[New 2015]

School-based interventions in reducing deaths from suicide and suicide attempts among young people [New 2015]

SCOPING QUESTION: In school students aged 14-15 years, are school-based interventions effective in reducing deaths from suicide and suicide attempts compared to care-as-usual?

BACKGROUND

Globally, suicide is the second leading cause of death in young people aged 15-29 years old (World Health Organization [WHO], 2014). For every adolescent suicide death, there are likely to be 10-40 suicide attempts (Hooven et al., 2010). Suicide attempts and severe suicidal ideation can have serious consequences, including considerable psychological suffering, increased risk for subsequent suicide attempt(s) and death. Importantly, suicidal behaviours also have profoundly negative consequences on family members, and the medical, financial and emotional costs to communities impacted by suicide are also substantial (Lindqvidst et al., 2008). Schools are an appropriate setting for interventions targeted to young people because these settings provide consistent and direct access to many young people at once.

The scoping question has been included in the mhGAP 2015 update process because there is a critical need for evidence on the effectiveness of school-based interventions in preventing suicide attempts and suicide deaths.

PART 1: EVIDENCE REVIEW

Population/ Intervention / Comparison / Outcome (PICO)

- **Population:** School students
- **Interventions:** School-based interventions
- **Comparison:** Care-as-usual
- **Outcomes:**
  - **Critical** – Suicide attempts, suicide deaths

Search strategy

The Cochrane Library, BMJ Clinical Evidence, NICE Guidelines, PubMed/Medline were searched using the following search string:

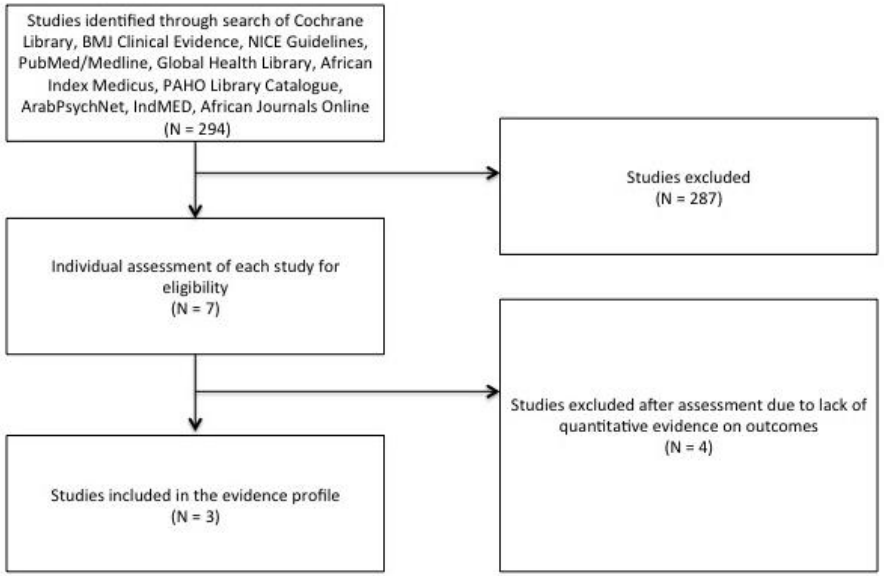
- (((suicide) AND school) AND prevention) AND evaluation)

Moreover, the following regional databases were also searched: the Global Health Library, the African Index Medicus, the PAHO Library Catalogue, ArabPsycNet, IndMED, African Journals Online (AJOL). There were no restrictions on language or on publication type. The search was restricted to the past 10 years (2004).

There were 294 papers initially identified on the basis of the search string. Reference lists were also scanned for additional relevant articles. Studies were selected for inclusion if they reported about the effectiveness of school-based suicide preventive interventions with suicides or attempted suicides as the primary outcomes. Individual assessments of all selected papers identified four recent systematic reviews (within the past five years) and three RCTs. The three RCT studies were identified for inclusion because they report on the effectiveness of school-based interventions to prevent suicidal behaviour with suicide attempts as an outcome measure. There were no studies identified that used suicide deaths as an outcome measure.

The four systematic reviews identified were not included in the GRADE tables because they did not include quantitative information about the outcomes of reviewed studies (see 'Excluded from GRADE tables and footnotes' section below). These reviews systematically searched the available literature and described interventions and their effectiveness in a narrative form (see 'Additional evidence that was not included in GRADE tables' section on p. 8). Other reviews were not included because they were not relevant to the school setting.

