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Efficacy of Suicide Prevention Programs for Children and Youth

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SUMMARY

- The Canadian Association for Suicide Prevention reported in 1994 that some 70,000 to 100,000 young people per year attempted suicide to varying degrees. In 1997, suicide was the second leading cause of death for children aged 10 to 14 years and for adolescents aged 15 to 19 years.
- In response to the increase of youth suicide starting in the 1950s, numerous suicide prevention programs have been developed and expanded since the early 1970s. Although extensive attempts have been made to prevent youth suicide, there is a lack of published research on suicide prevention programs.
- Two recent systematic reviews evaluated the evidence from a large number of studies to determine the risk factors associated with youth suicidal behaviour. High rates of psychiatric illness and the presence of co-morbid mental disorders primarily characterize young people at highest risk of suicide. Risk factors for complete suicide and attempted suicide are not identical although there is substantial overlap.
- The rationale for introducing curriculum-based education programs is that the majority of suicidal youth come to the attention of their peers rather than adults. Ten primary studies and two systematic reviews were identified that evaluated school-based suicide prevention programs. No Canadian studies to determine the effectiveness of suicide prevention program for children and youth have been published since 1991.
- The suicide prevention programs varied considerably in content, frequency, duration, and delivery making it difficult to draw general conclusions across studies. The programs' objectives varied as well and even comparison of programs with similar objectives was not possible because of the dissimilarities within the programs themselves.
- Few primary studies on the efficacy/effectiveness of suicide prevention programs for children and youth were rated high for methodological quality in terms of their study design, control of confounding factors and testing of validity and reliability of the outcome measurement tools.
- Two studies using similar approaches for risk stratification provided consistent and encouraging evidence on the effects of the prevention programs in youth at high risk. These studies indicated significant changes in depression, hopelessness, stress, anxiety and anger within the groups. One of studies found an increase in self-esteem and networks support.
- One study on suicide prevention awareness programs for the general population of students indicated a significant improvement in knowledge and attitude.

- Two studies evaluated changes in behavioural and coping strategies in the general population. One study noted lowered suicidal tendencies, improved ego identity, and coping ability with a greater effect in females. The other study identified a reduction in suicide risk, such as improved awareness of distress-coping skill, and other positive changes.
- Two studies published before 1991 indicated that harm may result when students attend a suicide prevention program. All of the primary studies since 1991, except for one, either failed to evaluate the program for harmful effects or showed that no harmful effects were found. The potential for harmful effects indicated in the one study were not verified in a follow up study.
- Most often the significant finding of change due to the prevention programs were within the groups (pre/post changes) rather than significant differences between the control and experimental groups. Thus, the overall findings of this review suggest that there is insufficient evidence to either support or not to support curriculum-based suicide prevention programs in schools.
- The generalizability of the results from these studies to the Alberta context is at question since most of the studies were conducted in the United States and their school demographics appear to be different from those in Canada.
- There is a good opportunity for the Alberta Mental Health Board to sponsor and design a good quality Canadian study in the area of suicide prevention programs for children and youth. The findings from this review may guide program evaluation and research in this province.

DEFINITIONS

Children – according to the scope of this report, children refer to the persons between the ages of 5 and 14 years (inclusive).

Youth/adolescent/young person – refers to a person between the ages of 15 and 24 years (inclusive) according to the WHO definition ⁽¹⁾. Within the scope of this report, youth or adolescent refers to a person between the ages of 15 and 19 years (inclusive).

Suicide – refers to an act with fatal outcome, which was deliberately initiated and performed by the deceased, in the knowledge or expectation of its fatal outcome, and through which the deceased aimed at realizing changes he/she desired ⁽²⁾.

Suicidal ideation – refers to cognition that can vary from fleeting thoughts that life is not worth living, via very concrete, well-thought-out plans for killing oneself, to an intense delusional preoccupation with self-destruction ⁽³⁾.

Parasuicide (suicide attempts) – covers behaviours that can vary from suicidal gestures and manipulative attempts to serious attempts to kill oneself ⁽³⁾. According to WHO definition, parasuicide refers to an act with a nonfatal outcome, in which an individual deliberately initiates a non-habitual behaviour that, without intervention from others, will cause self-harm, or deliberately ingests a substance in excess of the prescribed or generally realized therapeutic dosage, and which is aimed at realizing changes which the subject desired via the actual or expected physical consequences ⁽²⁾.

Suicidal behaviour – may cover a wide range of self-destructive behaviours with a non-fatal or fatal outcome, described by the terms attempted suicide and suicide, respectively ⁽⁴⁾.

Contagion – suicide occurs sometimes in clusters or small epidemics within a relatively short time-span, usually in a small community such as a native village or a school ⁽⁵⁾.

Intervention – actions aimed at immediate management of the suicidal crisis and the longer-term care, treatment, and support of persons at risk ⁽⁶⁾.

- **Universal intervention** – directed at an entire population ⁽⁷⁾.
- **Selected intervention** – directed at individuals who are at greater risk for diseases or disorders than the general population ⁽⁷⁾.
- **Indicated intervention** – targeted at those relatively small groups who are found, by screening programs or other inquiries, to “manifest a risk factor, condition, or abnormality that identifies them, as individually, as being at sufficiently high risk to require the preventive intervention” ⁽⁷⁾.

Prevention – implementation of measures to prevent the onset of suicidal crises by eliminating or mitigating particular “attractive hazards” (situation of heightened risk); by promoting life-enhancing conditions; and by reducing negative societal conditions ⁽⁶⁾.

- **Primary prevention** – control of the factors associated with the emergence of health problems. Primary prevention addresses the general population ⁽⁸⁾.
- **Secondary prevention** – screening and early intervention. Secondary prevention targets individuals at the onset of the pathological condition in the context of screening ⁽⁸⁾.
- **Tertiary prevention** – treatment and rehabilitation. Tertiary prevention targets individuals in a context of treatment when clinical features are present ⁽⁸⁾.

Postvention – activities undertaken to deal with the aftermath of a suicide ⁽⁶⁾. Postvention encompasses several forms of interventions aimed at diminishing the consequences of a suicide, including possible suicidal behaviours among individuals affected by the person’s death ⁽⁸⁾.

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INTRODUCTION

In response to a request from the Alberta Mental Health Board (AMHB), the Health Technology Assessment (HTA) Unit of the Alberta Heritage Foundation for Medical Research prepared this systematic review which assesses the evidence on the efficacy/effectiveness of current suicide prevention programs for children and youth.

Suicide rates in children and youth significantly increased during the last three decades. According to national and international data, a true increase in suicide mortality and morbidity has occurred over most of the 20th century among the White urban adolescent and young adult populations of North America and Europe ⁽³⁾. In the United States, youth suicide among those 15 to 24 years was the third leading cause of death, behind unintentional injury and homicide in 1997 ⁽⁹⁾. From 1980 to 1997, the rate of suicide among teenagers aged 15 to 19 years increased by 11% and among children aged 10 to 14 years by 109% in the United States ⁽¹⁰⁾. High rates of youth suicide have also become a serious public health problem in countries such as Australia and New Zealand ⁽¹⁾. Moreover, it is believed that the actual suicide rates are underestimated.

In Canada, the most dramatic increase in suicide rates occurred in young males aged 15 to 19 years between the 1950s and the end of the 1980s ⁽⁸⁾. In 1997, suicide was the second leading cause of death for children aged 10 to 14 years and for adolescents aged 15 to 19 years ⁽¹¹⁾. The suicide rates among youth in Canada exceeded those in the United States, Australia, and the United Kingdom ⁽¹²⁾.

The possible reasons for the increased suicide rates among children and youth have been identified as the corresponding increase in the prevalence of depressive disorders, substance abuse and substance abuse disorders, psychological changes, particularly the dramatic lowering of the age of puberty, an increase in the number of social stressors with extensive consequences for youth, and changes in attitudes towards suicidal behaviours and the related increased availability of suicidal models ⁽³⁾.

In response to the increase of youth suicide, numerous suicide prevention programs have been developed and expanded since the early 1970s. In 1986/87 there were at least 115 curriculum-based suicide prevention programs that reached over 172,000 high school students in the United States ⁽¹³⁾. Most of these programs had been introduced since 1984 ⁽¹⁴⁾. There are also many school-based programs across Canada ⁽¹⁵⁾.

Although extensive attempts have been made to prevent youth suicide, the results are disappointing because the youth suicide rates still remain high. The question has arisen: are the suicide prevention programs efficacious/effective?

Two recent systematic reviews have been conducted to assess the effectiveness of youth suicide prevention programs ^(16, 17). Evidence from these reviews cannot sufficiently answer the question about the effectiveness of youth suicide prevention strategies. It is recognized that a better understanding of components and mechanisms of suicide prevention programs is required to provide some insights for decision-makers to direct future suicide prevention strategies. This report is aimed to update the evidence on the effectiveness of suicide prevention programs for children and youth, and analyze the elements related to the different prevention programs.

SCOPE OF THE REPORT

Given the very broad range of suicide prevention strategies, it is unrealistic to cover all of them in this report. Thus, the main focus of this review is to present the findings from primary research that assessed the efficacy/effectiveness of suicide prevention programs on school aged children and youth (i.e., ages 5 to 19 years) including school-based or community-based suicide prevention programs. The methodology, including the search strategy, selection criteria, and criteria for analyzing the methodological quality of the primary studies, is provided in Appendix A.

This review also briefly summarizes the findings from systematic reviews on risk factors and protective factors for suicidal behaviours among children and youth. Reduction in common risk factors and enhancement of protective factors informs the choice of outcome measures used in the primary studies which were conducted to determine a prevention program's effect. These systematic reviews were not critically appraised regarding their methodological quality.

EPIDEMIOLOGY

Completed suicide

It has been estimated that each year in Canada some 700 young people between the ages of 15 to 24 years, and some 25 to 30 children under the age of 15 years take their own lives ⁽¹⁸⁾. In 1997, the suicide rates for young Canadians aged 10 to 14 years and 15 to 19 years were 2.5 and 12.9 respectively per 100,000 ⁽¹¹⁾. A total of 312 children and youths aged 10 to 19 years took their lives in 1997 ⁽¹¹⁾. Suicide rates among Canadian males aged 15 to 19 years in 1992 was 20.1 per 100,000 compared to 5.1 in 1962, 13.8 in 1972, and 20.9 in 1982. Suicide rates among Canadian females aged 15 to 19 years was 5.4 per 100,000 in 1992 compared to 1.3 in 1962, 4.2 in 1972, and 3.1 in 1982 ⁽⁶⁾. Young males tend to complete suicide more often than females ⁽⁶⁾.

Statistics indicate that suicidal behaviours vary with age. Complete suicide is rare in children under the age of 10 years ⁽⁶⁾. In Canada, suicide rates for those

aged 1 to 14 years were 0.9 per 100,000 in 1997⁽²⁰⁾. In the United States, suicide rates for children aged 5 to 9 years was 0.02 per 100,000 in 1997⁽²¹⁾. In New Zealand, where youth suicide rates are higher than the average suicide rate for the entire population among the Organization for Economic Co-operation and Development countries, death by suicide before 15 years of age continues to be extremely rare (on average between 0 to 4 cases per annum between 1991-1996)⁽¹⁾. Although this may reflect the fact that children do have lower suicide rates, it may also indicate that many agencies responsible for certifying death choose not to accept the fact that children commit suicide⁽²²⁾.

Suicide rates for those aged 5 to 14 years have been positively correlated with the rates of those aged 15 to 24 years ($r = 0.65$). Thus, the nations with a higher rate of suicide in those aged 15 to 24 years also had a higher rate of suicide in those aged 5 to 14 years⁽²²⁾.

In Canada, hanging and firearms were the most commonly used means to commit suicide by both males and female aged 10 to 14 and 15 to 19 years in 1998⁽²³⁾.

Suicide rates among First Nation young people are high. The average suicide rate among First Nation youth aged 10 to 19 years for the period 1986-1990 was 37.0 per 100,000 which is much higher than the rate for the Canadian population as a whole⁽¹²⁾.

Suicidal ideation and suicide attempts

A number of surveys have been conducted to estimate the prevalence of suicidal ideation and attempted suicide among young people. A Canadian survey of 2,850 students between 12 and 18 years found that the estimated lifetime prevalence of suicidal ideation was 15.4% and attempts was 3.5%⁽²⁴⁾.

The Ontario Child Health Study interviewed 3,294 students between 12 and 16 years from 1,869 families and found that 5% to 10% of the male and 10% to 20% of the female students reported suicidal behaviour within a six-month period. Suicidal behaviours were related to psychiatric disorder, family dysfunction, and parental arrest⁽²⁵⁾.

The Canadian Association for Suicide Prevention reported in 1994 that some 70,000 to 100,000 young people per year attempted suicide to varying degrees⁽¹⁸⁾. Prevalence of youth suicide attempts is typically in the range of 3% to 10%⁽²⁶⁾. Suicidal ideation seems to be more prevalent among females during adolescence⁽²⁷⁾.

In summary, suicidal ideation is rather common in adolescence. Young males have higher rates of completed suicide, while young females are more likely to attempt suicide⁽¹⁾.

RISK FACTORS FOR SUICIDAL BEHAVIOURS

Numerous studies have been conducted to investigate the risk and protective factors associated with youth suicidal behaviours. Two recent systematic reviews by Beautrais ⁽²⁸⁾ and Hider ⁽¹⁾ applied broad inclusion criteria and evaluated the evidence from a large number of studies with different study designs such as meta-analysis, randomized-controlled trials or controlled trials, cohort studies, case control studies, and descriptive studies. Methodological quality of studies included in the reviews was critically appraised by assigning level of evidence and making comments on relevant methodological limitations.

These two reviews applied the same conceptual framework for the domains of risk factors. The risk factors for suicidal behaviour among youth are multi-factorial, complex, and probably inter-related. Risk factors contributing to youth suicidal behaviour were categorized into the following six domains: (1) social and demographic factors; (2) family and childhood experiences; (3) personality traits and cognitive styles; (4) genetic and biologic factors; (5) psychiatric morbidity, and (6) environmental and contextual factors. The findings from these reviews will be summarized within the six domains.

Social and educational disadvantage

The majority of studies included in the reviews found association between low socioeconomic status (SES) and suicide and suicide attempt risk, while a few studies failed to find any association. Although evidence in this area has been somewhat inconsistent, research that has employed a prospective study design or has been well conducted provided relatively strong evidence of an association between low SES and poor educational background with increased risk for youth suicidal behaviour. The reason for the inconsistency of evidence is unclear but may reflect sample collection characteristics.

Family adversity and childhood experience

A large number of studies assessed in the reviews found that young people with suicidal behaviours largely come from disadvantaged and dysfunctional family backgrounds. Evidence consistently suggests an association between suicidal behaviour and parental psychopathology (including substance abuse disorder, affective disorders, antisocial behaviours, and a family history of suicide), parental loss by separation/divorce (but not by parental death), impaired parent-child relationships, and a history of physical and sexual abuse during childhood.

However, the linkage between adverse family and childhood experience and risk of subsequent suicidal behaviour needs to be viewed with caution. The majority of studies suffered from a number of methodological limitations including use of selected samples, different measurement tools, variations in definitions of risk

factors, and variations in the extents to which risk factors have been controlled within the study's design or analyses of results.

Wagner ⁽²⁹⁾ argued that the majority of studies failed to show that exposure to family adversity is temporally antecedent to the onset of suicidal behaviours. Thus, no strong conclusions about the causal role of family factors may be drawn. On the other hand, as Beautrais ⁽²⁸⁾ pointed out, temporal sequencing is only one of a series of criteria that may be used to draw causal inference. Other criteria include evidence of dose-response, replication, and theoretical plausibility.

