

5-2021

## The Effectiveness of the More Than Sad School based Gatekeeper Training Program

Guy Diamond  
*Drexel University*

Lawrence Ogunkua  
*Drexel University*

Matthew B. Wintersteen  
*Jefferson University*

Tita Atte  
*Drexel University*

Perri Rosen  
*Garrett Lee Smith Youth Suicide Prevention Grant, Commonwealth Tower, Harrisburg*  
Follow this and additional works at: <https://jdc.jefferson.edu/phbfp>



Part of the [Psychiatry Commons](#)  
See next page for additional authors

[Let us know how access to this document benefits you](#)

---

### Recommended Citation

Diamond, Guy; Ogunkua, Lawrence; Wintersteen, Matthew B.; Atte, Tita; Rosen, Perri; and Gallop, Robert, "The Effectiveness of the More Than Sad School based Gatekeeper Training Program" (2021). *Department of Psychiatry and Human Behavior Faculty Papers*. Paper 65.  
<https://jdc.jefferson.edu/phbfp/65>

This Article is brought to you for free and open access by the Jefferson Digital Commons. The Jefferson Digital Commons is a service of Thomas Jefferson University's [Center for Teaching and Learning \(CTL\)](#). The Commons is a showcase for Jefferson books and journals, peer-reviewed scholarly publications, unique historical collections from the University archives, and teaching tools. The Jefferson Digital Commons allows researchers and interested readers anywhere in the world to learn about and keep up to date with Jefferson scholarship. This article has been accepted for inclusion in Department of Psychiatry and Human Behavior Faculty Papers by an authorized administrator of the Jefferson Digital Commons. For more information, please contact: [JeffersonDigitalCommons@jefferson.edu](mailto:JeffersonDigitalCommons@jefferson.edu).

---

**Authors**

Guy Diamond, Lawrence Ogunkua, Matthew B. Wintersteen, Tita Atte, Perri Rosen, and Robert Gallop

The Effectiveness of the More Than Sad School based Gatekeeper Training Program

Guy Diamond, Ph.D.

Lawrence Ogunkua, M.Ed., MSHI

Tita Atte, MPH

Center for Family Intervention Science, College of Nursing and Health Professions.

Drexel University

Perri Rosen, Ph.D., NCSP

Garrett Lee Smith Youth Suicide Prevention Grant

Matthew B. Wintersteen, Ph.D.

Thomas Jefferson University

Department of Psychiatry & Human Behavior

Guy Diamond, Ph.D.

3020 Market St. Suite 510, Philadelphia, PA 19072, [gd342@drexel.edu](mailto:gd342@drexel.edu)

## Abstract

Objective. Schools have been identified as an opportunity to identify and refer youth at risk for suicide. Gatekeeper training for school staff improves their ability to talk to students about mental health concerns. Unfortunately, research on the effectiveness of these programs has many methodological limitations: small sample sizes, lack of control groups, no long-term outcomes, non-standardize assessment measure, and no measure of change in behavior. This study improves on all these limitations and evaluated the effectiveness of the More than Sad program. Fourteen schools districts with over 1600 staff received the training. A standardized assessment tool was used before and after the training and two months later. Half of the schools served as a wait list control before receiving the treatment. Compared to wait listed staff, staff who received the treatment reported a significant increase in knowledge, attitudes, preparedness, self-efficacy and likelihood to refer. Referral behavior also increased. Gains were maintained at 2 month follow up. Conclusion. More than Sad can effectively improve suicide literacy and willingness to refer youth at risk for suicide to school mental health resources. With 90% of the program pre-recorded on DVDs, this program can be broadly disseminated with limited burden to schools. Who most benefits most from the program and whether training for the facilitator would improve outcomes remain a question for future research.

**KEYWORDS:** youth suicide, teacher training, school prevention

## Background

Suicide is currently the second leading cause of death among middle and high school students (Lancet, 2017). Recent research indicates that suicide rates have risen across all age ranges over the past two decades, and most notably since 2006, with some of the most dramatic increases affecting youth (CDC, 2016). National survey data from high school students in the United States suggests that approximately 17% reported serious thoughts of suicide, 7% reported a suicide attempt, and 2.4% reported receiving medical attention for a suicide attempt (YSBR, 2017). In Pennsylvania, surveys administered to middle and high school students have found that as many as 1 in 10 students report attempting suicide in the past 12 months (Pennsylvania Youth Survey, 2017). As a result, youth suicide has become a growing area of focus for schools, with most states having now adopted legislation requiring staff training in suicide prevention (i.e., gatekeeper training; Kreuze, Stecker, & Ruggiero, 2017; SAMHSA, 2012). Schools provide a unique context for youth suicide prevention efforts because teachers and staff have daily contact and with students. Unfortunately, many barriers exist in schools that undermine this opportunity. First, youth at risk of suicide may not be likely to reach out for help on their own (Hom, Stanley, & Joiner, (2015). Depression and hopelessness tend to isolate them from networks that can facilitate access to services. Second, teachers generally receive very little mental health training. In fact, many teachers feel unprepared to identify and assist youth with mental health distress, and suicide in particular (Ekornes, 2015; Shelemy, L., Harvey, K., & Waite, P., 2019). In addition, teachers report feel unsupported and unprepared for helping their students after a student completes suicide (Kölves, Ross, Hawgood, Spence, & De Leo, 2017). Finally, the general social stigma about mental health and suicide deters youth from turning to school personnel for help (Goldsmith, Pellmar, Kleinman,& Bunney, 2002).

Given these challenges, comprehensive approaches to school-based suicide prevention encourage staff training as an essential component of increasing identification rates of youth that may be at risk of suicide (SAMHSA, 2012). These “gatekeepers” serve an important function within the setting. Teachers, coaches, and other staff members are well-positioned, given their relationships with students, to notice warning signs, reach out to students about their concerns, and make referrals to school mental health professionals (Erbacher, Singer & Poland, 2015). Suicide prevention “gatekeeper” trainings do not promote intervention skills. Instead, these programs aim to increase staffs’ knowledge, comfort, and confidence to recognize the signs of student mental health distress, and then encourage students to seek help. In this way, these programs aim to reduce stigma about mental health, depression, and/or suicide and empower staff to take action when needed (SAMHSA 2012; Singer, Erbacher, & Rosen, 2019). School mental health professionals, such as school counselors or psychologists, are also considered gatekeepers, but serve in the additional role of screening or assessing for suicide risk once a student has been identified.