Figure 1. Study selection process



Included in GRADE tables or footnotes

- Aseltine RH Jr, James A, Schilling EA, Glanovsky J (2007). Evaluating the SOS suicide prevention program: a replication and extension. BMC Public Health.7(161): doi:10.1186/1471-2458-7-161.

- Wilcox HC, Kellam SG, Brown CH, Poduska JM, Ialongo NS, Wang W, Anthony JC (2008). The impact of two universal randomized first- and second-grade classroom interventions on young adult suicide ideation and attempts. Drug and Alcohol Dependence.95(Suppl.1):S60-S73. doi:10.1016/j.drugalcdep.2008.01.005.

- Wasserman D, Hoven CW, Wasserman C, Wall M, Eisenberg R, Hadlaczky G, Kelleher I, Sarchiapone M, Apter A, Balazs J, Bobes J, Brunner R, Corcoran P, Cosman D, Guillemin F, Haring C, Iosue M, Kaess M, Kahn JP, Keeley H, Musa GJ, Nemes B, Postuvan V, Saiz P, Reiter-Theil S, Varnik A, Varnik P, Carli V (2015). School-based suicide prevention programmes: the SEYLE cluster-randomised, controlled trial. Lancet.385(9977):1536-1544. doi:10.1016/S0140-6736(14)61213-7.

Excluded from GRADE tables and footnotes

Robinson J, Cox G, Malone A, Williamson M, Baldwin G, Fletcher K, O'Brien M (2013). A systematic review of school-based interventions aimed at preventing, treating, and responding to suicide- related behavior in young people. Crisis.34(3):164-182. doi: 10.1027/0227-5910/a000168.
REASON FOR EXCLUSION: Does not contain quantitative information about the effectiveness of the reviewed interventions.

Katz C, Bolton SL, Katz LY, Isaak C, Tilston-Jones T, Sareen J (2013). A systematic review of school-based suicide prevention programs. Depression and Anxiety.30(10):1030-1045. doi: 10.1002/da.22114.
REASON FOR EXCLUSION: Does not contain quantitative information about the effectiveness of the reviewed interventions.

Cusimano MD and Sameem M (2011). The effectiveness of middle and high school-based suicide prevention programmes for adolescents: a systematic review. Injury Prevention.17(1):43-49. doi: 10.1136/ip.2009.025502.
REASON FOR EXCLUSION: Does not contain quantitative information about the effectiveness of the reviewed interventions.

Cooper GD, Clements PT, Holt K (2011). A review and application of suicide prevention programs in high school settings. Issues in Mental Health Nursing.32(11):696-702. doi:10.3109/01612840.2011.597911.
REASON FOR EXCLUSION: Does not contain quantitative information about the effectiveness of the reviewed interventions.

PICO Table

Population: School students

Intervention	**Comparison**	**Outcomes**	**RCTs used for GRADE**	**Justification for inclusion**	**Relevant GRADE table**
Mental Health Awareness training (i.e., Signs of Suicide)	Care-as-usual (control)	Suicide attempts Suicide deaths	Aseltine et al. (2007)	RCTs identified by the search process, with the outcomes of suicide attempts or suicide deaths.	Table 1
Mental Health Awareness training and Skills training (i.e., Youth Aware of Mental Health YAM)	Care-as-usual (control)	Suicide attempts Suicide deaths	Wasserman et al. (2014)		Table 2
Skills training (i.e., Good Behaviour Game GBG)	Care-as-usual (control)	Suicide attempts Suicide deaths	Wilcox et al. (2008)		Table 3

Screening of adolescents at risk and referral (i.e., Professional Screening)	Care-as-usual (control)	Suicide attempts Suicide deaths	Wasserman et al. (2014)		Table 4
Gatekeeper training (i.e., Question, Persuade and Refer)	Care-as-usual (control)	Suicide attempts Suicide deaths	Wasserman et al. (2014)		Table 5

Narrative description of studies that went into the analysis

Aseltine et al. (2007) examined the effectiveness of the Signs of Suicide (SOS) prevention programme in reducing suicidal behaviour. SOS includes two approaches to suicide prevention for adolescents, combining mental health awareness education with self-recognition of depression and other risk factors associated with suicidal behaviour. Students are taught that suicide is related to depression and/or other mental health disorders mental, and is not a normal reaction to stress. Students are also taught how to recognize in themselves and others the signs of suicide and depression, as well as necessary actions to respond to these signs. The effectiveness of SOS was evaluated with a sample of 2100 students in five high schools in the United States. Students were randomly assigned to intervention and control groups. Students in both groups completed self-administered questionnaires approximately 3 months after programme implementation. Significantly lower rates of suicide attempts, as well as greater knowledge and more adaptive attitudes about depression and suicide were observed among students in the intervention group. The modest changes in knowledge and attitudes partially explained the beneficial effects of the programme.

