

Practitioner Review: Self-harm in adolescents

Dennis Ougrin,^{1,2} Troy Tranah,² Eleanor Leigh,¹ Lucy Taylor,²
and Joan Rosenbaum Asarnow³

¹Child and Adolescent Psychiatry, King's College London, Institute of Psychiatry, De Crespigny Park, London;

²South London and Maudsley NHS Foundation Trust, Michael Rutter Centre, De Crespigny Park, London;

³University of California, Los Angeles, CA, USA

Background: Repeated self-harm in adolescents is common and associated with elevated psychopathology, risk of suicide, and demand for clinical services. Despite recent advances in the understanding and treatment of self-harm there have been few systematic reviews of the topic. **Aims:** The main aim of this article is to review randomised controlled trials (RCTs) reporting efficacy of specific pharmacological, social or psychological therapeutic interventions (TIs) in reducing self-harm repetition in adolescents presenting with self-harm. **Method:** Data sources were identified by searching Medline, PsychINFO, EMBASE, and PubMed from the first available year to December 2010. RCTs comparing specific TIs versus treatment as usual or placebo in adolescents presenting with self-harm were included. **Results:** Fourteen RCTs reported efficacy of psychological and social TIs in adolescents presenting with self-harm. No independently replicated RCTs have been identified reporting efficacy of TIs in self-harm reduction. Developmental Group Psychotherapy versus treatment as usual was associated with a reduction in repeated self-harm, however, this was not replicated in subsequent studies. Multisystemic Therapy (MST) versus psychiatric hospitalisation was associated with a reduction of suicidal attempts in a sample of adolescents with a range of psychiatric emergencies. However, analyses focusing only on the smaller subgroup of adolescents presenting with deliberate self-harm at the initial psychiatric emergency, did not indicate significant benefits of MST versus hospitalisation. **Conclusions:** Further research is urgently needed to develop TIs for treating self-harm in adolescents. MST has shown promise but needs to be evaluated in a sample of adolescents with self-harm; dialectic behavioural therapy and cognitive behavioural therapy for self-harm require RCTs to evaluate efficacy and effectiveness. **Keywords:** Self-injury, self-harm, self-poisoning, adolescents.

Introduction

Definition

For the purpose of this review self-harm is defined as self-poisoning or self-injury, irrespective of the intent (Hawton et al., 2003). This broad definition includes self-harm with suicidal intent, nonsuicidal self-harm and self-harm episodes with unclear intent. In the United States the usual approach is to distinguish between self-harm episodes with and without suicidal intent, the former referred to as suicide attempts and the latter as nonsuicidal self-injury (NSSI). For clarity, we state if the results of the studies reviewed in this article apply to the adolescents with self-harm, suicidal attempts or NSSI where these distinctions are clear. When we refer to "self-harm", we are referring to the broad definition used in the UK and Europe which includes both NSSI and suicide attempts.

Prevalence and natural history

Suicide is the second or the third leading cause of death in adolescents in the West (CDC, 2008) and an important cause of death in developing countries (Yip, Liu, & Law, 2008). Self-harm is one of the strongest predictors of death by suicide in adoles-

cence, increasing the risk approximately 10-fold (Hawton & Harriss, 2007).

Self-harm is common among adolescents. A systematic review of 128 studies which included 513,188 adolescents found that 13.2% (95% CI, 8.1–18.3) reported engaging in self-harm at some point in their lifetime (Evans, Hawton, Rodham, & Deeks, 2005).

As expected, these rates for self-harm (which include suicide attempts and NSSI) are higher than those for suicide attempts, currently estimated at an annual rate of 6.3% (Eaton et al., 2010).

Prevalence rates of NSSI vary considerably across epidemiological studies, with reported lifetime prevalence between 2.8% (Hargus, Hawton, & Rodham, 2009) and 46.5% (Lloyd-Richardson, Perrine, Dierker, & Kelley, 2007). While this variability in part reflects measurement error, differences in assessment and sampling strategies, possible differences in self-harm prevalence between countries also play a role (Madge et al., 2008).

Around 10% of adolescents will repeat self-harm in a year in clinical samples (Hawton & James, 2005), and about a third of the adolescents presenting with self-poisoning will have a further presentation with self-poisoning in adulthood (Harrington et al., 2006).

Reports from two major treatment trials indicate that initial NSSI history at trial baseline predicted future suicide attempts in depressed youths.

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Baseline history of NSSI was a stronger predictor of suicide attempts than baseline history of suicide attempt (Asarnow, Porta, et al., 2011; Wilkinson, Kelvin, Roberts, Dubicka, & Goodyer, 2011). However, no study has as yet shown NSSI to be independently linked with a higher risk of completed suicide in adolescents.

Engagement with treatment

There is growing evidence that poor treatment adherence is a marker of unfavourable psychosocial outcomes in the adolescents presenting with self-harm (Pillay & Wassenaar, 1995). Disengagement from treatment is common in those who die of suicide (Ougrin, Banarsee, Dunn-Toroosian, & Majeed, 2011).