Personality and cognitive attributes and sexual orientation

A number of studies within the reviews found an association between youth suicidal behaviour and personality disorders (including antisocial, borderline and avoidance disorders) or traits (including self-esteem, hopelessness, impulsivity, anger, and aggressiveness). Generally, the evidence for an association between suicidal behaviour and personality disorders was more convincing than that available for a relationship between suicidal behaviour and personality traits among young people.

Several methodological difficulties contributed to the weakness of the evidence in relation to the association of suicidal behaviour and personality traits. First, self-reports of personality characteristics may be contaminated by current mental state factors including the presence of current depressive disorders. Second, personality characteristics might be less clearly apparent among young people than older individuals. Thirdly, among young people, it might be difficult to distinguish behaviours which represent mental disorder and those which are emerging personality characteristics, and to determine the extent of co-morbidity between this two sets of risk factors.

There was weak evidence for an association between certain cognitive styles and suicidal behaviour among young people, whereas there was no consistent evidence for a relationship between sexual orientation and suicidal behaviour among young people. Studies that have examined linkages between sexual orientation and suicide attempts have uniformly found increased risks among gay, lesbian and bisexual youth, with risk ratios ranging from 3.6 to 13.9. In contrast, studies examining sexual orientation among suicides have failed to find any association. These findings suggest that sexual orientation may be associated with an increased risk of suicide attempts but not suicide. The fact that assessment of sexual orientation following death by suicide was more difficult to ascertain than sexual orientation among suicide attempters may be explain these findings.

Genetic and biological factors

Evidence from a number of studies within the reviews indicated that higher rates of suicidal behaviour were reported for the families of young people with suicidal behaviour. These findings suggest that possibly genetic factors may be involved; however, it remains unclear how the genetic factors are related to suicidal behaviour. It may be a genetic predisposition to suicide per se, or a genetic vulnerability to psychiatric disorders or to personality types with which suicide is associated.

Little research was available on the relationship between biological risk factors and suicidal behaviour. Some evidence indicated that reduced levels of serotonergic activity exist in the brains of suicide victims and suicide attempters. Altered serotonin levels may be linked to impulsivity or aggression, which have been found to be associated with suicidal behaviour. However, it was not clear if serotonin and its metabolites are related to the suicidal behaviour or to an underlying psychiatric disorder, especially depression.

Overall, the evidence in this area was very limited. No firm conclusion about the role of genetic and biologic factors in suicide risk can be drawn at this stage.

Psychiatric disorders

Results from many studies within the reviews using a prospective cohort or psychological autopsy study design suggested that mental disorders play an important role in the development of youth suicidal behaviour. Results suggested that up to 90% of young people who die by suicide or attempt suicide have at least one mental disorder at the time of their death or attempt. Mental disorders most frequently associated with youth suicidal behaviour were affective (mood) disorders, substance abuse disorders and antisocial behaviours. Many young people who die by suicide or attempt suicide have multiple or co-morbid psychiatric conditions. Evidence suggests that the risk of suicidal behaviour increases with increasing numbers of mental disorders. Studies have reported that up to half of those who die by suicide or attempt suicide have a history of previous suicidal behaviour.

Compared to other social, familial, individual and environmental risk factors, the associations between psychiatric disorders and suicidal behaviour are far stronger. These findings suggest that a person's psychiatric state at the time of suicide attempt and a psychiatric history were more important determinants of suicide risk compared to any other factors describing that person's current social environment.

Environmental and contextual factors

Environmental and contextual factors evaluated by the primary studies included in the reviews may be grouped under the following categories: stressful life

events, suicide contagion and clusters, media influences, access to methods of suicide and protective factors.

Results from a large number of studies suggest that suicidal behaviour among young people was often preceded by a stressful life event such as an interpersonal conflict, loss, or legal/disciplinary problems. However, it is generally recognized that stressful life events commonly occur among adolescents and may act as precipitating factors for suicidal behaviour only when they occur in individuals who are vulnerable to such behaviour. The relationship between stressful life events and suicidal behaviour must be viewed with caution. The responses of a suicide attempter or those of a victim's family to questions about life events leading up to the action may be subject to bias. Potentially the suicide attempter may be suffering from a mental illness that may possibly influence the reporting of their life events. It is also possible that a victim's family may recall more stressful life events prior to a suicide in order to make sense of a tragic death.

Consistent evidence from statistical cluster analysis and other sources suggests that suicidal behaviours have contagious properties. Imitation is one of the methods by which contagion may occur. Suicide may result in suicidal behaviour by those persons who had been associated with the person who committed suicide or by vulnerable young people who become aware of the suicide. Generally, consistent evidence also suggests that media depiction and coverage of suicide was associated with increased rates of suicidal behaviour. Media publicity may increase suicide risk by both encouraging imitation among those vulnerable to suicidal behaviour and by normalizing suicide as a common and acceptable response to resolving one's personal problems and life crises.

Firearms play an important role in youth suicide. Research conducted in the United States strongly suggested that access to firearms is an important factor. The extent to which access to firearms will be a risk for suicidal behaviour appears to vary from society to society, depending on population rates of access to firearms.

Protective factors refer to those factors that appear to reduce the risk for suicide among young people. Relatively little research has been done to identify individual, family and community factors which may protect against suicidal behaviour in young people. The available evidence suggests that factors such as family cohesion, peer group affiliation, good coping skills and problem solving behaviours, positive beliefs and values, and maintaining attitudes against suicide may act to protect individuals.

Young people at highest risk of suicide are primarily characterized by high rates of psychiatric illness and the presence of co-morbid mental disorders. There is a strong association between suicidal behaviour and low SES and poor educational background, previous suicide attempts, family background with dysfunctional

circumstances, and environmental factors and stressful life events. There is a weaker association between suicidal behaviour and personality disorders, impulsive/aggressive personality traits and cognitive ability, and biological factors. Risk factors for complete suicide and attempted suicide are not identical although there is a great deal of overlap.

Suicide and attempted suicide in children and youth may be the result of the interaction of many risk factors at different levels within a youngster's environment including self, family, peers, school, community, culture, society, and the physical environment⁽³⁰⁾. The complexity of youth suicidal behaviour can be better understood in a framework illustrating the various interactions within the different levels. Accordingly, youth suicide prevention strategies may need to encompass a broad array of activities occurring across multiple contexts including mental health promotion, early intervention and prevention, crisis intervention, treatment, school-based efforts, and community-based efforts⁽³⁰⁾. This report focuses only on the effectiveness of prevention strategies of school-based or community-based programs specific for children and youth aged 5 to 19 years.

SUICIDE PREVENTION PROGRAMS FOR CHILDREN AND YOUTH

Suicide prevention programs that have been developed for children and youth include school gatekeeper training, community gatekeeper training, general suicide education, screening programs, peer support programs, crisis centers and hotlines, means restriction, and postvention⁽³¹⁾. These different suicide prevention programs can be divided into two conceptual categories: (1) strategies to enhance recognition of suicidal youth and their referral and (2) strategies designed to directly address known or suspected risk factors for youth suicide⁽³¹⁾.

The programs, which are mostly directed towards teenagers and school staff, and sometimes also to parents, have the following objectives: 1) raise awareness of the problem of suicide among young people; 2) increase knowledge about clinical features of pre-suicidal youngsters; 3) provide both behavioural and informational advice about how to refer adolescents identified as being at risk to appropriate resources; and 4) encourage any suicidal youngsters to disclose their preoccupations in order to obtain appropriate help⁽¹⁴⁾.

Curriculum-based suicide prevention or education programs are the most common approaches offered to school aged children and youth.

Curriculum-based prevention programs are both readily available and are in use by many schools⁽³²⁾. A national survey on American school-based suicide prevention programs revealed that of 115 prevention programs, 89% provided education or training for school staff, 71% had a program for parents, and 96% targeted students⁽¹³⁾.

The rationale for curriculum-based education programs is that the majority of suicidal youth come to the attention of their peers rather than adults. These peer confidants may play an important role in the prevention of youth suicide if they take responsible action on behalf of their troubled peers⁽³³⁾. However, some adolescents, particularly some males, do not respond in an empathic or helpful way to potentially or overtly suicidal peers^(34, 35). The experience of school officials and research to date indicate that only one fourth of teens are likely to take the most responsible course of action of telling an adult about a potential suicidal peer⁽³³⁾. The goal of most curriculum-based programs is to increase the likelihood that students who come into contact with potentially suicidal peers can more readily identify them, will know how to obtain adult help for them, and will be consistently inclined to take such action⁽³³⁾.

EVIDENCE ON THE EFFICACY/EFFECTIVENESS OF SUICIDE PREVENTION PROGRAMS

Ten primary quantitative studies and two systematic reviews^(16, 17) were identified as meeting the inclusion criteria. All studies evaluated school-based suicide prevention programs. Among the ten primary studies, seven were conducted in the United States, two in Israel, and one in Australia. Different prevention programs evaluated in the ten primary studies are detailed in Table 1. Data extraction from each of the primary studies is presented in Table 3 (Appendix B). No Canadian studies to determine the effectiveness of suicide prevention program for children and youth have been published since 1991.

The intervention strategies (outlined in Table 1) evaluated in each of the ten primary studies can be grouped for the purpose of this assessment into four categories: (1) curriculum-based suicide education programs for adolescents at high risk; (2) curriculum-based suicide education programs for general school population; (3) suicide prevention programs for the general school population focused on behavioural change and coping strategies; and (4) postvention programs.

Studies on suicide prevention programs for high risk

Four studies explored the effect of suicide prevention programs on high risk or special needs students⁽³⁶⁻³⁹⁾. Two studies^(36, 39) reported on the same group of high risk students, but the study by Thompson and colleagues⁽³⁹⁾ focused on the intervention 'processes'.

All the studies took place in the United States. The programs were either part of the school curriculum⁽³⁷⁾ or were an elective offering, provided to a diverse ethnic group, and delivered by trained school personnel who were evaluated or observed while delivering the program to ensure consistency.

The high-risk prevention programs provided were different in many aspects:

- **the purpose of the programs:** One focused on presentation of factual knowledge ⁽³⁷⁾ and the others ^(36, 38, 39) intent was to reduce depression and suicide risk behaviours, and enhance protective factors;
- **the frequency:** Two classes each 50 minutes in length ⁽³⁷⁾, 3.5 to 4 hours or 12 1-hour sessions over six weeks ⁽³⁸⁾ versus 90 (one semester) classes or 180 (two semesters) classes each 55 minutes in length;
- **school population:** One program was offered to Grade 10 students only ⁽³⁷⁾, and the other program was offered to students in Grades 9 through Grade 12 ^(36, 39); and
- **identification of at risk population:** Two studies ^(36, 39) used a three stage identification process to identify youth at high risk of school failure and screened for suicide risk; another study ⁽³⁸⁾ used a 2-step process to identify youths at risk for suicide; and the other study ⁽³⁷⁾ subdivided the entire sample only on the basis of the pretest measures of social support, stress, anxiety and hopelessness.

Follow up measurements were conducted at different time intervals. Silbert and Berry ⁽³⁷⁾ carried out measurements at one month after completion of the program and again at two months but only for the experimental groups. Eggert et al. ⁽³⁶⁾ assessed program results immediately after the completion of each semester. For the experimental group who only completed one semester of the Personal Growth Class (PGC), this meant a second assessment at 5 months post intervention after the other group completed the 10 month two semester program. Thompson et al. ⁽³⁸⁾ assessed program results 4 weeks, 10 weeks, and 9 months after the interventions.

Studies focused on similar outcomes such as stress and hopelessness and showed a favourable change in these variables. The outcome measures used, however, were different for each study. The study by Eggert et al. ⁽³⁶⁾ showed a significant decrease in stress and hopelessness for all groups including the control group. The authors noted that this was as an unanticipated effect most likely due to the Measure of Adolescent Potential for Suicide (MAPS) assessment protocol administered to all groups. They suggested that the MAPS assessment protocol appeared to be as effective as the PGC offered to the two experimental groups. The study by Thompson et al. ⁽³⁸⁾ found that all study groups showed some reductions in suicide risk behaviours and emotional distress immediately following the intervention and at the 9-month follow-up. The Counselors CARE (C-CARE) and Coping and Support Training (CAST) interventions were more effective than usual care in sustaining reductions in suicidal ideation, depression, and hopelessness across time. These results appeared promising because they

suggest that two prevention approaches may provide longer-term prevention effects.

The study by Silbert and Berry ⁽³⁷⁾ indicated that levels of stress and hopelessness showed a significant decrease over time in the special needs experimental group, while this change was not noted in the special needs control group. No significant differences however were noted between these groups.

The purpose of the follow-up study by Thompson et al. ⁽³⁹⁾ was to examine the process by which the suicide prevention program, PGC, was hypothesized to reduce depression and suicide risk behaviours. There was partial support for the hypothesis that personal control mediates between support resources and reductions in depression and suicide risk behaviours.

The studies did not include measures for potential harm associated with participating in the suicide prevention programs under study. Since these were high risk students, perhaps a measure for detecting harm should have been included in the study designs as the findings of Shaffer and colleagues ⁽⁴⁰⁾ indicated that adolescents who had histories of previous suicide attempts endorsed more negative attitudes and beliefs about suicide and responded negatively to the suicide prevention programs.

Studies on suicide prevention awareness programs

Five studies evaluated school-based suicide awareness programs ^(14, 33, 41, 42, 43). One of these studies ⁽⁴¹⁾ was a follow-up assessment on a sub-set of the same sample from a previous study ⁽¹⁴⁾. All the studies were conducted in the United States and all programs were curriculum-based.

Shaffer and colleagues ⁽¹⁴⁾ assessed the impact of three school based programs measuring change in the accuracy of students' knowledge, attitudes that might promote suicidal behaviour and attitudes towards receiving help, as well as reaction to the program. Vieland and colleagues ⁽⁴¹⁾ conducted an 18-month follow up on a sub-set of these same students to determine the effects of one of the school-based programs on help seeking behaviours and suicide morbidity. This follow up study, however, failed to detect any program effects.

Ciffone ⁽⁴²⁾ developed his own program that was part of a sophomore level health class. His program had similar objectives as the programs of Shaffer and colleagues ⁽¹⁴⁾. Their program was to affect change in undesirable attitudinal responses about help seeking behaviours, suicide being a solution, and suicide being a manifestation of a mental illness.

Kalafat and colleagues ^(33, 43) assessed the efficacy of a school-curriculum program in achieving an increase in the likelihood that students who come into contact with potentially suicidal peers can identify them, will know how to obtain adult help and consistently be inclined to take such action.

The programs were different in many aspects such as:

- **location of the schools:** Three studies ^(33, 42, 43) involved suburban middle class schools, while the other study ⁽¹⁴⁾ involved 11 schools (six demonstration schools and five control schools matched on ethnic distribution, enrollment size and socioeconomic status) of which five were in urban, two in suburban, and four in rural/suburban communities;
- **incorporation of program in the school curriculum:** Two studies ^(33, 42) provided the suicide awareness lessons during health classes while another ⁽⁴³⁾ offered the program during a fall marking period. In the other study ⁽¹⁴⁾, three different stand alone programs were provided;
- **duration and frequency:** Kalafat and Elias ⁽³³⁾ assessed a program that was delivered in three 40 to 45 minute participatory sessions; another study ⁽⁴³⁾ was provided over five regular classes. Ciffone's ⁽⁴²⁾ program involved the distribution and review of written material on day one and a 15 minute video followed by 40 minutes of discussion on day two. The other study ⁽¹⁴⁾ evaluated three different programs varying from 4 hours to 1-1/2 hour classes;
- **target population:** One of the three curriculum programs were provided to Grade 10 urban minority students ⁽¹⁴⁾. Kalafat and Gagliano ⁽⁴³⁾ offered the program to Grade 8 Caucasian students and the other study ⁽³³⁾ provided its program to Grade 10 middle class students;
- **outcome measures:** One study ⁽³³⁾ used items drawn from published curriculum assessment instruments and from a pool of items developed by the teachers who delivered the program. The other study ⁽⁴³⁾ used two simulation conditions to measure pre/post responses. Ciffone ⁽⁴²⁾ used an attitudinal survey and the other study ⁽¹⁴⁾ used a 48 item self administered questionnaire for the experimental group and the controls received a version that omitted the program evaluation portion; and
- **length of follow up:** Ciffone ⁽⁴²⁾ measured at 4 weeks, Kalafar and Elias ⁽³³⁾ measured at 3 weeks. Similarly the study by Kalafat and Gagliano ⁽⁴³⁾ measured at 2.5 weeks after the last session and the other study measured at 4 to 6 weeks and an 18 month follow up was also conducted on a subset of Grade 9 students receiving only one of the programs.