Wasserman et al. (2015) undertook the Saving and Empowering Young Lives in Europe (SEYLE) study, a multi-centre cluster Randomised Controlled Trial (German Clinical Trials Registry DRKS00000214) implemented in 10 EU countries. The study's primary objective was to evaluate the efficacy of three school-based preventive interventions of suicidal behaviours in comparison with control groups. The interventions were: a) Question, Persuade, and Refer (QPR), a gatekeeper training targeting teachers and other school personnel; b) Youth Aware of Mental Health (YAM) that targeted pupils; and c) Screening by Professionals (ProfScreen), with referral of at-risk pupils. QPR is a manualised gatekeeper programme employed to train teachers and other school personnel to recognize risk for suicidal behaviours in pupils and enhance their communication skills in order to motivate and help at-risk pupils to seek professional care. The YAM programme is a programme for students aged 14–17 years that promotes increased knowledge and discussion about mental health and the development of new skills and emotional intelligence (e.g., problem solving, coping with stress and crisis). YAM offers a hands-on approach to mental health issues, such as stress, crisis, depression and suicide, allowing the personal experiences of the participants to influence programme content and discussion. ProfScreen is a questionnaire-based screening intervention. Health professionals reviewed the answers to screening questionnairs completed by students. Those pupils who screened at- or above predetermined cut-off points were invited to participate in a professional mental health clinical assessment and subsequently referred to clinical services, if needed. The main outcome measures were the number of incident cases of suicide attempts at 3-month and 12-month follow-up. At 12-month follow-up, a significant effect of the YAM programme compared with controls was observed with reduction of incident suicide attempts (OR: 0·45 [0·24 - 0·85]; p=0·0141) and severe

suicidal ideation (OR: 0·50 [0·27 – 0·92]; p=0·0250). No significant effects of the QPR and ProfScreen programmes in reducing incident suicide attempts in comparison with controls were observed.

Wilcox et al. (2008) evaluated the effectiveness of the Good Behaviour Game (GBG) in reducing the risk of suicide attempts. The GBG is a classroom team-based behaviour management strategy that promotes good behaviour by rewarding teams that do not exceed maladaptive behaviour standards, as set by the teacher. The goal of the GBG is to create an integrated classroom social system that is supportive of all children being able to learn with little aggressive and/or disruptive behaviours. The methods involve helping teachers to define unacceptable behaviours clearly and to socialize children with regulation of teammates' behaviour through a process of team contingent reinforcement and mutual self-interest. GBG was tested in an RCT performed on two cohorts of first grade children. In the first cohort, a GBG-associated reduced risk for suicide attempts by age 19-21 years compared to control was observed. In the second cohort, no significant effects of the GBG intervention were observed.

GRADE Tables

Table 1. SOS programme vs. care-as-usual

Authors: V Carli and C Barbui
Question: In school students aged 14-15 years, is the SOS programme effective in reducing suicide attempts and suicide deaths compared to care-as-usual?
Bibliography: Aseltine RH Jr, James A, Schilling EA, Glanovsky J (2007). Evaluating the SOS suicide prevention program: a replication and extension. BMC Public Health.18(7):161.

Quality assessment							No. of patients		Effect		Quality	Importance
No. of studies	Design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	SOS program	Care-as-usual	Relative (95% CI)	Absolute		
Suicide Attempts (follow-up mean 3 months; assessed with: self report question)												
1	Randomized trials	No serious risk of bias	No serious inconsistency	No serious indirectness	Serious[1]	None	61/2039 (3%)	94/2094 (4.5%)	OR 0.66 (0.47 to 0.91)	15 fewer per 1000 (from 4 fewer to 23 fewer)	⨁⨁⨁◯ MODERATE	CRITICAL
Suicide deaths - not measured												
0	-	-	-	-	-	None	-	-	-	-		

[1] Only one RCT available.

