to the diverse nature of primary research evidence, there was a great deal of variability in terms of diagnoses, interventions and outcome measures utilised across the studies. A range of adolescent mental health problems were addressed that included social phobias, OCD, learning disorders, anger management difficulties, behavioural difficulties, and self esteem issues. Issues of variability did not only relate to diagnostic groups, but extended to outcome measures as well. While almost all studies measured behaviour status of participants, a standard outcome measure was not universally utilised across these studies. Furthermore, there was considerable variability and lack of clarity in the administration and reporting of outcome measures. This heterogeneity leads to reduced confidence in the comparison of results from different studies.

Service components

Type of program

All eight included studies used a multi-component intervention and all but one study reported the use of addition co-interventions. This may indicate the need for a multimodal approach in the management of mental health disorders in this population. Not surprisingly considering the setting, seven out of the eight studies used a group-based intervention approach, potentially highlighting the importance of a peer-supported, dynamic environment. Group-based interventions may harness peer support, promote interaction between adolescents and replicate real life situations. In summary, the available research evidence for day therapy programs for adolescents with mental health problems seems to support a multimodal, group-based intervention approach.

Frequency and duration

Most commonly, day therapy programs were conducted once a week with a relatively short duration of 30 to 120 minutes. This duration may be influenced by a variety of factors including resource and time and financial constraints. Specifically, the short duration and frequency may reflect work and school commitments for both parents and adolescents. The range of total program duration of 6 to 25 weeks may also reflect time or resource restrictions. While all of the eight day therapy programs were effective in some way, the vast diversity in frequency and duration between individual studies must be recognised.

Co-intervention

Co-interventions were a common feature of the eight studies and included homework tasks, medication and parental involvement. While studies which limited the use of co-interventions may provide a more rigorous examination of the effectiveness of a specific day therapy program, the inclusion of co-interventions in these research studies may reflect current practice of “packages of care” and therefore may be more generalisable to clinical practice. Maintaining the use of any regular medication, setting homework tasks, and involving parents in the intervention may be important elements of a broader approach to addressing mental health problems in this population.

Service provision

On face value, the diverse range of health care professionals, locations and settings of day therapy programs may confound the findings of this review. However as an overview, it appears that irrespective of the type of health professional involved or the location or setting of the day therapy program, it is possible to achieve positive outcomes. It also appears that adolescents attending day therapy programs could benefit from the involvement of at least one health professional from a psychology or psychiatric background.

Limitations of this review

The inclusion of pilot studies with small sample sizes and limited power could potentially influence the results of studies. In addition, the inclusion of pre-post studies without control groups may potentially introduce bias into study findings. All studies included in this review were identified from databases accessible through University of South Australia’s libraries. This, in addition to all studies reporting positive results, highlights the potential for publication bias. It must be noted that the majority of the studies included in this review did not follow up their subjects in the long term. Hence the long-term effectiveness of day therapy programs for adolescents with mental health problems is yet to be established. Although this systematic review provides

a good starting point for the evaluation of the effectiveness of day therapy programs, it is limited by the heterogeneity of studies, many of which used different outcome measures and different interventions.

Strengths of this review

This systematic review takes a broad view of adolescent mental health problems and day therapy programs. Those completing future reviews on this topic may wish to investigate individual mental health problems, or specific types of day therapy programs in more detail, as more primary evidence becomes available. This review is the first of its kind to analyse the components of day therapy programs, so that stakeholders in adolescent mental health can gain insight into the key constructs of a day therapy programs for adolescents with mental health problems.

Implications for future research

More high-level, high quality studies evaluating the effectiveness of day therapy programs for adolescents with mental health problems are needed. These studies should build on the findings of prior research. Further research is needed to determine the effectiveness of day therapy programs as a stand alone intervention and in combination with other interventions, for specific mental health problems such as depression and psychiatric disorders. The collection of data in follow up periods of greater than 12 months will provide insight into the effectiveness of day therapy programs in the long-term. Finally, studies that evaluate the effectiveness of specific components of day therapy programs (such as an optimal duration and frequency of program) would be of value.

CONCLUSION

Despite its limitations, the current body of research suggests that day therapy programs may be an effective intervention for adolescents with mental health problems. A multimodal and multi-disciplinary group-based treatment approach may be most effective, although the type of program utilised may depend on the health issue being addressed. Although a frequency of once per week is most commonly reported in the literature, the optimal frequency and duration of day therapy programs for adolescents with mental health problems remains unclear. Adolescents attending day therapy programs could benefit from the involvement of at least one health professional from a psychology or psychiatric background. However a range of health professionals may contribute to the success of a day therapy program and a range of locations and settings may be appropriate. Further high-level, high quality research is required to build on this emerging evidence base and bridge key gaps in the current research evidence.

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Appendices

Appendix 1. Modified McMaster Quantitative Critical Appraisal Tool

McMaster Items (Yes=1 No=0)	
1 – Study purpose stated clearly	**9** – Contamination avoided
2 – Relevant background literature reviewed	**10** – Co-intervention avoided
3 – Research design appropriate	**11** – Results reported in terms of statistical significance
4 – Sample described in detail	**12** – Appropriate analysis methods
5 – Sample size justified	**13** – Clinical importance reported
6 – Outcome measures reliable	**14** – Drop-outs reported
7 – Outcome measures valid	**15** – Appropriate conclusions
8 – Intervention/Exposure described in detail	

Appendix 2. NHMRC hierarchy of evidence

Level of evidence	Type of study design
I	A systematic review of level II studies
II	A randomised controlled trial
III-1	A pseudo randomised controlled trial (i.e. Alternate location or some other method)
III-2	A comparative study with concurrent controls: • Non-randomised, experimental trial • Cohort study • Case-control study • Interrupted time series with a control group
III-3	A comparative study without concurrent controls: • Historical control study • Two or more single arm study • Interrupted time series without a parallel control group
IV	Case series with either post-test or pre-test/post-test outcomes

Appendix 3. Critical appraisal scores

Study	McMaster items															
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**Total**
Al-Ansari & Hafeed 1998[10]	0	1	1	0	0	0	0	1	1	1	1	1	0	1	1	**9**
Baer & Garland 2005[11]	1	1	1	1	1	1	1	1	1	0	1	1	1	1	1	**14**
Crisp & O'Donnell 1998[12]	1	0	1	1	0	1	1	1	1	0	0	1	0	0	1	**9**
Dalton et al. 2003[13]	1	1	1	1	0	1	1	0	1	0	1	1	1	1	1	**12**
Hayward et al. 2000[14]	1	1	1	0	0	1	1	1	1	0	1	1	1	0	1	**11**
Kellner & Bry 1999[15]	0	1	1	1	0	1	1	1	0	0	1	1	0	0	0	**8**
Rey et al. 1998[16]	1	1	1	1	0	1	1	1	1	0	1	1	1	1	1	**13**
Thienemann et al. 2001[17]	1	1	1	0	0	1	1	1	1	0	1	1	1	1	1	**12**