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Review: Understanding the effectiveness of school-based interventions to prevent suicide: a realist review

Vasumathi Balaguru[1], Juhi Sharma[2] & Waquas Waheed[3]

[1]*Child and Adolescent Mental Health Services (CAMHS), The Elms, 50 Cowley Hill Lane, St Helen's, WA10 2AW, UK. E-mail: vasumathi.balaguru@5bp.nhs.uk*
[2]*General Adult Psychiatry, Black Country Partnership NHS Foundation Trust, West Bromwich, UK*
[3]*Lancashire Care NHS Foundation Trust and the University of Manchester, University Department of Psychiatry, Lantern Centre, Preston, UK*

Background: Schools appear an obvious place to deliver suicide prevention interventions for children and adolescents. The complexity of suicide interventions lead to a paucity of good quality evidence. An alternate approach of information gathering is needed to identify and collate evidence from existing interventions. **Scope:** We completed a realist review of school-based suicide interventions. This is a novel method of understanding complex interventions that uses an iterative approach. In this review, we attempt to clarify and lay out what type of suicide intervention programme might be useful in schools, based on the local needs and context. **Conclusion:** It is possible to develop and implement an evidence-based suicide intervention in schools by understanding the different processes that can contribute to success or failure of these interventions in a real-world setting.

Key Practitioner Message:

- Schools are useful resources for providing suicide interventions in children and adolescents
- Suicide interventions are difficult to evaluate in the real world with no clear evidence for an intervention that is effective
- A realist review can help to understand the context and mechanisms by which interventions work or do not work
- It is important to establish clear pathways for help-seeking prior to delivery of an intervention
- Universal interventions like education about suicide are likely to be beneficial when there is a clear lack of awareness and in rural areas with poor access to mental health services
- Culturally tailored and targeted suicide interventions are likely to work if they are sustained and also enhance family and community support

Keywords: Intervention; prevention; school; self-injury; suicide

Introduction

Suicide accounts for almost 23 per cent of all deaths in people aged 15–24 years. Out of over 4 million annual suicide attempts globally, approximately 90,000 or more adolescents are victims of suicide (World Health Organization, 2008). The actual number is likely to be higher than this figure, due to underreporting and misclassification of deaths in this age group (Wasserman, Cheng, & Jiang, 2005).

Suicide prevention interventions can be implemented at various levels and in different settings. Various reviews in the past decade have identified a variety of interventions in preventing suicide. These range from staff training initiatives to access to means like firearm restrictions. However, there is a clear lack of evidence to support the use of any specific intervention (Leitner, Barr, & Hobby, 2008; Cusimano & Sameem, 2010; Mann et al., 2005).

The lack of evidence can be explained by understanding suicide prevention as a complex intervention. A complex intervention has several components that are subject to large variations (Pawson, Greenhalgh, Harvey, & Walshe, 2005). Some of these components include human intent, and the social and political context at the time of delivery of the intervention. The difficulties in defining, developing, documenting and reproducing complex interventions make it impractical to conduct and compare interventions in the real world (Campbell et al., 2000).

Evaluating complex interventions using a systematic review frequently concludes that there is a lack of clear evidence for any specific treatment due to the stringent requirements for study selection and the amount of data required. A realist review is a novel method that uses a qualitative method of synthesising research, which has an explanatory rather than judgmental focus. A realist review exposes and articulates the mechanisms by which the primary studies assumed the interventions to work (either explicitly or implicitly); gathers evidence from primary sources about the process of implementing

the intervention; and evaluates that evidence to judge the integrity with which each theory was actually tested. In essence, it attempts to clarify 'what works for whom in what circumstances' (Pawson et al., 2005).

Method

The first stage of a realist synthesis study consists of clarifying the intended 'product', for example, what it is that the study wants to know and what it wants to achieve. This informs the identification of relevant programme theories for scrutiny.

Children and adolescents spend the majority of their time in education. Hence, schools have become the platform of choice to deliver interventions. However, there is little evidence to support the use of any specific intervention in schools, which have limited resources to access. The aim of this study was to review the available literature on school-based suicide interventions to identify components or processes that lead to either positive or harmful outcomes of these interventions. This would help in the development and implementation of effective school-based suicide prevention programmes.

Completed suicides are rare events in terms of public health. Hence, it is challenging to deliver and evaluate the effect of interventions by recording an outcome of 'completed suicide'. Suicide interventions therefore aim to identify and reduce the risk factors contributing to suicide. A reduction in the risk factors that can be modified is thus used as targets and indicators of an effective suicide intervention.