Table 2. YAM vs. care-as-usual

Authors: V Carli and C Barbui

Question: In school students aged 14-15 years, is YAM effective in reducing suicide attempts and suicide deaths compared to care-as-usual?

Bibliography: Wasserman D, Hoven CW, Wasserman C, Wall M, Eisenberg R, Hadlaczky G, Kelleher I, Sarchiapone M, Apter A, Balazs J, Bobes J, Brunner R, Corcoran P, Cosman D, Guillemin F, Haring C, Iosue M, Kaess M, Kahn JP, Keeley H, Musa GJ, Nemes B, Postuvan V, Saiz P, Reiter-Theil S, Varnik A, Varnik P, Carli V (2015). School-based suicide prevention programmes: the SEYLE cluster-randomised, controlled trial. Lancet.385(9977):1536-1544. doi:10.1016/S0140-6736(14)61213-7.

Quality assessment							No. of patients		Effect		Quality	Importance
No. of studies	Design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	YAM	Care-as-usual	Relative (95% CI)	Absolute		
Suicide Attempts (follow-up mean 12 months; assessed with: self-report questionnaire)												
1	Randomized trials	No serious risk of bias	No serious inconsistency	No serious indirectness[1]	Serious[1]	None	14/1987 (0.7%)	34/2256 (1.5%)	OR 0.45 (0.24 to 0.85)	8 fewer per 1000 (from 2 fewer to 11 fewer)	⨁⨁⨁◯ MODERATE	CRITICAL
								0%		-		
Suicide deaths - not measured												
0	-	-	-	-	-	None	-	-	-	-		

[1] Only one RCT available

Table 3. GBG vs. care-as-usual

Authors: V Carli and C Barbui
Question: In school students aged 14-15 years, is GBG effective in reducing suicide attempts and suicide deaths compared to care-as-usual?
Bibliography: Wilcox HC, Kellam SG, Brown CH, Poduska JM, Ialongo NS, Wang W, Anthony JC (2008). The impact of two universal randomized first- and second-grade classroom interventions on young adult suicide ideation and attempts. Drug and Alcohol Dependence.95(Suppl.1):S60-S73. doi:10.1016/j.drugalcdep.2008.01.005.

Quality assessment							No. of patients		Effect		Quality	Importance
No. of studies	Design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	GBG	Care-as-usual	Relative (95% CI)	Absolute		
Suicide Attempts (follow-up mean 15 years)												
1	Randomized trials	No serious risk of bias	No serious inconsistency	No serious indirectness	Very serious[1,2]	None	-	-	RR 0.5 (0.3 to 0.9)	-	⨁⨁⨁◯ LOW	CRITICAL
								0%		-		
Suicide deaths - not measured												
0	-	-	-	-	-	None	-	-	-	-		

[1] Only one RCT available.
[2] No information available about absolute effects.

Table 4. QPR vs. care-as-usual

Authors: V Carli and C Barbui
Question: In school students aged 14-15 years, is QPR effective in reducing suicide attempts and suicide deaths compared to care-as-usual?
Bibliography: Wasserman D, Hoven CW, Wasserman C, Wall M, Eisenberg R, Hadlaczky G, Kelleher I, Sarchiapone M, Apter A, Balazs J, Bobes J, Brunner R, Corcoran P, Cosman D, Guillemin F, Haring C, Iosue M, Kaess M, Kahn JP, Keeley H, Musa GJ, Nemes B, Postuvan V, Saiz P, Reiter-Theil S, Varnik A, Varnik P, Carli V (2015). School-based suicide prevention programmes: the SEYLE cluster-randomised, controlled trial. Lancet.385(9977):1536-1544. doi:10.1016/S0140-6736(14)61213-7.

Quality assessment							No. of patients		Effect		Quality	Importance
No. of studies	Design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	QPR	Care as usual	Relative (95% CI)	Absolute		
Suicide Attempts (follow-up mean 12 months)												
1	Randomized trials	No serious risk of bias	No serious inconsistency	No serious indirectness	Very serious[1,2]	None	22/1978 (1.1%)	34/2256 (1.5%)	OR 0.70 (0.39 to 1.25)	4 fewer per 1000 (from 9 fewer to 4 more)	⨁⨁⨁◯ LOW	CRITICAL
								0%		-		
Suicide deaths - not measured												
0	-	-	-	-	-	None	-	-	-	-		

[1] Only one RCT available.
[2] Wide confidence intervals.