Predictors of poor treatment engagement are increasingly better understood. Studies indicate that older age, male gender (Piacentini et al., 1995), belonging to an ethnic minority, low socioeconomic status and being diagnosed with substance misuse and antisocial behaviour (Pelkonen, Marttunen, Laippala, & Lonnqvist, 2000) predict poor engagement with treatment. In addition time delays between the initial and the follow-up appointments (Clarke, 1988), delayed initial evaluation and the attitude of emergency department staff (Rotheram-Borus et al., 1996) all seem to influence engagement with aftercare.

There is no evidence that offering a specific psychological treatment improves engagement in comparison with treatment as usual (Ougrin & Latif, 2011).

Previous reviews

Previous notable reviews of self-harm in adolescents which this review extends and updates, specifically focused on suicidal behaviour (Brent, 1997; Bridge, Goldstein, & Brent, 2006), nonsuicidal self-harm only (Kerr, Muehlenkamp, & Turner, 2010; Nock, 2010); social factors linked with self-harm (King & Merchant, 2008); emergency management of self-harm (Newton et al., 2010), studies with mixed adult and adolescent samples (Robinson, Hetrick, & Martin, 2011) or the aetiological factors of self-harm (Bursztein & Apter, 2009).

Scope

The article includes an overview of assessment and immediate management of self-harm in adolescents, as well as its prevention and a systematic review of self-harm treatment studies.

Assessment and immediate management

When assessing adolescents presenting with self-harm clinicians should consider the following three categories of risk factors: characteristics of the

index event, proximal risk factors, and distal risk factors.

Characteristics of the index event

The following four characteristics of the index episode are of particular importance: suicidal intent, motivation, lethality, and method.

When assessing suicidal *intent* the following four factors may be considered (Brent et al., 1988) (a) The youth's belief about intent. Did they want to die? Are they relieved that they are still alive? Do they still want to die? (b) Preparation before attempt. Was episode impulsive or planned? Did the youth select a significant date? How long before the event did they decide to self-harm? Had they been drinking or used drugs prior to self-harm? Did they give their possessions away? (c) Prevention of discovery. Did they make efforts to avoid discovery? Were they alone? Did they resist help? (d) Communication. Did the youth communicate their intention to self-harm to others? Did they leave a suicide note? Intent to die is not always black and white. Many adolescents will be ambivalent as to whether they live or die.

Motivation. Adolescents may present a range of motives for self-harm: to die, to escape thoughts and feelings, to feel better, to get help, or to replace emotional pain with physical pain.

Clinicians should distinguish between objective *lethality*, that is the actual degree of danger to life and subjective lethality, the youth's anticipated consequences of self-harm. Did the youth require medical intervention? Did they attend hospital or their family doctor? Did they think they could die by holding their breath? There is often a low correlation between suicidal intent and objective lethality in children and adolescents (Brown, Henriques, Sosdjan, & Beck, 2004). This low correlation could be moderated by subjective lethality (Beck, Beck, & Kovacs, 1975) or may reflect lack of knowledge regarding lethality in children.

Method. This refers to the way or the process that is used by the youth to self-harm. Method is closely linked with objective lethality, ranging from highly lethal behaviours like shooting and hanging at one extreme to cutting and burning on the opposite side of the spectrum (Skegg, 2005). One of the key questions in assessing risk is whether the youth has access to lethal agents like dangerous drugs or firearms.

Proximal risk factors

Proximal risk factors include recent changes of physical or mental state, substance misuse and recent stressful life events (Hawton et al., 2003). The latter could include self-harm precipitants like

arguments with boyfriend/girlfriend or parents, recent 'losses', for example, bereavement, romantic, or family break-up; school related stress, for example, exams or being bullied; exposure to suicide/self-harm in friends and pregnancy in self or partner (Asarnow et al., 2008). Adolescents may report a recent episode of abuse (sexual or physical) or having been reminded of past abuse. Subjective meaning attributed to the stressful event may be different from objective reality. For example, some adolescents may feel devastated by relatively innocuous events and some might self-harm in anticipation of a perceived humiliating punishment.

Recent onset of physical or mental health problems and escalation of frequency and severity of suicidal thinking and self-harm have all been linked to increased risk of self-harm (Wong et al., 2008).

Distal risk factors

There are a number of known distal risk factors for self-harm. They can be divided into sociodemographic, psychiatric, and psychological variables.

Psychiatric and psychological factors. A history of self-harm is a key predictor of future self-harm. Diagnoses such as emerging borderline personality disorder, disruptive disorders, anxiety, mood disorders, eating disorders, and psychosis are all associated with an increased risk of self-harm as are previous psychiatric admissions and substance misuse (Kyriakopoulos, 2010). Low self-esteem, perfectionism, trait anger, impulsivity, poor decision making, hopelessness, neuroticism, nonheterosexual sexual orientation and poor emotional problem solving increase the risk of self-harm (Asarnow, Carlson, & Guthrie, 1987; Bridge et al., 2006).