This review focused on suicide attempts, which are approximately 20 times more common than completed suicides. National statistics and a broad range of research studies have conclusively established that people engaging in suicidal behaviours are at a substantively increased risk of completed suicide (Hawton, Rodham, Evans, & Weatherall, 2002). The presence of inconsistencies and variations in the use of terms like 'self-harm' and 'attempted suicide' in research have led the authors to include studies that measure the impact of intervention by reporting suicidal thoughts, acts or self-harm. However, they did not include specific intent as an outcome measure.

The inclusion criteria were studies in the English language and interventions designed for suicide prevention that were delivered in school settings and measure the outcomes of suicidal ideas, attempts, self-harm or completed suicides. No restrictions were applied to the type of participant, school or intervention.

Interventions that were not delivered with the primary purpose of suicide prevention, such as general mental health, were excluded, as this would deviate from the focus of the review. It would also require the researchers to consider a different theoretical approach to analyse a combination of complex interventions. Individual intervention, case reports and studies on crisis intervention or postvention were excluded to retain the focus of developing a population intervention.

A recent systematic review of suicide interventions using the gold standard Cochrane detailed method provided an annotated bibliography for reference (Leitner et al., 2008). In this review, only approximately 19 per cent of the primary empirical studies originated from the UK; the majority of the literature originated from the American/Canadian population. The review reported seven studies meeting the study criteria.

The authors repeated the search across 14 electronic databases with a search date extending to 2008 using various wildcard key words for suicide, for example, Suicid* OR selfharm* OR selfinjur* suicid* AND overdos*. Restriction keywords like Interven* OR prevent* OR control* were then used to identify interventions for suicide. However, applying a restriction word of 'school' identified references that were relevant and appropriate to this study. All papers identified were manually searched for school-based interventions satisfying the inclusion criteria. Two additional primary studies were identified and included in the review.

Nine primary studies met the study criteria and were analysed in the review. Replication or follow-ups from the primary studies (Aseltine, James, Schilling, & Glanovsky, 2007; Zenere & Lazarus, 2009; LaFromboise & Lewis, 2008) were included in the synthesis stage to add evidence for or against the theories. This iterative approach to procure new data, which tests whether it strengthens or weakens the theories, is part of realist synthesis (Pawson et al., 2005).

A brief summary of the analysed studies is highlighted in Table 1.

The key steps in a realist review of concept mining (extracting theory from the literature), theory formalisation (extrapolating to a set of explanatory themes) and evidence synthesis (revision and development of the model to explain complex patterns of success and failure) following a step process are outlined in Figure 1.

The first author read the papers and collated information representing each theory in an Excel spreadsheet. The theory areas (Table 2) were explored and papers revisited to clarify the meanings. Two reviewers (authors) independently checked the data using the data extraction form and findings discussed. Studies supporting the proposed theories were considered to be possibly effective.

Results

Table 3 summarises the main theories that influence the effectiveness of school-based suicide prevention programmes.

Theories on why school-based suicide interventions work

Identifies and treats underlying mental illness. Three interventions (Aseltine et al., 2007; Eggert, Thompson, Randell, & Pike, 2002; Vieland, Whittle, Garland, Hicks, & Shaffer, 1991) targeted the underlying psychopathology, predominantly depression, using different methods. The first two reported a significant improvement in depression and a lower rate of suicide attempts. Greater knowledge and more adaptive attitudes about depression and suicide were observed in all of the studies.

Addresses the underlying risk factor of alcohol use. Six of the nine studies were based on the premise that alcohol and drug misuse were risk factors for suicide, and all reported a significant decrease in all suicidal risk behaviours. However, only one (Toumbourou & Gregg, 2002) reported specific outcome measures on alcohol use. Three programmes delivered intensive group sessions for students who were considered a high risk of suicidal behaviours using principles of motivational interviewing (LaFromboise & Howard, 1995; Eggert et al., 2002; Thompson, Eggert, Randell, & Pike, 2001). One programme (Zenere & Lazarus, 2009) delivered education and explored alternatives to alcohol and drugs in the curriculum. Aseltine et al. (2007) did not detail how this was incorporated in the intervention. Toumbourou and Gregg (2002) educated parents about substance misuse, with an intervention group reporting a significant decrease in alcohol initiation and escalation.