Table 5. Prof Screen vs. care-as-usual

Authors: V Carli and C Barbui
Question: In school students aged 14-15 years, is ProfScreen effective in reducing suicide attempts and suicide deaths compared to care-as-usual?
Bibliography: Wasserman D, Hoven CW, Wasserman C, Wall M, Eisenberg R, Hadlaczky G, Kelleher I, Sarchiapone M, Apter A, Balazs J, Bobes J, Brunner R, Corcoran P, Cosman D, Guillemin F, Haring C, Iosue M, Kaess M, Kahn JP, Keeley H, Musa GJ, Nemes B, Postuvan V, Saiz P, Reiter-Theil S, Varnik A, Varnik P, Carli V (2015). School-based suicide prevention programmes: the SEYLE cluster-randomised, controlled trial. Lancet.385(9977):1536-1544. doi:10.1016/S0140-6736(14)61213-7..

Quality assessment							No. of patients		Effect		Quality	Importance
No. of studies	Design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	ProfScreen	Care-as-usual	Relative (95% CI)	Absolute		
Suicide Attempts (follow-up mean 12 months)												
1	Randomized trials	No serious risk of bias	No serious inconsistency	No serious indirectness	Very serious[1,2]	None	20/1961 (1%)	34/2256 (1.5%)	OR 0.65 (0.36 to 1.18)	5 fewer per 1000 (from 10 fewer to 3 more)	⨁⨁⨁◯ LOW	CRITICAL
Suicide deaths - not measured												
0	-	-	-	-	-	None	-	-	-	-		
								0%		-		

[1] Only one RCT available.
[2] Wide confidence intervals.

Additional evidence not mentioned in GRADE tables

The identified systematic reviews included studies that also showed promising results for other interventions. However, these interventions were not evaluated for their effectiveness in preventing suicide attempts or suicide deaths. Instead, these studies used other intermediate outcomes, such as knowledge and attitudes. They are as follows:

In an RCT evaluating QPR Gatekeeper Training Programme and involving 249 school staff, Wyman et al. (2008) found beneficial effects of QPR on suicide knowledge, skills and attitudes. Positive effects were shown on general knowledge, perceived preparedness, self-evaluated knowledge and gatekeeper efficacy outcomes. Unfortunately, although gatekeepers could learn how to identify those at risk, only those gatekeepers who typically had good relationships with students felt comfortable enough approaching students with offers of help. This programme did not show an effect on subsequent mental health service use.

Tompkins et al. (2009) evaluated the effectiveness of training 78 school staff on QPR compared to a 24-person control group. QPR training resulted in increased knowledge of- and more positive attitudes toward suicide. However, the study found no positive effects on gatekeeper behavioural outcomes, such as asking students about suicide, increased number of referrals and better connections with students.

There were four randomized trials evaluating a motivational counselling intervention CARE (Care, Assess, Respond, Empower), including Randell et al. (2001); Thompson et al. (2001); Eggert et al. (2002); and Hooven et al. (2010). All of the trials reported that the programme was effective in reducing depression and hopelessness in both young women and men, as well as anxiety and anger among young women. Hooven et al. (2010) found improvements on knowledge and attitudes towards suicide, as well as a reduction of risk factors for suicide. The studies were not included in GRADE tables because *suicide risk behaviours* were measured as outcomes. It is not possible to deduce from the reported data if the programme was effective in preventing suicide attempts.

PART 2: FROM EVIDENCE TO RECOMMENDATIONS

Summary of quantitative evidence table

Outcome	**SOS** *(Number of studies, result, quality)*	**YAM** *(Number of studies, result, quality)*	**GBG** *(Number of studies, result, quality)*	**QPR** *(Number of studies, result, quality)*	**ProfScreen** *(Number of studies, result, quality)*
Suicide attempts and suicide deaths	1 study OR 0.66 (0.47 to 0.91) Favours SOS MODERATE quality	1 study OR 0.45 (0.24 to 0.85) Favours YAM MODERATE quality	1study RR 0.5 (0.3 to 0.9) Favours GBG LOW quality	1 study OR 0.70 (0.39 to 1.25) No difference LOW quality	1 study OR 0.65 (0.36 to 1.18) No difference LOW quality

Evidence to recommendation table

Benefits	Mental Health Awareness programmes that include skills training (e.g., problem solving, coping with stress) have been found effective in reducing suicide attempts. Other school-based interventions, such as the QPR gatekeeper training and motivational interventions, have been shown to affect intermediate outcome measures, such as attitudes, knowledge and suicide risk factors.
Harms	Potential harms may result through a lack of healthcare and community resources to provide care for at-risk adolescents who seek help.
Summary of the quality of evidence	The overall quality of the evidence is low due to the scarcity of available studies. Awareness and skills training interventions have been evaluated in RCTs of moderate quality. For other programmes, the results are negative (e.g., screening, QPR gatekeeper training) or the quality of the evidence is very low and only intermediate outcome measures have been included in the study design (e.g., QPR gatekeeper training, motivational counselling).

