Suicide prevention among young people: Testing an Internet-based program

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Key messages

- Suicide and suicidal ideation in young people is a significant problem. To date, however, there is a lack of evidence regarding effective interventions for this population.

- Cognitive behavioural therapy (CBT) has been one of the most commonly investigated interventions for young people with suicide related behaviours and has shown promise in several trials. Additionally, there has been a significant increase in the use of technology to deliver mental health services across the lifespan. Internet-based CBT has the potential to be more accessible and less stigmatising than traditional, face-to-face models of therapy. Despite this, no studies have tested an internet-based CBT program for young people with suicidal ideation.

- In response to this, we developed and tested a youth-specific internet-based program for school students at risk of suicide. The program is called Reframe-IT, and it was designed to be delivered by school wellbeing staff. In pilot testing Reframe-IT was associated with decreases in suicidal ideation and depression.

- The aim of the current project was to conduct a randomised controlled trial of Reframe-IT to examine whether or not it led to reductions in suicidal ideation, reduced symptoms of depression and anxiety, reduced levels of hopelessness, reductions in suicide attempts, and increases in problem solving skills. Additionally we aimed to examine the potential mediators of symptom improvement.

- A secondary aim was to examine students’ satisfaction and experience of participating in the Reframe-IT program and the acceptability and feasibility of delivering Reframe-IT among school wellbeing staff via qualitative interviews.

- Fifty students (mean age = 15.6; 82% female) with current or recent suicidal ideation were successfully recruited and randomised to either the Reframe-IT intervention group or control group.

- Overall we observed improvements in suicidal ideation, depression, hopelessness and anxiety and problem solving ability in both the intervention and control groups. While the improvements were larger in the intervention group, there were no statistically significant differences, possibly due to lack of power. Additionally, there was a non-significant association between the use of CBT skills and symptom improvement. No iatrogenic effects were reported.

- Both staff and students generally reported finding the Reframe-IT program acceptable and helpful, even in cases where students were allocated to the control group.

- Several barriers to recruitment were identified via interviews with staff and students, the main one being the requirement to obtain informed consent from participants’ parents or guardians.

- This project was the first of its kind internationally. It demonstrated the feasibility and potential efficacy of the Reframe-IT program, which was shown to be acceptable to young people and safe to administer. This is significant given increasing rates of suicide among young Australians and the ever-increasing use of internet-based platforms for help-seeking among young people. As such this study paves the way for a new generation of suicide research.
Executive summary

Suicide and suicide-related behaviour is a significant problem in young people, with nearly one-quarter of adolescents experiencing suicidal ideation within the past year. The prevention of suicide, and the development of a strategic research agenda targeting interventions for suicidal youth have both been cited as national priorities, yet there remains a lack of research into suicide prevention interventions that can be effective for this population.

Cognitive behavioural therapy (CBT) has been one of the most commonly investigated interventions for young people with suicide related behaviours and has shown promise in several trials. Additionally, with the increasing popularity of the internet, there has been a significant increase in the use of technology to deliver mental health services across the lifespan. Internet-based CBT has the potential to be more accessible and less stigmatising than traditional, face-to-face models of therapy. Although research has tested an online CBT intervention among suicidal adults, to date no research has tested the efficacy of internet-based CBT for suicidal youth. Given that schools are an obvious and accepted environment for implementing suicide prevention initiatives, and school wellbeing staff are often the first port of call for students experiencing mental-health-related difficulties, the development of an internet-based CBT program for delivery by school wellbeing staff is a logical next step.

In response to this, we developed and tested a youth-specific internet-based program for school students at risk of suicide. The program is called Reframe-IT, and was designed to be delivered by school wellbeing staff. In pilot testing there was a reduction in suicidal ideation, depressive symptoms and hopelessness, and an increase in problem solving and coping skills. The data also showed that Reframe-IT did not induce either distress or suicidal ideation, and that participants found Reframe-IT enjoyable and useful. The pilot study was small and uncontrolled, therefore the program required testing in a randomised controlled trial.

The present study comprised two components:

1. A randomised controlled trial that tested the impact of the Reframe-IT program on young people; and
2. A qualitative examination of the acceptability of the program to school staff and young people’s satisfaction and experience of participating in the study.