Improves problem-solving skills. Six studies (Aseltine et al., 2007; Ross, 1980 and below) included a problem-solving component in their interventions. Of these, four (LaFromboise & Howard, 1995; Eggert et al., 2002; Zenere & Lazarus, 2009; Orbach & Joseph, 1993) facilitated this by discussing alternatives to self-harm and seeking help. These studies reported significantly fewer suicidal attempts without a concomitant decrease in

Table 1. Papers included in review

Author	Name of programme, country	Intervention	Study design	Delivery of intervention	Intervention delivered by
Aseltine & DeMartino, 2004; Aseltine et al., 2007.	Signs of Suicide (SOS), Connecticut, USA	Universal Suicide awareness and self screen	Experimental, RCT	In class video with anonymous self screen for depression, over 2 days	Teacher
Eggert, Thompson, Herting & Nicholas, 1995; Thompson, Eggert & Herting, 2000.	Reconnecting youth, PGC (personal growth and control programme), Seattle, USA	Indicated, Targeted high risk group Education, Screening and skills intervention	Repeated measures design	Groups Over 1 or 2 semesters	Trained research staff
LaFromboise & Howard, 1995; LaFromboise & Lewis, 2008.	Zuni life skills programme, New Mexico, USA	Selective Culturally tailored life skills development programme	Quasi experimental	3 times/week over 30 weeks group discussion in language/ art class as part of curriculum	Teachers, assisted by two cultural resource persons
Orbach & Joseph, 1993.	Israel	Universal Education and crisis management	Longitudinal	2 hrs/week, during social issues discussion class for 7 weeks	School counsellor/ psychologist
Randell et al., 2001; Thompson et al., 2001; Eggert et al., 2002.	Reconnecting youth programme, Counsellors care (C-CARE) and Coping and Support training (C-CAST), Seattle, USA	Indicated Screening, Skills development in high risk school drop outs	RCT	Group 2 times/week over 6 weeks	Trained research staff
Ross, 1980.	San Mateo, California, USA	Universal, Awareness and gatekeeper	Qualitative	In class group discussions and leaflets 1 year duration	Teacher/personnel-dealing with suicidal student,
Toumbourou & Gregg, 2002.	The Resilient families programme, Parenting adolescent: A creative experience (PACE), Australia	Universal Empowerment based parent education groups-Gatekeeper training	Nonrandomised control group comparison	Parent education group within school- 7 sessions	Graduate level facilitator
Vieland et al., 1991.	USA	Universal Suicide education Programme	Group comparison	Session in Class as part of curriculum	Trained research staff
Zenere & Lazarus, 1997.	Dade Country department of crisis management prevention programme (DCPS), TRUST, Miami Florida, USA	Universal Suicide prevention and crisis management	Retrospective follow-up	Within health education coursework for 1 semester	3 counselling professionals at school

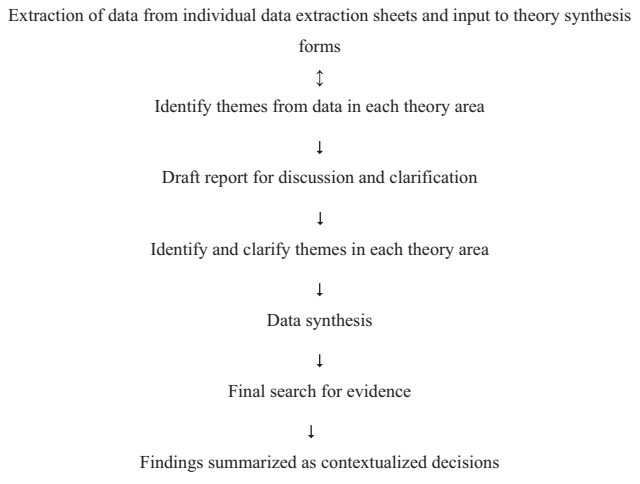

Figure 1. Steps in realist synthesis. Extraction of data from individual data extraction sheets and input to theory synthesis

suicidal ideas. One programme (Toumbourou & Gregg, 2002) trained parents on group problem-solving, with a non-significant decrease in self-harm.

Provides support and stress coping skills. Suicidal ideas and behaviours are considered early warning signs of emotional distress and an inability to cope with stress. The first two of three studies (Ross, 1980; Zenere & Lazarus, 1997; Orbach & Joseph, 1993) based on this theory established school-based crisis teams and reported an increase in referrals for help.