Given the potential importance of gatekeeper training, it is surprising that such little research has examined its effectiveness. In the last decade, several good reviews have been conducted (e.g., Katz et al., 2013; Mo et al., 2018; Robinson et al., 2013; Torok, et. al., 2019) which in total have identified about 14 to 20 methodically strong studies. Question, Persuade, Refer (QPR; Quinnett, 2007) and Applied Suicide Assistance Training (ASIST; Turley, Pullen, Thomas, & Rolfe, 2000) have received the most attention. Most studies examined a single, face to face, brief (1 to 2 hours with some going to 8 hours), intervention. Some interventions employed behavioral rehearsal of skills but most relied primary on a psycho educational format. Only two studies tested a booster session (Cross et al., 2011; Wyman, et al., 2008).

One widely used training program has never received any program evaluation let alone received rigorous scientific scrutiny. More Than Sad was developed by the American Foundation for Suicide Prevention. It has two primary goals: a) to increase understanding of the problem of youth suicide, the risk factors that can lead to suicide, and the treatment and prevention options, and b) increase knowledge of the warning signs of youth suicide, in order to encourage school personnel to identify and refer students who may be at risk. Most of the program consists of school staff gathered in a group to watch one 90 minute DVD which follows the stories of four students struggling with mental health concerns in high school. The stories focus as much on mental health (i.e., depression) as they do suicide. Because the content is pre-recorded, any school mental health champion could, with basic instruction from the manual, implement and lead the training. The facilitator does not require extensive training and certification. The effectiveness of More than Sad has never been evaluated.

When school based, gate keeper training programs have been evaluated, most studies demonstrated some improvement in participants' knowledge, skills, self-efficacy, attitudes and likelihood to intervene. Unfortunately, most of these studies suffer from numerous methodological challenges that limit our confidence in the findings. Most studies only collected pre and post data, and no follow up outcome assessment (3 to 12 month). Few studies used a control group (e.g., wait-list) or randomization. Sample sizes were relatively small with a range from 30 to 400 with most studies slightly over 100 teachers. One well-designed study had a sample of over 700 teachers (Wynne et al., 2008). Finally, very few studies used an assessment measure that had been psychometrically validated. Most studies developed their own scales usually to measure common domains such as knowledge, comfort, attitudes, behaviors, etc.

Many of these assessment tools only measured one or two of these key domains rather than all of them.

Most surprisingly, outcomes related to behavioral change have rarely been examined. Based on behavioral change models, gatekeepers' programs target knowledge and attitudes with the hope it will change behaviors (Cole, 1995). Behavioral change itself might include talking to a student about psychological distress or actually referring a student to the school counselor for an assessment. However, referral rates for a suicide screening or assessment, or other mental health supports, are rarely include in these studies. When it was measured, investigators usually relied on teacher self-report behavior (e.g., did I make more referrals, etc.) which can easily be confounded by social desirability (e.g., saying what they think the investigator wants to hear). Taken together, these kinds of methodically challenges limit our understanding of the effectiveness of school-based gatekeeper training programs.

This study aims to address some of these gaps in the literature. We tested the efficacy of the More Than Sad gatekeeper training program with a population of middle and high school staff. The aim was to see if the 90-minute program could impact knowledge, attitudes, comfort, self-efficacy, and behavior. To address some of the past methodical limitations outlined above, we used a large samples (1642) of school personnel (mostly teachers) from 14 school districts across rural and urban communities. We assessed teachers before and after the training and 2 months post training to assess the degree to which outcomes were maintained over time. Schools who served as the wait list subjects were then offered the training after the wait list period. To improve on measurement, we used a new gatekeeper measure that has recently received some rigorous psychometric evaluation (Albright, et al., 2016). Finally, we measured behavioral change in two ways. First, we collected teachers' self-report of frequency with which they



engaging in conversation with students about mental health or referring them for follow-up screening or assessment. Second, we collected school records of actual teacher referrals to the school counselors for concerns about self-harm in the year before and after the training.

## **Methods**

### **Procedures**

Recruitment. Superintendents of schools in several Pennsylvania counties were contacted about the program. They were given a brief written summary and oriented to the training and research protocol through a 30-minute phone call. If interested in the study the schools appointed a liaison for the project. The More Than Sad Project Coordinator then proceeded to schedule a face to face or telephone meetings with specific school principals and liaison who expressed an interest in the training.

Assessments. All teachers and school personnel within a district were invited to attend the training. Schools provided email addresses for each staff member. These addresses were entered into a Qualtrics database. The assessment measure was sent to all staff two weeks before the scheduled training. IRB approved consent was done online. Questionnaires took about 10 minutes to complete. Immediately after the training, the teachers and staff were again sent the questionnaire. Then two months later, they received the same questionnaire as a follow up procedure. All staff who completed the follow up received a \$10 gift card.

Study Design. 612 teachers served as a no treatment control. The control group was given the assessment tool, no intervention, and then re administered the assessment tool two months later. A post-evaluation was not conducted on the control group as it would have been days after the base line assessment with no intervention. After the follow up assessment, the 600 teachers in the control condition received the intervention, again completing the pre, post, and follow up

assessment. Then, 1000 more teachers were recruited for the study. We had intended to get a wait-list control period on this sample as well, but logistics with the schools would not allow. (They would call and say come do the training in 4 weeks). Therefore, these 1030 teachers only received the treatment and pre, post, follow up assessment.

Intervention. Developed by the American Foundation for Suicide Prevention, *More Than Sad: Suicide Prevention Education for Teachers and Other School Personnel* is designed to help educators better understand suicidal behavior in adolescents, including its causes, treatment, and prevention. The program is built around two 25-minute DVDs: *More Than Sad: Preventing Teen Suicide* and *More Than Sad: Teen Depression*. (In the current program, *Teen Depression* is used to show adults how a potentially life-threatening mental disorder can present in teens.) The facilitator materials are downloadable from the [AFSP website](#) and include a Facilitator's Guide, slides for teacher trainers, instructional manual for program participants, and other resources. An expert advisory panel guided the development of the program. The materials were updated in 2015. The program is also suitable for parents and other adults who care for or work with teens. After completing the program, participants should have a) increased awareness of teen suicide, and prevention and treatment models, b) increased understanding of mental disorders and other risk factors for teen suicide, and c) feel prepared to identify and refer students who may be at risk.

