

Mapping the Evidence of Prevention and Intervention Studies for Suicidal and Self-Harming Behaviors in Young People

Stefanie De Silva^{1,2}, Alexandra Parker^{1,2}, Rosemary Purcell²,
Patrick Callahan³, Ping Liu⁴, and Sarah Hetrick^{1,2}

¹Orygen Youth Health Research Centre and headspace Centre of Excellence, Melbourne, Australia

²Centre for Youth Mental Health, University of Melbourne, Australia

³Orygen Youth Health Clinical Program, Melbourne, Australia

⁴School of Psychological Science, The University of Melbourne, Australia

Abstract. *Background:* Suicide and self-harm (SSH) in young people is a major cause of disability-adjusted life years. Effective interventions are of critical importance to reducing the mortality and morbidity associated with SSH. *Aims:* To investigate the extent and nature of research on interventions to prevent and treat SSH in young people using evidence mapping. *Method:* A systematic search for SSH intervention studies was conducted (participant mean age between 6–25 years). The studies were restricted to high-quality evidence in the form of systematic reviews, meta-analyses, and controlled trials. *Results:* Thirty-eight controlled studies and six systematic reviews met the study inclusion criteria. The majority ($n = 32$) involved psychological interventions. Few studies ($n = 9$) involved treating young people with recognized mental disorders or substance abuse ($n = 1$) which also addressed SSH. *Conclusion:* The map was restricted to RCTs, CCTs, systematic reviews, and meta-analyses, and thus might have neglected important information from other study designs. The effectiveness of interventions within the trials was not evaluated. The evidence base for SSH interventions in young people is not well established, which hampers best-practice efforts in this area. Promising interventions that need further research include school-based prevention programs with a skills training component, individual CBT interventions, interpersonal psychotherapy, and attachment-based family therapy. Gaps in the research exist in evaluations of interventions for SSH in young people with identifiable psychopathology, particularly substance use disorder, and research that classifies participants on the basis of their suicidal intent.

Keywords: self-injurious behavior, suicide, evidence-based practice, adolescent, intervention studies

Suicide and self-harm (SSH) behaviors are recognized as a significant public health problem, and the burden associated with self-inflicted injuries has been ranked by the World Health Organization as one of the leading causes of disability-adjusted life years (Murray & Lopez, 1996). Adolescence is known to be a period of heightened suicide risk. A systematic review of the international prevalence of “suicidal phenomena” found that 9.7% of adolescents had made a suicide attempt, and that 29.9% had at least thought about suicide at some stage in their life (Evans, Hawton, Rodham, & Deeks, 2005). In Australia, the rate of adolescents hospitalized for deliberate self-harm increased by 27% since 1999, and mortality resulting from these injuries is today a leading cause of death in this age group (Australian Institute of Health and Welfare, 2008). A large proportion of suicidal individuals have a mental disorder, with rates of disorder lying around

90% in young people who die by suicide (Fleischmann, Bertolote, Belfer, & Beautrais, 2005; Marttunen, Aro, & Lonnqvist, 1993). Since many suicidal young people have been in contact with primary health care and mental health services in the year leading up to their death, early detection and intervention efforts have significant potential to reduce suicide rates (Luoma, Martin, & Pearson, 2002; Pfaff, Acres, & Wilson, 1999).

Despite the prevalence and burden of suicidal phenomena in young people, the health system response is far from optimal. A gulf exists between research evidence and practice, and interventions with limited evidence are often regarded as “best practice” in clinical management (Burns, Dudley, Hazell, & Patton, 2005). These include the use of “no-suicide contracts,” which are verbal or written agreements by the individual to not engage in self-harming be-

haviors; and emergency “green cards,” which provide guaranteed access to 24-h clinical readmission on demand. The establishment of telephone crisis hotlines has also become widespread in developed communities, and there has been significant continued investment in this response, despite equivocal evidence regarding any beneficial effects on rates of suicide (Burns & Patton, 2000). Given the seriousness of SSH, there is a pressing need to encourage the uptake of evidence-based practice (EBP), defined as the integration of clinical expertise with “conscientious, explicit, and judicious use of current best evidence” (Sackett, Rosenberg, Gray, Haynes, & Richardson, 1996, p. 71) to determine the best choice of treatment for individual patients.

Significant barriers to the uptake of EBP are the time and resources required to navigate the sheer volume of information available in a broad research area (Cabana et al., 1999). One approach to minimizing these barriers and facilitating EBP is to conduct a review of the literature to collate methodologically sound research relevant to the area of interest and filter out any irrelevant research. Evidence mapping is a process of reviewing the literature in a manner that enables exploration of the breadth of the research activity in a particular field. While systematic reviews can address specific clinical questions (e.g., is treatment X effective for condition Y?), evidence mapping allows a concise summary of the extent and distribution of evidence in a broad field of interest (e.g., what interventions are available for condition Y?). Evidence maps are based on an explicit research question relating to the field of enquiry, which may vary in depth, but should be informed by end-users. The research question then drives the search for, and collection of, appropriate studies utilizing explicit and reproducible methods at each stage (Arksey & O'Malley, 2005; Bragge et al., 2011; Hetrick, Parker, Callahan, & Purcell, 2010; Katz et al., 2003). This includes a clear definition of the components of the research question, development of a thorough and reproducible search strategy, development of explicit inclusion and exclusion criteria, and transparent decisions about the level of information to be obtained from each study. The key difference from a systematic review is that evidence mapping does not include an in-depth quality appraisal and synthesis of the findings. Its purpose is to provide an overview of existing research, with the view toward identifying evidence gaps (Bragge et al., 2011). The end-user may be researchers or research funding bodies who can identify these gaps in the evidence, which in turn creates opportunities for new research and policymakers, who use the evidence map to inform policy decisions, or clinicians who can access information about interventions.

This paper presents the results of an evidence map we conducted on SSH in young people. The extent, range, and nature of high-quality clinical research interventions for SSH in young people is summarized. This process of taking stock of the evidence is an essential first step in obtaining an overview of the breadth of research activities before further exploring the effectiveness of interventions.