Sociodemographic factors. Females are significantly more likely to self-harm compared with males though males are more likely to complete suicide (Hawton & James, 2005). Self-harm often starts in early adolescence and increases towards later teens (Hawton & James, 2005). Certain ethnic backgrounds such as Hispanic girls and some Native American populations in the United States have been linked with increased rates of self-harm (CDC, 2009). A past history of physical or sexual abuse (Gratz et al., 2010) violence and/or forensic history all seem to increase the risk of self-harm independently. Those with a history of being bullied, recurrent interpersonal problems and self-harm behaviour in friends are all more vulnerable (King & Merchant, 2008). Likewise being a child in a single-parent family, being in-care or in a secure institution is also associated with a greater likelihood of engaging in self-harm. There is also a higher prevalence of self-harm among asylum seekers and those from a more socio-economically deprived background (King & Merchant, 2008). Family history of

self-harm or suicide and family psychiatric disorders in general are consistent predictors of self-harm risk (Brent, Bridge, Johnson, & Connolly, 1996).

In summary, when assessing adolescents with self-harm clinicians should pay particular attention to the method used and patterns of current and past self-harm, suicidal intent, establishing the presence of psychiatric illnesses, evaluating depressive symptoms, establishing the possible triggers for self-harm and documenting risk factors and protective factors specific to the youth.

Immediate management

The priority in terms of immediate management is to ensure the safety of the youth. According to the National Institute for Health and Clinical Excellence (NICE) guidelines all adolescents under the age of 16 presenting with self-harm should be admitted to a paediatric unit overnight and be assessed by a specialist in child and adolescent mental health. There are no rigorous RCTs showing that psychiatric inpatient admissions reduce the risk of self-harm, however, common sense and clinical judgement dictate the necessity of an admission in some cases. That said, some adolescents may increase their self-harm behaviour once placed in an inpatient unit (Huey et al., 2004). If inpatient care is deemed necessary then clinicians should be planning for discharge at the point of admission and contingencies should be examined to strengthen reinforcers for alternatives to self-harm. Prior to discharge to the community linkage to outpatient treatment should be made, preferably with a next day appointment set up prior to discharge, and a plan for follow-up to check that the outpatient treatment plan has been followed.

In all cases where the youth is to be cared for in the community a crisis/safety plan should be developed together with the patient and carers before they leave the initial session. The plan should specifically restrict youths' access to potentially dangerous suicide attempt means (see discussion of FISP later in the article for more detail on developing safety plans).

In summary, when formulating immediate risk management clinicians should consider the least restrictive care environment which is compatible with safety of the youth, formulate a safety plan and ensure effective follow-up arrangements.

Engagement with treatment

The studies that both aim to improve engagement and also report on self-harm repetition rate (Ougrin, Zundel, et al., 2011; Spirito, Boergers, Donaldson, Bishop, & Lewander, 2002) will be included in the systematic review below. Older studies aimed at improving adherence to follow-up care (Rotheram-Borus, Piacentini, Cantwell, Belin, & Song, 2000;

Zimmerman, Asnis, & Schwartz, 1995) using skills development, family therapy, and staff training approaches, have shown modest results overall.

A recent study of Therapeutic Assessment (Ougrin, Zundel, et al., 2011) replicated the results of a pilot (Ougrin, Ng, & Low, 2008) in significantly improving engagement with follow-up. The major components of Therapeutic Assessment which is based on Cognitive Analytic Therapy model are as follows:

1. Standard psychosocial history and risk assessment (approximately 1 hr).
2. A 10 min break to review the information gathered and to prepare for the rest of the session, followed by a 30 min intervention covering the next four steps.
3. Joint construction of a diagram aiming to capture the vicious cycles that maintain self-harm.
4. Identifying a target problem.
5. Considering and enhancing motivation for change.
6. Exploring potential 'exits' (i.e. ways of breaking the vicious cycles identified).
7. Describing the diagram and the exits in an 'understanding letter' which the clinician is required to prepare on the basis of the initial assessment.

A second example of a brief intervention associated with improved engagement with follow-up treatment (92% versus 76%; $p = .004$) among youths receiving emergency evaluation for suicidality is the Family Intervention for Suicide Prevention (FISP) based on cognitive behaviour therapy (CBT; Asarnow, Baraff, et al., 2011). The FISP aims to use the emergency visit as a 'window of opportunity' to deliver a beneficial intervention and enhance motivation to attend follow-up treatment (Asarnow, Berk, & Baraff, 2009). The FISP session is also conceptualised as an 'imminent risk assessment' with a series of five tasks addressed and difficulties addressing these tasks conceptualised as behavioural indicators of greater need for further evaluation and/or inpatient hospitalisation. Specifically: (a) to frame suicidality as a serious problem that must be addressed actively psychoeducation emphasised the importance of linking youths to outpatient mental health treatment, maximising safety (i.e. restricting access to dangerous suicide attempt methods), and the youth was asked to commit to using a safety plan in future suicidal crises. (b) To strengthen family support and healthy communication (putative protective factors), youths and family members were encouraged to identify positive attributes in the youth and the family. (c) To begin linking feelings to a hierarchy of suicide-eliciting situations, an 'emotional thermometer' was introduced to assist youths in identifying feelings, their triggers, and associated physiological signals, thoughts and behaviours. (d) To develop a 'safety plan' that youths could use to reduce 'emotional temperature' and risk for

suicidality, coping strategies were identified and practiced, including both behavioural strategies (putting a cool wash cloth on the forehead, seeking support from parents) and cognitive strategies ('helpful' thoughts). (e) To provide a concrete tool that youths could use at times of acute stress/suicide attempt risk to cue safe/adaptive coping, a 'Safety Plan Card' was developed and often supplemented by developing a 'Hope Box' filled with reminders of reasons for living and cues/facilitators of the safety plan [coping cards (CDs); Brown et al., 2005]. The crisis therapy session was supplemented by linkage telephone contacts made within the first 48 hr after discharge from the ED/hospital with additional contacts as needed (usually at 1, 2, and 4 weeks after discharge). Contacts were structured and focused on enhancing motivation for outpatient treatment, providing referrals, and support in addressing treatment barriers.