The study was conducted by Orygen, The National Centre of Excellence in Youth Mental Health, between August 2013 and December 2016. The study team comprised a project coordinator (JR), a research therapist (SH); two clinical psychologists (SB; SR), a statistician (HPY) and research assistants. The Reframe-It website was developed by String Theory Creative, a boutique digital communications agency based in Melbourne, who provide video and sound production services, as well as creative development services that translate and adapt information into engaging digital and online solutions.

The Reframe-IT intervention comprised eight modules and was delivered over a 10-week period. Each participant had access to his or her own personalised webpage accessed via secure login. Once each individual module was completed in the presence of the school staff member, participants were able to access it from home, 24 hours a day. The program took the form of an adult ‘host’ character that delivered standard CBT approaches verbally, and a series of video diaries made by young people. There were also two activities included with each module. The program had no social networking function.

All secondary schools in the study catchment area were invited to participate and a total of 18 schools were recruited across the study period. Students who presented to the wellbeing staff aged 14 to 18 and with any level of suicidal ideation in the past month were eligible to participate. Exclusion criteria were an intellectual disability, psychotic symptoms and/or inability to speak English.

In total, 50 students (mean age = 15.6; 82% female) were randomised; 24 to the control group and 26 to the intervention group. Results showed reductions in suicidal ideation, depression, hopelessness and...
anxiety, and increases in problem solving ability, in both the intervention and control groups. While the improvements were larger in the intervention group, there were no statistically significant differences. It is possible that the non-significant results are due to the small sample size and resulting lack of power. The other consideration is that all participants received treatment as usual, which included contact with the school wellbeing staff as well as interventions by various mental health professionals outside of school. Engagement with the intervention was relatively good, with over half the participants completing four or more modules.

Results also demonstrated that participants benefited from the intervention in terms of increased use of CBT skills, with those in the intervention group using cognitive and behavioural skills more so than those in the control group. While between-group differences were not significant, there was an association between the use of CBT skills and symptom improvement. For example, the acquisition of CBT skills caused an improvement in depression, which in turn caused an improvement in suicidal ideation.

Finally, satisfaction data showed that participants liked, and used, a number of the specific skills taught in Reframe-IT, particularly behavioural activation skills.

For component two of the study, three students and ten school wellbeing staff completed a semi-structured interview following participation in the study. All three of the student participants were allocated to the control condition. Overall, feedback regarding Reframe-IT was positive. In particular, school staff liked the fact that it was video- and not text-based, which meant it was accessible for students with literacy or language issues. Many also reported that they thought the characters were relatable to young people. Both students and staff thought the assessments alone were helpful; this is in line with existing research showing that even brief contact with services can result in a reduction in suicidality.

Several barriers to recruitment were identified by school wellbeing staff, most commonly: 1) the need to obtain parental consent; 2) students being either too high or low risk; and 3) concern that students would be over-serviced. Parental consent was also highlighted as a barrier by the students interviewed, and is a common barrier to recruitment in general in research of this nature. Interestingly, the students, despite being often severely unwell, did not seem to mind being in the control group and still found participating in the trial to be worthwhile. Concerns about the potentially detrimental effects of being allocated to the control group are often cited in the literature, and was also a barrier mentioned by the school staff. This finding, however, shows that a trial of this nature can be managed in a way that ensure benefit to all, even with those with severe suicidal ideation and previous attempts.

The key limitation of the study was the poor recruitment of young people into the trial, limiting the statistical power of the study. A second limitation regarding component two of the study was that we were only able to successfully recruit three participants to follow-up interviews, and all had been allocated to the control group. This meant that we were unable to obtain qualitative data from the perspective of students who accessed the Reframe-IT website. A third limitation was the fact that, due to the high attrition rate of school staff, we were unable to achieve our original aim of quantitatively measuring change in staff knowledge, confidence, and skill using interviews administered at the beginning and end of the project. Notwithstanding these limitations, this novel trial employed high quality methods and was conducted in line with relevant guidelines.

This study was the first of its kind internationally to examine the impact of an online program on young people with suicidal ideation. The study was also the first to include young people demonstrating all levels of suicide risk from very mild, fleeting expressions of suicidal ideation to frequent and severe suicide-related behaviour. This is significant as it is not uncommon for young people at risk of suicide to be excluded from studies of this nature.