Addresses cultural barriers and taboos around suicide. The Zuni Life Skills Programme (LaFromboise & Howard, 1995) was the only one that delivered a culturally tailored intervention and reported a significantly lower suicide probability, improved problem-solving and hopelessness. The ethnic minority group in one universal education programme had a more adaptive attitude towards depression and suicide after intervention (Aseltine & DeMartino, 2004).

Theories on why suicide prevention programmes do not work

Clarifies myths about suicidal attempts and suicide. Universal awareness programmes providing information demonstrated an improvement in knowledge and an adaptive attitude towards depression and suicide. However, this was not associated with an increase in help-seeking behaviours and did not correlate with the higher number of suicidal attempts reported by females (Aseltine et al., 2007; Vieland et al., 1991).

Table 2. Theories explored for realist synthesis

Properties of the people and context in suicide intervention	Need for developing the intervention Impact of funding Perceived acceptability for the intervention Impact of scale of implementation
Issues involved in development of intervention	Impact of delivery of similar intervention in past Concept of suicide proposed Type of intervention Ethical issues
Factors enabling/barriers in delivery of intervention	Resource impact on school (timings, school organisation, equipment) Links with mental health services Staff training required Parent/student consent Target group School demographics Extra resource in recruitment/retention (pilot)
Issues surrounding the delivery of intervention	Form of delivery Structured manual Ongoing supervision/support Duration Changes during course

Table 3. School based suicide interventions: key factors

Theories of why school based suicide prevention work	Identifies and treats mental illness Addresses risk factor of use of alcohol Improves parents understanding of the problem Improves problem solving skills Supports and improves coping skills in stress Addresses cultural barriers and taboos around suicide
Theories of why suicide prevention programmes do not work	Clarifies myths about suicidal attempt and suicide Fails to foster peer support Fails to address confidentiality issue for seeking help Intervention too short Lack of ongoing support from mental health services Lack of family support and resources outside school
Theories not explored though identified	Restricts access to means of suicide (drugs, alcohol, firearms, sharps)

Fails to engage parents. A significant improvement in suicidal behaviours and other risk factors such as delinquent behaviour and substance misuse was reported in the study that directly involved parents (Toumbourou & Gregg, 2002). Active involvement of parents, like informing parents of risk by telephone or during assessment, also demonstrated better outcomes (Eggert et al., 1995, 2002; Randell, Eggert, & Pike, 2001; Thompson et al., 2001).

Fails to foster peer support. The Zuni Life Skills Programme (LaFromboise & Howard, 1995) was the only study that directly attempted to educate students in identifying and acknowledging the suicidal ideas expressed by peers and providing them support to seek help from a responsible adult. Upon evaluation, the intervention group showed better intervention skills on behavioural observation than the peer ratings. The responses were better in mild than severe suicide scenarios. In one programme (Vieland et al., 1991), fewer girls in the intervention group had talked to a friend their about personal or emotional problems compared with the control group.

Fails to address confidentiality concerns in seeking help. One study (Ross, 1980) trained staff on confidentiality versus duty to warn. It also conducted a group discussion with students, focusing on the reluctance of the suicidal person, for example anxiety, hostility, fear and ignorance, to seek help. They reported an increase in requests for direct counselling and calls for assistance. Aseltine et al. (2007) identified barriers in help-seeking due to concerns over confidentiality highlighted by students in informal discussions postintervention. This review found that interventions promote increased self- or peer recognition of depression and mental illness. However, the onus of seeking help was on the young person. Concerns and uncertainty about confidentiality can suppress individuals from seeking help from staff or professionals.

Intervention delivered were of too short duration. Brief education lasting 1.5 hrs or skills programmes lasting longer than a few weeks did not result in any significant decrease in suicidal attempts (Vieland et al., 1991; Eggert et al., 2002). On the other hand, comprehensive screen assessments lasting approximately 4 hrs (Eggert et al., 2002; Thompson et al., 2001) appeared to be effective in high-risk groups.

Lack of ongoing support from mental health services. One study (Ross, 1980) established ongoing consultation and the provision of crisis response services before implementing the programme. It reported an increased ability of the school staff in recognising signs of suicidal depression and effectively responding to suicidal students.

Other studies that reported no significant improvement in help-seeking after intervention identified various reasons for these, such as a shortage of available staff for dealing with students with mental health concerns, and a lack of information on the nature of and processes involved in psychiatric treatment (Aseltine et al., 2007; Zenere & Lazarus, 2009; Vieland et al., 1991).