Method

The evidence map of interventions for SSH behaviors in young people was produced as part of a larger evidence mapping project within *headspace*, the National Youth Mental Health Foundation in Australia. Established by the Federal Government in 2006, *headspace* provides accessible, specialized, multidisciplinary care to young people with mental health and substance-use disorders, with an emphasis on early detection and intervention (McGorry et al., 2007). Within the *headspace* framework, the Centre of Excellence in Youth Mental Health is responsible for synthesizing, appraising, generating, and disseminating evidence regarding interventions for adult-type mental disorders in the youth population.

The process for constructing evidence maps is described in detail elsewhere (Hetrick et al., 2010). The four main steps specific to the construction of the SSH map were: (1) consultation with experts to define the research question relevant to the field of enquiry; (2) a search of the literature in this field (driven by the research question and including definitions of key variables, specification of key characteristics of studies to be mapped and ultimately, prespecified inclusion and exclusion criteria); (3) selection and collection of the appropriate studies relevant to the defined research question; and (4) presentation of the literature in such a way as to facilitate a clear understanding of what evidence exists – and what does not – within the mapped area. Each of these steps is outlined with details specific of the SSH evidence map below.

Defining the Research Question

Experts in youth mental health working within *headspace* (including clinical psychologists and youth workers), along with youth mental health clinicians and researchers external to *headspace* (including psychiatrists and clinical psychologists) were consulted to inform the relevant clinical questions, the scope and possible structure, and presentation of the SSH map. This process revealed two areas of focus for the map, namely:

- I. What good quality evidence exists regarding the prevention of and interventions for SSH behaviors among young people?
- II. What areas are, and what areas are not, well researched?

Defining Key Variables

Because SSH behaviors are not a diagnosable mental disorder and do not have a definition in the current Diagnostic and Statistical Manual of Mental Disorders (DSM) or International Classification of Diseases (ICD), there is considerable variation in the terms used to discuss SSH. Consistent with other definitions in the field (e.g., Fortune &

Hawton, 2007), we defined SSH as encompassing any form of deliberate self-injurious behavior, regardless of the outcome or intent to die. In the evidence map, however, we sought to categorize SSH behaviors into “suicidal” or “non-suicidal” intent or a combination thereof. As a rule, interventions for self-poisoning behaviors were coded as a combination of both, as suicidal intent is particularly difficult to determine in these cases. Although some argue against this binary approach and maintain that SSH behaviors should be assessed along a continuum of lethality (e.g., Linehan, 1997; Stanley, Winchel, Molcho, Simeon, & Stanley, 1992), there is evidence from emerging literature to suggest that nonsuicidal self-injury (NSSI) is distinguishable from suicidal behaviors in many aspects of psychopathology (Brausch & Gutierrez, 2010; Muehlenkamp & Gutierrez, 2004, 2007). This is also consistent with new conceptualizations in the field, such as the proposed revision to recognize NSSI as a distinct disorder in DSM-5 (American Psychiatric Association, 2010).

Based on the key questions above, other key characteristics of the studies to be defined for inclusion in the map were the type of study, population (“young people”), types of intervention and stage of illness (Hetrick et al., 2010) of SSH behavior manifestation.

In order to define “good quality evidence,” the map utilized only evidence from randomized controlled trials (RCTs), pseudo-RCTs, clinical controlled trials (CCTs), systematic reviews, and meta-analyses of RCTs, as these are regarded as the most robust study designs for examining the effectiveness of interventions (Boutron, Moher, Altman, Schulz, & Ravaud, 2008). This included published and unpublished work (the latter, for example, including trials published in conference proceedings). Studies were limited to those published in English after 1980, predominantly because of resource constraints and because recognition of youth mental health as a discrete area of interest has emerged only in the last three decades (Rutter, Graham, Chadwick, & Yule, 1976).

The definition of “young people” was in accordance with the Australian Bureau of Statistics, which defines this group as persons aged 12–25 years. However, research involving participants younger than 12 years and over 6 years of age was also included given the focus on *prevention* and *early intervention*. Inclusion of a study in the map required the mean age of participants to fall between 6–25 years (inclusive). In defining the population, we also included intervention studies for populations with mental health disorders if there were SSH-related outcomes. Research has consistently demonstrated a high incidence of SSH in those with diagnosed mental disorders, with depression in particular being an important antecedent to suicide among young people (AIHW, 2008; Burns & Patton, 2000; Fortune & Hawton, 2007). The outcome measures used to assess the efficacy of interventions included both formal (e.g., suicide scales) and informal (e.g., self-reported) measurements of mortality, suicide attempts, suicidal behavior, suicidal ideation, deliberate self-harm, and suicide risk.

Interventions targeting clinicians or other personnel in positions to help young people with SSH behaviors (e.g., “gatekeeper training” to develop skills in identifying those at risk) were included if SSH-related outcomes were reported. Reviews or studies on treatment-emergent suicidal events (e.g., SSH as a side effect of antidepressant medication) were excluded, except for studies on interventions for SSH in this population with SSH-related outcomes. We also excluded studies in which the recruitment of participants was based on physiological or medical conditions (e.g., SSH in the context of a terminal physical illness).

Prevention trials were categorized into universal and targeted prevention. Universal interventions are those delivered to a designated population regardless of their risk, and targeted interventions are those delivered to populations that have been identified to be at risk of SSH (e.g., potential high-school dropouts). Treatment studies refer to those aimed at preventing future SSH behaviors in populations that have previously engaged in SSH.

Searching the Literature

A broad literature search of relevant databases was conducted using MEDLINE, PsycINFO, EMBASE, and The Cochrane Central Register of Controlled Trials (CENTRAL) for studies published between 1980 and January 2011. The search strategies were devised using relevant subject headings for each database (e.g., “self-injurious behavior,” “suicidal behavior”) with additional free text words (e.g., “self-inflicted,” “self-poisoning”) also included (a full search strategy is available upon request from the corresponding author). All reference lists of included systematic reviews and meta-analyses were hand-searched to identify potential studies relevant to the map.