There has previously been a reluctance to engage young people in online suicide prevention activities. This has largely been due to safety and ethical concerns; in particular issues relating to duty of care if a young person expresses suicidal ideation on a professionally run platform and fear of contagion.
However the findings generated from this study suggest that this can be done safely. This is important given the increase in the use of online platforms by young people and the fact that better integration of online platforms into clinical care is now a national priority.25

This study suggests taking part in a research study may be beneficial in and of itself, and at the very least provides evidence to suggest that conducting suicide research of this nature does not increase suicidal ideation. As a result we can be confident that it is safe to include suicidal young people in research projects, including those that are testing the efficacy of online platforms, thereby paving the way for a new generation of suicide research. The study also demonstrated the feasibility and potential efficacy of the Reframe-IT program, which was shown to be acceptable to young people and safe to administer. This is significant given increasing rates of suicide among young Australians and the ever-increasing use of internet-based platforms for help-seeking among young people.
Section One: Background

Suicide-related behaviours, including suicide attempts and suicidal ideation are common among young people. Up to 24% of 12–17 year-olds have reported suicidal ideation, and 7-11% have reported a 12-month prevalence of suicide attempts. These behaviours are associated with a range of negative outcomes including completed suicide and premature mortality via other causes. The prevention of suicide and the development of a strategic research agenda targeting interventions for suicidal youth have both been cited as national priorities, yet there remains a lack of high quality intervention research for suicidal individuals, including youth.

Cognitive behavioural therapy (CBT) has been one of the most commonly investigated interventions for young people with suicide related behaviours and has shown promise in several trials. It is also is used extensively in the treatment of adolescent depression. Given depression is the most common risk factor for suicide related behaviours, CBT is an obvious intervention to further investigate.

There has been a significant increase in the use of technology to deliver mental health services across the lifespan. Internet-based CBT has the potential to be more accessible and less stigmatising than traditional, face-to-face models of therapy and has been shown to be an effective and cost-effective form of treatment for depression and anxiety among adults, with similar potential in adolescents. Although there is an emerging evidence regarding the impacts of web-based and mobile suicide prevention interventions in young people, there is currently little published research.

Programs that are password protected, and practitioner prescribed and supported, tend to have better rates of adherence. Given this, and that school wellbeing staff are considered helpful by students when it comes to mental health-related difficulties, the development of an internet-based CBT program for delivery by school wellbeing staff is a logical next step. Indeed, schools are an obvious and accepted environment for implementing suicide prevention initiatives.

In response to this, we developed and tested a youth-specific internet-based program for school students at risk of suicide. The program is called Reframe-IT, and was designed to be delivered and supported by school wellbeing staff. In pilot testing there was a reduction in suicidal ideation, depressive symptoms and hopelessness, and an increase in problem solving and coping skills. The data also showed that Reframe-IT did not induce either distress or suicidal ideation, and that participants found Reframe-IT enjoyable and useful. The pilot study was small and uncontrolled, therefore the program required testing in a randomised controlled trial.

The Reframe-IT Project

The present study was divided into two components. The first was a randomised controlled trial that tested the impact of the Reframe-IT program on young people. The second component was a qualitative examination of the acceptability of the program to school staff and young people’s satisfaction and experience of participating in the study.

Aims: Component One

This component aimed to examine whether or not participation in the Reframe-IT program led to:

1. Reduced suicidal ideation;
2. Reduced symptoms of depression;
3. Reduced symptoms of anxiety;
4. Reduced levels of hopelessness;
5. Increased problem solving skills; and
6. Reduced suicide attempts among participating students.

An additional aim was to examine the potential mediators of symptom improvement.
Aims: Component Two

This component aimed to examine via the use of qualitative interviews:

1. The acceptability and feasibility of delivery of Reframe-IT among school wellbeing staff;
2. Participants’ satisfaction and experience of participating in the Reframe-IT program.

The two components of this study are reported in Sections Two and Three of the report.