The More Than Sad program provides a 25-minute video tape. This tape is a self-contained training with a host providing introduction and overview of four clinical vignettes with actors playing out students, teachers, parents and counselors, and then a summary at the end. A live facilitator introduces the program, and then answers questions after the film has ended. In

this way, the program is designed to be delivered by any school personnel with an interest in this topic, not necessarily mental health professionals.

Assessment tool. For this study, we used the Gatekeeper Behavior Scale (Albright et al., 2016). This scale was developed and validated on a sample of over 8000 teachers. It consists of 11 items making up three subscales. The preparedness scale first assesses teachers' knowledge about risk behaviors and warning signs (e.g., recognize when a student appears to have psychological distress). Preparedness also assesses teachers' skills for assessing and referring a student for help (e.g., motivate them to seek counseling). The Likelihood scale assesses if the teacher thinks they actually would follow through with prevention behavior (e.g. talk with or refer a student). The Self-Efficacy scale measures how confident the teacher feels carrying out the assessment and behavior. Factor loading showed all items correlated highly with the theoretical constructs ( $r > .84, p < .001$ ). Construct validity, criterion validity, and convergent validity were also strong. Regression analysis also showed that all three scales predicted teachers report of actually conducting gatekeeper behavioral techniques with a student (e.g., talking with them about suicide/depression or referring them for services.).

For the purposes of this project, we added to additional scales: Knowledge and Attitudes. These domains are directly targeted by the More Than Sad training and proposed as primary factors in changing behavior. Knowledge pertains to what teachers know about depression and suicide risk and warning signs. The assumption is that knowledge should increase comfort and self-efficacy. Attitude refers to teachers view of their responsibility within their professional role for intervening on mental health (e.g., the belief that teachers are responsible for addressing suicide). The modification also included a stronger behavioral indicator. We asked, "In the past

two months did you talk to a student about depression or suicide?” and “How many times did a student approach you about these problems. “

Teacher referrals. One unique context of this study is the Pennsylvania’s Student Assistance Program (SAP), which is a process for obtaining assessment for youth having school performance problems. Teachers refer youth for any concerns including mental health (and suicide ideation or behavior is a referral reason). SAP is an in-school committee tasked with determining if a student needs an assessment from a mental health provider. This is not for students in crisis. To initiate the SAP process, anyone (including teachers, parents, and students) submit a referral form indicating why they are referring students to the SAP team. We collected these “reasons for referral” for one year before the training and for the entire year after the training (all trainings were done in the fall).

#### Data Analysis

All analyses were conducted with the intent-to-treat sample. To address our hypotheses, we examined depressive symptom severity using a Mixed Model Analysis of Variance (MMANOVA; Schwarz, 1993). The MMANOVA framework allowed us to accommodate the clustering due to nesting within school as well as nesting within subject due to the clustering with person. Moreover, the MMANOVA treats time as a categorical factor, therefore estimating means for each group for each time point. This strategy accommodates non-linear change over time as well as the difference in time-assessments between intervention with treatment arm assessed at Pre, Post, and Follow-up, Wait-List is assessed solely Pre and Follow-up. The MMANOVA framework requires multivariate normality of the model based residuals. The Box-Cox (Box & Cox, 1964) assessment indicated the need to employ a square root transformation on

the EPDS outcome to ensure normality of the residuals at each discrete time point, resulting in multivariate normality.

As described by Raudenbush (1997) and Raudenbush and Liu (2001), and implemented with the Optimal Design Software (Spybrook, Raudenbush, Liu, Congdon, & Martinez, 2008), power calculations were estimated for two level hierarchical designs using the following parameter values: (a) the number of participating school districts set at  $n = 25$ , (b) a minimum of 25 units per school district, and (c) within school district interclass correlation coefficient of 0.15, slightly larger than what was reported in Young et al. (2018). Assuming equally sized groups and a type I error rate of 0.05, the study has 98.3% power to detect a Cohen's D effect size of 0.20 corresponding to a small effect size per Cohen (1988).

## Results

Table #1 provides the demographic of the teachers and staff who received the intervention. Table #2 provides descriptive of the outcomes for each intervention arm and time point. Figure 1 shows the trajectories of change over time. Each outcome was analyzed through Mixed-effects analyses. Cohen's D Effect sizes were derived for the various comparisons for both between and within group effect sizes. Additionally, we produce model based adjusted effect sizes, represented by  $D^*$ , which covary for the baseline measures presented in Table 1 which have significant intervention differences. All analyses address the clustering within school, where for each outcome we saw significant portion of the variance attributable to school. School accounted for 5.20%, 1.49%, 1.80%, 3.92%, and 4.17% of the variance for each of the respective domains.

As illustrated in Figure 1, for knowledge there is a non-significant difference at Pre-treatment between intervention and wait-list control corresponding to a difference of -0.067

( $se=0.322$ ,  $p=0.83$ ,  $D=0.05$ ,  $D^*=0.11$ ). The intervention experiences a significant increase in knowledge pre-treatment to post-treatment corresponding to an on-average increase of 0.875 ( $se=0.051$ ,  $p<.0001$ ,  $D=0.65$ ,  $D^*=0.68$ ). Post-treatment through follow-up, the intervention experience a significant decrease on knowledge correspond to an on-average decrease of 0.354 ( $se=0.056$ ,  $p<.0001$ ,  $D=0.26$ ,  $D^*=0.24$ ). None the less, even at the follow-up assessment, the intervention experiences a significant increase in on-average knowledge compared to pre-treatment corresponding to an on-average increase of 0.524 ( $se=0.053$ ,  $p<.0001$ ,  $D=0.38$ ,  $D^*=0.44$ ). In contrast, the wait-list condition does not experience a significant change in knowledge with an on-average increase of 0.106 ( $se=0.082$ ,  $p=0.20$ ,  $D=0.08$ ,  $D^*=0.09$ ). Contrast of intervention at post-treatment and follow-up in comparison to the wait-list condition at follow-up corresponds to significant differences with intervention on-average 0.837 ( $se=0.324$ ,  $p=.01$ ,  $D=0.62$ ,  $D^*=0.62$ ) higher at post-treatment and a non-significant difference at follow-up with intervention on-average 0.483 units higher ( $se=0.325$ ,  $p=0.14$ ,  $D=0.36$ ,  $D^*=0.46$ ).