Screening and Positioning the Relevant Evidence Within the Map (Charting)

Comprehensive inclusion and exclusion criteria, based on the above key variables and characteristics were developed to ensure the process of selecting literature for the map was consistent within the team of researchers. The set criteria were piloted on a random subset of 100 retrieved articles, and consensus meetings were held with the two author/raters (SDS & PC) to clarify any inconsistent decisions and revise search strategies or inclusion criteria where necessary. The process was repeated until the inclusion criteria were finalized and an acceptable interrater reliability of 0.9 (measured using intraclass correlation coefficient) was reached.

Initial screening was based on the information contained in the title and abstract. The screening at this stage was overly inclusive in order to ensure that the entire body of literature was mapped, and that no relevant studies were

excluded. Second-stage screening involved retrieving and referring to the full-text article to determine final inclusion.

Included studies were then coded first according to the *type of intervention* (psychological, biological, complementary/alternative, or service/delivery improvement), followed by the *stage of intervention* (prevention of SSH, intervention for SSH, or intervention for SSH in diagnosed mental disorders). These three categories were subsequently further divided into prevention studies as universal or targeted prevention, intervention studies according to the recruitment of participants (suicidal, nonsuicidal, or both), and intervention studies for mental disorders by the type of diagnosis. Trials were finally classified according to the specific type of intervention researched (i.e., a specific psychological therapy or class of medication).

Results

A flowchart of the number of references screened and included, based on the criteria above, is presented in Figure 1. Of 7,498 references initially retrieved from the search, 57 met the inclusion criteria for the evidence map. There were six published systematic reviews on interventions for SSH behaviors in young people. A list of citations for all RCTs, CCTs, and systematic reviews included in the map is available on request; alternatively the included studies can be found on our searchable database (<http://www.headspace.org.au/what-works/evidence-maps>).

After accounting for multiple publications arising from a single trial, 38 controlled trials were included in the final SSH map (see Figure 2). As previously indicated, the evidence map sought to categorize SSH behaviors into “suicidal,” “nonsuicidal,” or a combination of both intentions. However, none of the included controlled studies made a precise distinction based on the intention of SSH for the purpose of patient recruitment. Therefore, this dimension is not reflected in Figure 2.

Of the 38 included trials, 32 psychological interventions were identified, most commonly problem-solving therapy in individual or group form ($n = 6$) and psychoeducation ($n = 6$). Two trials examined a biological intervention (fluoxetine and a “medication algorithm,” which included monotherapy with an SSRI as an initial step); three trials examined complementary/alternative interventions (aftercare contact, emergency “green card,” and a therapeutic writing paradigm); and three examined service/delivery improvement interventions (rapid response outpatient treatment, specialized emergency room intervention, and specialized hospital service).

Across the types of interventions, 10 studies involved young people with a diagnosed mental disorder. These were made up of depressive disorders ($n = 6$), borderline personality disorder ($n = 2$), psychosis ($n = 1$), and alcohol use disorder ($n = 1$). The specific intervention types examined in each disorder can be seen in Figure 2. The alcohol

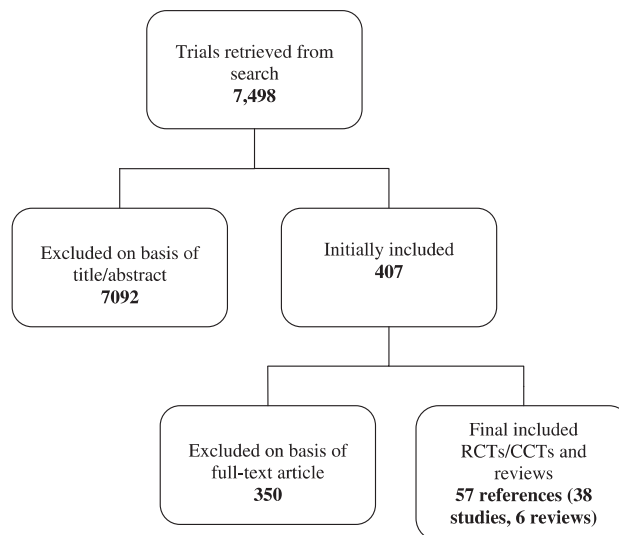


Figure 1. The number of trials included and excluded during the screening process.

use disorder study was a complementary intervention that looked at the effects of different aftercare conditions (none vs. in-person vs. telephone) on suicidal ideation following CBT group therapy (Kaminer, Burleson, Goldston, & Burke, 2006).

The 10 studies examining the prevention of SSH behaviors in young people were all school-based psychological interventions (universal prevention = 6, targeted prevention = 4). Four were classified as psychological education interventions, while the remaining six were prevention programs that varied considerably in their content and delivery and could not be defined according to a single intervention type. These were broadly classified as “psychological-other” interventions. Two of the psychological education interventions involved gatekeeper training, and one of these included training in the use of suicide contracts (“no-harm agreements”). The outcome measure in this intervention was the effectiveness of the training, for example, whether the gatekeepers were significantly better able to recognize symptoms of suicide and intervene appropriately (Hennig, Crabtree, & Baum, 1998). As such, the study did not evaluate the actual effectiveness of the contracts on SSH behaviors. None of the included trials examined the use of no-suicide contracts as an intervention for SSH.