Setting

The study was conducted by Orygen, The National Centre of Excellence in Youth Mental Health, between August 2013 and December 2016. Orygen is a leading youth mental health research centre with an integrated clinical service and an education and training program. The clinical program provides clinical care to young people aged 15-25 in the north-western suburbs of Melbourne. The research centre conducts world-leading research into the full spectrum of mental disorders and includes a number of studies that are evaluating programs delivered to young people. It also has an internationally renowned suicide prevention research program that conducts a broad range of research in both clinical and school settings.

The study team comprised a project coordinator (JR), a research therapist (SH); two clinical psychologists (SB; SR), a statistician (HPY) and three research assistants (KT; GC; EB). The Reframe-It website was developed by String Theory Creative, a boutique digital communications agency based in Melbourne, who provide video and sound production services, as well as creative development services that translate and adapt information into engaging digital and online solutions.

Intervention

The Reframe-IT intervention comprised eight modules delivered over a 10-week intervention period. Each participant had access to his or her own personalised webpage accessed via secure login. For safety reasons, the student wellbeing staff member administered the program at school. Once each individual module was completed in the presence of the school staff member, participants were able to access it from home, 24 hours a day. The program had no social networking function. The intervention has been described in detail elsewhere but is summarised in Table 1 below.

The program took the form of an adult ‘host’ character that delivered standard CBT approaches verbally, and a series of video diaries made by young people. There were two activities per week. The site had a message board through which the participant could communicate with the research-therapist who also checked completed activities and responded with personalised but standardised messages. Finally, it contained a series of factsheets covering a range of related topics, including managing suicidal thoughts; plus downloadable relaxation MP3s.

Table 1: Reframe-IT modules.

<table>
<thead>
<tr>
<th>Module</th>
<th>Content</th>
<th>Activities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Week 1</td>
<td>Introduction, engagement, &amp; problem identification</td>
<td>Review safety plan</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Feeling identification activity</td>
</tr>
<tr>
<td>Week 2</td>
<td>Emotional recognition and distress tolerance</td>
<td>Mood chart for character</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Participant mood chart</td>
</tr>
<tr>
<td>Week 3</td>
<td>Identification of negative automatic thinking</td>
<td>Identification of automatic thoughts for character</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Participant automatic thoughts</td>
</tr>
<tr>
<td>Week 4</td>
<td>Behavioural activation - help-seeking</td>
<td>Identify sources of help for characters</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Identify sources of help for self</td>
</tr>
<tr>
<td>Week 5</td>
<td>Behavioural activation - activity scheduling &amp; relaxation</td>
<td>Develop activity schedule for character</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Activity scheduling for self &amp; relaxation MP3</td>
</tr>
<tr>
<td>Week 6</td>
<td>Problem solving</td>
<td>View SMART plan for character</td>
</tr>
<tr>
<td>------------</td>
<td>----------------</td>
<td>-------------------------------</td>
</tr>
<tr>
<td>Week 7</td>
<td>Cognitive restructuring</td>
<td>Reframe thoughts for character</td>
</tr>
<tr>
<td>Week 8</td>
<td>Wrap up and review</td>
<td>Coping cards – suicide prevention messages for characters</td>
</tr>
</tbody>
</table>

**Ethics and safety**

Detailed safety protocols were developed for the study. Fortnightly supervision meetings with the research therapist and the clinical psychologist were held. Participants completed a weekly suicidal ideation screen, which was checked by the school wellbeing staff member at the end of each session. The website itself was moderated on a daily basis five days a week during the school term by the clinical psychologist, who followed documented procedures to manage any indication of risk. It was made clear to all participants that the website was only moderated during these times. The website included information about appropriate sources of help in a crisis and participants were encouraged to use these contacts when necessary instead of contacting the research team.

An independent safety advisory committee oversaw the trial. The project received ethical approval from the University of Melbourne Human Research and Ethics Committee (Application 1033768) and approval from the Department of Education and Training in Victoria and the Catholic Education Office in Victoria.
Section Two: Quantitative Component - Impact on Symptom Reduction in Students

This was the primary component of the study, employing a randomised controlled trial design to investigate the impact of participation in the Reframe-IT program on suicidal ideation, depression, anxiety, hopelessness, problem solving skills and suicide attempts.