In summary there is growing evidence that brief psychotherapeutic interventions at the point of initial self-harm assessment improve engagement with follow-up treatment. Clinicians should consider gaining training in these interventions and applying those in their practice.

Prevention trials

Recent studies reported short-term improvements in knowledge and more adaptive attitudes about depression and suicidal behaviour in both adolescents and the school staff but no impact on self-harm repetition (Kalafat & Elias, 1994; Wyman et al., 2008, 2010). Concerns about iatrogenic impact of self-harm screening have not been borne out when studied systematically (Gould et al., 2005). Furthermore, a suicide prevention programme called signs of suicide (SOS) has been shown to reduce self-harm in two RCTs (Aseltine, DeMartino, Aseltine, & DeMartino, 2004; Aseltine et al., 2007), although the trials had partially overlapping samples and the results have not yet been replicated independently. Nonetheless the SOS programme has been studied in a large and diverse sample of adolescents which improves the generalisability of the findings. The SOS programme includes raising awareness of suicide, highlighting its link with mental illness and substance misuse using a video dramatisation and a depression and suicidality screening using a self-report anonymised tool. The message given to the adolescents is this: suicidal thoughts are not a normal response to stress and if a pupil expresses suicidal thoughts one should ACT: Acknowledge the SOS and take those signs seriously; show that the listener Cares and Tell a responsible adult.

An early NSSI prevention programme evaluation has recently been published. No significant reduction of NSSI has yet been reported post intervention (Muehlenkamp, Walsh, & McDade, 2010).

In summary there is growing evidence that self-harm prevention strategies improve knowledge about self-harm in adolescents. There is no independently replicated evidence that self-harm prevention programmes reduce self-harm and the wider use of these programmes can not be recommended. An independent replication of the initial positive findings is urgently needed.

Treatment interventions for self-harm: systematic review

Method

A standard search strategy developed by the Cochrane Collaboration, was used to identify relevant randomised controlled trials. OVID Medline® PsychINFO, EMBASE and PubMed databases were searched in December 2010 with a range of key words relevant to self-harm in adolescents (detailed methodology and the flow of studies are available in Appendix S1). The search was updated in September 2011.

Results

The original search resulted in the retrieval of 369 articles (see Figure S1). Sixty-two of those described RCTs and 15 of these were RCTs of TIs in children and adolescents with the presenting problem of self-harm and there were three further RCTs in progress (Mehlum, 2011; Rossouw, 2011; Tsai, 2011).

Fourteen of the fifteen studies met the inclusion criteria. Selected characteristics of these studies are presented in Table 1. One study (Huey et al., 2004) was excluded as adolescents with self-harm comprised a minority of the study sample. The quality of the studies was variable; random allocation concealment was evident in nine of the 14 studies and it was unclear in the rest. The Jadad score was three for nine studies and it was two for five studies. There were no disagreements between the two raters regarding the quality of the studies.

The trials included in this review reported the effects of the following TIs (Table 2): specific problem-solving intervention designed to increase engagement (Spirito et al., 2002), cognitive behaviour treatment targeting problem solving and affect management skills (Donaldson, Spirito, & Esposito-Smythers, 2005); home-based family therapy delivered by social workers (Harrington et al., 1998); developmental group psychotherapy incorporating the techniques of problem-solving and cognitive behavioural interventions, dialectical behaviour therapy (DBT) and psychodynamic group psychotherapy (Green et al., 2011; Hazell et al., 2009; Wood, Trainor, Rothwell, Moore, & Harrington, 2001); individual cognitive analytic therapy designed to prevent the development of borderline personality disorder (Chanen et al., 2008); attachment-based

family therapy (Diamond et al., 2010); Therapeutic Assessment for self-harm (Ougrin, Zundel, et al., 2011); emotion regulation group training (Schuppert et al., 2009), issuing tokens allowing readmission (Cotgrove, Zirinsky, Black, & Weston, 1995); youth nominated support team (King et al., 2006, 2009), and the FISP (Asarnow et al., 2011).

Developmental group psychotherapy

In a study by Wood et al. (2001) 63 participants (mean age 14 years, range 12–16 years, 78% female) were allocated to either developmental group therapy or standard care. Group therapy involved a minimum of six weekly sessions lasting 1 hr, after which participants were free to choose how much longer they remained in a long-term support group. At 29 weeks' follow-up there was a significant difference favouring group therapy over standard after-care with respect to reducing the likelihood of engaging in two or more episodes of self-harm (relative risk = 0.19; 95% CI 0.05–0.81). There was also a positive effect on a range of behavioural problems.