For attitude there is a non-significant difference at Pre-treatment between intervention and wait-list control corresponding to a difference of -0.146 ( $se=0.499$ ,  $p=0.77$ ,  $D=0.04$ ,  $D^*=0.03$ ). The intervention experiences a significant increase in attitude pre-treatment to post-treatment corresponding to an on-average increase of 3.445 ( $se=0.143$ ,  $p<.0001$ ,  $D=0.92$ ,  $D^*=0.94$ ). Post-treatment through follow-up, the intervention experience a significant decrease on attitude correspond to an on-average decrease of 1.453 ( $se=0.156$ ,  $p<.0001$ ,  $D=0.39$ ,  $D^*=0.36$ ). Nonetheless, even at the follow-up assessment, the intervention experiences a significant increase in on-average attitude compared to pre-treatment corresponding to an on-average increase of 1.992 ( $se=0.149$ ,  $p<.0001$ ,  $D=0.53$ ,  $D^*=0.58$ ). In contrast, the wait-list condition does not experience a significant change in attitude with an on-average decrease of

0.041 (se=0.232, p=0.20, D=0.01, D\*=0.01). Contrast of intervention at post-treatment and follow-up in comparison to the wait-list condition at follow-up corresponds to significant differences with intervention on-average 3.633 (se=0.510, p<.001, D=0.98, D\*=0.97) higher at post-treatment and a significant difference at follow-up with intervention on-average 2.180 units higher (se=0.511, p<.001, D=0.58, D\*=0.60).

For prepared there is a non-significant difference at Pre-treatment between intervention and wait-list control corresponding to a difference of -0.226 (se=0.461, p=0.62, D=0.07, D\*=0.05). The intervention experiences a significant increase in prepared pre-treatment to post-treatment corresponding to an on-average increase of 3.629 (se=0.122, p<.0001, D=1.15, D\*=1.21). Post-treatment through follow-up, the intervention experience a significant decrease on prepared correspond to an on-average decrease of 0.800 (se=0.132, p<.0001, D=0.25, D\*=0.27). Nonetheless, even at the follow-up assessment, the intervention experiences a significant increase in on-average prepared compared to pre-treatment corresponding to an on-average increase of 2.829 (se=0.126, p<.0001, D=0.89, D\*=0.94). In contrast, the wait-list condition does not experience a significant change in prepared with an on-average increase of 0.272 (se=0.200, p=0.17, D=0.09, D\*=0.13). Contrast of intervention at post-treatment and follow-up in comparison to the wait-list condition at follow-up corresponds to significant differences with intervention on-average 3.583 (se=0.469, p<.001, D=1.13, D\*=1.13) higher at post-treatment and a significant difference at follow-up with intervention on-average 2.782 units higher (se=0.470, p<.001, D=0.88, D\*=0.86).

For self-efficacy/confidence there is a non-significant difference at Pre-treatment between intervention and wait-list control corresponding to a difference of 0.840 (se=0.561, p=0.13, D=0.31, D\*=0.31). The intervention experiences a significant increase in self

efficacy/confidence pre-treatment to post-treatment corresponding to an on-average increase of 2.551 (se=0.103,  $p<.0001$ ,  $D=0.95, D^*=0.99$ ). Post-treatment through follow-up, the intervention experience a significant decrease on self-efficacy/confidence correspond to an on-average decrease of 0.406 (se=0.111,  $p=.0003$ ,  $D=0.15, D^*=0.17$ ). None the less, even at the follow-up assessment, the intervention experiences a significant increase in on-average self-efficacy/confidence compared to pre-treatment corresponding to an on-average increase of 2.146 (se=0.107,  $p<.0001$ ,  $D=0.80, D^*=0.83$ ). In contrast, the wait-list condition experience a significant decrease in self efficacy/confidence with an on-average decrease of 0.519 (se=0.168,  $p=0.002$ ,  $D=0.19, D^*=0.18$ ). Contrast of intervention at post-treatment and follow-up in comparison to the wait-list condition at follow-up corresponds to significant differences with intervention on-average 2.230 (se=0.566,  $p<.001$ ,  $D=0.83, D^*=0.82$ ) higher at post-treatment and a significant difference at follow-up with intervention on-average 1.824 units higher (se=0.566,  $p<.002$ ,  $D=0.68, D^*=0.65$ ).

For Likelihood there is a non-significant difference at Pre-treatment between intervention and wait-list control corresponding to a difference of 0.886 (se=0.540,  $p=0.10$ ,  $D=0.35, D^*=0.30$ ). The intervention experiences a significant increase in likelihood pre-treatment to post-treatment corresponding to an on-average increase of 1.654 (se=0.096,  $p<.0001$ ,  $D=0.66, D^*=0.69$ ). Post-treatment through follow-up, the intervention experience a significant decrease on likelihood correspond to an on-average decrease of 0.332 (se=0.104,  $p=.002$ ,  $D=0.13, D^*=0.15$ ). Nonetheless, even at the follow-up assessment, the intervention experiences a significant increase in on-average likelihood compared to pre-treatment corresponding to an on-average increase of 1.321 (se=0.100,  $p<.0001$ ,  $D=0.52, D^*=0.54$ ). In contrast, the wait-list condition experience a significant decrease in likelihood with an on-



average decrease of 0.352 (se=0.155, p=0.023, D=0.14,D=0.12). Contrast of intervention at post-treatment and follow-up in comparison to the wait-list condition at follow-up corresponds to significant differences with intervention on-average 1.120 (se=0.544, p=0.04, D=0.44,D\*=0.46) higher at post-treatment and a non-significant difference at follow-up with intervention on-average 0.787 units higher (se=0.545, p=0.15, D=0.31,D\*=0.31).

Reason for Referral. Pre intervention teachers made 28 referrals to the in school mental health assessment team (SAP) for concerns about suicide behavior and 16 referrals for suicide ideation. After the intervention referrals for an assessment by the SAP team for suicide behavior dropped to 22, corresponding to a non-significant reduction ( $\chi^2(1)=0.96$ , p=0.33) and referrals for suicide ideation increase to 44, corresponding to a significant increase ( $\chi^2(1)=18.67$ , p<.0001). (see figure #2.)