Value and preferences	
In favour	School-based interventions that increase mental health awareness and provide skills training show effectiveness in reducing suicide attempts. These interventions are also likely to bring more general benefits to youth mental health.
Against	No harm was reported in association with the implementation of mental health awareness interventions that include skills training. Assistance procedures should be in place for cases where adolescents seek additional help and supports after participating in the intervention.
Uncertainty or variability?	There is uncertainty with regards to legal, cultural and religious beliefs and circumstances in different countries.

Feasibility (including resource use considerations)	The implementation of mental health awareness and skills-training programmes in classrooms may or may not require significant resources. Feasibility may depend on the education system's current capacity to assimilate new materials and training-related expenditures.
Uncertainty or variability?	There is variability in capacity to deliver these interventions with regard access to resources for material development and training of health care providers.

Recommendation and remarks

Recommendation

The implementation of suicide prevention programmes in school settings that include mental health awareness training and skills training can be offered to reduce suicide attempts and suicide deaths among adolescent students.

Rationale: Mental health awareness programmes that include skills training (e.g., problem solving, coping with stress) have been found to be effective in reducing suicide attempts, although the quality of the evidence is low. Potential harms may result through a lack of healthcare and community resources to provide care for at-risk adolescents who seek help.

Remarks

Most of the described interventions have been administered and evaluated in adolescent populations of 14-17 years old.

Suicide prevention programmes, including the training of programme providers, would need to be adapted/contextualized to local religious, cultural and legal settings in a sensitive and appropriate manner.

Judgements about the strength of a recommendation

Factor	Decision
Quality of the evidence	□ High □ Moderate **X Low** □ Very low
Balance of benefits versus harms	**X Benefits clearly outweigh harms** □ Benefits and harms are balanced □ Potential harms clearly outweigh potential benefits
Values and preferences	**X No major variability** □ Major variability
Resource use	**X Less resource-intensive** □ More resource-intensive
Strength	**CONDITIONAL**

OTHER REFERENCES

Eggert LL, Thompson EA, Randell BP, Pike KC (2002). Preliminary effects of brief school-based prevention approaches for reducing youth suicide–risk behaviors, depression and drug involvement. Journal of Child Adolescent Psychiatric Nursing.15(2):48–64.

Hooven C, Herting JR, Snedker KA (2010). Long-term outcomes for the promoting CARE suicide prevention program. American Journal of Health Behavior.34(6):721–736.

Lindqvist P, Johansson L, Karlsson U (2008). In the aftermath of teenage suicide: A qualitative study of the psychosocial consequences for the surviving family members. BioMed Central (BMC) Psychiatry.8:26. doi:10.1186/1471-244X-8-26.

Randell BP, Eggert LL, Pike KC (2001). Immediate post-intervention effects of two brief youth suicide prevention interventions. Suicide and Life-Threatening Behavior.31(1):41–61.

Thompson EA, Eggert LL Randell BP, Pike KC (2001). Evaluation of indicated suicide risk prevention approaches for potential high school dropouts. American Journal of Public Health.91(5):742–752.

Tompkins TL, Witt J, Abraibesh N (2009). Does a gatekeeper suicide prevention program work in a school setting? Evaluating training outcome and moderators of effectiveness. Suicide and Life-Threatening Behavior.39(6):671–681.

World Health Organization (WHO). Preventing Suicide: A global imperative. Luxembourg: WHO; 2014 (http://apps.who.int/iris/bitstream/10665/131056/1/9789241564779_eng.pdf?ua=1&ua=1, access Autumn 2014).

Wyman PA, Brown CH, Inman J, Cross W, Schmeelk-Cone K, Guo J, Pena JB (2008). Randomized trial of a gatekeeper program for suicide prevention: 1-year impact on secondary school staff. Journal of Consulting and Clinical Psychology.76(1):104–115.