These findings were not replicated in a subsequent trials (Green et al., 2011; Hazell et al., 2009). Among the possible explanations, it may be that the number of treatment sessions (about 10) was insufficient, the well conducted usual care may have reduced the possible differential efficacy of the intervention or that the result represents a regression to the mean (Ougrin, 2011).

The rest of the studies included in this review showed no statistically significant reduction in self-harm repetition compared with treatment as usual (Table 2).

Self-harm repetition in depression trials

Depression is extremely common among adolescents presenting with self-harm and is an important predictor of repetition of self-harm (Hawton, Kingsbury, Steinhardt, James, & Fagg, 1999) and suicide (Kovacs, 1996). For those adolescents with affective disorders who self-harm, it has been proposed that treatments targeting the depressive symptoms, rather than the self-harm, may be more effective (Harrington et al., 1998) and we review the relevant trials below.

In the Treatment of Adolescent Depression Study (TADS; March et al., 2004) treatment with fluoxetine was superior to CBT and to placebo in terms of self-reported depression symptoms, while the combined treatment led to the greatest improvement. While suicidality reduced over the acute period with all treatments, there was significantly greater improvement in suicidal ideation for the combined treatment (Emslie et al., 2006). Suicide-related events were twice as common among those treated with fluoxetine alone compared with CBT or combined treatment, and only fluoxetine led to significantly more

Table 1 Selected characteristics of the RCTs reporting the effect of TIs versus TAU on self-harm repetition in adolescents with self-harm

Study, Country	Inclusion criteria	Age	Control	N	Interventions	ITT	Allocation	Self-harm ascertainment	Follow-up
Asarnow et al., 2011, USA	ED presentation with suicide attempt or ideation	10–18	TAU	181	Family Intervention for Suicide Prevention	Subjects randomised	Concealed	Clinical interview and self-report	~2 months
Cotgrove et al., 1995, UK	Hospital presentation with an episode of self-harm	<17 (mean 14.9)	AAU	105	AAU and token allowing readmission	Subjects randomised	Not specified	Clinical records	12 months
Harrington et al., 1998, UK	Self poisoning cases referred to mental health teams	<16 (mean 14.5)	TAU	162	Home-based family intervention + TAU	Subjects randomised	Concealed	Clinical interview	6 month
Wood et al., 2001; UK	Repeat self-harmers referred to an outpatient service	12–16	TAU	63	Developmental group psychotherapy + TAU	Subjects randomised	Concealed	Clinical interview	7 month
Spirito et al., 2002, USA	Suicide attempters receiving care in ED or paediatrics ward	12–18	AAU	76	Compliance enhancement and standard disposition planning	Subjects completing treatment	Not specified	Clinical interview	3 month
Donaldson et al., 2005, USA	Suicide attempters presenting to ED or inpatient unit	12–17	Supportive relationship treatment	39	Skills based treatment	Subjects starting treatment	Not specified	Clinical interview	6 months
King et al., 2006, USA	Psychiatrically hospitalised suicide attempters or patients with significant suicidality	12–17	TAU	289	Youth nominated support team-Version 1 + TAU	Subjects randomised	Unclear using a random numbers table (even/odd assignment).	Clinical interview and self-report	6 months
Chanen et al., 2008, Australia	Outpatients with at least 2 DSM-IV criteria for BPD + specified risk factors for BPD	15–18	Standardised good clinical care	86	Cognitive analytic therapy	Subjects randomised	Concealed	Clinical interview	24 months
Hazell et al., 2009, Australia	At least two episodes of self-harm, one in past 3 months, referred to outpatient service	12–16	TAU	72	Developmental group psychotherapy + TAU	Subjects randomised	Concealed	Clinical interview	12 months
Schuppert et al., 2009, Holland	Outpatients with two or more symptoms of BPD	14–19	TAU	43	Emotion Regulation Group Training	Subjects completing treatment	Not specified	Clinical interview and self-report	4 months (end of treatment)
King et al., 2009, USA	Psychiatrically hospitalised suicide attempters or patients with significant suicidality	13–17	TAU	448	Youth-Nominated Support Team	Subjects randomised	Concealed	Clinical interview and self-report	12 months
Ougrin et al., 2011, UK	Urgent hospital/community presentation with an episode of self-harm	12–18	AAU	70	AAU and Therapeutic Assessment	Subjects randomised	Concealed	Clinical records	3 months
Diamond et al., 2010, USA	Score >31 on the Suicidal Ideation Questionnaire and score >20 on the Beck Depression Inventory identified in primary care and emergency departments	12–17	Enhanced Usual Care	66	Attachment Based Family Therapy	Subjects randomised	Concealed	Clinical interview	6 months
Green et al., 2011, UK	Outpatients with a history of at least 2 episodes of self-harm within the previous 12 months	12–17	TAU	336	Developmental group psychotherapy + TAU	Subjects randomised	Concealed	Clinical interview	12 months

TAU, treatment as usual; TIs, therapeutic interventions; ED, emergency department; AAU, assessment as usual; BPD, borderline personality disorder; RCTs, randomised controlled trials.