Lack of family support and resources outside school. Only one study that directly provided education and support to parents demonstrated a positive outcome with a decrease in delinquency, substance misuse and family engagement measures with adolescents and also an indirect positive effect on the best friend dyad who did not receive intervention (Toumbourou & Gregg, 2002). However, no change was noted in the number of depression or suicidal behaviours. Two programmes that involved preintervention engagement with the community by providing education, and setting personal and community goals as part of the sessions demonstrated decreased suicidal behaviours after intervention (LaFromboise & Howard, 1995; Ross, 1980).

Fails to address previous/repeated suicide attempters. Students who have previously attempted suicide are unlikely to benefit from education or awareness programmes. They may also feel isolated and uncomfortable talking about these experiences in small group settings, where they feel exposed (Orbach & Joseph, 1993). Previous attempters were more disturbed by the programmes than their peers, and there was no clear indication of a particular benefit for this group (Vieland et al., 1991).

Theories not explored even though identified

Restricts access to means of suicide (drugs, alcohol, firearms, knives). This method has been considered effective in community interventions. However, none of the studies reviewed seemed to use this element either in educating staff, family or students in awareness or skills programmes.

Process issues influencing effectiveness

Table 4 summarises the process and measurement issues that impact the delivery of school-based suicide intervention programmes.

Process factors that increase the effectiveness of school-based suicide prevention programmes

Strong evidence across trials. Staff's lack of awareness of dealing with suicide: Studies were effective when staff were keen to receive training. Educating and encouraging staff to 'ask' students about their suicidal thoughts and feelings was considered important for the early identification, treatment and decreasing stigma of suicide. Universal education and gatekeeper programmes have been useful in rural, ethnic minority communities (Ross, 1980; LaFromboise & Howard, 1995).

Recent incident of suicide in school: The occurrence of an incident of self-harm or suicide within a school or community increases motivation of the school and staff to receive training. Awareness is increased and the possibility of resource allocation provides fertile ground for interventions. Incidents or rising local suicide rates have led to the development and delivery of two studies (Ross, 1980; LaFromboise & Howard, 1995), both of which reported significant improvements in their outcomes.

Programme uses multiple presentation methods: Raising awareness through multiple modes can increase the chances of delivery of programme theory and also reach a wider audience, for example, school personnel, family or school visitors and community services. Four studies

Table 4. Processes that influence effectiveness of school interventions

Processes improving effectiveness	
Strong evidence across trials	Staff lacking awareness Recent incident of suicide/attempt in school Programme use multiple methods of presentation Intervention tailored for high risk groups Interventions have been piloted and have longer implementation history
Limited evidence across trials	Resource/manuals provided for persons delivering intervention Programme incorporated in routine classes/curriculum Anonymity in data collection Programme presents suicide as related to mental illness
Possible factors that might be tested in future studies	Overflow effect of intervention Delivered by experts Age of students
Processes decreasing effectiveness	
Peer support skills of students	
Intervention not sustainable or resource intensive	
Processes which need to be tested in future studies	
Measures to increase awareness/recruitment	
Existent suicide prevention strategies and awareness can accentuate effect	
Measurement issues impacting evidence of effectiveness	
Measuring fidelity of intervention	
Measuring risk/protective factors	
Measurement of drop-outs	
Baseline comparisons	
Measuring outcomes	

(Ross, 1980; LaFromboise & Howard, 1995; Aseltine et al., 2007; Toumbourou & Gregg, 2002) used multiple delivery modes for the programmemes like pamphlets/brochures, didactic lectures, workshops, group discussions, videos, role-play and newsletters.

Intervention tailored for target groups: Targeted interventions for high-risk groups showed an improvement in suicidal risk behaviours. These programmes provided frequent face-to-face sessions, provided a case manager or link person to seek help in crisis (Thompson et al., 2001; Eggert et al., 2002), used multiple components (awareness, screening, skills programme) with long periods of intervention, and also included parental or community involvement (LaFromboise & Howard, 1995; Toumbourou & Gregg, 2002).