Data are also provided on acceptability and feasibility in terms of utilisation and acceptability of the program as well as on the impact of Reframe-IT on CBT skill acquisition and the impact of this on symptom improvement.

Methods

The study was a randomised controlled trial with a two-year recruitment phase. The intervention involved the delivery of eight modules of CBT over a 10-week intervention period plus treatment as usual, compared with treatment as usual only. Assessments were conducted at baseline, immediately post intervention (10-weeks) and 12-weeks later (22-weeks).

Recruitment

All secondary schools in the study catchment area were invited to participate; 18 schools were recruited in a staggered manner over the duration of the study. Participants who presented to the wellbeing staff aged 14 to 18 and with any level of suicidal ideation in the past month and provided signed consent, from themselves and a parent or guardian were eligible to participate. Exclusion criteria were an intellectual disability, psychotic symptoms and/or inability to speak English.

Outcome measures

The primary outcome of the study was reduced suicidal ideation. All outcome measures are listed in Table 2.

Table 2: Outcome measures.

<table>
<thead>
<tr>
<th>Outcome</th>
<th>Measure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Suicidal ideation</td>
<td>Suicidal Ideation Questionnaire (SIQ)42,43</td>
</tr>
<tr>
<td>Depressive symptoms</td>
<td>Children’s Depression Rating Scale-Revised (CDRS-R)44,45</td>
</tr>
<tr>
<td></td>
<td>The Reynolds Adolescent Depression Scale-2 (RADS-2)46,47</td>
</tr>
<tr>
<td>Hopelessness</td>
<td>Beck Hopelessness Scale (BHS) 48</td>
</tr>
<tr>
<td>Anxiety</td>
<td>Multidimensional Anxiety Scale for Children (MASC)49</td>
</tr>
<tr>
<td>Problem solving</td>
<td>Negative Problem-Oriented Questionnaire (NPOQ)50</td>
</tr>
<tr>
<td>Suicide attempt</td>
<td>A specifically designed questionnaire that asked the participant: 1) whether they had attempted suicide since the last assessment, and, if yes 2) how many attempts they had made.</td>
</tr>
<tr>
<td>CBT skill acquisition</td>
<td>Cognitive-behavioural Therapy Skills Questionnaire (CBTSQ)51 – This measure provides an overall score of general CBT skill acquisition as well as two subscale scores, one measuring acquisition of behavioural activation skills (Cognitive-behavioural Therapy Skills Questionnaire-Behavioural Activation; CBTSQ-BA) and one measuring acquisition of cognitive restructuring skills (Cognitive-behavioural Therapy Skills Questionnaire – Cognitive Restructuring; CBTSQ-CR).</td>
</tr>
<tr>
<td>Demographic information</td>
<td>A specifically-designed questionnaire</td>
</tr>
</tbody>
</table>

1 This was changed to 13 in September 2015.
Assessments were conducted at the participating schools by a trained research assistant. All outcome data were de-identified and stored on a password-protected database located on a secure server housed by Orygen.

Randomisation, treatment allocation and blinding

After baseline assessment the study coordinator randomised eligible participants into the treatment or control group using a randomisation list prepared by an independent statistician. The list was stratified by school and was incorporated into an online randomisation computer program. Immediately after each randomisation, the relevant school wellbeing staff member was automatically notified of treatment allocation via email. They then administered the appropriate treatment to the participant.

Because of the nature of the intervention it was not possible for school staff to be blind to intervention. In addition, the study coordinator and the study psychologists (SH, SR, SB) were unblinded in order to enable the website to be moderated. The research assistants conducting outcome assessments and the statistician conducting the analysis, however, remained blind to treatment allocation.

Statistical analysis

Descriptive statistics including frequencies, means and standard deviations were calculated for all variables. Chi-squared analysis was used to compare frequency of suicide attempt between groups. Linear mixed-effects model analysis was used to compare the two treatment groups in terms of the change in continuous outcome measures from baseline to the two follow-up time points. For each outcome measure, school was included as a random factor to account for possible school effect.

Effect size and statistical power

The initial power calculation was based on changes in suicidal ideation from baseline measured at ten and 22-weeks measured by the SIQ. A sample size of 169 was required to detect medium effect sizes based on an alpha of 0.05 and power of 0.80, accounting for intra-cluster correlation to take account of the clustering effect of the schools, and a dropout rate of 24%.