## **Discussion**

Overall, the results of the study are quite positive for the More than Sad ability to improve teacher's suicide gatekeeper skill. In particular, in comparison to the wait list, we saw a significant increase in knowledge about depression and suicide, improved attitude about mental health, feeling more prepared to discuss mental health concerns with students, feeling more confidence to talk about mental health problems, and feeling more likely to reach out to a student who display psychological distress. These improvements were most pronounced right after the training (as we would expect). Two months later, some deterioration in scores occurred , but scores were still significantly higher than base line. This suggest that the More Than Sad program could not only have an immediate impact on teacher's gatekeeper skills but that it sustains those benefits up to at least 8 weeks after the training.

Results also indicated that the training affected teacher behavior with regard to actually referring a student for assistance. Unlike many other studies, teacher/staff self-report suggested that they increased the number of students they talked with about depression and increases the number of students they referred to the counselor's office (Mo et al., 2018; Torok et al., 2019). Although social desirability can be high in these self-report (Hom, Stanley & Joiner, 2015), it still may suggest that teachers want to be more active in this way, or at least think they should. We did, however, collect a slightly more objective measure of change in staff behavior. Compared to the previous year, in the year during the intervention, staff showed an increase in referrals for suicide ideation and a decrease in referrals for self-harm. It is not likely that the intervention reduced episodes of self-harm. Instead, the training may have reduced teacher over reactivity to self-harm (i.e., any suspicions of suicide is an attempts) or possibly improved their suicide assessment vocabulary so they could more accurately report on the phenomena (Robinson et al., 2013. Either of these interpretations would represent positive outcomes. It is also possible that the gains in reporting capacity were made by those already engaged in this kind of communication with students (see Wyman et al., 2008). Future analysis of treatment moderators will explore this possibility.

The goodness of fit diagnostic of the model indicated no significant outliers or influential observation. Analyses did not adjust for multiple comparisons. Nonetheless, the acquired sample sizes were more than sufficiently powered to detect small effects. As indicated, all changes are not incredibly large per the scale; therefore, we provided Cohen's D effect sizes. We additionally reported adjusted effect sizes, which adjust for the baseline measures in Table X resulting in significant intervention differences. Statistical significance does not change when including these baseline measures. We do see small changes in effect sizes with the adjusted effect sizes

usually higher due to more error explained by the inclusion of these baseline measures; therefore, we report the unadjusted results as conservative effects. As illustrated within the intervention group, effect sizes from pre-treatment to post-treatment are all at least medium effects ( $D > 0.65$ ). Similarly, the within intervention group effects sizes pre-treatment to follow-up all exceed 0.50 with the exception of Knowledge ( $D = 0.38$ ). Therefore, within the intervention group, we see almost two-thirds of a standard deviation increase in the target outcome at post intervention, with a slight degrade in scores at follow up. Even with this degrade, the follow scores were on average half a standard deviation increase over based line scores. Knowledge show a slightly smaller retention but the initial gains were also smaller. This may reflect the general societal increase in awareness about adolescent depression and suicide.

Several limitations may comprise the confidence in the findings. First, although teacher referrals to the school mental health team indicated an increase concern about self-harm, referrals for youth with urgent concern about suicidal behavioral get sent immediately to the school crisis system. Unfortunately, none of the participating schools kept track of the number and outcome of these referrals. We are addressing this data infrastructure inadequacy in another study. Second, one may also ask if the expertise of the trainer herself interventionist increased the impact of the study. Although nearly 90% of the More Than Sad program is presented as pre recorded content on a DVD, the discussant helps bring meaning and local personalization to the material (e.g., talking about suicides in the school). Future studies comparing expert facilitators versus local school staff might illuminate if ASFP should provide a train the trainer program. Yet, while the lack of training requirements may compromise fidelity, it might reduce barriers to dissemination and uptake in schools that don't have the resources or time for a training program. These kinds of implementation and dissemination questions warrant more research.

A third limitation concerns the fact that only half the sample completed a no treatment control phase before receiving the intervention. A more rigorous step wedge design would have every school function as its own (and for others schools) no treatment control. (Brown, Mason & Brown, 2014). However, conducting rigorous randomized trials in school settings present many challenges (Hom, et al., 2015; Robertson, et al., 2013). In our context for example, new legislative mandates now require PA schools to provide gatekeeper training for teachers and staff. On the one hand, this increased motivation to participated in this study, but it also increase impatience about delaying the service the training. In addition, the idea of filling out measures without the immediate reward of treatment was not well received. Finally, we did not measure student related outcomes such as reduction of suicide ideation and suicide attempts. To think that a teacher funding was also only for 18 months, giving us a small window of time to waitlist and train so many school districts. Still, we have a very larger sample size, a comparison control group, long-term outcome data, and a fairly well developed and standardized outcome assessment tool. These design strengths overcome many of the methodological weaknesses of past studies (Mo et al., 2018; Torok et al., 2019).

Teacher-based, More than Sad, gatekeeper training seems to serve as a low cost, high-yield method for disseminating school-based suicide prevention strategies. More contemporary models for school-based suicide prevention have proposed the integration of these efforts within multi-tiered frameworks (e.g., Multi-Tiered Systems of Support, Positive Behavioral Interventions and Support) that offer multiple components including universal gatekeeper training, early identification, as well as targeted screening and intervention (Singer, Erbacher, & Rosen, 2019; Wasserman et. al., 2015). Possibly with a multi faceted prevention systems like this, programs could have more impact on student ideation and attempt behavior.

**Acknowledgements:** This study was funded by a contract from the American Foundation for Suicide Prevention. However, no AFSP staff were involved in the implementation of the study and interpretation of the data. The views, policies, and opinions expressed are those of the authors and do not necessarily reflect those of AFSP.

**Compliance with Ethical Standards**

Conflict of interest: The authors declare that they have no conflict of interest. However Dr. Diamond and Dr. Wintersteen have received research funding from this organization.

Human and Animal Rights: All procedures performed in studies involving human participants were in accordance with the ethical standards of Drexel University's institutional review committee and with the 1964 Declaration of Helsinki and its later amendments or comparable ethical standards.

Informed Consent: Informed consent was obtained from all individual participants included in the study.