The systematic review by Ploeg et al. (1996) focused on school-based suicide prevention programs. The majority of the 11 included studies examined outcomes such as attitudes and knowledge related to suicide. While most programs demonstrated improvements in attitude, emotions, coping skills, and knowledge of suicide, two earlier studies also flagged potentially detrimental effects of these programs, particularly among males and among those who had made a previous suicide attempt. For instance, a psychological education program by Shaffer, Garland, Vieland, Underwood, and Busner (1991) not only failed to find sig-

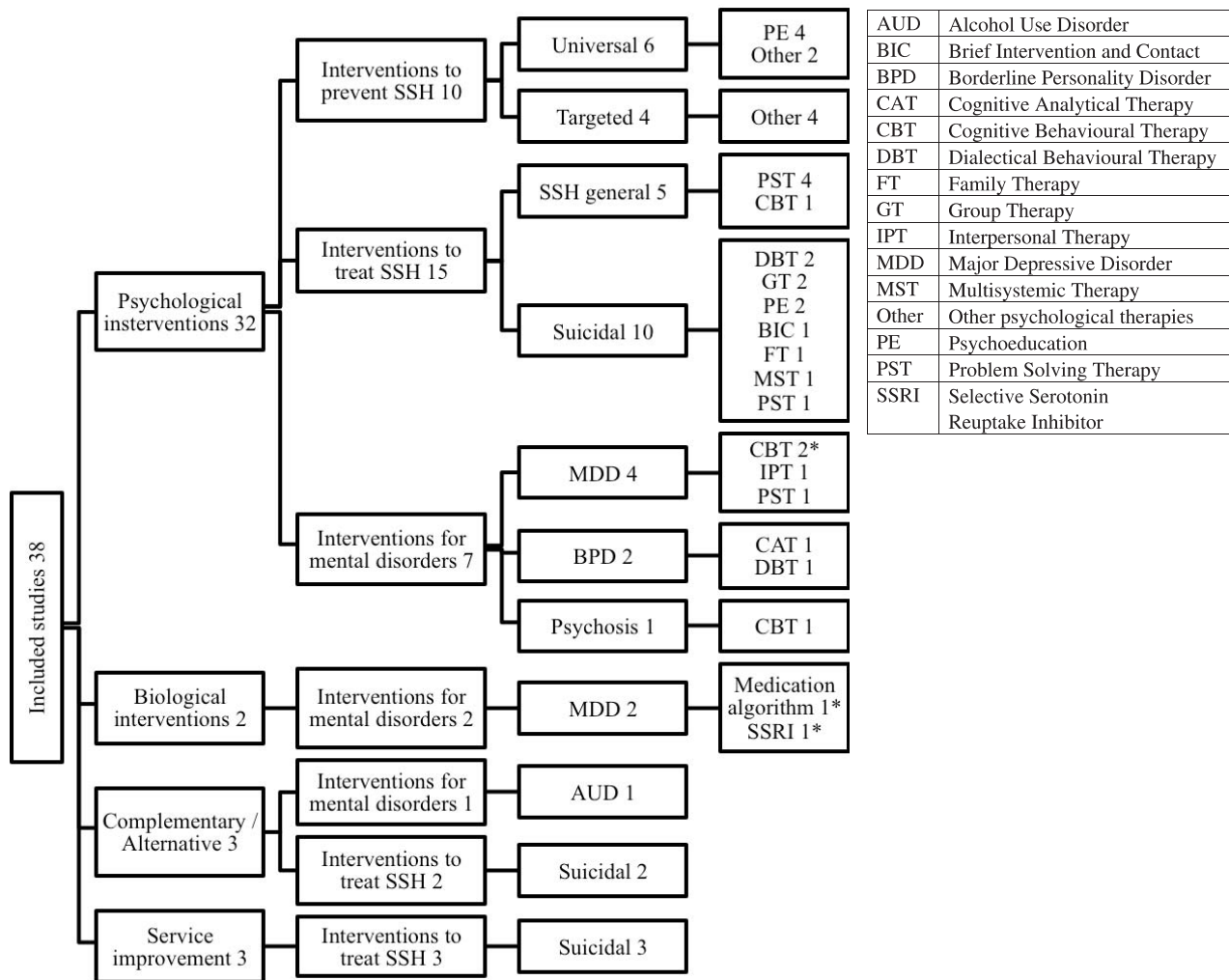


Figure 2. The distribution of included trials in categories during second-stage screening. The numbers presented refer to the number of trials rather than the number of references (given that multiple papers can be published from a single trial). The asterisks (*) indicate those studies (Brent et al., 2009; March et al., 2004) that looked at more than one type of intervention.

nificant program effects at 18-month follow-up (Vieland, Whittle, Garland, Hicks, & Shaffer, 1991), but more students in the experimental group indicated suicide as a possible solution to their problems – and this effect was greater in males. Another found that male participants showed an increase in hopelessness and maladaptive coping following a suicide awareness curriculum (Overholser, Hemstreet, Spirito, & Vyse, 1989). Similar findings have not been reported in subsequent studies. Three studies in this systematic review examined suicide risk as an outcome variable (Hazell & Lewin, 1993; Klingman & Hochdorf, 1993; Orbach & Bar-Joseph, 1993). The latter two studies were universal prevention trials based in Israel and found that participants' suicidal risk was significantly reduced following interventions with a skills-based training component. The Hazell and Lewin (1993) trial was a targeted group counseling intervention that did not find any significant changes in suicidal ideation and behavior. The authors of this sys-

tematic review on school-based suicide prevention programs for young people concluded that there is currently insufficient evidence to support these programs, as many of the previous studies are methodologically weak and report inconsistent findings. In another systematic review, Steele and Doey (2007) contend that school-based intervention programs should be further developed based on the success of some skills-based training programs, and because the school is a key point of contact for young people. A more recent school-based study in Taiwan found significant positive effects in depressed adolescents with suicidal risk following intensive interpersonal psychotherapy in comparison with TAU (Tang, Jou, Ko, Huang, & Yen, 2009).