Table 2 Participants' flow and self-harm repetition in the RCTs reporting the effects of TIs versus TAU in adolescents with self-harm

Study	Eligible	Randomised		Self-harm repetition definition	Self-harm follow-up data available	Participants with at least one episode of self-harm at baseline		Participants who repeated self-harm		OR
		TI	TAU			TI	TAU	TI	TAU	
Asarnow et al., 2011	181	89	92	At least one suicide attempt	139	63	77	4/62	5/77	NS
Cotgrove et al., 1995	134	47	58	At least one suicidal or nonsuicidal self-harm episode	105	47	58	3/47	7/58	NS
Harrington et al., 1998	288	85	77	At least one suicidal or nonsuicidal self-harm episode	149	85	77	11/74	11/75	NS
Wood et al., 2001	83	32	31	Two or more suicidal or nonsuicidal self-harm episodes	63	32	31	2/32	10/31	6.3 (1.4–28.7)
Spirito et al., 2002	82	36	40	At least one suicide attempt	63	36	40	3/29	5/34	NS
Donaldson et al., 2005	44	21	18	At least one suicide attempt	31	21	18	4/15	2/16	NS
King et al., 2006	986	151	138	At least one suicide attempt	236	86	104	20/113	14/123	NS
Chanen et al., 2008	106	44	42	At least one suicidal or nonsuicidal self-harm episode	68	31/41	25/37	11/35	11/33	NS
Hazell et al., 2009	138	35	37	At least one suicidal or nonsuicidal self-harm episode	68	35	37	30/34	23/34	NS
Schuppert et al., 2009	Not reported	23	20	At least one suicidal or nonsuicidal self-harm episode	31	15	15	6/14	11/17	NS
Ougrin et al., 2011	78	35	35	At least one suicidal or nonsuicidal self-harm episode	65	35	35	9/33	9/32	NS
King et al., 2009	1050	223	225	At least one suicide attempt	346	169	162	29/175	35/171	NS
Diamond et al., 2010	85	35	31	At least one suicide attempt	66	19	22	4/35	7/31	NS
Green et al., 2011	394	183	183	At least one episode of self-harm	359	183	183	145/181 ^a 104/179 ^b	142/181 ^a 110/180 ^b	NS

TAU, treatment as usual; TIs, therapeutic interventions; OR, odds ratio; NS, not statistically significant; RCTs, randomised controlled trials.

^a0–6 months follow-up.^b6–12 months follow-up.

suicide-related events than placebo. These data have raised the possibility that CBT (and perhaps other psychotherapies) may offer some protection against a possible increased risk of suicidality with antidepressant medications.

In the UK-based Adolescent Depression Antidepressant and Psychotherapy Trial (ADAPT; Goodyer et al., 2007) addition of CBT was not found to improve outcome at 28 weeks, nor was it found to confer any protective effect against suicidality or frequency of self-harm. The study, however, was not powered to detect differences in suicidality and self-harm. The requirement in the ADAPT study that youths entering the RCT continue to show depression after having received a brief psychosocial intervention, may have led to a sample with lower likelihood of responding to psychosocial treatment. Among other factors (e.g. differences in the comparison condition) a tendency for youths with milder depressions to obtain the greatest benefits from combined psychosocial and medication treatment, as found in TADS (Curry et al., 2006), may also have contributed to the relatively weak performance of combined treatment in the ADAPT study.

In the Treatment of SSRI-Resistant Depression in Adolescents (TORDIA) trial (Brent et al., 2008) alternative treatment strategies were evaluated for adolescents who had not benefited from an initial SSRI trial. Results indicated that a combination of CBT plus a change in medication (either an alternative SSRI or venlafaxine) led to improved depression outcomes, relative to a change in medication alone. However, there was no reported benefit of CBT on suicidal ideation or frequency of self-harm. This may have been related to the increased likelihood of detection of suicidal events in the CBT condition, where youths had greater opportunities to report suicidality, but this may also have been due to the increased severity and chronicity in the TORDIA versus TADS samples or other factors.

In the Youth Partners in Care (YPIC) trial, which evaluated a quality improvement intervention for increasing access to evidence-based depression treatments (primarily CBT and antidepressants) through primary care, youths in the quality improvement condition showed a greater than 50% reduction in suicide attempt rates as compared with a lower reduction in the treatment as usual condition (Asarnow, Jaycox et al., 2009). However, the trial was not powered to detect suicide attempt outcomes and this was not a statistically significant effect. It should also be noted that the YPIC trial included a broad group of youths screening positive for depressive symptoms (subsyndromal depression) as well as disorders. As youths presenting with suicide attempts tend to present with high levels of depressive symptoms but may be subsyndromal for depressive disorders (Asarnow, Jaycox et al., 2009), suicide attempt outcomes could be more readily

detected in a more broadly defined 'depressed' population.

A meta-analysis by Weisz, McCarty, and Valeri (2006) reported a small benefit of psychotherapy on suicidality (including suicidal thinking and behaviour) in depression (average effect size = 0.18), although the effect of psychotherapy on self-harm specifically was not reported. Another meta-analysis (Dubicka et al., 2010) concluded that the addition of CBT to medication provided only limited benefit in terms of depression symptoms or suicidality.