All researchers agreed that these numerous programs show some promise. Since the measures used to determine program effects varied as well as the programs themselves, no general conclusions can be drawn.

All studies, with the exception of the one by Kalafat and Gagliano ⁽⁴³⁾, focused on the potential harm that the suicide prevention programs may have had on the experimental students. Kalafat and Elias ⁽³³⁾ noted that all students in both the control and experimental groups disagreed with the statement "that talking

about suicide in class makes some kids more likely to kill themselves". Both groups agreed with the statement that "talking about suicide in class makes it easier for some kids to ask for help".

Shaffer and colleagues⁽¹⁴⁾, on the other hand, found that program attendance was associated with a significantly higher proportion of students who changed their initial response. The response that they did not feel suicide could be a reasonable solution for people who have a lot of problems changed to a positive response after program attendance. This effect was greater among males, Blacks, and those exposed to Program 1. The 18 month follow up study by Vieland and colleagues⁽⁴¹⁾, however, showed that there was no evidence that the program (in this case only Program 3 was studied) had an effect on suicide attempt rates among exposed teens. Of the experimental group 2.5% reported having made a suicide attempt compared to 2.7% in the control group.

Ciffone⁽⁴²⁾ measured his program's effect indirectly by comparing the change in the response of the experimental group to the question: "For people who have a lot of problems, I think suicide is never/possible solution." Of the 203 students in the experimental group, 31 had an undesirable attitude at pretest. At post test 14 of the 31 students with the undesirable attitude gave up the idea that suicide is a possible solution.

Studies on suicide prevention programs for behavioural change and coping strategies

Two studies^(44, 45), both of which were conducted in Israel, assessed school based prevention programs.

Klingeman and Hochdorf⁽⁴⁵⁾ evaluated the effectiveness of an intervention program based primarily on Meichenbaum's three-phase intervention model designed to improve coping with distress and enhance awareness of and response to peers in distress. Orbach and Bar-Joseph⁽⁴⁴⁾ evaluated a program which is an expansion of an approach advocated by Ross aimed to improve coping with stress through an introspective exploration of experiences and feelings related to suicidal tendencies.

The programs were different in other respects:

- **technique of delivery:** Emotion oriented and group centered workshops versus cognitive-oriented and structured didactic classes⁽⁴⁵⁾;
- **duration and frequency:** One hour sessions per week over 12 weeks⁽⁴⁵⁾ versus two hour sessions per week over 7 weeks⁽⁴⁴⁾;
- **target population:** Grade 8 students (low to middle class) from one school versus high school juniors from five normal middle class schools and one special high school (students with conduct disorders but normal intelligence⁽⁴⁴⁾); and

- **outcome measures:** Hopelessness, ego identity, and coping scales versus loneliness scale, index of empathy, semantic differential, knowledge assessment, and story completion ⁽⁴⁵⁾.

Both studies used the Israeli Index of Potential Suicide (PSI) as a measure of outcome and post-tests were conducted at similar times after the intervention (1 to 3 week intervals versus 2 weeks). Klingman and Hochdorf ⁽⁴⁵⁾ noted that boys in their study showed a significant reduction on PSI but not girls, which was not the case in the Orbach and Bar-Joseph ⁽⁴⁴⁾ study that noted the opposite findings.

They tried to explain this difference by noting that the age of the study population and the focus of the programs were different. Researchers from both studies agreed that the measures used can not be extrapolated to predict behavioural change.

An evaluation of the programs was included in both studies. No negative or harmful effects due to exposure to the programs were found.

Studies on postvention programs

Only one study by Hazell and Lewin ⁽⁴⁶⁾ evaluated postvention counselling provided to students (close friends of the deceased) from Grades 8 to 11 at two schools within 7 days of the committed suicides. This study evaluated the effectiveness of only one component of the postvention program. At 8 months follow up there were no differences in outcomes measured between counselled students and matched controls. The authors note that it is reassuring that no apparent harm was done to the counselled students but disappointing that no benefit of counselling could be demonstrated.

Table 1: Description of prevention programs in primary studies

Study	Theory	Intervention	Contents	Delivery
<p>Eggert et al. 1995 ⁽³⁶⁾</p> <p>Reducing suicide potential among high-risk youth: Test of a school-based prevention program</p> <p>Thompson et al. 2000 ⁽³⁹⁾</p> <p>Mediating effects of an indicated prevention program for reducing youth depression and suicide risk behaviours</p>	<p>Suicide-risk factors and protective factors emerge as a function of the individual within a network of social relationships. The content and strategies of the intervention were derived from integration of strain, social learning, and social control theories.</p>	<p>Duration/frequency:</p> <p>PGC I: 1-semester class (5 months or 90 class days);</p> <p>PGC II: 2-semester class (10 months or 180 class days).</p> <p>55 minutes per class.</p> <p>All groups had the MAPS assessment.</p> <p>Follow-up: 5 and 10 months</p>	<p>Fundamental components of the program- Personal Growth Class (PGC) included (1) a small-group (12 students) work component characterized by social support and help exchanged in group leader-to-student and peer-to peer relationships; (2) weekly monitoring of activities targeting changes in mood management, school performance and attendance, and drug involvement; (3) life skill training in self-esteem enhancement, decision making, personal control, and interpersonal communication.</p>	<p>School personal (teacher, counselor, or school nurse) experienced and trained in interpersonal skills for working with high risk youths.</p> <p>On-going weekly teacher training sessions and videotaped evaluations.</p>

Table 1: Description of prevention programs in primary studies (cont'd)

Study	Theory	Intervention	Contents	Delivery
<p>Thompson et al. 2001 ⁽³⁸⁾</p> <p>Evaluation of indicated suicide risk prevention approaches for potential high school dropouts</p>	<p>Suicidal behaviours are linked to school performance factors. Suicidal ideation is associated with weak academic orientation, attempts are related to deficits in school performance, and suicides often follow long absences from school. These vulnerable youths are at risk for suicide and manifest co-occurring risk factors that intensify their suicide risk. Indicated prevention programs are needed to prevent escalating suicide risk among youths at high risk for suicidal behaviours.</p>	<p>Duration/frequency: Counselors CARE (C-CARE): 3.5 to 4 hours; Coping and Support Training (CAST): 12 1-hour sessions over 6 weeks; Control (usual care): 15-30 minutes. C-Care and CAST groups had MAPS assessment. Follow-up: 4 weeks, 10 weeks, and 9 months</p>	<p>C-CARE consisted of (1) a 2 hour one-to-one computer-assisted suicide assessment; (2) a brief motivational counseling session to enhance empathy and support, deliver personal information, reinforce positive coping skills and help-seeking behaviours, and increase access to help; and (3) social connections intervention to link each youth with school personnel and parents to enhance immediate support, access to help, and communication between the youth, school personnel, and parents.</p> <p>CAST: a small group skill-training and social support intervention combined with C-CARE individual approach. Each session included helping youths apply newly acquired skills and gain support from family and other trusted adults.</p>	<p>C-CARE: trained research staff, typically advanced-practice nurses or social workers.</p> <p>CAST: trained, experienced, master's-level high school teachers, counselors, or nurses.</p>
<p>Silbert & Berry 1991 ⁽³⁷⁾</p> <p>Psychological effects of a suicide prevention unit on adolescents' levels of stress, anxiety and hopelessness: implications for counselling psychologists</p>	<p>Suicide may be associate with the levels of stress, anxiety, hopelessness and social support.</p>	<p>Duration/frequency: Two 50-minute class sessions for lessons one and two of the suicide prevention unit. Posttest: one month after intervention Follow-up test: two months after posttest</p>	<p>Lesson 1: understanding teenage suicide and learning to cope with depression; Lesson 2: suicide warning signs and resources for help; Film/video suicide and class discussions and papers as supplementary activities.</p> <p>The personal Wellness Handbook and pamphlet <i>"Be a Winner: Reach Out and Show you Care"</i> provided to all students.</p>	<p>School teachers received an orientation session conducted by the examiner prior to presentation of the suicide prevention unit.</p> <p>Assessor observed portion of class to ensure program was being presented consistently.</p>

Table 1: Description of prevention programs in primary studies (cont'd)

Study	Theory	Intervention	Contents	Delivery
<p>Ciffone 1993 ⁽⁴²⁾ Suicide prevention: A classroom presentation to adolescents</p>	<p>Youth suicide always occurs in the context of a psychiatric illness. The relationship between mental illness and suicide completion should be addressed in the suicide prevention programs.</p>	<p>Duration/frequency: Two-day program Day 1: provision of written materials; Day 2: 15-minute video filmstrip and 40-minute discussion. Follow-up: 30 days</p>	<p>Day 1: distribute and review materials on the warning signs of adolescent suicide and basic intervention strategies with suicidal peers; Day 2: 15-minute video filmstrip "Teens who choose life: The suicide crisis, part II Gail chooses life" 40-minute structured discussion focused on difference between normal and abnormal feelings and stress, relationship between mental illness and suicide, friendship values, coping skills, and resources. A positive self-esteem checklist was distributed at the end.</p>	<p>School health teacher and social worker. Previous training not mentioned.</p>
<p>Kalafat & Elias 1994 ⁽³³⁾ An evaluation of a school-based suicide awareness intervention</p>	<p>Adolescents are often the first to know of a peer's suicide thoughts or plans, thus suicide awareness intervention may help students to identify suicidal peers and to seek help.</p>	<p>Duration/frequency: 3 classes of 40-45 minutes over 1 week. Follow-up: 3 weeks</p>	<p>Lesson 1: focused on information about suicide, attitude toward suicide, and the tunnel thinking that is produced by extreme stress; Lesson 2: addressed warning signs, helping suicidal peers; Lesson 3: included a video about the consequence of failing to respond to a suicidal peer and review of school-based resources. A wallet card with suicide information and local crisis phone number were provided to all students.</p>	<p>School teachers who had taught suicide awareness class in the past and received 2.5 hours training.</p>

Table 1: Description of prevention programs in primary studies (cont'd)

Study	Theory	Intervention	Contents	Delivery
<p>Kalafat & Gagliano 1996 ⁽⁴³⁾</p> <p>The use of simulations to assess the impact of an adolescent suicide prevention curriculum</p>	<p>Open-ended responses to simulations of actual situations may be better estimates of response tendencies in actual situation.</p>	<p>Duration/frequency: Over 5 regular classes. Follow-up: 2.5 weeks</p>	<p>Small-group discussion classes covered effective coping techniques, which emphasized talking about one's concern and seeking help; explained the role of mental health counselling; helped students to identify helpful adults; reviewed suicide myths and facts, and the role of peers in identifying and assisting troubled youths; and demonstrated how to respond appropriately by being empathic and non-judgmental, and obtaining help.</p> <p>Wallet cards with local emergency, mental health, and school resources were distributed to the students.</p>	<p>Consultant from the Youth Services Bureau of a Northeastern suburban community mental health center.</p>

Table 1: Description of prevention programs in primary studies (cont'd)

Study	Theory	Intervention	Contents	Delivery
<p>Shaffer et al. 1991 ⁽¹⁴⁾ The impact of curriculum-based suicide prevention programs for teenagers</p> <p>Vieland et al. 1991 ⁽⁴¹⁾ The impact of curriculum-based suicide prevention programs for teenagers: an 18 month follow-up</p>	<p>The suicide curriculum may increase awareness of suicide-related information and change students' attitude toward suicide and toward seeking help for emotional problems.</p>	<p>Duration/frequency: Program1: 4 hours; Program 2: 3 hours; Program 3: 1 and ½ hours. Follow-up: one month</p> <p>Duration/frequency: Program 3: 1 and ½ hours. Follow-up: 18 months</p>	<p>Three suicide prevention programs aimed to increase awareness of suicide.</p> <p>Program 1: emphasized clinical features of the suicidal adolescent and the need to seek help from professionals; Program 2: emphasized the value of support networks in alleviating stress; Program 3: emphasized problem-solving techniques.</p>	<p>Program1: delivered by professionals and educators with experience with similar programs.</p> <p>Program 2 and 3: delivered by teachers who received 6 to 10 hours of training.</p>
<p>Klingman & Hochdorf 1993 ⁽⁴⁵⁾ Coping with distress and self harm: The impact of a primary prevention program among adolescents</p>	<p>A cognitive-oriented program may be effective through its impact on the major processes that were found to be related to a high risk of distress and self-destructive behaviours, i.e., suicidal tendencies, loneliness, hopelessness, and coping skills.</p>	<p>Duration/frequency: 12 weekly 50 minute sessions. Follow-up: 2 weeks</p>	<p>Three-phase intervention program: Phase 1. educational/conceptual : understanding the nature of distress and the response/ reactions; Phase 2. skill acquisition: developing coping skills, seeking help, and identifying peers' distress/suicidal high risk signs; Phase 3. rehearsal and application: rehearsing and strengthening the acquired skills.</p>	<p>Experienced school counselors or psychologist volunteers who received 3 hour intensive training and structured curriculum guide.</p>

Table 1: Description of prevention programs in primary studies (cont'd)

Study	Theory	Intervention	Contents	Delivery
<p>Orbach & Bar-Joseph 1993 ⁽⁴⁴⁾</p> <p>The impact of a suicide prevention program for adolescents on suicidal tendencies, hopelessness, ego identity, and coping</p>	<p>A gradual controlled confrontation with inner experiences and life difficulties related to suicidal behaviour accompanied by an emphasis on coping strategies can immunize against self-destructive behaviour in the future.</p>	<p>Duration/Frequency: 7 weekly 2 hour sessions. Follow-up: 1 to 3 weeks</p>	<p>The program consisted of two parts: (1) student workshop: emphasized negative and positive aspects, sharing of experience, coping and learning alternative ways to solve problems, and encouraging a self-help and peer-help approach. Topics included depression and happiness, family, helplessness, coping with failure, coping with stress and problem solving, and coping with suicidal urges. (2) staff training.</p>	<p>Trained school counselors and psychologists. They were provided with guidelines and facts for each session and clues on how to handle problems and promote discussions.</p>
<p>Hazell & Lewin 1993 ⁽⁴⁶⁾</p> <p>An evaluation of postvention following adolescent suicide</p>	<p>Postvention is a therapeutic activity directed to the "survivor victims" to alleviate the distress of affected individuals, reduce the risk of imitative suicidal behaviour, and promote healthy recovery of the affected community</p>	<p>Duration/frequency: 90-minute counselling session provided within 7 days of the suicides. Follow-up: 8 months</p>	<p>Counselling session focused on understanding the events that led to the suicide; rumor control; personal reactions following the suicide; an acknowledgement that some students in the group may themselves feel suicidal. Specific advice was given regarding avenues of assistance for students experiencing suicidal ideation.</p>	<p>Child psychiatrist or trainee psychiatrist.</p>

CRITICAL APPRAISAL OF PRIMARY STUDIES

All of the primary studies on suicide prevention programs for children and youth were critically analyzed using a quality measurement tool described by Ploeg et al. 1999⁽¹⁷⁾. This tool was developed, pre-tested and modified in other overviews⁽⁴⁷⁾. The process and rationale for the rating scale are provided in Appendix A. The methodological qualities of the ten primary studies are summarized in Table 2.