The general consensus of the other five systematic reviews was that there are insufficient data from controlled trials to date to recommend any specific intervention or prevention strategy over another in the youth population

(Burns et al., 2005; Daniel & Goldston, 2009; Gould, Greenberg, Velting, & Shaffer, 2003; Robinson, Hetrick, & Martin, 2011; Steele & Doey, 2007). Further descriptions of a number of studies identified in the systematic reviews have been provided here. Slee, Garnefski, Van Der Leeden, Arensman, and Spinhoven (2008) investigated supplementing treatment as usual (TAU) with a time-limited CBT intervention for young participants who had recently engaged in self-harm. Compared to those who only received TAU, participants in the experimental group had significantly greater reductions in self-harm and suicidal ideation at 9-month follow-up. Diamond et al. (2010) also found significant reductions in suicidal ideation and depressive symptoms in adolescents with suicidal thoughts after 10 sessions of attachment-based family therapy compared with usual care. However, their findings should be treated with caution as there were study limitations, such as the lack of blinding. Robinson et al. (2011) is the only meta-analysis to date: They concluded that individual CBT-based interventions appear promising, and that it is worthwhile to further investigate attachment-based family therapy in a high-quality RCT.

The authors of the systematic reviews all noted the methodological issues and marked heterogeneity across studies. A concern with the methodological quality of studies was the insufficient reporting of the conduct of trials. This made it difficult to determine whether there were issues with study design, selection bias, or the failure to control for possible confounders. The content of interventions varied across studies, were often multimodal in nature, and included elements from different forms of therapeutic approaches. This was particularly evident in the psychological prevention programs, such that in our map, we were unable to define an intervention type for six studies and coded them broadly as “psychological-other.” Factors like program intensity and follow-up period also varied considerably. Interventions were often compared against “standard care” or TAU, but the content of these comparison interventions was also diverse. Outcomes measures of interest varied across studies, and even the measurement of common constructs such as “attitude” was conducted with different instruments. It was also noted that many studies neglected to test these measurement tools for validity and reliability (Ploeg et al., 1996). The heterogeneity of the existing research, and the use of ambiguous or inconsistent terminology, make it difficult to compare interventions in order to reach general conclusions.

Robinson et al. (2011) recommended that future research work should be less heterogeneous by, for instance, adopting standardized definitions and using similar measures. They also advised researchers to be mindful of minimizing the risk of bias in their studies and to report data for all measured outcomes. These steps should allow findings from different studies to be pooled, thus enabling the evaluation and comparison of interventions, and informing decisions on the development of SSH research in young people.

Discussion

The current evidence base of interventions and models of care for SSH behaviors in young people is inadequate and high-quality systematic research is scarce, as is the case generally in the field of youth mental health (Patel, Fisher, Hetrick, & McGorry, 2007). This evidence map provides direction on research opportunities of high priority in the area of SSH in young people.

Key Areas in Need of Research

Interventions Treating SSH in Young People with Mental Disorders

The rates of SSH in youths with a diagnosed mental disorder or subthreshold symptoms of disorders can be as high as 90%, with mood and substance use disorders being the most prevalent conditions in this population (Bridge, Goldstein, & Brent, 2006; Marttunen et al., 1993). However, only 10 intervention studies target SSH in young people with a mental disorder. This may in part reflect the general lack of evidence for early intervention in young people with emerging or established mental disorders. However, we did find substantial bodies of clinical research for early intervention in depression (Callahan, Hetrick, Liu, & Purcell, 2012) and psychosis (Liu et al., 2010), which suggests that the lack of early intervention studies for SSH in youth with mental disorders may be due to the exclusion of this group of young people in treatment studies and/or the failure to measure SSH as an outcome in research (Bridge et al., 2006). There are methodological and ethical issues related to conducting clinical research in the SSH population which could explain the paucity of systematic research in this area. However, it has been proposed that, with careful consideration, many of these dilemmas can be addressed in “safe, just, and systematic ways” (Fisher, Pearson, Kim, & Reynolds, 2002, p. 13).

The inclusion of SSH outcomes as standard practice in clinical trials of psychotropic interventions for those with mental health disorders would provide valuable information, for example, as reported in the Treatment for Adolescents with Depression study (TADS) (March et al., 2004). It would be beneficial if more treatment strategies were developed to specifically address SSH in young people with a particular mental disorder, such as the CBT trial in early psychosis (Power et al., 2003) or the DBT trial in borderline personality disorder (Turner, 2000). Of note is the paucity of SSH intervention studies in young people with substance use disorders, given their prevalence in youth with SSH (Fleischmann et al., 2005). As such, more clinical research is needed in this particular population. Considering the growth in the field of early intervention and the increasing number of youth-specific treatment services (e.g., in Australia, headspace offers clinical services in 40 settings across the country), the

possibility and feasibility of conducting such trials is growing. Further, in the adult literature of SSH intervention, it was found that even clients with severe SSH risk can benefit from such interventions in a clinical trial setting (Linehan, 1997). The provision of SSH interventions in this target population may prove to be a cost-effective way to prevent SSH in young people with mental disorders. We argue that there is a significant knowledge gap in our understanding of the effects of commonly practiced biological and psychological treatments for SSH in young people with emerging mental health problems, and that it is logistically and methodologically possible to conduct such trials in the near future.

Treatment for SSH Without a Specified Psychopathology Status

As reflected in Figure 2, various psychological treatment strategies were investigated in 15 studies of participants whose psychopathology status was not specified. Problem-solving therapy, delivered on an individual or group basis, received the most attention. However, results from the most recent systematic review (Robinson et al., 2011) suggest that, in the absence of strong evidence, CBT is currently probably the most effective intervention. The high cost associated with delivering CBT on an individual basis potentially prohibits the scalability of this intervention. However, new research using innovative information technology is being undertaken to examine internet-based CBT as an intervention for depression, anxiety and/or suicide-related behaviors in young people (e.g., Robinson, Titov, Andrews, McIntyre, Schwenke, & Solley, 2010; Whittaker et al., 2009). A recent review suggests that, although there is insufficient evidence to determine whether internet-based interventions are effective for treating or preventing mental health problems in young people, this research holds promise for the treatment of high prevalence disorders (Titov, 2007). As such, high priority should be given to testing the effects of these interventions in young people with SSH.