By August 2013, nine schools had been recruited with an additional six added over the following year. However, recruitment of students was considerably slower than anticipated and it was clear that the recruitment target would not be met. A number of actions were taken to address this (see the Discussion section) however these did not significantly improve the recruitment rate. As a result the rate of recruitment remained too low to meet sample size requirements. While underpowered, the data still provides indication of feasibility, acceptability and potential efficacy of this type of intervention with this population. To further compensate for this, we added component two of this project which involved qualitative interviews with students recruited into the trial and school wellbeing staff.

Results

Descriptive Statistics

Fifty students were randomised; 24 to the control group and 26 to the intervention group. Between one and seven students were recruited from each school. Ten-week follow-up was completed by 21 and 18 students in the control and intervention groups respectively, and the 22-week assessment was completed by 17 and 13 young people in the control and intervention groups respectively (Figure 1).
Figure 1: Flow of participants through the trial.

The characteristics of all randomised participants can be found in Table 3. Most of the participants were female and the gender distribution between the two groups was similar. The majority of participants were in year nine at school, followed by year 10.

Table 3: Baseline characteristics for all randomised participants.

<table>
<thead>
<tr>
<th>Baseline characteristics</th>
<th>Control (n=24)</th>
<th>Intervention (n=26)</th>
<th>Combined</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean age (SD), y</td>
<td>14.9 (1.3)</td>
<td>15.7 (1.3)</td>
<td>15.6 (1.3)</td>
</tr>
<tr>
<td>Female, N (%)</td>
<td>20 (83.3)</td>
<td>21 (80.7)</td>
<td>41 (82)</td>
</tr>
<tr>
<td>Living with parents, N (%)</td>
<td>22 (91.7)</td>
<td>25 (96.2)</td>
<td>47 (94)</td>
</tr>
<tr>
<td>Seeking external MH related professional help, y (%)</td>
<td>22 (91.7)</td>
<td>25 (96.2)</td>
<td>47 (94)</td>
</tr>
<tr>
<td>Taking mental-health-related medication, y (%)</td>
<td>4 (16.6)</td>
<td>9 (34.6)</td>
<td>13 (26)</td>
</tr>
<tr>
<td>School year (N)</td>
<td>8</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>9</td>
<td>8</td>
<td>9</td>
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<tr>
<td></td>
<td>10</td>
<td>7</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>11</td>
</tr>
</tbody>
</table>
Clinician rated measure

<table>
<thead>
<tr>
<th>Measure</th>
<th>Mean (SD) 1</th>
<th>Mean (SD) 2</th>
<th>Mean (SD) 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>CDRS-R (raw)</td>
<td>55.9 (14.9)</td>
<td>59.1 (13.6)</td>
<td>57.6 (14.2)</td>
</tr>
</tbody>
</table>

Self-report measures

<table>
<thead>
<tr>
<th>Measure</th>
<th>Mean (SD) 1</th>
<th>Mean (SD) 2</th>
<th>Mean (SD) 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>SIQ</td>
<td>103.4 (43.3)</td>
<td>104.2 (46.7)</td>
<td>103.8 (44.6)</td>
</tr>
<tr>
<td>RADS</td>
<td>32.2 (4.2)</td>
<td>32.2 (4.9)</td>
<td>32.2 (4.5)</td>
</tr>
<tr>
<td>BHS</td>
<td>12.7 (5.4)</td>
<td>11.9 (5.3)</td>
<td>11.5 (2.8)</td>
</tr>
<tr>
<td>MASC</td>
<td>58.5 (21.7)</td>
<td>58.4 (18.1)</td>
<td>58.4 (19.7)</td>
</tr>
<tr>
<td>NPOQ</td>
<td>39.5 (10.4)</td>
<td>39.5 (9.6)</td>
<td>39.5 (10)</td>
</tr>
<tr>
<td>CBTSQ</td>
<td>42.8 (9.8)</td>
<td>38.5 (10.1)</td>
<td>40.5 (10.1)</td>
</tr>
<tr>
<td>CBTSQ-BA</td>
<td>18.2 (5.1)</td>
<td>17.2 (5.9)</td>
<td>17.5 (5.5)</td>
</tr>
<tr>
<td>CBTSQ-CR</td>
<td>24.6 (7.0)</td>
<td>21.8 (6.5)</td>
<td>23.0 (6.9)</td>
</tr>
</tbody>
</table>