Two studies, one on behavioural change and coping skills⁽⁴⁴⁾ and another one that evaluated prevention approaches in high risk youth⁽³⁸⁾, were rated as 'strong'. Four studies were judged 'moderate', which included two studies that examined the effect of curriculum-based suicide prevention programs for at risk students^(36, 37, 39), one study that examined the effect of a prevention program in the general student population^(14, 41), and one study that focused on behaviour change and coping skills⁽⁴⁵⁾. Four studies, with one study being an evaluation of a postvention program⁽⁴⁶⁾ and the other three studies being curriculum-based suicide prevention programs for the general student population^(33, 42, 43), were rated as 'weak'.

The ratings in this review are somewhat different from those of Ploeg et al.⁽¹⁷⁾. A 'strong' rating was assigned to the study by Orbach and Bar-Joseph⁽⁴⁴⁾ in this review, while the study by Klingman and Hochdorf⁽⁴⁵⁾ was rated 'strong' in Ploeg's review and 'moderate' in this review. Studies by Kalafat and Elias⁽³³⁾ and Kalafat and Gagliano⁽⁴³⁾ were rated 'weak' in this review, while they were rated 'moderate' in the Ploeg et al. review. The study by Shaffer et al.⁽¹⁴⁾ and its follow-up study⁽⁴¹⁾ were rated 'moderate' in this review, while they were assigned a 'weak' rating in the Ploeg et al. review. The ratings for the studies by Eggert et al.⁽³⁶⁾ and Ciffone⁽⁴²⁾ were given the same ratings in both reviews. Reasons for the differences are not clear since only global ratings for each study were available in the Ploeg et al. review. One possibility is that the methodological quality criteria were interpreted differently. The intent of the present review was to strictly apply the criteria for evidence of validity and reliability of the outcome measurement tools used in each of the studies. This aspect was considered key when evaluating the efficacy/ effectiveness of the various suicide prevention programs.

Selection bias

Participants in most studies are considered to be representative of the target population. In some studies, however, it is difficult to determine the percentage of the selected individuals that agreed to participate. Some studies did not provide sufficient description of the sample selection procedure and the numbers of individuals in the initial sample.

There were serious limitations in the sampling procedure used in all of the primary studies, although this aspect was not included as one of the criteria in the assessment tool. The sample size was generally too small in the studies. In some studies, the difference in sample size between the experimental and control groups was considerable. For example, in the study of Silbert and Berry ⁽³⁷⁾, the number of students in the experimental groups was 119 to 148, while the number of students in the control groups were only 26 to 30. This difference is likely to influence the detection of a significant effect.

Study design

Among the ten studies, only three studies ^(38, 44, 45) had a randomized control design and two of these studies ^(38, 44) were rated as ‘strong’. None of the three studies provided information about the methods of randomization. The other seven studies used prospective cohort designs that allowed for comparison between experimental and control groups as well as between pretest and posttest measures in each group. One study by Hazell and Lewin ⁽⁴⁶⁾ used a matched case control design using both retrospective and prospective data.

Some researchers did not employ particular criteria in assigning students to either the experimental or control groups. Although a strict random procedure was not used, the “haphazard” assignment based on students being assigned to different classes through the school registration process, was unlikely to produce systematic differences between groups ^(33, 43).

Some researchers discussed the difficulties involved with the randomized study design. These difficulties include, firstly, that the type of prevention program in some cases dictates the design. For example, for the postvention program, it is unreasonable to assign students who were actually exposed through relationship to the suicide victim to a control (no intervention) group ⁽⁴⁶⁾. Secondly, setting up suicide prevention programs in the school class have to follow the school policy and fit into the class schedule; thus it is difficult, without disruption of the class, to randomly assign students into different groups ⁽⁴⁵⁾.

Control of confounders

Some studies provided sufficient information on the characteristics of the participants and the methods (for example, matching) used to control for potential confounding factors ^(14, 36-39, 41, 44, 46), while other studies did not ^(33, 42, 43). Sex, age, ethnic origin, SES, and pretest measurement were considered to be important variables to consider.

Blinding

Most of the primary studies did not report whether the outcome assessors were aware of the intervention status of the participants or if the study participants were aware of the research question. Only one study ⁽⁴³⁾ mentioned that the outcome assessors were blind to the exposure status of the participants. It is likely that students who participated in the studies were not aware of the research hypothesis. Also student identity was held in confidence in several studies by using ID numbers.

Data collection methods

Only four studies ^(36, 37, 38, 44) provided sufficient information on the establishment of validity and reliability of their measurement tools. Some studies only reported testing of reliability, while others only mentioned establishment of validity. In some studies, validity or reliability was only reported for certain scales but not for others. Given that validity and reliability of outcome measurement tools are of critical importance for detecting the impact of suicide prevention programs, the determination of the psychometric properties of measurement tools seems to be lacking for most studies.

Withdrawals and drop-outs

Some researchers did not report the numbers and reasons for withdrawals and drop-outs as well as the percentage of participants completing the study. Some studies provided the numbers of students who did not complete the study but provided no reasons why this happened.

Summary

In summary, few primary studies on the efficacy/effectiveness of suicide prevention programs for children and youth were rated as high for methodological quality in terms of their study design, control of confounding factors and testing of validity and reliability of the outcome measurement tools. Research in the area of suicide prevention for children and youth is considered to be relatively weak.

Some studies may not have provided enough information as a result of restrictions imposed by the publishers. The quality assessors of this review did not have time to approach the researchers of the primary studies and may have assigned lower ratings due to the absence of the information.

Table 2: Methodological quality of primary studies

Study	Component rating*						Global rating
	Selection bias	Study design	Confounders	Blinding	Data collection methods	Withdrawals and drop-outs	
Eggert et al. 1995 ⁽³⁶⁾	Moderate	Moderate	Strong	Moderate	Strong	Moderate	Moderate
Thompson et al. 2000 ⁽³⁹⁾	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate
Thompson et al. 2001 ⁽³⁸⁾	Moderate	Strong	Strong	Moderate	Strong	Strong	Strong
Silbert & Berry 1991 ⁽³⁷⁾	Moderate	Moderate	Strong	Moderate	Strong	Weak	Moderate
Ciffone 1993 ⁽⁴²⁾	Moderate	Moderate	Weak	Moderate	Weak	Weak	Weak
Kalafat & Elias 1994 ⁽³³⁾	Strong	Moderate	Weak	Moderate	Weak	Weak	Weak
Kalafat & Gagliano 1996 ⁽⁴³⁾	Strong	Moderate	Weak	Moderate	Moderate	Weak	Weak
Shaffer et al. 1991 ⁽¹⁴⁾	Moderate	Moderate	Strong	Moderate	Moderate	Moderate	Moderate
Vieland et al. 1991 ⁽⁴¹⁾	Moderate	Moderate	Strong	Moderate	Weak	Moderate	Moderate
Klingman & Hochdorf 1993 ⁽⁴⁵⁾	Strong	Strong	Strong	Moderate	Moderate	Weak	Moderate
Orbach & Bar-Joseph 1993 ⁽⁴⁴⁾	Strong	Strong	Strong	Moderate	Strong	Strong	Strong
Hazell & Lewin 1993 ⁽⁴⁶⁾	Moderate	Moderate	Strong	Moderate	Weak	Weak	Weak

* Ref. Ploeg et al.⁽¹⁷⁾

SUMMARY OF CRITICAL REVIEWS

Two systematic reviews by Ploeg and colleagues ^(16,17), one of which was an update of the previous review, assessed the effectiveness of school based suicide prevention programs. The studies published from 1991 onwards included in the updated systematic review ⁽¹⁷⁾ were the same as the studies included in the present report. Four additional studies, one by Hazell and Lewin ⁽⁴⁶⁾, one by Silbert and Berry ⁽³⁷⁾, and two by Thompson et al. ^(38,39), were included in the present review.

Ploeg et al. published their systematic review in 1996 on the effectiveness of adolescent suicide prevention programs ⁽¹⁶⁾. In this review, the authors analyzed 11 primary studies published between 1980 and 1995. In 1999, the authors updated this review and focused on the effectiveness of school-based curriculum suicide prevention programs for adolescents ⁽¹⁷⁾. According to their modified relevance criteria, nine primary studies published during the period of 1980 to June 1998 were included in their analysis. All nine articles were prospective studies with control or comparison groups and were published in peer-reviewed journals. Only two studies from Israel had randomised control study design.

Their tool for measuring methodological quality is outlined in Appendix A. Major weaknesses identified in the studies included lack of data on the reliability and validity of the collection tools, inadequate control for potential confounders, lack of blinding of outcome assessors and study participants, and selection bias.

The authors found that the evidence existing in the literature indicates mixed results with both significant and non-significant impact on suicide risk behaviours and suicide related knowledge and attitude. The evidence also indicates both beneficial and harmful effects of the intervention. Some studies indicated detrimental effects of the prevention programs on suicide-related attitudes, hopelessness, and coping, particularly among males who are at greater risk for suicide. Based on their assessment, the authors concluded that there is currently insufficient evidence to support school-based curriculum suicide prevention programs for adolescents. They suggest that studies on more broadly based comprehensive school health programs should be evaluated for their effectiveness in addressing the determinants of adolescent risk behaviour.

DISCUSSION

Potential harm of prevention programs

There are some concerns among school staff and parents about suicide awareness interventions for adolescents. There seems to be a general belief that suicidal behaviour will increase if suicide is talked about openly. In addition, talking about suicide may

also promote the use of suicidal threats or gestures as a means of gaining attention or obtaining a desired goal ⁽⁴⁸⁾.

Overholser et al. ⁽⁴⁹⁾ found that after taking the suicide awareness curriculum, male students demonstrated statistically significant increases in the level of hopelessness, less appropriate evaluative attitudes, and an increase in maladaptive coping responses. Males were more likely to feel that discussing suicide could increase a person's risk for attempting suicide, making it less likely that they would be able to deal with suicidal tendencies in an open and constructive manner.

Shaffer et al. ⁽⁴⁰⁾ also found unwanted effects of suicide awareness programs on students who had attempted suicide previously. The 'at-risk students' reaction to the programs were generally more negative than non-attempters. They were significantly less likely to recommend that the programs be provided to other students and significantly more likely to indicate that talking about suicide in the classroom makes some students more likely to try to kill themselves. This research has been widely cited as evidence for the potential harm of suicide prevention programs. However, according to Kalafat ⁽⁵⁰⁾, this may be the most damaging misinterpretation about school-based programs because the number of student attempters was too small in their studies to generalize the results with any confidence.

In addition, one can argue that many young people have already been in contact with the topic of suicide via movies, news reports and music, thus it is necessary to talk about it openly. It has been suggested that the manner of the presentation of the information on suicide is of critical importance ⁽⁴⁹⁾. Portraying suicide in glamorous and romantic ways may cause imitation, while showing suicide as a very real tragedy for family, friends, school, and community may minimize contagion ⁽⁴⁸⁾. Almost all of the primary studies except for one included in this review did not report or failed to report any harmful effects from suicide prevention programs.

Outcome measurement tools

Outcome measures used in the primary studies are described in Appendix C. There was a lack of testing for validity and reliability of the outcome measurement tools employed in the primary studies.

Given the rapid change and development in youth over a relatively short time span, the inclusion in the studies of students of various ages or grades and the differences in their understanding of suicide or suicidal behaviour requires that the validity or reliability of the measurement tools be tested within the population under study. Most studies failed to do this. The two studies conducted in Israel ^(44, 45) raised the question whether outcome measurement tools were age and gender sensitive. Both studies used the same outcome measurement, the Israel Index of Potential Suicide, and found that this tool 'reacted' differently in the two different populations under study. They suggested that age was the cause for this variance.

A common limitation of all of the studies was their dependence on student self-report for the assessment of program impact. The reliability of such measurement approaches is of question. For example, Vieland et al. ⁽⁴¹⁾ found that the self-reported suicide attempt rate obtained in their study was consistent with the self-reported rate in the literature but it was higher than interview-based rates. Moreover, some students changed their answers on certain items that resulted in the researchers questioning the stability of the measurement tools.

Measuring the impact of suicide prevention programs may also be influenced by some other factors related to students' life experience. Silbert and Berry ⁽³⁷⁾ found that instruments measuring stress and anxiety levels are geared towards responses to situational or environmental stresses that exist in the person's life at the time of testing. This may contribute to the detection of a lack of significant differences between experimental and control groups. It is desirable to develop more sensitive and specific instruments to detect the impact or no impact of the various available programs.

Only a few measurement tools have been accepted and used widely. Beck's hopelessness scale is one example. This instrument has been widely used and its validity and reliability has been well established. Most primary studies used this tool to measure feelings of hopelessness. However, in some cases researchers employed different instruments, which were developed by themselves or modified from previously developed tools, to measure the same variable. This makes it difficult to compare the results across studies assessing changes in similar outcomes.

Findings from the primary studies

Although numerous school-based suicide prevention programs have been implemented since the 1970s in North America, there have been relatively few studies that have attempted to evaluate the efficacy/effectiveness of these programs. Only ten primary studies were located that have been published over the last 10 years. Most of these studies were conducted in the United States, while one was conducted in Australia and the other two in Israel. No Canadian studies were found that assessed school-based suicide prevention programs. Hence, the generalizability of the results from these studies to the Alberta context is at question.

All primary studies were conducted either in junior high or high schools. There were no published studies that were conducted in elementary schools. This approach would be supported by the epidemiological data that in Canada suicide is rare in children under the age of 10 years ⁽⁶⁾. Perhaps prevention strategies should be implemented sooner to decrease suicide rates in those aged 15 to 19 years.

Participants in the studies were from a wide range of ethnic backgrounds including Black, Caucasian, and Hispanic, attending schools (Grade 8 through to Grade 12) in urban or rural areas from families with different SES and with an age range of 12 to 19 years. In Canada there, too, is a mix of different cultures and ethnic origins that may be different from those participants included in the primary studies. Based on recent

Canadian epidemiological data, suicide rates among First Nations are higher than that of the general population⁽¹²⁾.

As can be seen from Table 1 and Table 3, the suicide prevention programs varied considerably in content, frequency, duration, and delivery. Thus it is difficult to draw general conclusions across studies. Most interventions were curriculum based school suicide prevention programs while one intervention was group counselling provided as part of a postvention program. The programs' objectives varied as well but even comparison of programs with similar objectives was not possible because of the dissimilarities within the programs themselves.

The suicide prevention programs evaluated in the primary studies were aimed at two different populations - those at-risk or the general student population. Most of the studies focused on the general student population, while a few studies first categorized students as 'at-risk' or 'in need' before the intervention. Studies by Eggert et al.⁽³⁶⁾ and Thompson et al.^(38,39) provided consistent and encouraging evidence on the effects of indicated suicide prevention programs targeting youth at high risk. Eggert et al.⁽³⁶⁾ compared the effects of suicide prevention programs with different frequency and duration and found that a brief MAPS assessment protocol produced similar program effects as one semester or two semester prevention programs. The study by Thompson et al.⁽³⁸⁾ also demonstrated effects of two brief suicide prevention programs. These results may suggest that frequency and duration of the prevention programs, the key components that should play a critical role in the programs' dose-response relationship, may not be the only variable to consider. In other words, if a program does not contain a therapeutic element, even sufficient dosage would not produce any desired program effect.

There continues to be a debate on the most appropriate target group in relation to age and risk. Although a number of risk factors have been identified to be associated with youth suicide, these risk factors are considered to be sensitive but not specific since they have high levels of associations with a broad array of other disorders. It is therefore a challenge to develop a youth suicide prevention program that targets the reduction of specific risk factors. There seems to be some evidence for enhancing protective factors, such as social support and well developed coping skills and this focus may reduce the likelihood of a range of disorders or dysfunctions or suicide⁽⁵¹⁾.