Categorizing SSH Behaviors Based on Intent

Finally, there is emerging evidence to suggest that NSSI should be distinguished from acts of self-harm with intent to die (Brausch & Gutierrez, 2010; Muehlenkamp & Gutierrez, 2004, 2007). Recent efforts to standardize the nomenclature of suicide used the presence or absence of suicidal intent as a key basis for classification (Silverman, Berman, Sanddal, O'Carroll, & Joiner, 2007). This is a relatively recent concept and is still under debate, but it might account for the insufficient effort made in trials to date to measure suicide intent. In their treatment recommendations, the NICE Guidelines on Self-Harm (2004, 2011) point out that suicidal intent is complex and

difficult to assess, and they do not categorize self-harm according to intent, but instead treat these as behaviors along a continuum. However, they do caution against assuming all self-harm behaviors are acts of suicide and overlook the underlying function or intention of the act in the process. There is a need for innovative research that attempts to distinguish participants on the basis of their suicidal intent, and considers the distinct underlying psychopathology of these groups when tailoring prevention and treatment efforts.

Limitations

One limitation of the current study is that there was no evaluation of the effectiveness of the interventions within the trials, which restricted us from drawing any conclusions on intervention efficacy. Also, the search supporting this evidence map was not exhaustive, focusing only on "gold standard" research, and was limited to those published post-1980 in English. It is acknowledged that designing a controlled trial is especially challenging when trying to identify the efficacy of treatments for SSH, and many potentially promising interventions are not amenable to evaluation by RCT designs (e.g., universal preventions such as building barriers on bridges to prevent jumping deaths, or complex interventions with multiple components). Consequently, potentially promising research at a cohort or case-control level may have been overlooked as were quality evaluations of SSH interventions.

Nonetheless, this evidence map has systematically demonstrated what high-quality studies exist for prevention and treatment interventions for young people with SSH. In doing so, the evidence map has exposed gaps in the research evidence in order to inform researchers, funding bodies and policy makers as to the opportunities for future research.

Conclusion

While a number of prevention and treatment programs were designed to respond to SSH in young people, the body of evidence has not firmly established the most effective interventions, due in part to some of the limitations covered above. Promising interventions that need further research include school-based prevention programs with a skills training component, individual CBT interventions, interpersonal psychotherapy, and attachment-based family therapy. Gaps in the research exist in evaluations of interventions for SSH in young people with identifiable psychopathology, particularly substance use disorder, and research that classifies participants on the basis of their suicidal intent.