Interventions have been piloted and have a longer implementation history: Interventions developed and funded under local and national initiatives for suicide prevention with the provision of adequate resources that were piloted before implementation demonstrated better outcomes and acceptability (Ross, 1980; LaFromboise & Howard, 1995; Aseltine et al., 2007; Eggert et al., 2002). Long-term established programmes with modified delivery of intervention and outcome measurements resulted in adherence to the research methodology and effectiveness (Zenere & Lazarus, 2009). On the contrary, the withdrawal of resources resulted in decreased programme engagement and no sustained improvements in outcome (Toumbourou & Gregg, 2002).

Limited evidence across trials. Resource/manuals provided for persons delivering the intervention: Most of the awareness programmes and some brief group skills programme were provided with back-up resources, guides and manuals to conduct the study (LaFromboise & Howard, 1995; Ross, 1980; Aseltine et al., 2007; LaFromboise & Howard, 1995; Toumbourou & Gregg, 2002; Zenere & Lazarus, 1997). The provision of resource manuals or guides may ensure standardised delivery of an intervention and also reach higher target numbers. However, it appeared to have little impact on the outcomes.

Programme incorporated into routine classes/curriculum: Two studies (Aseltine & DeMartino, 2004; Vieland et al., 1991) were presented as part of the curriculum. Two programmes (LaFromboise & Howard, 1995; Orbach & Joseph, 1993) also incorporated it into specific classes, whereas it was included in another as coursework across all years (Zenere & Lazarus, 2009). None of the above variations seemed to have a specific link to the outcomes.

Anonymity in data collection: Self-reporting and anonymity in data collection has reported a higher recruitment and retention rate and greater post-intervention help-seeking across the studies (Aseltine et al., 2007). A high attrition rate was reported in a study that lacked clarity on ensuring anonymity for the participants (Vieland et al., 1991).

Programme presents suicide as related to mental illness: Presenting suicide as related to mental illness can cause poor outcomes due to the perception of the stigma associated with mental illness. One study reported a decreased positive attitude to seeking help from peers or health professionals, especially amongst girls (Vieland et al., 1991).

Parents actively consenting to intervention: Four programmes (Eggert et al., 1995, 2002; Thompson et al., 2001; Toumbourou & Gregg, 2002) targeting a high-risk group required active parental consent and involvement for an intervention. This improved parents' awareness and involvement during the intervention.

Possible factors that might be tested in future studies. Contamination effect of intervention: Interventions delivered to only a few students or one class within a school can contaminate the effects measured in the

controls. Two studies (Aseltine et al., 2007; LaFromboise & Howard, 1995) attempted to match school allocation to eliminate the overflow effect of intervention. One study (Toumbourou & Gregg, 2002) demonstrated a positive overflow effect in peers identified as 'best friend dyads'.

Delivered by experts: Intervention can be delivered by training already skilled staff or professionals. The latter may be more difficult to sustain, but is generally more economical and acceptable than referring young persons to a mental health service. Most studies attempted to train frontline school staff to deliver the intervention. Three programmes (Orbach & Joseph, 1993; Zenere & Lazarus, 2009; Ross, 1980) provided ongoing supervision and consultation to those individuals delivering the programmes. Two studies requiring longer skill intervention appeared to need more trained staff or intensive training (Eggert et al., 2002; Randell et al., 2001). Two interventions (Toumbourou & Gregg, 2002; LaFromboise & Howard, 1995) used facilitators who had experience working locally with the disadvantaged and families.

Age at time of intervention: Most studies have included teenage students (13–16 years). However, one programme focused on life skills and drug misuse in primary school years (Zenere & Lazarus, 1997).

Process factors that seem to decrease the effectiveness of school-based suicide prevention programmes. Peer support skills lacking in students: Most programmes focused on recognising warning signs and seeking adult help, but they did not appear to directly enhance peer support or relationships. One programme (LaFromboise & Howard, 1995) acknowledged the importance of the age of the students, their cognitive, emotional maturity and their ability to cope with these situations.

Intervention not sustainable or resource-intensive: Only one programme appeared feasible by providing training material and a self-screening questionnaire for students to assess and seek help (Aseltine et al., 2007). Despite poor help-seeking in this programme (attributed to local barriers), it revealed higher acceptability and feasibility for continuation. Two programmes reported difficulties in engaging schools due to resource and technical constraints (LaFromboise & Howard, 1995; Orbach & Joseph, 1993).

Process issues that require testing in future studies. Measures to increase awareness/recruitment: Better awareness and the implementation of varied suicide prevention strategies concurrently can increase the acceptability and effectiveness of new programmes. Ineffective, poorly delivered programmes with low perceived benefit by students, staff or community can lead to poor engagement. Two studies (Ross, 1980; Toumbourou & Gregg, 2002) used advertisements in local newsletters, and television and radio specials to raise awareness and recruitment.