As provided in Appendix C there was also a wide array of outcome measures used. The choice of outcome measure should be related to the program's objective(s) and ideally values of reliability and validity should be established for each instrument in the population under study prior to conducting the study. The measurements of the impact of suicide prevention programs included: changes in knowledge related to suicide, attitude towards suicide, awareness of potential suicide in peers, awareness of help resources, changes in direct and indirect risk factors (suicidal ideation, previous suicide attempts, school dropout, substance abuse, depression, stress, hopelessness, and loneliness), protective factors (perceived personal control, self-esteem, and social

network support) and distress-coping skills. Only one study ⁽⁴¹⁾ measured actual suicide attempts during an 18-month follow-up period.

Discussion of the significant outcomes from each of the primary studies will be done in concert with the analyses of the methodological quality of each of the primary studies as provided in Table 2. Among three primary studies with one follow-up study that evaluated suicide prevention programs for at-risk students ⁽³⁶⁻³⁹⁾, one study ⁽³⁸⁾ was rated as strong and the other three were rated as moderate for their methodological quality. The results from these studies indicated changes in depression, hopelessness, stress, anxiety and anger, as well as improvements in self-esteem and network support, personal control, and problem-solving coping. These changes were most often noted as within group changes rather than significant differences between the experimental and control groups.

There were four studies ^(14, 33, 42, 43) and one follow up study ⁽⁴¹⁾ on suicide prevention awareness programs. Only one study ⁽¹⁴⁾ had a moderate rating while the other studies all had weak ratings in relation to their methodological quality. The main findings reported by Shaffer and colleagues ⁽¹⁴⁾ indicated significant improvement in knowledge and attitude (but only for 3 out of 9 items measuring attitude). As well, gender differences were noted.

Two studies ^(44, 45) on suicide prevention programs stressing behavioural change and coping strategies were found to be strong and moderate in their quality ratings. Orbach and Bar-Joseph ⁽⁴⁴⁾ assessed the effectiveness of their program in six schools, one of which was a special school for students with normal intelligence but conduct disorders. The results were analyzed on a school by school bases as well as by gender. They noted lowered suicidal tendencies in four schools with a greater effect in females at two schools; improved ego identity in three schools, and improved coping ability in two schools. Klingman and Hochdorf ⁽⁴⁵⁾ found a reduction in suicide risk, improved distress-coping skill awareness, and more positive changes in the intervention group.

Only one study ⁽⁴⁶⁾ assessed the effect of postvention programs. This study was rated as weak in relation to its methodological quality and no program effects were detected.

Curriculum-based suicide prevention or education programs are the most common approaches to primary prevention of suicide in children and adolescents. Based on the findings of this review, however, there is insufficient evidence to either support or not to support curriculum-based suicide prevention programs in schools. When, how and if suicide prevention programs should be introduced into schools continues to be of considerable debate.

Research on other aspects of various suicide prevention programs, such as in-service training for educators and other school staff members, training for coaches and leaders responsible for community recreation and arts, firearm management, suicide education for the media, education of family and community members, need to be assessed to determine the level of evidence and the confidence one can place in their findings.

Implication for suicide prevention programs

Implications of the findings from this assessment for prevention programs already established and those to be implemented may best be highlighted by a brief presentation of program elements including a few words on prognostic variables.

Program Objectives

Although the ultimate goal of suicide prevention programs is to reduce the incidence of suicide attempts and completion, it may not be the immediate objective of the program. A prevention program may be only one of many strategies to achieve the overall goal to reduce suicide rates among children and adolescents.

For example, in the primary studies reviewed in this report, the goals/objectives of the school-based suicide prevention programs were varied such as: (1) to increase knowledge about suicide and change undesired attitudes toward suicide; (2) to reduce suicide risk factors and to enhance protective factors among the general population or high-risk youth; (3) to enhance coping skills; and (4) to change help-seeking behaviours and suicide morbidity (suicide attempts). Program objectives should be focused and attainable according to the program's curriculum.

Target population

Debate continues on who should be the target group of school-based suicide prevention programs. Some researchers suggest that programs focusing on the high-risk population may be more effective because of the overall low base rate of suicidal behaviour among the general population. Other researchers argued that the current methods to identify high-risk groups are neither sensitive nor specific. Since this debate remains unresolved, it has been suggested that suicide prevention programs should address the general population (universal intervention), as well as at risk-population (indicated intervention).

Another important consideration is the dosage (frequency and duration) of the intervention. While a single session or a short series of sessions may be insufficient to obtain the desired effects, prevention programs with key therapeutic elements may produce similar effects even with minimum dosage. The appropriate dosage would depend on the target population and their previous exposure.

Delivery

One important element for a successful suicide prevention program may be the process of program delivery. This includes staff training and assessing implementation commitment and consistency by monitoring and evaluating educator's performance. The personality, accessibility of the educator and their relationship with students would also be important variables to consider. Another aspect to take account of would be the size of group to which the program is offered. Sometimes interactive workshops rather than didactic sessions are more appropriate.

Outcome measures

The choice of outcome measure (measure of program performance) should be related to the program's objective(s) and ideally values of reliability and validity should be established. Outcome measures may 'react' differently based on age and gender. This is a rapidly changing population, both physically and mentally. Moreover, it is important that the instruments chosen are able to measure the outcomes of interest related to the program's objectives.

Assessing association

It is recognised that youth suicide is a very complex phenomenon caused by the interaction of many factors such as biological, social, and psychological. Current knowledge indicates that no single factor is sufficient to induce death by suicide.

Although some risk factors have been identified to predict suicide risk and some protective factors have been shown to avoid or delay suicidal behaviour, it is generally believed that most of the measurement tools used by researchers are neither sensitive nor specific enough for measuring change in these factors. The lack of reliable and valid measures furthers the debate of which risk and protective factors can be linked to the prevention strategy. If reduction in risk factors and enhancement of protective factors are the program's objective, it is important to ensure that the instruments used are 'really' measuring the outcomes of interest.

Several questions should be addressed when considering the implementation of suicide prevention programs in schools; unfortunately the majority of these questions have not been answered through this review:

- What do we mean by prevention when applied to suicide?
- What are the objectives of suicide prevention programs?
- What and where is the focus (change in knowledge, risk factors, behaviour, etc) of suicide prevention?
- Who are the target populations for suicide prevention programs?
- What data should be collected to measure the program's impact?
- What is the effect of the addition of a parent component and/or community support component to the classroom program?
- Do both physical and mental developmental differences as well as gender have an effect on the response to prevention programs?
- Which program elements (frequency of contact, length of program, content, delivery, and approach) are critical in order to achieve the program's objective?

Implication for future research

Research on effectiveness of suicide prevention strategies is complex because of the multidimensional nature of children and adolescents and issue of consent. Future research should emphasise the need for:

- the establishment of national and international epidemiology databases of prevalence and incidence of suicide attempts and completion,
- investigation of the association and causality of suicidal behaviours, and
- systematically evaluate efficacy/effectiveness of school-based suicide prevention programs currently recognised as being the 'best' in this province.

First, to capture a more comprehensive provincial and national picture of suicide morbidity and mortality the following suggestions are offered:

- Establish standardized definition for suicidal ideation and suicide attempts.
- Link the databases from various sources already available.
- Develop a reliable database for collecting the numbers of suicide attempts and factors associated with suicidal behaviours.
- Establish a comprehensive system for collecting outcome data from schools, mental health agencies, and emergency rooms.

Secondly, in order to identify associations and eventually determine causality, the following research is suggested:

- Conduct a prospective cohort study that permits the assessment of temporal relationships between risk factors and suicidal behaviour. A prospective design will minimize selection bias because participants are included in the study before the suicidal behaviour has occurred.
- Establish reliability and validity of the current instruments used to measure risk factors and protective factors. If necessary, develop new or modified measurement tools and establish reliability and validity in the population under study.

Thirdly, since there are a variety of programs being provided in schools throughout the province it would be important to:

- Develop a standardized evaluation framework suitable to the program's objectives and outcomes of interest.
- Evaluate and compare similar programs to identify those elements potentially associated with beneficial effects.

Taking these considerations under advisement it is necessary to evaluate the effectiveness of current 'best' programs against 'standard' programs. This should advise the future allocation of resources in a more appropriate manner.

CONCLUSION

In Canada, the most dramatic increase in suicide rates occurred in young males aged 15 to 19 years between the 1950s and the end of the 1980s. Suicide rates among Canadian males aged 15 to 19 years in 1992 was 20.1 per 100,000 compared to 5.1 in 1962, 13.8 in 1972, and 20.9 in 1982. Suicide rates among Canadian females aged 15 to 19 years was 5.4 per 100,000 in 1992 compared to 1.3 in 1962, 4.2 in 1972, and 3.1 in 1982. These rates seem to indicate that since 1982 there has been an increase in female suicide rates while male suicide rates stabilized. In 1997, however, suicide was the second leading cause of death for children aged 10 to 14 years and for adolescents aged 15 to 19 years.

In response to the increase of youth suicide, numerous suicide prevention programs have been developed and expanded since the early 1970s. Good, quality published research about effectiveness of prevention programs for this age group, is lacking.

Two systematic reviews evaluated the evidence from a large number of studies to determine which risk factors are associated with suicidal behaviours. The authors of these reviews found that high rates of psychiatric illness and the presence of co-morbid mental disorders primarily characterize young people at highest risk of suicide. From the studies reviewed a strong association was noted between suicidal behaviour and low SES and poor educational background, previous suicide attempts, family background with dysfunctional circumstances, environmental factors and stressful life events. Although risk factors for suicide and attempted suicide are not identical there seems to be substantial overlap.

The rationale for introducing curriculum-based prevention programs into schools is that the majority of suicidal youth come to the attention of their peers rather than adults. These programs usually focus on strategies to enhance the identification of suicidal youth and encourage appropriate follow up actions.

All studies included in this review evaluated school-based suicide prevention programs. There were no published studies that were conducted in elementary schools. This is supported by the epidemiological data that in Canada suicide is rare in children under the age of 10 years. The question arises however as to whether prevention strategies should be implemented sooner to decrease suicide rates among those aged 15 to 19 years.

Most of the studies focused on the general student population, while a few studies first categorized students as 'at-risk' or 'in need' before the intervention. Six out of 10 studies on the efficacy/effectiveness of suicide prevention programs for children and youth were rated as moderate to strong for methodological quality in terms of their study design, control of confounding factors and testing of validity and reliability of the outcome measurement tools. Based on the overall findings from methodologically weak studies (most studies were not RCTs) and inconsistent conclusions, there is insufficient evidence to either support or not to support curriculum-based suicide prevention programs in schools.

Two studies that used similar approaches for risk stratification and delivered intervention programs with similar objectives showed consistent and encouraging evidence on the effects (for example, decreases in depression, hopelessness, stress, anxiety and anger) of these programs for youth at high risk. The authors were however, surprised to find that the brief MAPS assessment protocol used to risk stratify the students resulted in overall similar short term effects as the comprehensive programs.

There are some concerns among school staff and parents about suicide awareness interventions for adolescents causing harm. All primary studies reviewed, except for one, did not report or failed to report any harmful effects from suicide prevention programs.

The generalizability of the results from these studies to the Alberta setting is at question. No Canadian studies to determine the effectiveness of suicide prevention programs for children and youth have been published since 1991. Participants in the studies were from a wide range of ethnic backgrounds including Black, Caucasian, and Hispanic, attending schools (Grade 8 through to Grade 12) in urban or rural areas from families with different SES and with an age range of 12 to 19 years. Canada also exhibits a mix of different cultures and ethnic origins, which are, however, different from those participants included in the primary studies.

There is a good opportunity for the Alberta Mental Health Board to sponsor and design a good quality Canadian study on suicide prevention programs for children and youth. As this review highlights, research on effectiveness of suicide prevention strategies is complex because of the multidimensional nature of children and adolescents. There are various school-based programs being offered throughout this province. As a first step it is necessary to evaluate the effectiveness of current programs in achieving their objectives and then proceed to design research studies to address questions of highest priority.

APPENDIX A: METHODOLOGY

A literature search was conducted using the approach described below. All abstracts were read by two reviewers. From the references identified, a selection was made according to inclusion and exclusion criteria described below and full text articles were retrieved.

The search of databases, websites, and references lists of retrieved articles resulted in the identification of approximately 800 articles. Ten studies that met the inclusion criteria for primary quantitative studies were assessed and methodological quality rated.

Two systematic reviews identifying the evidence on risk factors for youth suicide were located. Two systematic reviews on the effectiveness of curriculum based suicide prevention programs, with one being an update, were retrieved. These systematic reviews were not evaluated using formalized criteria regarding their methodological quality.

Articles published prior to 1991, which provided background information, are also quoted when necessary.

Search Strategy

A comprehensive primary literature search was conducted on the following databases: PubMed (1991 - 2001), EMBASE (1991 - May 2001, Week 08), HealthSTAR (1993 - 2000), CINAHL (1991 - January 2001), PsycINFO (1991 - February, Week 2, 2001), Eric (1991 - December 2000), Sociological Abstracts (1991 - December, 2000), EBM Reviews – Best Evidence (1991 – Jan/Feb 2001), Web of Science (includes Science Citation Index, Social Sciences Citation Index and Arts and Humanities Citation Index (1991 - 2001), Cochrane Library (Issue 1, 2001).

The following keywords were used alone or in combination to ensure a high recall rate of the relevant references: suicide/ suicides / suicidal / parasuicide / suicide attempt/suicidal behaviour AND one OR more of prevention / preventive / prevent / postvention / crisis intervention / primary prevention/secondary prevention/prevention and control AND one OR more of child/adolescent/ adolescence/teen/youth/school health services/school/schools/school-based/high school/elementary school/health program.

Several web sites were also searched for the current issues and progresses regarding suicide prevention world-wide.

A secondary search was conducted in December 2001 on the topic of suicide risk assessment in children and adolescents. This search included the following databases: PubMed (1991 – 2001), EMBASE (1991 - September 2001), CINAHL (1991 – August 2001), PsycINFO (1991 – July 2001), Eric (1991 – September 2001), Web of Science (1991 –

2001), Cochrane Library (Issue 4, 2001) and the CRD Databases (DARE, HTA NHS EED).

The following terms were used in these searches: suicide AND risk factors / risk assessment / at risk populations / risk. This search was restricted (where possible) to studies of children and adolescents under the age of 18, and to systematic reviews, overviews or reviews in this area.

Selection of studies

From the abstracts, a selection was made and full text articles that meet the following inclusion criteria were retrieved:

- **Primary quantitative studies** that evaluated efficacy/effectiveness of suicide prevention program for children and youth and met the following criteria:
 - Study design: Had to be a controlled study, included both an intervention group and control group.
 - Study population: The study had to be conducted on children and/or adolescents of school age (i.e. age 5 to 19 years).
 - Outcome measurement: The study had to report on suicide-related outcomes such as change in the awareness of suicide-related knowledge, suicide protective factors (personal control, coping skill, etc), suicide-risk factors (depression, hopelessness, stress, etc.), or reduction in suicidal ideation and attempt rates or, if there is any, suicide rates.
 - Studies from 1991 onwards.
 - Studies published in English, German, and Chinese.

Studies would not be included if

- Focus was on treatment rather than prevention strategy.
- Focus was on educational programs for parents of children and adolescents.
- **Systematic reviews** that addressed risk factors for youth suicidal behaviour or assessed the efficacy/effectiveness of youth suicide prevention programs, and met the following criteria:
 - Research questions were clearly defined to either address the risk factors for youth suicidal behaviour or assess the efficacy/effectiveness of youth suicide prevention programs.
 - Search strategy was comprehensive.
 - Methodological quality of primary studies was critically appraised.
 - Published within the last 10 years.