References

- American Psychiatric Association. (2010). *DSM-5 development: V 01 nonsuicidal self-injury*. Retrieved from <http://www.dsm5.org/ProposedRevisions/Pages/proposedrevision.aspx?rid=443>
- Arksey, H., & O'Malley, L. (2005). Scoping studies: Toward a methodological framework. *International Journal of Social Research Methodology*, 8, 19–32.
- Australian Institute of Health and Welfare. (2008). *Making progress: The health, development and wellbeing of Australia's children and young people*. Canberra, Australia: Author.
- Brent, D., Greenhill, L., Compton, S., Emslie, G., Wells, K., Walkup, J., . . . Turner, J. (2009). The Treatment of Adolescent Suicide Attempters Study (TASA): Predictors of suicidal events in an open treatment trial. *Journal of the American Academy of Child and Adolescent Psychiatry*, 48, 987–996.
- Boutron, I., Moher, D., Altman, D. G., Schulz, K. F., & Ravaud, P. (2008). Extending the CONSORT statement to randomized trials of nonpharmacologic treatment: Explanation and elaboration. *Annals of Internal Medicine*, 148, 295–309.
- Bragge, P., Clavisi, O., Turner, T., Tavender, E., Collie, A., & Gruen, R. (2011). The global evidence mapping initiative: Scoping research in broad topic areas. *BMC Medical Research Methodology*, 11, 92.
- Brausch, A., & Gutierrez, P. (2010). Differences in nonsuicidal self-injury and suicide attempts in adolescents. *Journal of Youth and Adolescence*, 39, 233–242.
- Bridge, J. A., Goldstein, T. R., & Brent, D. A. (2006). Adolescent suicide and suicidal behavior. *Journal of Child Psychology and Psychiatry*, 47, 372–394.
- Burns, J. M., Dudley, M., Hazell, P., & Patton, G. (2005). Clinical management of deliberate self-harm in young people: The need for evidence-based approaches to reduce repetition. *Australian and New Zealand Journal of Psychiatry*, 39, 121–128.
- Burns, J. M., & Patton, G. C. (2000). Preventive interventions for youth suicide: A risk factor-based approach. *Australian and New Zealand Journal of Psychiatry*, 34, 388–407.
- Cabana, M. D., Rand, C. S., Powe, N. R., Wu, A. W., Wilson, M. H., Abboud, P. A., & Rubin, H. R. (1999). Why don't physicians follow clinical practice guidelines? A framework for improvement. *The Journal of the American Medical Association*, 282, 1458–1465.
- Callahan, P., Hetrick, S. E., Liu, P., & Purcell, R. (2012). Evidence map of prevention and treatment interventions for depression in young people. *Depression Research and Treatment*. Advance online publication. doi 10.1155/2012/820735
- Daniel, S. S., & Goldston, D. B. (2009). Interventions for suicidal youth: A review of the literature and developmental considerations. *Suicide and Life-Threatening Behavior*, 39, 252–268.
- Diamond, G. S., Wintersteen, M. B., Brown, G. K., Diamond, G. M., Gallop, R., Shelef, K., & Levy, S. (2010). Attachment-based family therapy for adolescents with suicidal ideation: A randomized controlled trial. *Journal of the American Academy of Child and Adolescent Psychiatry*, 49, 122–131.
- Evans, E., Hawton, K., Rodham, K., & Deeks, J. (2005). The prevalence of suicidal phenomena in adolescents: A systematic review of population-based studies. *Suicide and Life-Threatening Behavior*, 35, 239–250.
- Fisher, C. B., Pearson, J. L., Kim, S., & Reynolds, C. F. (2002). Ethical issues in including suicidal individuals in clinical research. *IRB: A Review of Human Subjects Research*, 24, 9–14.
- Fleischmann, A., Bertolote, J. M., Belfer, M., & Beautrais, A. (2005). Completed suicide and psychiatric diagnoses in young people: A critical examination of the evidence. *American Journal of Orthopsychiatry*, 75, 676–683.
- Fortune, S. A., & Hawton, K. (2007). Suicide and deliberate self-harm in children and adolescents. *Pediatrics and Child Health*, 17, 443–447.
- Gould, M. D., Greenberg, T., Velting, D. D., & Shaffer, D. D. (2003). Youth suicide risk and preventive interventions: A review of the past 10 years. *Journal of the American Academy of Child and Adolescent Psychiatry*, 42, 386–405.
- Hazell, P., & Lewin, T. (1993). An evaluation of postvention following adolescent suicide. *Suicide and Life-Threatening Behavior*, 23, 101–109.
- Hennig, C. W., Crabtree, C. R., & Baum, D. (1998). Mental health CPR: Peer contracting as a response to potential suicide in adolescents. *Archives of Suicide Research*, 4, 169–187.
- Hetrick, S. E., Parker, A. G., Callahan, P., & Purcell, R. (2010). Evidence mapping: Illustrating an emerging methodology to improve evidence-based practice in youth mental health. *Journal of Evaluation in Clinical Practice*, 16, 1025–1030.
- Kaminer, Y., Burleson, J. A., Goldston, D. B., & Burke, R. H. (2006). Suicidal ideation among adolescents with alcohol use disorders during treatment and aftercare. *American Journal on Addictions*, 15(Suppl. 1), 43–49.
- Katz, D. L., Williams, A. L., Girard, C., Goodman, J., Comerford, B., Behrman, A., & Bracken, M. B. (2003). The evidence base for complementary and alternative medicine: Methods of evidence mapping with application to CAM. *Alternative Therapies in Health and Medicine*, 9, 22–30.
- Klingman, A., & Hochdorf, Z. (1993). Coping with distress and self-harm: The impact of a primary prevention program among adolescents. *Journal of Adolescence*, 16, 121–140.
- Linehan, M. M. (1997). Behavioral treatments of suicidal behaviors. Definitional obfuscation and treatment outcomes. *Annals of the New York Academy of Sciences*, 836, 302–328.
- Liu, P., Parker, A. G., Hetrick, S. E., Callahan, P., De Silva, S., & Purcell, R. (2010). An evidence map of interventions across premorbid, ultra-high risk and first episode phases of psychosis. *Schizophrenia Research*, 123, 37–44.
- Luoma, J. B., Martin, C. E., & Pearson, J. L. (2002). Contact with mental health and primary care providers before suicide: A review of the evidence. *American Journal of Psychiatry*, 159, 909–916.
- March, J., Silva, S., Petrycki, S., Curry, J., Wells, K., Fairbank, J., . . . Severe, J. (2004). Fluoxetine, cognitive-behavioral therapy, and their combination for adolescents with depression: Treatment for Adolescents With Depression Study (TADS). Randomized controlled trial. *JAMA: The Journal of the American Medical Association*, 292, 807–820.
- Marttunen, M., Aro, H., & Lonnqvist, J. (1993). Adolescence and suicide: A review of psychological autopsy studies. *European Child and Adolescent Psychiatry*, 2, 10–18.
- McGorry, P. D., Tanti, C., Stokes, R., Hickie, I. B., Carnell, K., Littlefield, L. K., & Moran, J. (2007). Headspace: Australia's national youth mental health foundation – where young minds come first. *The Medical Journal of Australia*, 187(Suppl.), S68–S70.