Table #1. Demographic

	No Treatment Control (N=612)	Treatment (N=1030)	Statistical Significance
<b>RACE</b>			
Black	4.6%	4.9%	0.72
White	89.2%	83.6%	0.002
Asian	0.2%	0.9%	0.10
Multiacial	0.7%	1.8%	0.079
American Indian/Native American	0.2%	0.1%	0.99
<b>HISPANIC/LATINO</b>	1.7%	7.6%	<.0001
<b>AGE</b>	39.8 (11.2)	38.9 (11.3)	0.12
<b>GENDER</b>			
Female	73.0%	75.8%	0.21
Male	24.8%	22.6%	0.32
Transgender	0%	0.3%	0.26
<b>LGBTQ+</b>	1.9%	2.9%	0.25
<b>CURRENT PRIMARY ROLE</b>			
Teacher	81.5%	80.9%	0.79
Administrator	6.4%	3.6%	0.009
Athletic Staff	0%	0.1%	1.00
Paraprofessional	1.2%	4.4%	0.0003
School-based Mental Health professional	5.2%	5.4%	0.86
School Nurse	1.5%	0.9%	0.23
School Resource Officer	0.2%	0.3%	1.00
Other Job	4.1%	4.5%	0.70
<b>YEARS EXPERIENCE</b>	13.9 (9.9)	12.8 (9.01)	0.018
<b>GRADE LEVEL OF STUDENTS CURRENTLY WITH WHOM HAVE CONTACT</b>			
K-2 <sup>nd</sup> Grade	20.9%	16.8%	0.039
3 <sup>rd</sup> – 5 <sup>th</sup> Grade	18.2%	14.6%	0.053
6 <sup>th</sup> -8 <sup>th</sup> Grade	20.2%	23.4%	0.14
9 <sup>th</sup> -12 <sup>th</sup> Grade	34.6%	38.3%	0.139
Other	6.1%	7.0%	0.47
<b>NO SUICIDE PREVENTION IN PAST 2 YEARS</b>	78.1%	68.3%	<.001
<b>STUDENTS WHO DIED BY SUICIDE IN THE LAST 2 MONTHS</b>			

0 students	99.8%	83.4%	<.0001
1 student	0.2%	7.4%	<.0001
2 students	0%	1.5%	0.003
3 or more students	0%	0%	1.00
Don't Know	0%	7.7%	<.0001
<b>EVER WORKED AT A SCHOOL WHEN A STUDENT DIED BY SUICIDE</b>	20.5%	27.3%	.002

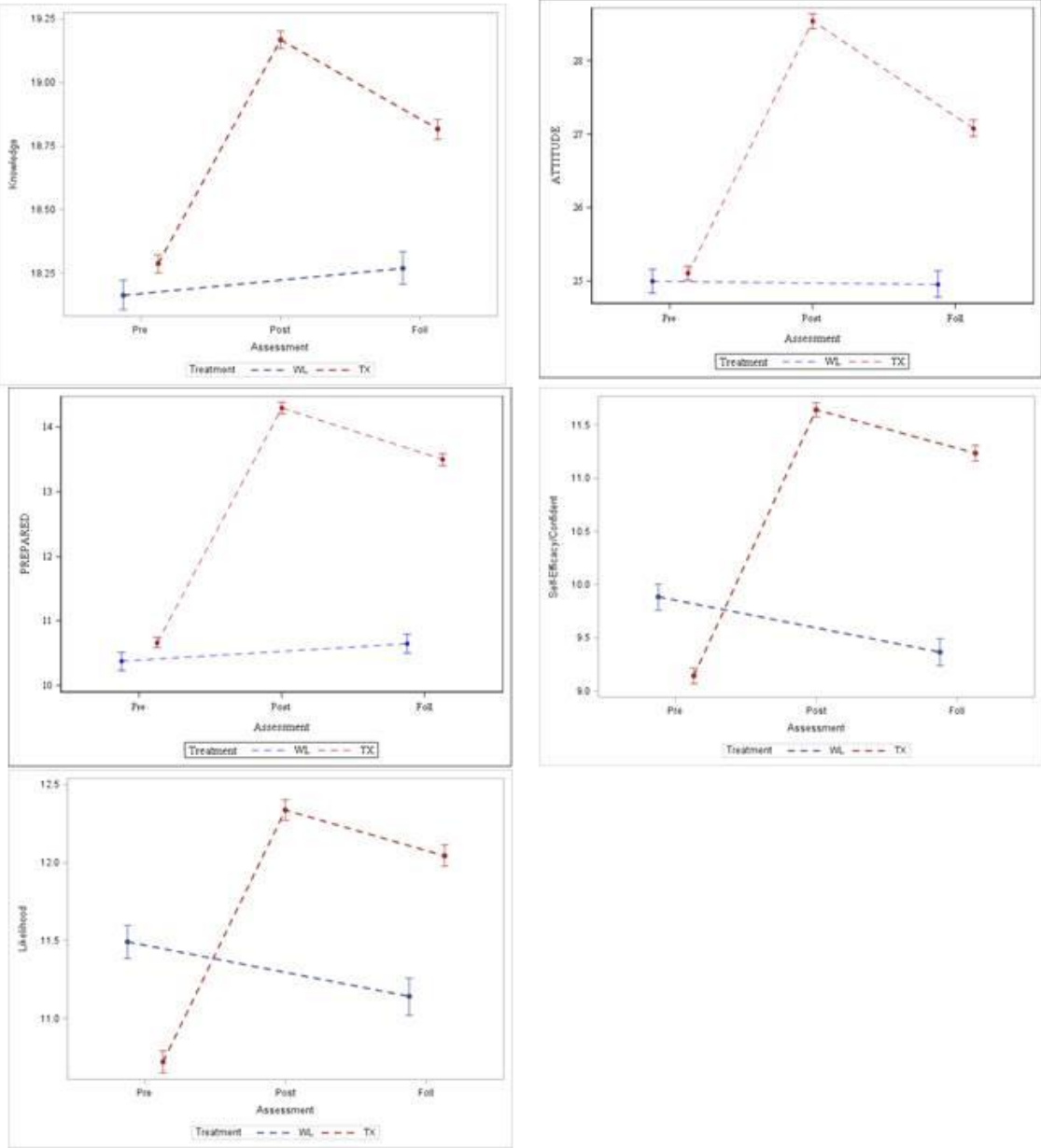
Note: Standard deviation in parentheses.