There has been considerable controversy regarding the use of antidepressants with adolescents with depression, and specifically about whether SSRIs increase the risk of suicidal behaviours. A meta-analysis of 27 trials of antidepressants (Bridge et al., 2007) revealed that although the benefits of medication with depressed youths were modest (number needed to treat = 10), these were greater than the risks of suicidal ideation/attempt (number needed to harm = 112). The authors also reported that for children under 12 years, only fluoxetine was found to confer benefit over placebo. The Committee for Safety in Medicines (CSM, 2003) concluded that fluoxetine alone has a favourable risk-benefit profile in the treatment of depression in youths. Consistent with this, the antidepressant recommended by the NICE guidelines (NCCMH, 2005) is fluoxetine, with consideration of citalopram and sertraline as second-line treatments.

Other treatment studies

Dialectical behaviour therapy

Dialectical Behaviour Therapy (Linehan, Armstrong, Suarez, Allmon, & Heard, 1991) is directed towards creating a 'life worth living', primarily through stopping self-harm and enhancing emotional regulation, distress tolerance, and effective problem solving. Self-harm is seen as a maladaptive attempt to problem-solve. Several independently replicated trials support DBT as an effective strategy for reducing self-harm in adult women with a diagnosis of BPD (Kliem, Kroger, & Kosfelder, 2010). DBT has also proven effective for improving treatment compliance and reducing drop out (Linehan et al., 1991). Adaptations have been made to DBT to address the developmental needs of adolescents, with strategies for including families developed (e.g. multifamily skills training groups) (Rathus & Miller, 2002).

To date only nonrandomised trials of DBT in adolescents have been published (Goldstein et al., 2007; James, Taylor, Winmill, & Alfoadari, 2008; Katz & Cox, 2002; Katz, Cox, Gunasekara, & Miller, 2004; Rathus & Miller, 2002). There is one RCT in progress comparing DBT to TAU in Norway (Mehlum, 2011) and a multisite RCT comparing DBT with individual and group supportive therapy beginning

in Seattle (Linehan, McCauley) and Los Angeles (Berk, Asarnow).

Multisystemic therapy

Multisystemic therapy (MST) is a treatment package that takes into account multiple systems that the family and the adolescents interact with. The main target of the therapy is effective parenting skills and enhanced community supports (school, peers, and other community supports), primarily targeted at engaging adolescents with prosocial activities and disengaging with antisocial ones, removing potential methods of suicide and monitoring and support of the youths by responsible adults. The therapy is intensive (contact could be daily) and time limited (3–6 months). Contacts are made in adolescents' homes and the average caseload of the therapists is low (4–6 families).

Multisystemic therapy was studied in a sample of adolescents referred to an Emergency Department and authorised for psychiatric admission ($n = 156$, age 10–17, average age 12.9, 65% male, 65% African American). 51% of these adolescents were classified as suicidal (intense suicidal ideation or attempt) the rest had a variety of severe psychiatric problems. These adolescents were randomised to either MST or hospitalisation. Based on youth report, MST was significantly more effective than hospitalisation at decreasing rates of attempted suicide at 1-year follow-up. MST did not have any differential effect on depression, hopelessness or suicidal ideation, nor did subgroup analyses among the smaller group of youths with initial self-harm yield statistically significant benefits of MST (although this may have been related in part to a reduction in statistical power as repeated self-harm remained less common in the MST versus Hospitalised group (40% vs. 60%), (Huey et al., 2005).

Another study of MST undertaken in Hawaii did not report suicidal behaviour-related outcomes (Rowland et al., 2005). There were no differences between the two arms on a measure of youth dangerousness based on Youth Risk Behavior Surveillance System (YRBS) items that assessed the adolescents' dangerousness to self and others.

Mentalization based therapy

Mentalization could be defined as implicitly and explicitly interpreting the actions of oneself and others as meaningful on the basis of intentional mental states. In other words, having the awareness that all people have their own feelings and thoughts (mental states) that determine their actions while, by their very nature, mental states are opaque and can't be "read" directly.

Trials of mentalization based therapy (MBT) for partially hospitalised adults with BPD have now reported 8 year follow-up showing significant

improvements in suicidality and self-harm (Bateman & Fonagy, 1999, 2008). There are no published studies of MBT in adolescents but one trial is currently nearing completion (Rossouw, 2011).

Cognitive behaviour therapy

Cognitive behaviour therapy has been shown to reduce self-harm repetition in independent trials in adults with self-harm (Hawton et al., 2012). In addition to the studies described above, a large open trial of adolescent suicide attempters with depression ($n = 124$) was conducted (the Treatment of Adolescent Suicide Attempters study [TASA]). TASA examined a specialised CBT for suicide attempting adolescents ($n = 17$), a medication algorithm ($n = 14$), or the combination ($n = 93$) (Brent et al., 2009). At 6 months follow-up 12% (15/104) of the adolescents in the whole sample repeated a suicide attempt.

Another small observational pilot study of a manualised CBT package (Taylor et al., 2011) for adolescent self-harm ($n = 16$) showed significant reductions in self-harm behaviour, depression symptoms and trait anxiety.

In summary there are no independently replicated studies demonstrating a reduction of self-harm repetition in adolescents published to date. A judicious use of adult self-harm literature may be indicated. DBT and other CBTs tend to reduce self-harm repetition in adults, these results have been independently replicated, and the adolescent literature supports the feasibility and possible benefits of these approaches. Clinicians may consider offering adolescents with self-harm treatment in these modalities pending the results of on-going adolescent trials, particularly when combined with close monitoring during the course of treatment and the use of evidence-informed decision making as treatment proceeds. In addition clinicians should offer appropriate treatment for the psychiatric disorders identified in adolescents with self-harm, including affective disorders, anxiety disorders and schizophrenia.