- Muehlenkamp, J. J., & Gutierrez, P. M. (2004). An investigation of differences between self-injurious behavior and suicide attempts in a sample of adolescents. *Suicide and Life-Threatening Behavior*, 34, 12–23.
- Muehlenkamp, J. J., & Gutierrez, P. M. (2007). Risk for suicide attempts among adolescents who engage in nonsuicidal self-injury. *Archives of Suicide Research*, 11, 69–82.
- Murray, C., & Lopez, A. (1996). *The global burden of disease*. WHO and World Bank. Boston, MA: Harvard School of Public Health.
- National Institute for Health and Clinical Excellence. (2004). *Self-harm: The short-term physical and psychological management and secondary prevention of self-harm in primary and secondary care*. CG16. London, UK: National Institute for Health and Clinical Excellence.
- National Institute for Health and Clinical Excellence. (2011). *Self-harm: Longer-term management*. CG133. London, UK: National Institute for Health and Clinical Excellence.
- Orbach, I., & Bar-Joseph, H. (1993). The impact of a suicide prevention program for adolescents on suicidal tendencies, hopelessness, ego identity, and coping. *Suicide and Life-Threatening Behavior*, 23, 120–129.
- Overholser, J. C., Hemstreet, A. H., Spirito, A., & Vyse, S. (1989). Suicide awareness programs in the schools: Effects of gender and personal experience. *Journal of the American Academy of Child and Adolescent Psychiatry*, 28, 925–930.
- Patel, V., Flisher, A. J., Hetrick, S., & McGorry, P. (2007). Mental health of young people: A global public-health challenge. *The Lancet*, 369, 1302–1313.
- Pfaff, J. J., Acres, J. G., & Wilson, M. (1999). The role of general practitioners in parasuicide: A Western Australia perspective. *Archives of Suicide Research*, 5, 207–214.
- Ploeg, J., Ciliska, D., Dobbins, M., Hayward, S., Thomas, H., & Underwood, J. (1996). A systematic overview of adolescent suicide prevention programs. *Canadian Journal of Public Health*, 87, 319–324.
- Power, P. J., Bell, R. J., Mills, R., Herrman-Doig, T., Davern, M., Henry, . . . McGorry, P. D. (2003). Suicide prevention in first episode psychosis: The development of a randomized controlled trial of cognitive therapy for acutely suicidal patients with early psychosis. *Australian and New Zealand Journal of Psychiatry*, 37, 414–420.
- Robinson, E., Titov, N., Andrews, G., McIntyre, K., Schwencke, G., & Solley, K. (2010). Internet treatment for generalized anxiety disorder: A randomized controlled trial comparing clinician vs. technician assistance. *Plos ONE*, 5, 1–9.
- Robinson, J., Hetrick, S. E., & Martin, C. (2011). Preventing suicide in young people: Systematic review. *Australian and New Zealand Journal of Psychiatry*, 45, 3–26.
- Rutter, M., Graham, P., Chadwick, O. F. D., & Yule, W. (1976). Adolescent turmoil: Fact or fiction? *Journal of Child Psychology and Psychiatry*, 17, 35–56.
- Sackett, D. L., Rosenberg, W. M. C., Gray, J. A. M., Haynes, R. B., & Richardson, W. S. (1996). Evidence based medicine: What it is and what it isn't. *British Medical Journal (Clinical Research Ed.)*, 312, 71–72.
- Shaffer, D., Garland, A., Vieland, V., Underwood, M., & Busner, C. (1991). The impact of curriculum-based suicide prevention programs for teenagers. *Journal of the American Academy of Child and Adolescent Psychiatry*, 30, 588–596.
- Silverman, M. M., Berman, A. L., Sanddal, N. D., O'Carroll, P. W., & Joiner, T. (2007). Rebuilding the tower of Babel: A revised nomenclature for the study of suicide and suicidal behaviors. Part 1: Background, rationale, and methodology. *Suicide and Life-Threatening Behavior*, 37, 248–263.
- Slee, N., Garnefski, N., Van Der Leeden, R., Arensman, E., & Spinhoven, P. (2008). Cognitive-behavioral intervention for self-harm: Randomized controlled trial. *British Journal of Psychiatry*, 192, 202–211.
- Stanley, B., Winchel, R., Molcho, A., Simeon, D., & Stanley, M. (1992). Suicide and the self-harm continuum: Phenomenological and biochemical evidence. *International Review of Psychiatry*, 4, 149–155.
- Steele, M. M., & Doey, T. (2007). Suicidal behavior in children and adolescents. Part 2: Treatment and prevention. *Canadian Journal of Psychiatry – Revue Canadienne de Psychiatrie*, 52 (Suppl.), 35S–45S.
- Tang, T. C., Jou, S. H., Ko, C. H., Huang, S. Y., & Yen, C. F. (2009). Randomized study of school-based intensive interpersonal psychotherapy for depressed adolescents with suicidal risk and parasuicide behaviors. *Psychiatry and Clinical Neurosciences*, 63, 463–470.
- Titov, N. (2007). Status of computerized cognitive behavioral therapy for adults. *Australian and New Zealand Journal of Psychiatry*, 41, 95–114.
- Turner, R. M. (2000). Naturalistic evaluation of dialectical behavior therapy-oriented treatment for borderline personality disorder. *Cognitive and Behavioral Practice*, 7, 413–419.
- Vieland, V., Whittle, B., Garland, A., Hicks, R., & Shaffer, D. (1991). The impact of curriculum-based suicide prevention programs for teenagers: An 18-month follow-up. *Journal of the American Academy of Child and Adolescent Psychiatry*, 30, 811–815.
- Whittaker, R., Merry, M., McDowell, H., Faleafa, M., Cargo, T., Ameratunga, S., . . . Rodgers, A. (2009). *ADAPT: A trial of a mobile phone-based depression prevention program for adolescents*. Retrieved from <http://www.tepou.co.nz/knowledge-exchange/research/view/listing/250/>

Received September 6, 2011

Revision received September 17, 2012

Accepted September 20, 2012

Published online March 18, 2013

About the authors

Stefanie De Silva (BA (Hons) is a Senior Research Assistant at the Centre of Excellence in Youth Mental Health, Melbourne, Australia. Her primary research interests are in youth mental health and antecedents of schizophrenia. She worked previously as a case manager at the Early Psychosis Intervention Programme, Singapore, and is currently a candidate in the Doctor of Psychology (Clinical) program at Deakin University, Melbourne, Australia.

Dr. Alexandra Parker (MPsych, PhD) is a Senior Research Fellow and Director of the Headspace Centre of Excellence in Youth Mental Health, Melbourne, Australia. Her primary research interests lie in physical activity and low-intensity psychosocial interventions for young people with depression and anxiety to prevent the development of severe levels of disorder and to improve functioning.

Prof. Rosemary Purcell (MPsych, PhD) is a Principal Research Fellow and Psychologist at the Centre for Youth Mental Health, Melbourne, Australia. Her primary research interests are psychosocial predictors of illness progression in young people, psychosocial interventions for depression and anxiety, and early intervention to prevent or reduce violence and victimization among young people.

Patrick Callahan (MPsych) worked in youth mental health research for 4 years prior to becoming a clinician with particular research interests in depression. He is currently working in the Orygen Youth Health Clinical Program, Melbourne, Australia, as a psychologist.

Ping Liu (MBBS, BBehavSc (Hons)) is currently a PhD student at the School of Psychological Science of the University of Melbourne, Australia. Her main research interests are multitasking performance, the interaction between higher cognitive functions and visual perception, and human visual perception in general.

Dr. Sarah Hetrick (DPsych) is a clinical psychologist and Senior Research Fellow at the Centre for Youth Mental Health, Melbourne, Australia. She undertakes evidence synthesis and holds an NHMRC training fellowship focused on evidence implementation for youth depression. She is a lead investigator on several research projects.

Stefanie De Silva

National Youth Mental Health Foundation
Street Level 2, South Tower,
485 La Trobe St
Melbourne, 3000
Australia
Tel. +61 3 9027 0100
Fax +61 3 9027 0199
E-mail louisa.de@unimelb.edu.au