Table #2. Scale Descriptive

Scale	Treatment			Wait-List	
	PRE Mean(SD)	POST Mean(SD)	Follow-up Mean(SD)	PRE Mean(SD)	Follow-up Mean(SD)
<b>Knowledge</b>	18.29 (1.44)	19.17 (1.22)	18.82 (1.27)	18.16 (1.40)	18.27 (1.38)
<b>Attitude</b>	25.11 (3.84)	28.54 (3.53)	27.08 (3.62)	25.01 (3.89)	24.96 (3.79)
<b>Prepared</b>	10.67 (3.37)	14.30 (2.90)	13.50 (2.99)	10.38 (3.30)	10.65 (3.21)
<b>Confident</b>	9.14 (2.92)	11.64 (2.35)	11.24 (2.44)	9.88 (2.94)	9.36 (2.70)
<b>Likelihood</b>	10.72 (2.78)	12.34 (2.23)	12.05 (2.27)	11.49 (2.54)	11.14 (2.57)

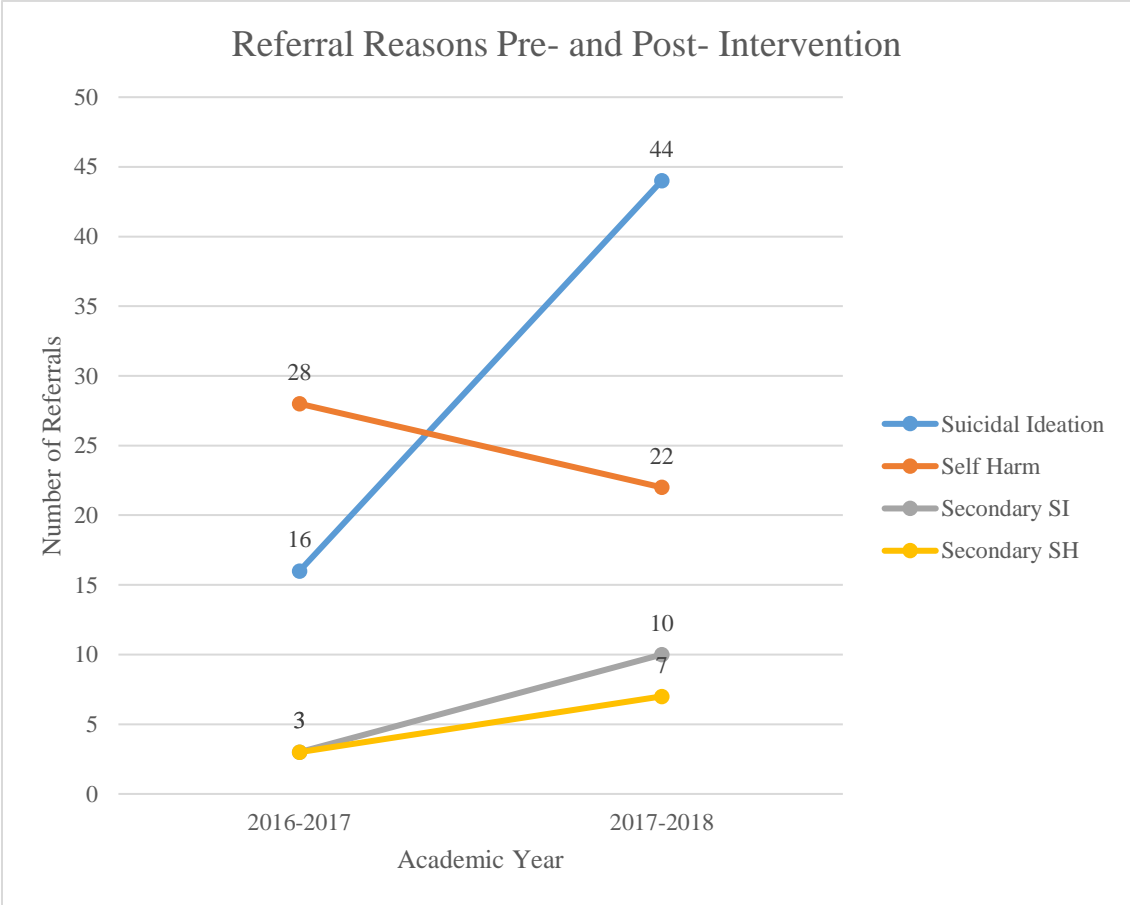


Figure 1: Five domains over time



Note: Error bounds are 1 standard error bounds

Figure #2. Staff referrals of youth at risk for suicide to school mental health team.



## References

- Albright, G. L., Davidson, J., Goldman, R., Shockley, K. M., & Timmons-Mitchell, J. (2016). Development and validation of the gatekeeper behavior scale. *Crisis*. (2016), 37, pp. 271-280. <https://doi.org/10.1027/0227-5910/a000382>
- Box, G. E., & Cox, D. R. (1964). An analysis of transformations. *Journal of the Royal Statistical Society: Series B (Methodological)*, 26(2), 211-243. <https://doi.org/10.1111/j.2517-6161.1964.tb00553.x>
- Brown, C. H., Mason, W. A., & Brown, E. C. (2014). Translating the intervention approach into an appropriate research design: The next-generation adaptive designs for effectiveness and implementation research. In *Defining prevention science* (pp. 363-387). Springer, Boston, MA.
- Centers for Disease Control and Prevention, National Vital Statistics System. (2016). *10 Leading causes of death by age group, United States 2016* (online). Retrieved from, 15 June 2017: [https://www.cdc.gov/injury/worksheets/lc-chart s/leading\\_cause s\\_of\\_death age\\_group 2016\\_1056w 814h.gif](https://www.cdc.gov/injury/worksheets/lc-chart s/leading_cause s_of_death age_group 2016_1056w 814h.gif).
- Cohen, J. (1988). *Statistical power analysis for the behavioral sciences*, Hillsdale, NJ: Lawrence Erlbaum.
- Cole, G.A (1995) *Organizational Behavior: Theory and Practice*. London: Thomson Learning
- Cross, W. F., Seaburn, D., Gibbs, D., Schmeelk-Cone, K., White, A. M., & Caine, E. D. (2011). Does practice make perfect? A randomized control trial of behavioral rehearsal on suicide prevention gatekeeper skills. *Journal of Primary Prevention*, 32(3), 195-211.
- Ekornes, S. (2015). Teacher perspectives on their role and the challenges of inter-professional collaboration in mental health promotion. *School Mental Health*, 7(3), 193-211.