Discussion

At present not enough good quality independently replicated RCTs have been conducted to make conclusions about the effectiveness of specific TIs for self-harm in adolescents. At present there are no published RCTs of pharmacological agents specifically targeting self-harm in adolescents. There is limited evidence that MST may reduce suicide attempts but MST requires further evaluation for the treatment of self-harm. The literature points to problems with adherence to follow-up treatment after an emergency evaluation for suicide attempts/self-harm (Spirito & Esposito-Smythers, 2006). Importantly, there are now two independent dem-

onstrations that brief therapeutic interventions at the point of self-harm assessment may improve engagement with outpatient follow-up treatment, a critical first-step for delivering effective treatment.

Review limitations

Many of the studies included in this review are limited by small sample sizes and by poorly characterised and nonmanualised treatment as usual conditions (with the exception of Donaldson et al., 2005; Chanen et al., 2008). A significant proportion of the adolescents presenting with self-harm were excluded prior to randomisation or lost to follow-up, further limiting generalisability of the findings.

The limitations of this review include a small number of studies precluding subgroup analysis. We did not calculate effect sizes across self-harm RCTs because there were so few within each category of therapeutic modality. We did not report the results of a systematic review of prevention and engagement studies due to word limits but provided a brief overview of the relevant studies instead.

The studies included used different definitions of self-harm, reflecting uncertainty over the reliability of intent assessment. This difference is unlikely to have influenced the overall conclusion as there are no published studies documenting differential response to treatment in the adolescents presenting with suicidal versus nonsuicidal self-harm.

Comparison with other reviews

There have been many previous reviews in this area with often conflicting conclusions. In contrast to some reviews (Newton et al., 2010; Robinson et al., 2011) we did not find sufficient evidence to recommend any specific intervention to prevent and reduce self-harm. This is partly due to the more stringent criteria adopted for this review and partly due to stricter age criteria. However, our findings are in line with most other related reviews. Above all and in line with other reviews' recommendations, more research and replication of the positive findings by independent groups are urgently required.

Conclusion

Studies indicate that approximately 10% of adolescents will have self-harmed by the time they finish secondary school and 10% will repeat self-harm in a year. Different types of self-harm appear to be inter-linked and practitioners should assess adolescents presenting with NSSI for suicidality and vice versa.

At present there are no independently replicated findings of any intervention being effective in reducing or preventing self-harm in adolescents. There is limited evidence that the SOS programme is efficacious in prevention of self-harm (two RCT by the same group with partially overlapping samples).

There is limited evidence that Therapeutic Assessment and the FISP lead to improved engagement with after care. There is limited evidence that MST in comparison with hospitalisation may reduce self-harm repetition in adolescents with a range of psychiatric emergencies (one unreplicated RCT). Adult literature points towards DBT and other CBTs as potentially promising interventions but these require rigorous evaluation in adolescent RCTs. There are no published RCTs of any pharmacological intervention leading to secondary prevention of self-harm in adolescents. Pharmacological treatment may be aimed at alleviating psychiatric conditions associated with self-harm.

More research is urgently needed to establish effective treatment for self-harm adolescents. Greater international consensus regarding definitions and measurement strategies for self-harm behaviours would strengthen efforts to advance research and practice.

While there is still much research to be done, this is an active research area, and much progress has been made. The literature offers the practitioner with descriptions of promising approaches for addressing the needs of youths struggling with suicidality and self-harm tendencies, approaches have been identified for increasing engagement with follow-up treatment, and major trials are in progress evaluating treatments for this population.

Supporting information

Additional supporting information is provided along with the online version of this article.

Appendix S1: Treatment interventions (TIs) for self-harm: systematic review.

Figure S1: Flow of studies.

Please note that Wiley-Blackwell are not responsible for the content or functionality of any supporting materials supplied by the authors (although this material was peer reviewed by JCPP referees and Editors along with the main article). Any queries (other than missing material) should be directed to the corresponding author for the article.

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Correspondence to

Dennis Ougrin, Child and Adolescent Psychiatry, King's College London, Institute of Psychiatry, PO85, De Crespigny Park, London SE5 8AF, UK; Tel: +44(0) 20 7848 0957; Fax: +44(0) 20 7708 5800; Email: dennis.ougrin@kcl.ac.uk

Key points

- 10% of adolescents will have self-harmed by the time they finish secondary school and 10% of the adolescents who engage in self-harm will repeat self-harm within a year.
- Therapeutic Assessment and the FISP may lead to improved engagement with aftercare; MST may reduce self-harm repetition in comparison with hospitalisation.
- DBT and CBT have the best evidence in adults with self-harm, while DBT and CBT with adolescents require rigorous evaluation in RCTs.
- Pharmacological agents require evaluation in adolescents with self-harm.
- Positive findings of the SOS programme need to be independently replicated and MST needs to be studied in adolescents presenting with self-harm.
- International consensus regarding definitions and measurement of self-harm is required.

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