Measurement issues

Most studies appear to employ varied theory models that do not test the direct outcome of interventions. Depression, hopelessness and self-reported suicidal ideas, attempts, and substance misuse are used as indicators of programme effectiveness. Baseline comparisons and measuring the fidelity of interventions were variable, depending on the type, intensity and duration of the intervention. It is important to systematically measure a change in other risk factors, like an improvement in school attendance, academic performance and drug misuse, before and after the intervention to evaluate the direct or indirect effects of these interventions. Measures of an actual repeat in suicide attempts, and local and regional suicide rates in real time can also be helpful to evaluate the impact of interventions.

Discussion

It is not surprising that this review revealed that an ideal suicide prevention programme is one that is long-term, targets all possible risk factors for suicide, engages children, parents, staff and community, and has good accessibility to mental health services. However, this is impractical given the finite resources. There is clearly a need to review the available evidence, acknowledging the use of proximal measures of risk and suicide attempts, rather than the distal rare outcome of suicide as evidence of effectiveness.

This review had a narrow scope, with the evaluation limited to nine studies. However, the authors believe that this focus helped to highlight the key theories and factors that need to be considered when developing or implementing school-based suicide interventions. All studies included were delivered to students in the age range of 13–16 years in mainstream schools, with an almost equal gender representation. Hence, the findings of the review are best applicable to a high school setting. Some of the key ingredients of success in the context of local needs are discussed below.

This review suggests that awareness or education programmes are useful for staff and students with poor knowledge, living in rural areas and having poor access to mental health services. Universal education interventions have a lower probability of drop-outs or refusal to participate. The findings also revealed that populations with a high representation of ethnic minority populations having cultural taboos on suicide may benefit from educational interventions. A positive impact of using an educational pamphlet was reported in rural Australia (Bridge, Hanssens & Santhanam, 2007). In urban areas, students and schools appear to possess awareness and knowledge about suicide (Vieland et al., 1991; Cliffone, 2007). Educating to develop a positive attitude does not necessarily translate into help-seeking or positive coping (Portzky & Heeringen, 2006). It is vital that these interventions incorporate information on access to appropriate support, clarify and provide confidentiality and include sources of self-referral outside school to seek help. Curriculum-based awareness programmes can clarify myths and help in delivering other components of intervention like screening (Aseltine et al., 2007).

Screening for mental illness can be an effective intervention in schools with well-established systems for self-harm and crisis management. Mental health screening with the provision of a school case manager is also useful for students identified as high risk.

Targeted interventions are beneficial in schools located in deprived areas with a high prevalence of youth substance abuse and existing suicide prevention programmes. It is likely to benefit students identified as

high risk due to poor attendance, academic performance, substance misuse and behavioural problems. Longer term outcomes like developing better social skills, incurring fewer problems with the law and increasing the potential for future employment can also translate into a positive outcome of the intervention.

Students who have previously self-harmed may find groups exposing (Orbach & Joseph, 1993). Hence, it is important that interventions do not focus or expose individuals who have problems with self-harm or mental illness. The potential pitfall of drop-out due to stigma can be addressed by offering confidential access to professional help outside school hours or in an alternate setting.

Educating and engaging parents can increase the effectiveness of all interventions. Information pamphlets, telephone discussions, face-to-face contact and the availability of support groups can enhance parents' understanding and their engagement with adolescents. Direct parental engagement is beneficial in adolescents who are at higher risk (like using drugs or school drop-out). Furthermore, establishing clear links with crisis services and services that provide consistent consultation to schools is essential for any intervention to be effective.

Conclusions

This review synthesis lays out some contextual decisions and mechanisms that need to be considered to develop and implement an evidence-based suicide intervention in schools. It may be inferred that some of the key processes identified to contribute to the success of these interventions in the school setting would also be applicable to interventions in other settings, such as parental and community education, engagement and access to the right support and services.

Interventions are likely to be effective when they are sustained and involve peers, parents and the community during delivery. Comprehensive suicide prevention strategies incorporating all components can still fail in the presence of severe youth, parental psychopathology and adverse social circumstances due to poor engagement in the intervention. Hence, it is recommended to deliver locally designed interventions with clear theories, pathways and evaluation methods that can contribute to building on the available evidence.

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