Data Extraction from Primary Quantitative Study

I. General information

Author(s), countries where studies conducted, and year of the study.

II. Specific information

Population:

Sample size at baseline

Sample size of experimental and control groups

Population characteristics: age, grade, gender, ethnic background, geographic region (rural or urban), and risk factors

Intervention

Theoretical basis for intervention

Intervention target (individual, family, group)

Intervention focus (education, emotional support)

Intervention site (urban, rural)

Delivery mode of intervention (lecture, discussion group)

Delivery of intervention (teacher, counselor, or psychiatrist)

Training provided to delivery staff

Intervention intensity and duration

Level of compliance with intervention

Follow-up (rate and period)

Outcomes

Findings/results

Measurement tool

Validity and reliability of measurement tool

Time interval between first and second measurement and time interval between first and last measurement

Types of data analysis

Statistical significance

Appraisal of the Methodology Quality

Previously established selection criteria were used to decrease reviewer bias. Once the studies were selected, two reviewers completed an independent critical appraisal of the quality of the primary studies on the efficacy of suicide prevention programs. The

quality assessment tool included six criteria: (a) selection bias (representativeness of the sample and percentage of selected individuals who agree to participate); (b) study design; (c) control for confounders; (d) blinding (of outcome assessors and study participants); (e) validity and reliability of data collection methods; and (f) withdrawals and drop-outs⁽¹⁷⁾. It is noted that the length of follow up was not included in the quality measurement tool. Given that different suicide prevention programs require different lengths of follow up, it is difficult to determine what is the most appropriate time period of follow up.

Each of the six criteria was rated as 'strong', 'moderate', and 'weak', according to pre-established guidelines⁽¹⁷⁾. Each study was then assigned a global rating of 'strong', 'moderate' or 'weak'. For an article to be considered 'strong', a minimum of four of the six criteria had to be rated as 'strong' with no 'weak' ratings for any of the criteria. Articles with less than four 'strong' and a maximum of one 'weak' rating were judged as 'moderate'. Studies with two or more 'weak' rating were rated as 'weak'. Each of the six criteria had equal weight for the global rating. If a study used the word 'random assignment' for the study design but did not provide any description of the method for randomization, it was categorized as a controlled clinical trial (CCT). Any study classified by the authors as either a RCT or CCT will receive a 'strong' rating for the study design.

All quality ratings were completed independently by each of the two reviewers. Any disagreement was resolved by discussion.

APPENDIX B: PRIMARY QUANTITATIVE STUDIES

Table 3: Primary quantitative studies on effectiveness of suicide prevention program

Study Objective	Study Design (methodological quality)	Subjects	Outcomes	Author's Conclusions
<p>Eggert et al. 1995⁽³⁶⁾ USA <u>Objective:</u> to test the efficacy of a school-based prevention program (Personal Growth Class) for reducing suicide potential among high-risk youth.</p>	<p>Cohort Three-group, repeated measures design (moderate)</p>	<p>105 high-risk students, in Grade 9-12, from five urban high schools Group I (n = 36): an assessment of suicide potential + 1-semester Personal Growth Class (PGCI); Group II (n = 34): an assessment of suicide potential + 2-semester Personal Growth Class (PGCII); Group III (n = 35): an assessment protocol-only.</p>	<p><u>Measurements:</u> Changes in direct suicide-risk factors (suicide thoughts, threats, and attempts), related risk factors (depression, hopelessness, anger, perceived stress), and protective factors (sense of personal control, self-esteem, social network support). <u>Methods of data analysis:</u> Trend analysis <u>Results:</u> <i>Statistically significant *</i> Decreased suicide risk behaviours, related-risk factors (depression, hopelessness, stress, and anger) in all groups; Increased self-esteem and network social support; Increased personal control in the experimental groups but not in the assessment-only group (Group III).</p>	<p>The prevention program identified vulnerable youth and employed theoretically based and intensive intervention. School context is a practical setting for delivery of comprehensive, yet cost-effective, prevention programs. The necessary and sufficient strategy for suicide prevention need further study as the assessment-only group showed improvements similar to those of the experimental groups.</p>

Table 3: Primary quantitative studies on effectiveness of suicide prevention program (cont'd)

Study Objective	Study Design (methodological quality)	Subjects	Outcomes	Author's Conclusions
<p>Thompson et al. 2000⁽³⁹⁾ USA <u>Objectives:</u> to examine the impact of teacher support, peer group support, and perceived personal control on the effects of a high school-based prevention program designed to reduce depression and suicidal behaviours among high-risk youth.</p> <p>This study is a further analysis of the data collected by Eggert et al.⁽³⁶⁾ to explore the mechanisms contributing to the observed effects of their suicide prevention program.</p>	<p>Cohort Three-wave, longitudinal design (moderate)</p>	<p>106 high-risk students, in Grade 9-12, from five urban high schools Group I (n = 36): an assessment of suicide potential + 1-semester Personal Growth Class (PGCI); Group II (n = 35): an assessment of suicide potential + 2-semester Personal Growth Class (PGCII); Group III (n = 35): an assessment protocol-only.</p>	<p><u>Measurements:</u> Teacher support, peer support, personal control, depression, suicide risk behaviour. <u>Method of analysis:</u> Structured equation modeling <u>Results:</u> <i>Statistically significant*</i> Teacher support: had a direct, positive, and strong effect on peer support but not on personal control; Peer support: had a direct effect on personal control for Group I and a direct negative effect on suicide risk behaviours for Group II; Personal control: had a direct ameliorating effect on depression and/or suicide risk behaviours for three groups.</p>	<p>The PGC teacher's support played a central role in promoting social behaviours and building positive peer group culture and support. School-based intervention programs need to be carefully constructed in terms of curriculum content and the context within which the curriculum is delivered.</p>

Table 3: Primary quantitative studies on effectiveness of suicide prevention program (cont'd)

Study	Study Design (methodological quality)	Subjects	Outcomes	Author's Conclusions
<p>Thompson et al. 2001 ⁽³⁸⁾ USA <u>Objectives:</u> to evaluate the extended efficacy and differences in effects between the sexes of two suicide risk protocols: C-CARE and CAST.</p>	<p>Randomized control study (Did not mention the method of randomization) (Strong)</p>	<p>460 high-risk students, age 14 to 19 years, from seven high schools. Female 52% Euro-American 49%, Native American 4%, Asian American/Pacific Islander 18%, African American 19%, and Latino or Hispanic 10% Counselors CARE (C-CARE) (n = 150); Coping and Support Training (CAST) (n = 155); Control (usual care; n = 155).</p>	<p><u>Measurements:</u> Changes in suicide risk behaviours (favorable attitude toward suicide, suicidal ideation, threats and attempts), related risk factors (depression, hopelessness, anxiety, and anger), and protective factors (sense of personal control, problem-solving coping, and family support). <u>Method of analysis:</u> Growth curve analysis, post hoc descriptive analysis, trend analysis. <u>Results:</u> <i>Statistically significant *</i> Declines in suicide risk behaviours (attitude toward suicide, suicidal ideation), related risk factors (depression, hopelessness, anxiety, and anger) in C-CARE and CAST groups immediately following interventions and at 9-month follow-up. Females showed greater change in anxiety and anger-control problems in response to C-CARE and CAST. CAST was most effective in enhancing and sustaining personal control and problem-solving coping for males and females.</p>	<p>School-based, indicated prevention approaches are feasible and effective for reducing suicidal behaviours, related emotional distress and for enhancing protective factors. This study reinforces the need for public health prevention through school-based screening and indicated intervention programs.</p>

Table 3: Primary quantitative studies on effectiveness of suicide prevention program (cont'd)

Study Objective	Study Design (methodological quality)	Subjects	Outcomes	Author's Conclusions
<p>Silbert & Berry 1991 ⁽³⁷⁾ USA <u>Objective:</u> to examine the instructional impact of a senior high school suicide prevention program on students' levels of stress, anxiety, and hopelessness.</p>	<p>Cohort (Moderate)</p>	<p>323 Grade 10 from 3 schools. Ages range 14 to 18 with almost 2/3 being 15 years old. Nearly equal numbers of males and females. Special needs defined as: low social support, high stress, high anxiety, high degrees of hopelessness Special needs experimental (n = 119); Non-special needs experimental (n = 148); Special needs control (n = 26); Non-special needs control (n = 30).</p>	<p><u>Measurements:</u> Knowledge about suicide prevention, social support, stress, anxiety, hopelessness. <u>Method of analysis:</u> Multivariate analysis <u>Results:</u> <i>Statistically significant *</i> Improved knowledge about suicide in both special needs and no special needs experimental groups. Slight decrease in knowledge from posttest to follow up indicated most knowledge was retained; Decrease in combined variables (stress, anxiety, and hopelessness) for special needs experimental group; Decrease in level of stress in special needs experimental group; Decrease in level of hopelessness in special needs experimental group. <i>Non-significant</i> Levels of anxiety for special needs experimental group; Changes in combined variables in special needs control group; Differences between special needs experimental and control groups for stress, anxiety or hopelessness.</p>	<p>There is a need for counselling psychologists to take a greater role in the design and implementation of school suicide prevention programs to maximize the benefits for those who are most in need.</p>

Table 3: Primary quantitative studies on effectiveness of suicide prevention program (cont'd)

Study Objective	Study Design (methodological quality)	Subjects	Outcomes	Author's Conclusions
<p>Ciffone 1993 ⁽⁴²⁾ USA <u>Objective:</u> to test the effectiveness of school-based suicide prevention programs.</p>	<p>Cohort (weak)</p>	<p>324 sophomore students from three suburban high schools in the Chicago metropolitan area. Experimental: n = 203 (119 males and 84 females); Control: n = 121 (53 males and 68 females).</p>	<p><u>Measurements:</u> Reduce prevalence of undesired attitude to survey questions. <u>Method of analysis:</u> Logistic analysis <u>Results:</u> <i>Statistically significant *</i> Changes from undesirable attitude to desirable attitude after intervention for most items (respond to suicidal peers, seek help from health professionals, talk to others), males more likely than females to seek help from mental health professional.</p>	<p>A sizable number of adolescents held undesirable attitudes about suicide. Author's program seems to have a positive impact on the resistant minority of adolescents who hold disconcerting views on suicide.</p>

Table 3: Primary quantitative studies on effectiveness of suicide prevention program (cont'd)

Study Objective	Study Design (methodological quality)	Subjects	Outcomes	Author's Conclusions
<p>Kalafat & Elias 1994 ⁽³³⁾ USA <u>Objective:</u> to assess the efficacy of a high school suicide curriculum in achieving their instructional objectives.</p>	<p>Cohort Solomon Four Group Design (Weak)</p>	<p>253 students in Grade 10 from two suburban, middle-class schools. Experimental: n = 136, Control: n = 117. Male 57%, female 43% Group 1 (n = 71): Suicide awareness class with pretest and posttest; Group 2 (n = 63): control with pretest and posttest; Group 3 (n = 65): Suicide awareness class with posttest but without pretest; Group 4 (n = 54): control with posttest but without pretest.</p>	<p><u>Measurements:</u> Knowledge about suicide; Attitude toward suicide; Response to potential suicide in peers; Reaction to the suicide awareness classes. <u>Method of analysis:</u> Multiple analysis of variance, univariate analysis of variance. <u>Results:</u> <i>Statistically significant *</i> Improved knowledge about suicide; Improved attitude toward suicide, helping and talking about suicide (most items); Improved responses to and awareness of potential suicidal peers. <i>Non-significant</i> Attitude toward suicide, helping and talking about suicide (some items).</p>	<p>The findings provide some encouraging evidence that the curriculum may be achieving its objectives. The results must be considered tentative initial findings that require replication.</p>

Table 3: Primary quantitative studies on effectiveness of suicide prevention program (cont'd)

Study Objective	Study Design (methodological quality)	Subjects	Outcomes	Author's Conclusions
<p>Kalafat & Gagliano 1996 ⁽⁴³⁾ USA <u>Objective:</u> to assess the impact of a prevention program on understanding and responding to suicidal peers.</p>	<p>Cohort (weak)</p>	<p>109 White students (46 females, 63 males), 8th grade, from a suburban, middle-class northeastern community. Experimental: n = 52 (31 males, 21 females); Control: n = 57 (21 males, 25 females).</p>	<p><u>Measurements:</u> Response to two vignettes <u>Method of analysis:</u> Chi-square analysis <u>Results:</u> <i>Statistically significant *</i> Posttest: experimental group provided significantly more "tell an adult" response than control group to two vignettes; Pretest and posttest: all students showed greater concern on the unambiguous vignette than on ambiguous vignette; Females expressed greater concern than males.</p>	<p>The results of this study provide evidence that classroom curricula on youth suicide may be effective in preparing youth for their critical role in the prevention of suicidal behaviour among their peers.</p>
<p>Shaffer et al. 1991 ⁽¹⁴⁾ USA <u>Objectives:</u> to assess the impact of three school-based suicide prevention programs.</p>	<p>Cohort (Moderate)</p>	<p>1438 students from 11 high schools Average ages 14.5 years Male 48% Female 52% Experimental: n = 758 (Grade 9 and 10 from six "demonstration" high schools); Control: n = 680 (from 5 schools).</p>	<p><u>Measurements:</u> Knowledge and attitudes about suicide, knowledge of treatment resources, seeking help for emotional problems. <u>Method of analysis:</u> Multiple regression, Chi-square analysis. <u>Results:</u> <i>Statistically significant *</i> Improved knowledge and attitudes related to suicide (3 of 9 items); Improved knowledge of where to obtain help, what to do for suicidal peers. <i>Non-significant</i> No changes in knowledge about suicide (6 of 9 items).</p>	<p>A prevention program that combines the provision of information about the nature and potential benefits of seeking help for emotional problems with systematic screening to identify adolescents at risk may be a promising route for additional prevention activities.</p>

Table 3: Primary quantitative studies on effectiveness of suicide prevention program (cont'd)

Study	Study Design (methodological quality)	Subjects	Outcomes	Author's Conclusions
<p>Vieland et al. 1991 ⁽⁴¹⁾ USA <u>Objectives:</u> to examine the long-term impact of school-based suicide prevention curricula on help-seeking behaviours and suicide morbidity of high school students.</p> <p>This study was an 18-month follow up on a sub-set of the same students included in the study by Shaffer et al. ⁽¹⁴⁾</p>	<p>Cohort (Moderate)</p>	<p>381 Grade 9 students from four schools Experimental: n = 174 (from two schools, 55% female); Control: n = 207 (from two other schools, 49% female). Both groups almost entirely white</p>	<p><u>Measurements:</u> Students' behaviour during the previous 18 months. <u>Method of analysis:</u> Two-tailed Fisher exact tests <u>Results:</u> <i>Statistically significant</i> * Impact on student behaviour only in two items out of 136 comparisons (item 1: I told a friend to call a counselor; Item 2: When I had a bad person/emotional problem, I talked to a friend). <i>Non-significant</i> Failed to find convincing evidence of any program effect; No program effect on primary items describing depression or suicide-related problems; No program impact on student behaviour; No program effects on reports of previous suicide attempts.</p>	<p>The absence of a discernable program impact may reflect limited nature of the intervention because the prevention program was an in-class presentation lasting 1 1/2 hours. But the limited intervention may also pose limited risk.</p>

Table 3: Primary quantitative studies on effectiveness of suicide prevention program (cont'd)