- Erbacher, T. A., Singer, J. B., & Poland, S. (2015). *Suicide in schools: A practitioner's guide to multi-level prevention, assessment, intervention, and postvention*. New York: Routledge.
- Goldsmith, S. K., Pellmar, T. C., Kleinman, A. M., & Bunney, W. E. (2002). *Reducing suicide: A national imperative*. National Academies Press.
- Hom, M. A., Stanley, I. H., & Joiner Jr, T. E. (2015). Evaluating factors and interventions that influence help-seeking and mental health service utilization among suicidal individuals: A review of the literature. *Clinical psychology review, 40*, 28-39.
- Katz, C., Bolton, S. L., Katz, L.Y., Isaak, C., Tilston-Jones T., & Sareen, J. (2013) A systematic review of school-based suicide prevention programs. *Depress Anxiety, 30*(10), 1030–45. doi: 10.1002/da.22114
- Kölves, K., Ross, V., Hawgood, J., Spence, S. H., & De Leo, D. (2017). The impact of a student's suicide: Teachers' perspectives. *Journal of Affective Disorders, 207*, 276–281. <https://doi.org/10.1016/j.jad.2016.09.058>
- Kreuze, E., Stecker, T., & Ruggiero, K. J. (2018). State requirements for school personnel suicide prevention training: where do we go from here? *Adolescent Research Review, 3*(2), 235-253. <https://doi.org/10.1007/s40894-017-0057-0>
- Lancet Psychiatry (2017). Adolescent mental health: Reasons to be cheerful. *The Lancet Psychiatry, 4*(7), 507.
- Mo, P. K. H., Ko, T. T., & Xin, M. Q. (2018). School-based gatekeeper training programmers in enhancing gatekeepers' cognitions and behaviors for adolescent suicide prevention: A systematic review. *Child and Adolescent Psychiatry and Mental health, 12*(1), 29. doi: <https://doi.org/10.1186/s13034-018-0233-4>

Pennsylvania Youth Survey (PAYS); [https://www.pccd.pa.gov/Juvenile-Justice/Pages/Pennsylvania-Youth-Survey-\(PAYS\).aspx](https://www.pccd.pa.gov/Juvenile-Justice/Pages/Pennsylvania-Youth-Survey-(PAYS).aspx)

Quinnett, P. (2007). QPR gatekeeper training for suicide prevention: The model, rationale, and theory. *Retrieved July, 28, 2008.*

Raudenbush SW. Statistical analysis and optimal design for cluster randomized trials. *Psychological Methods* 1997 June;2(2):173-85.

Raudenbush, S.W., & Liu, X.F. (2001). Effects of study duration, frequency of observation, and sample size on power in studies of group differences in polynomial change. *Psychological Methods*, 387-401.

Robinson, J., Cox, G., Malone, A., Williamson, M., Baldwin, G., Fletcher, K., et al. (2013). A systematic review of school-based interventions aimed at preventing, treating, and responding to suicide-related behavior in young people. *Crisis: The Journal of Crisis Intervention and Suicide Prevention*, 34(3), 164–182. <https://doi.org/10.1027/0227-5910/a000168>.

Substance Abuse and Mental Health Services Administration. Preventing Suicide: A Toolkit for High Schools. HHS Publication No. SMA-12-4669. Rockville, MD: Center for Mental Health Services, Substance Abuse and Mental Health Services Administration, 2012.

Schwarz, C.J, 1993. The Mixed-Model ANOVA: The truth, the computer packages, the books. *Amer. Statistician* 47, 48-59.

Shelemy, L., Harvey, K., & Waite, P. (2019). Secondary school teachers' experiences of supporting mental health. *The Journal of Mental Health Training, Education and Practice*.

- Singer, J. B., Erbacher, T. A., & Rosen, P. (2019). School-based suicide prevention: A framework for evidence-based practice. *School mental health, 11*(1), 54-71.
- Spybrook, J. Raudenbush, S.W., Liu, X.F., Congdon, R., and Martinez, A. (2008). Optimal Designs for Longitudinal and Multilevel Research: Documentation for the “Optimal Design” Software, downloaded August 12, 2008 from, <http://sitemaker.umich.edu/group-based/files/od-manual-20080312-v176.pdf>.
- Torok, M., Callear, A. L., Smart, A., Nicolopoulos, A., & Wong, Q. (2019). Preventing adolescent suicide: A systematic review of the effectiveness and change mechanisms of suicide prevention gatekeeping training programs for teachers and parents. *Journal of adolescence, 73*, 100-112.
- Turley, B., Pullen, L., Thomas, I., & Rolfe, I. (2000). LivingWorks Applied Suicide Intervention Skills Training (ASIST). *A Competency-Based Evaluation. Melbourne: Lifeline Australia Inc*, 1-6.
- U.S. Department of Health and Human Services, Centers for Disease Control and Prevention. (2018). *High School Youth Risk Behavior Surveillance System* [data tool]. Retrieved from <https://nccd.cdc.gov/youthonline/App/Default.aspx>.
- Wyman, P. A., Brown, C. H., Inman, J., Cross, W., Schmeelk-Cone, K., Guo, J., & Pena, J. B. (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.
- Young J.F., Jones J.D., Sbrilli M.D., Benas J.S., Spiro C.N., Haimm C.A., Gallop R., Mufson L., and Gillham J.E. (2018) Long-Term Effects from a School-Based Trial Comparing Interpersonal Psychotherapy-Adolescent Skills Training to Group Counseling, *Journal of Clinical Child & Adolescent Psychology*, doi: [10.1080/15374416.2018.1479965](https://doi.org/10.1080/15374416.2018.1479965)

Youth Risk Behavior Survey (YSBR), 2017:

[https://www.cdc.gov/nchhstp/dear\\_colleague/2018/dcl-061418-YRBS.html](https://www.cdc.gov/nchhstp/dear_colleague/2018/dcl-061418-YRBS.html)

Wasserman, D., Hoven, C. W., Wasserman, C., Wall, M., Eisenberg, R., Hadlaczky, G., ... &

Bobes, J. (2015). School-based suicide prevention programmes: the SEYLE cluster-randomised, controlled trial. *The Lancet*, 385(9977), 1536-1544.