Study Object	Study Design (methodological quality)	Subjects	Outcomes	Author's Conclusions
<p>Klingman & Hochdorf 1993 ⁽⁴⁵⁾ Israel <u>Objectives:</u> to test the effectiveness of a cognitive-oriented program through its impact on the major processes related to a high risk of distress and self-destructive behaviours.</p>	<p>Randomized control study (Did not mention the method of randomization) (Moderate)</p>	<p>237 students in Grade 8 (ages 12.5 –13.5 years) from a junior high-school in Israel; low-middle class. Experimental: n = 116 (male 56, female 60); Control: n = 121 (male 56, female 65).</p>	<p><u>Measurements:</u> Depression, anxiety, emotionality, loneliness, empathy, story completion, semantic differential (SD), Knowledge about youth suicide. <u>Methods of analysis:</u> Analysis of covariance, content analysis method and semantic differential. <u>Results:</u> <i>Statistically Significant *</i> Greater reduction in suicidal risk in experimental group; greater reduction in suicidal risk for males than for girls; Increased empathy for girls but not for boys; Improved distress-coping skills awareness for experimental group; Improved knowledge of youth suicide and help resources; More positive attitude changes for intervention group. <i>Non-significant</i> Loneliness</p>	<p>This study demonstrates that a suicide prevention program for normal adolescents in their natural setting can affect positively those processes known to be related to self-destructive behaviour. The study did not find any harmful program effects.</p>

Table 3: Primary quantitative studies on effectiveness of suicide prevention program (cont'd)

Study Objective	Study Design (methodological quality)	Subjects	Outcomes	Author's Conclusions
<p>Orbach & Bar-Joseph 1993 ⁽⁴⁴⁾ Israel <u>Objective:</u> to test the effectiveness of an introspective suicide prevention program with regard to suicidal tendencies, depression, hopelessness, ego identity, and coping ability.</p>	<p>Randomized control study (Did not describe method of randomization) (Strong)</p>	<p>393 high school juniors from six high schools (one school students normal intelligence but had conduct disorder) predominantly middle-class population. Male 45%, Female 55% Experimental: n = 215; Control: n = 178.</p>	<p><u>Measurements:</u> Suicidal tendency, ego identity cohesion, hopelessness, self-control. <u>Methods of analysis:</u> ANOVA <u>Results:</u> <i>Statistically significant *</i> Lowered suicidal tendencies in 4 schools; larger decrease in suicidal scores for females than males in two schools; Improved ego identity scores in 3 schools; Improved coping ability in 2 schools. <i>Non-significant</i> Hopelessness</p>	<p>Program was effective in reducing students' suicidal feelings and in increasing their ego identity, cohesion and ability to cope with problems. No harmful program effects.</p>

Table 3: Primary quantitative studies on effectiveness of suicide prevention program (cont'd)

Study	Study Design (methodological quality)	Intervention	Outcomes	Author's Conclusions
Hazell & Lewin 1993 ⁽⁴⁶⁾ Australia Objective: to evaluate the effect of postvention (group counselling for at-risk students) provided at two schools following a suicide by a student at each school.	Cohort (weak)	806 in Grade 8 to 10 and Grade 8 to 11 from two schools. The mean age at two schools 15.1 and 14.1 years. 63 students were identified to be close friends of suicide victims. Counselling group: n = 63; Matched controls: n = 63.	<u>Measurements:</u> Youth behaviour, Risk taking behaviour, Proximity to attempted and completed suicide, Suicidal ideation and behaviour, Drug and alcohol consumption questionnaire. <u>Methods of analysis:</u> Bonferroni-adjusted probability, Pearson Chi-square. <u>Results:</u> No difference in outcome between counselled students and matched controls.	The results should not be taken to be representative of other postvention counselling programs, since the intervention examined in the study was limited in scope, and was itself being piloted.

* 'Statistically significant' means that the probability of an observed difference by chance alone is less than 5%. Statistical significance only represents the 'generalizability' of the result, i.e., the degree of confidence we can have that we could expect to find those same changes expressed in the population as a whole.

Eggert et al. ⁽³⁶⁾

This study was conducted to evaluate the efficacy of a school-based prevention program, Personal Growth Class (PGC), for reducing suicide potential among high-risk youth. The PGC intervention integrated two essential components, that is, social support and life-skills training. The underlying rationale of the intervention was that suicide risk and protective factors are maintained as a function of the individual within a network of social relationships. The PGC contains components on social support and help exchange, monitoring activity changes in mood management, school performance and attendance, and drug involvement, as well as life skills training.

A total of 105 high school students were identified as being at high -risk and assigned to one of three groups: (1) Group I (experimental) who received an assessment of suicide potential plus a 1-semester PGC; (2) Group II (experimental) who received an assessment of suicide potential plus a 2-semester PGC II; and (3) Group III (control) who only received an assessment of suicide potential.

Compared to the baseline measurement, there was a significant decline in suicide-risk behaviours for all three groups ($F_{\text{Linear}(1,102)} = 104.14, p < .001$) over the 10 months. Mean levels of suicide-risk behaviours for all three groups were one standard deviation above the normal control's mean score before intervention but were within or closed to one standard deviation of the 'typical' youth means after the intervention. Gender difference was not found for this change pattern. This result, according to the authors, indicates that the decrease in suicide-risk behaviours were both clinically and statistically significant.

High risk youths in all three groups also showed improvements post intervention in related-risk factors including depression ($F_{\text{Linear}(1,101)} = 88.93, p < .001$), hopelessness ($F_{\text{Linear}(1,102)} = 55.81, p < .001$), stress ($F_{\text{Linear}(1,100)} = 27.70, p < .001$), and anger ($F_{\text{Linear}(2,102)} = 4.13, p < .019$). The patterns of change did not vary among the three groups for depression, hopelessness, and stress, but did vary for anger. Reductions in anger were more dramatic for Group I and III than for Group II. Regarding the protective factors, Group I and Group II showed a significant increase in personal control across time, while Group III ($F_{\text{Linear}(1,100)} = 6.15, p = .70$) did not. There were significant increases across time for the three groups in self-esteem ($F_{\text{Linear}(1,101)} = 60.17, p < .001$) and in social network support ($F_{\text{Linear}(1,100)} = 32.08, p < .001$).

The authors note that the striking finding from this study was that the assessment protocol alone appeared as effective as the intervention-PGC, in reducing suicide-risk behaviours and related-risk factors, as well as increasing self-esteem and social support. This finding suggests that providing even minimum intervention may be effective for high-risk youth.

Thompson et al. ⁽³⁹⁾

This cohort study examined the direct and indirect effects of a high school-based prevention program, the PGC, on teacher support, peer group support, and perceived

personal control for high-risk youth. This study was an extension of the results collected by Eggert et al. ⁽³⁶⁾, which focused on intervention outcomes. This study was to examine the process by which the preventive strategy was hypothesized to reduce depression and suicide risk behaviours among high-risk youth.

This study showed that teacher support had a direct, positive, and strong effect on peer support ($B = .56$, $t = 3.35$, $p \leq .001$, and $B = .71$, $t = 5.58$, $p < .001$, for Groups I and II, respectively), but no significant direct effects on personal control. The effect of teacher support on peer support for two-semester PGC program was greater in comparison to the one-semester PGC program. Peer support had a significant direct effect on personal control for Group I ($B = .39$, $t = 2.07$, $p < .05$) and a direct negative effect on suicide risk behaviours for Group II ($B = -.38$, $t = 3.40$, $p < .001$). Classmate support did not influence personal control for Group III. The effects of personal control varied among the groups. For Group I, personal control had a direct and significant ameliorating effect on depression ($B = -.32$, $t = -1.86$, $p < .05$) and suicide risk behaviours ($B = -.22$, $t = -2.72$, $p < .01$). For Group II, personal control had a direct ameliorating effect on depression ($B = .71$, $t = 1.80$, $p < .05$) and a non-significant effect on suicidal behaviour. For Group III, personal control had a significant effect on suicide risk behaviours ($B = -.11$, $t = -2.11$, $p < .05$) but not on depression. The results indicate that personal control directly influenced reductions in suicide-risk behaviours and depression.

The authors noted some limitations of this study including small sample size, selection bias, and doubt on validity, reliability and sensitivity of the brief measures used in this study. The authors concluded that teacher support enhanced peer group support and the effect was stronger for the PGC program participants and strongest for youth in the two-semester PGC program. This result perhaps indicates the possible importance of the quality and specificity of teacher support and the duration of exposure to the PGC teacher.

Thompson et al. ⁽³⁸⁾

This randomized study evaluated the efficacy of two indicated suicide preventive interventions. A total of 460 high school students were identified as being at suicidal risk and randomly assigned to 1 of 3 groups: (1) Counselors CARE (C-CARE), a brief one-to-one assessment and crisis intervention; (2) Coping and Support Training (CAST), a small group skills-building and social support intervention delivered with C-CARE; and (3) usual-care control. Outcomes were measured pre-intervention, 4 weeks, 10 weeks, and 9 months after the interventions.

There were no significant differences among the three groups for the background variables of sex, race/ethnicity, and percentage living with both biological parents. CAST youths tended to be slightly older than the youths in the other groups. All outcome variable were equivalent cross the groups except scores for problem-solving coping were significantly higher for CAST and usual care youths than for C-CARE youths.

Compared with usual care, C-Care and CAST interventions were associated with faster rates of decline in direct risk factors including attitude toward suicide and suicidal ideation. There were no intervention-specific outcomes for suicide threats or attempts within the last month. The reductions in these direct suicide risk behaviours were sustained at the 9-month follow-up. Compared to usual care, CAST and C-CARE groups had significantly greater rates of decline in related risk factors including depression, hopelessness, anxiety, and anger. Reductions in mean levels of depression and hopelessness were sustained at follow-up. Significant sex interaction effects were found for anxiety and anger. Males tended to show improvements regardless of the intervention mode, while females were differentially responsive to the experimental interventions, especially CAST. In regard to protective factors, CAST, but not C-CARE, had significant influences on the rate of change in personal control and problem-solving coping. For family support, no differentials in rates of change or increases in mean levels were associated with the experimental interventions.

The authors concluded that the CAST and C-CARE interventions were more effective than usual care in sustaining reductions in suicidal ideation, depression, and hopelessness across time. These promising results suggest that the two prevention approaches may provide longer-term effects.

Silbert & Berry ⁽³⁷⁾

This cohort study evaluated the impact of a senior high school suicide prevention program on students with and without special needs. A total of 323 students with broad ethnic backgrounds were divided into four distinct groups: 1) Special needs experimental (SNE); 2) Non-special needs experimental (NSNE); 3) special needs control (SNC); and 4) non-special needs control (NSNC). Experimental and control groups received a pretest prior to the beginning of the prevention program and a posttest one month later after completion of the prevention program. Experimental groups also received a follow-up test two months after the posttest, while the control groups did not. The intervention consisted of two lessons that involved two 50-minute class sessions, and a video show. Lesson one focused on understanding teenage suicide and learning to cope with depression, while lesson two emphasized suicide warning signs and resources available for help.

Both experimental groups showed significant changes in knowledge from pre- to post-test. The SNE group demonstrated significant decreases in levels of stress ($F(1,118)=9.69$, $p = 0.002$) and hopelessness ($F(1,118)=18.3$, $P<0.001$), but not in levels of anxiety. The SNC group did not indicate any significant decreases for any of these measures. However, there were no significant differences between the SNE and SNC groups for any of the three variables.

The authors proposed that direct focus on stress and depression by the suicide prevention program account for the positive changes in stress and hopelessness for the SNE group. The lack of significant difference between the SNE and SNC groups was considered to be due to the emphasis of the instruments used to measure the three

variables and the relatively shorter duration between pre- and post-test for the SNC group.

The authors suggested the need for counselling psychologists to take a greater role in the design and implementation of school suicide prevention programs in order to maximize the benefits of such programs for those students who are most in need.

Ciffone ⁽⁴²⁾

This study used a matched cohort design to evaluate the impact of a school-based suicide prevention program on the students' attitudes toward suicide. A total of 324 high school students were divided into an experimental group and a control group. School teachers and a social worker provided the program as part of a health class over a two day period. The prevention program focused on the relationship between suicide and mental illness. An attitudinal survey developed by the author was administered pre- and 30 days after the intervention to evaluate program effectiveness.

The experimental group showed significant change for most survey questions (undesirable attitude to a desirable attitude). Students in the experimental group were more likely to agree with the statement that teenagers who kill themselves are usually mentally ill. Accordingly, the experimental group was more likely than the control group to speak about their suicidal thoughts and seek help from health professionals. The study did not evaluate students' reaction to the program.

The author pointed out that the limitation of this study was the use of attitudinal surveys to measure program effectiveness since it implies that that attitude and behaviour are causally linked and this is not always true. The author concluded that suicide prevention programs should specifically address the relationship between suicide and mental illness.

Kalafat and Elias ⁽³³⁾

A Solomon four-group design was used to evaluate the efficacy of a school-based suicide awareness intervention. In this study only one of the experimental groups (n = 71) and one of the control groups (n = 63) received the pre- and a post-test. The other experimental group (n = 65) and the other control group (n = 54) in the Solomon four-group design received only the post-test. Three 40-45 minute classes, taught by four regular health teachers, focused on the information about suicide, attitudes toward suicide, warning signs, and help resources for suicidal peers. The outcomes measured were in four domains: (1) knowledge about suicide; (2) attitude toward suicide and help seeking; (3) self-reported responses to the awareness of potential suicide in peers; and (4) reactions to the suicide awareness classes.

Compared with measurements at baseline, significant improvements in knowledge ($F_{(7,234)} = 12.82, p < .0001$), some items in attitudes toward suicide and help seeking ($F_{(14,225)} = 1.87, p < .03$), and responses towards suicidal peers ($F_{(5,245)} = 2.82, p < .02$) were found in the experimental group three weeks after the intervention. There were no differences between groups on some attitude items; for example, both experimental and

control groups disagreed with the statement that suicide can become a reasonable solution. Sixty-four percent of the students in the experimental group indicated that the classes would make it easier for them to deal with their friends' problems. Fifty-one percent of the students in the experimental groups indicated it would make it easier to deal with their own problems. Only 43% of the experimental groups rated the classes as helpful and 53% were neutral. However, 10% of the experimental students indicated that they knew someone who was helped by the classes; 10% indicated that someone was upset by the classes and 81% thought other students should participate.

The authors concluded that the findings provide some encouraging evidence on the effectiveness of suicide prevention curriculum.

Kalafat & Gagliano ⁽⁴³⁾

This cohort study employed simulations of encounters to assess the impact of an adolescent suicide response curriculum. The program covered effective coping strategies, explained mental health counselling, how to identify and assist troubled peers, how to respond appropriately and how to obtain help from adults and health professionals. A total of 109 Caucasian students participated in the study. Fifty-two students received the intervention lessons during a 5-day period, while 57 students served as the control group and received lessons at a later period. All students received pre-test before the intervention and a posttest 2.5 weeks after the last session of the first round of classes. Responses to two vignettes (one with low ambiguity, and another one with high ambiguity) which simulated the actual situations of two suicidal peers measured the program effect.

At the pre-test, there were no significant differences between the experimental and control groups in the response to the two vignettes. On the post-test, the experimental group provided significantly more "tell an adult" responses than those in the control group for vignette 1 (χ^2 (2, n = 109) = 26.33, $p < .001$) and for vignette 2 (χ^2 (2, n = 108) = 25.37, $p < .001$). Females expressed greater concern than males on both vignette 1 [$t(106) = 3.73$, $p < .001$] and vignette 2 [$t(107) = 9.37$, $p < .001$].

The authors concluded that the simulation employed in this study show promise as a measurement tool for the impact of youth suicide response curricula which may be effectively preparing youth for their critical role in the prevention of suicidal behaviour among their peers.

Shaffer et al. ⁽¹⁴⁾

This cohort study evaluated three school-based suicide prevention programs that focused on acquisition of suicide-related information and changes in attitude towards suicide and seeking help for emotional problems. The three programs shared similar goals but differed slightly in emphasis, program length, and program delivery staff. Program 1 delivered to Grade 10 students emphasized the clinical features of the suicidal adolescents and the need for seeking help from professionals. Program 1 was delivered by professionals and educators who had given similar programs previously.

Program 2 emphasized the value of support networks in alleviating stress. Program 3 emphasized problem-solving techniques. Programs 2 and 3 were delivered to Grade 9 students by the regular class teachers who had received 6 to 10 hours of training. A total of 758 students received one of the three programs and 680 students served as control groups.

Significant intervention effects were found one month after the interventions for only three out of nine items on knowledge and attitudes about suicide. Compared to the control groups, a larger percentage of the experimental students changed their views from disagreement to agreement with the statement that “people who do risky things...may be trying to hurt or kill themselves, and could use some help”. A larger proportion of students in the experimental groups compared to the control groups increased their awareness of where to obtain help. The experimental students also showed more willingness to help suicidal peers by taking some actions such as telling an adult, suggesting a call to the hotline or mental health centre, getting advice from another friend, or taking the situation seriously.

No intervention effects were found on seeking help for emotional problems. There was a small but significant increase in the number of experimental students who indicated that suicide could be a possible solution to problems. This negative effect of the intervention was more marked among males and Blacks.

Study limitations described by the authors were that a sizable number of responses could not be matched and the tool used measured attitude and knowledge rather than actual behaviour.

The authors noted that a large majority of students knew and subscribed to some of the more important program goals before they participated in the present program. They suggested that a program that combines providing information regarding the nature and potential benefits of seeking help for emotional/psychiatric problems with systematic screening to identify adolescents at risk may be a promising strategy for suicide prevention.

Vieland et al. ⁽⁴¹⁾

This study looked at a subset of students from the Shaffer et al. study ⁽¹⁴⁾. In order to overcome the limitation of a relatively short follow-up period, Vieland and colleagues examined the long-term impact of a school-based suicide prevention curriculum on help-seeking behaviour and suicide morbidity among high school students. An 18 month follow-up period was chosen to allow sufficient time to elapse between the delivery of the prevention program and the measurement of actual help-seeking behaviours and rate of suicide attempts. One hundred and seventy-four students from two high schools received a 1 and 1/2 hour prevention program (Program 3) that emphasized a support network in alleviating stress, confronting one’s peers, and community resources.

This study failed to provide convincing evidence of the effects of the prevention program. Out of 136 comparisons for student behaviour, only two items showed significant differences between the experimental and control groups. There were no program effects on numbers of previous suicide attempts.

One major limitation of the study was its dependence on self-report for the assessment of program impact on suicide morbidity. The answers to some items showed instability indicating the potential unreliability of self-report.

Klingman & Hochdorf ⁽⁴⁵⁾

This randomized control study was conducted to assess the feasibility and effectiveness of a school-based psychological education program designed to improve adolescents' coping with distress and enhance their ability for helping peers in distress. The intervention was led by either experienced counsellors or psychiatrists during the course of twelve 50 minute weekly sessions. A total of 237 students were randomly assigned into an experimental group and a control group. The intervention program involved three phases, including educational-conceptual, exercise-training, and implementation-application phase.

Measurements at baseline and two weeks after the intervention revealed that the experimental group showed a greater reduction than the control group on depression, anxiety, and emotionality ($F_{(1,211)} = 3.64, p < .05$). Boys showed a greater reduction than girls indicating the gender difference for this effect. There was a significant rise in empathy scores for girls but not for boys. There was also significant improvement in knowledge related to youth suicide and in knowledge of help resources ($F_{(1,211)} = 3.64, p < .05$). No significant changes were found for loneliness scores.

Authors note that this is a formative evaluation with proximal outcomes. They also noted that responses to questionnaires do not necessarily predict behaviour in encounters with troubled students.

Orbach & Bar-Joseph ⁽⁴⁴⁾

This randomized controlled study evaluated the effectiveness of a school suicide prevention program that focused on suicidal tendencies, hopelessness, ego identity, and coping ability. Trained school counselors or psychiatrists provided students in the experimental groups with seven weekly workshops of 2 hours each. The workshop helped students to share their own emotional experiences, to learn coping and problem-solving skills, and to apply a self-help and peer-help approach. A total of 393 high school students were randomly divided into intervention and control groups.

One week before and 1 to 3 weeks after the intervention, the outcomes were measured for suicidal tendency, adolescents' ego identity cohesion, hopelessness, and coping styles in problem-solving situations.

The experimental group showed significantly lower scores on suicidal tendency ($F_{(1,17)} = 7.08; P < .05$), higher scores on ego identity ($F_{(1,17)} = 4.80; P < .05$), and higher scores on

coping ($F_{(1,17)} = 6.75; P < .05$). There were no significant differences for hopelessness between the experimental and control groups. The effects of the intervention differed depending on the school from which the students came. Students from the special education-conduct disorder school demonstrated a change in suicidal tendency only and not in other variables. This indicates that this special population may need a more structured program with a more generalized manner of discussion. Students from one school showed changes in more variables than others suggesting that the interaction of the prevention program itself, the counselor who conducts the workshops, and the special population of participants may account for the difference. The study also showed gender difference in program effects. Girls from three of these schools responded somewhat more favourable than boys indicating that girls were more sensitive and open to the issue of suicidal behaviour and reacted more strongly to the program. There was no indication of harm to those exposed to the program.

The authors concluded that the intervention could positively affect adolescents' internal process related to suicidal behaviour and have an immunization effect on coping with stress. The authors noted that they did not evaluate the effect of the intervention on actual improvement in the target skills nor on indices of better adjustment.

Hazell & Lewin ⁽⁴⁶⁾

This matched case control study was conducted to evaluate one component of a pilot postvention program that was provided at two schools. The component of interest consisted of group counselling for students who had a close friendship with one of the deceased. The selection process used was found to be inefficient since many students who were friends of the deceased were not selected for counselling.

The intervention was a 90-minute counselling session for groups of 20 to 30 students in Grades 8 to 11 that was provided by a child psychiatrist or trainee psychiatrist within 7 days of the suicide. The counselling focused on an understanding of the suicide events, personal reaction to the suicide, and advice regarding where to obtain help for students experiencing suicidal ideation.

Eight months after the two suicides, students were asked to complete questionnaires that "assessed proximity to attempted and completed suicide, suicidal ideation and behaviour before and after the suicides, recent emotional and behavioural symptoms, risk-taking behaviour, and drug use". Sixty-three students were identified by the questionnaires as having received group counselling and these students were matched to uncounselled students by proximity to completed suicide, age, sex, school, previous suicidal ideation, and previous suicidal behaviour.

The outcome variables of interest to detect an effect were suicidal ideation and behaviour. No differences were found between the experimental and control groups on any of the variables assessed.

The authors proposed several possible explanations for the results: (1) the selection criteria for counselling may not have been appropriate because proximity to completed

suicide alone was a relatively weak predictor for subsequent suicidal ideation and behaviour; (2) the style and focus of counselling may have been inappropriate; (3) the duration of counselling may have been too short; (4) the content of counselling may not have been specific to the intervention; and (5) the relatively long period between postvention and follow up makes it difficult to detect the difference between experimental and control groups. The authors noted another limitation of the study was the lack of means to determine whether suicidal ideation and behaviour occurred in individuals who are exposed to suicide as a result of imitation, or as a result of other mechanisms such as complicated bereavement, posttraumatic stress disorder, or coincidence.

APPENDIX C: OUTCOME MEASUREMENT FOR ALL SUICIDE PREVENTION PROGRAMS

Eggert et al. ⁽³⁶⁾, Thompson et al. ⁽³⁹⁾

The Brief Suicide Risk Behaviour Scale – a 5-item scale measuring the frequency of suicide thought, direct and indirect suicide threats, and suicide attempts. This scale forms the core of the suicide-risk screening protocol. Construct validity was also established using confirmatory factor analysis techniques. In addition, scale scores correlated significantly with depression ($r = .43$), hopelessness ($r = .49$), family distress ($r = .37$), school dissatisfaction ($r = .27$), and drug involvement ($r = .39$); all p values $< .05$. Internal consistency of the Brief Suicide Risk Behaviour Scale was established ($\alpha = .86$).

Measure of related-risk factors

Depression – a 5-item scale capturing depressive effect adapted for use with adolescents from the CES-D. Internal consistency (reliability) was established ($\alpha = .85$).

Hopelessness – 3-item scale ($\alpha = 0.81$)

Anger – 3-item scale ($\alpha = 0.69$)

Perceived stress – 4-item scale ($\alpha = 0.79$)

Measures of protective factors

Sense of personal control – 4-item scale ($\alpha = 0.75$)

Self-esteem – 4-item version of Rosenberg's Self-Esteem Scale ($\alpha = 0.77$)

Teacher support – 14 items ($\alpha = 0.95$)

Peer support – 14 items ($\alpha = 0.95$)

Comments: standard reliability and validity assessments of the measurement tools in previous studies and within this project.

Thompson et al. ⁽³⁸⁾

Suicide Risk Behaviour – the 4 single-item indicators of suicide risk behaviour were (1) favourable attitude toward suicide, (2) frequency of suicidal ideation, (3) frequency of direct suicide threats, and (4) number of suicide attempts within the past month.

Construct validity, established previously with confirmatory factor analysis, reported factor loadings ranging from 0.69 to 0.92 for these indicators on a latent suicide risk behaviour dimension.

Measure of related-risk factors

Depression – a 6-item scale adapted from the Center for Epidemiologic Studies Depression Scale for use with adolescents ($\alpha = 0.76$).

Hopelessness – 3-item scale ($\alpha = 0.63$)

Anxiety –4-item scale ($\alpha = 0.70$)

Anger control problems – 4-item scale ($\alpha = 0.69$)

Measures of protective factors

Personal control – 5-item scale ($\alpha = 0.76$)

Problem-solving coping – 3-item ($\alpha = 0.74$)

Family support – 5 items ($\alpha = 0.85$)

Comments: Acceptable reliability coefficient and construct validity had been previously established for measures of related risk factors and protective factors. Construct validity had been previously established for measures of suicide risk behaviours.

Silbert & Berry ⁽³⁷⁾

How Much Do You Know About Suicide – 18 statements which deal with facts and mistaken or confusing ideas about suicide.

The Provision of Social Relation Scale (PSR) – 15 item instrument which asks subjects to describe their relationship with other people.

The Subjective Stress Scale (SSS) – a series of 14 adjectives which were used to obtain a measure of self-reported psychological stress.

The State Trait Inventory (Form Y) (STAN) – 20 statements which asks subjects to describe feelings of apprehension, worry or tension, as well as the absence of these feelings.

The Hopelessness Scale (HS) – 20 statements which were used to measure feelings of hope or lack of hope about the future.

Comment: reliability was previously tested for PSR ($\alpha = 0.75-0.87$), STAN ($\alpha = 0.86-0.95$), and HS ($\alpha = 0.93$). Construct validity was previously tested for PSR, SSS, and HS.

Ciffone ⁽⁴²⁾

Attitudinal survey – includes eight questions related to suicide such as asking for help from adults and health professionals, self disclosure, attitude towards suicidal peers, understanding of the relationship between suicide and mental health. The survey questions were developed by the author based on a previous study in the same area.

Comments: the study did not provide information on whether the validity and reliability of this tool was tested previously or in this study population.

Kalafat and Elias ⁽³³⁾

Knowledge about suicide - 5 true/false items, 2 items asking for agreement, 1 open ended question.

Attitudes toward suicide, help seeking and talking about suicide in class - 14 items using agreement scale.

Assess self-reported responses to awareness of potential suicide in peers – 2 scenarios provided and the likelihood of carrying 5 actions for scenario 1 and 6 actions for scenario 2. Two yes/no questions about experiences with suicidal peers.

Reaction to suicide awareness classes – 14 questions about satisfaction and reaction to classes.

Comments: Items were drawn from published curriculum assessment instruments and from a pool of items developed by the health teachers. The study did not provide information on whether the validity and reliability of the measurement tools were tested previously or in the study population.

Kalafat and Gagliano ⁽⁴³⁾

Simulation conditions – two vignettes: vignette 1 with low ambiguity and vignette 2 with high ambiguity.

Comment: the vignettes had been pilot tested previously. The vignettes were administered to about 30 volunteer peer counselors from the school to assess the realism and validity.

Shaffer et al. ⁽¹⁴⁾

Self-completion questionnaire – includes 48-items developed to inquire about attitudes towards suicide, warning signs of suicide, and attitudes towards seeking help for emotional distress.

Comment: The instrument was tested on teenagers of similar age and background as those in the study to ensure that the wording of the items was appropriate and understandable. The establishment of validity and reliability was not provided in the study.

Vieland et al. ⁽⁴¹⁾

Self-completion questionnaire – 6 items designed to elicit information on students' behaviour during the follow-up period.

Comment: there was no information provided on whether the validity and reliability of the instrument have been tested previously and in the study population.

Klingman & Hochdorf ⁽⁴⁵⁾

Israeli Index of Potential Suicide (IIPS) – includes 21 items adapted for age and cultural differences. Items were grouped into three factors: depression (ten items), anxiety (five items) and emotionality (six items), each item was rated on a five-point scale. A higher score meant higher suicidal risk.

UCLA Loneliness Scale – has 20 statements. A higher score meant more loneliness.

Index of Empathy for Children and Adolescents – includes 22 items requiring yes/no responses. A lower score means more empathy.

Story completion - specifically constructed for this study to assess knowledge of positive coping in distressful situations. Scoring by independent judges who were specially trained (interrater reliability 0.95).

Semantic Differential – developed by Osgood, Suci and Tannenbaum measuring attitudes towards programs' concepts (Divergency between self and distress). Three sets of scales (dimensions): evaluative, potency, activity.

Knowledge assessment instrument – 15-item measure to assess the student's knowledge of facts about the problem of youth suicide and an awareness of factors that are known to contribute to the high risk of suicidal behaviour. Based on the 11 item Nelson's Suicide Prevention Questionnaire, three additional items were added.

Program evaluation – 7-item questionnaire specially constructed, pre-tested and validated for this study.

Comment: the reliability of IIPS was tested ($\alpha = 0.81$). The validity for program evaluation was previously tested. There was no information on whether the reliability and validity of the other measurement tools had been tested previously and in this study population.

Orbach & Bar-Joseph ⁽⁴⁴⁾

Israeli Index of Potential Suicide (IIPS) – same as in Klingman & Hochdorf 1993 ⁽⁴⁵⁾.

Ego Identity Scale – is comprised of 38 Likert-type items that assess adolescents' ego identity cohesion.

Beck Hopelessness Scale – is the best known and most widely used scale for evaluation of hopelessness.

Self-Control schedule – 36 Likert-type items to evaluate coping styles in problem-solving situations.

Comment: The reliability for IIPS ($\alpha = 0.81$), Ego Identity Scale, ($\alpha = 0.85$), Beck's Hopelessness Scale ($\alpha = 0.89$), and Self-Control Schedule ($\alpha = 0.76-0.86$) was previously tested. The validity for the Ego Identity Scale and Beck's Hopelessness Scale was tested previously

Hazell & Lewin ⁽⁴⁶⁾

Behaviour Scale of the Youth Self Report (YSR) Version of the Child Behaviour Checklist

Risk Behaviour Questionnaire (RBQ) – 14-item self-report questionnaire examining risk taking behaviour that has been used in a previous study of adolescent suicide.

Proximity to attempted and completed suicide – 8 categories describe the relationship.

Suicidal ideation and behaviour profile – a retrospective estimate of both suicidal ideation and behaviour.

Drug and alcohol consumption questionnaire – 10 questions which have been used in previous research.

Comment: RBQ had been used in another study of adolescent suicide and for which Australian norms are being developed. Drug and alcohol consumption questionnaire had been used in previous research. The study did not provide information on whether the validity and reliability of the measurement tools were tested previously or in the study population.

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