Suicide attempts

<table>
<thead>
<tr>
<th>Mode</th>
<th>Count 1</th>
<th>Count 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Suicide attempts</td>
<td>6 (total of 29 attempts)</td>
<td>12 (total of 102 attempts)</td>
</tr>
</tbody>
</table>

Of note were the elevated scores at baseline. Both the self-report and the clinician rated depression scores were above the suggested cut-points indicating clinically significant symptomatology. The hopelessness scores were also above the suggested cut-point of nine, which has been shown to be predictive of eventual suicide among clinical samples. The suicidal ideation scores were also elevated as were the anxiety scores. One hundred and two previous suicide attempts were reported across 12 people (one young person reported 75 suicide attempts); twice as many people in the intervention group had a history of suicide attempt than controls (p<0.001).

**Intervention use**

The average number of modules completed by the 26 participants in the intervention group was five (range one to eight out of a total possible of eight). Seven students completed only one or two modules; and eight students completed the entire eight modules (see Table 4). Of the 123 modules completed in total, the majority (87.8%) were 100% complete. In terms of the activities associated with each module, participants completed an average of eight out of a total possible of 16 activities each.

The message board was seldom used by participants, with only six people using it in total. Of those that did use it, five participants used it once and one person used it twice. All participants used it to communicate about difficulty accessing the modules. In no case was it used to communicate distress or suicidal ideation, nor was it used to communicate inappropriate content.

**Table 4: Frequency of module completion**

<table>
<thead>
<tr>
<th>N modules completed</th>
<th>N participants completing</th>
<th>N modules completed</th>
<th>N participants completing</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>5</td>
<td>5</td>
<td>3</td>
</tr>
<tr>
<td>2</td>
<td>2</td>
<td>6</td>
<td>1</td>
</tr>
<tr>
<td>3</td>
<td>2</td>
<td>7</td>
<td>1</td>
</tr>
<tr>
<td>4</td>
<td>4</td>
<td>8</td>
<td>8</td>
</tr>
</tbody>
</table>
Changes in outcome measures across time points

There was an improvement in the mean scores for each symptom measure from baseline to 10-week and 22-week follow-up for participants in both the intervention and control groups (see Table 5). At 10-week follow-up none of the participants in the intervention group reported any suicide attempt since baseline assessment compared with three young people in the control group who reported a total of nine suicide attempts. At 22-week follow-up, none of the intervention participants reported a suicide attempt since the 10-week follow-up assessment, compared with two young people in the control group who reported a total of four suicide attempts. The differences between groups were not significant at any time point.

A one-way ANOVA was undertaken in order to explore whether the improvement in the mean scores for our primary outcome over time was statistically significant across each time point. For suicidal ideation there was a significant effect of time (F (2, 116) = 12.791, p = .000). Post hoc tests indicated that suicidal ideation scores deceased significantly between baseline and 10-week follow-up (p = .001) and between baseline and 22-week follow-up (p < .000). However, there was no significant difference in the SIQ score between the 10-week and 22-week follow up (p = .439).
Table 5: Mean and SD for each of the outcome measures for the intervention and control groups at baseline, 10-week follow up and 22-week follow up.

<table>
<thead>
<tr>
<th></th>
<th>SIQ M (SD)</th>
<th>RADS M (SD)</th>
<th>CDRS-R raw score M (SD)</th>
<th>BHS M (SD)</th>
<th>MASC Raw</th>
<th>CBTSQ M (SD)</th>
<th>CBTSQ-BA M (SD)</th>
<th>CBTSQ-CR M (SD)</th>
<th>NPOQ M (SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Baseline</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Control (n=24)</td>
<td>103.4 (43.3)</td>
<td>32.2 (4.2)</td>
<td>55.9 (14.9)</td>
<td>11.3 (2.6)</td>
<td>58.2 (21.7)</td>
<td>42.8 (9.8)</td>
<td>18.2 (5.1)</td>
<td>24.6 (7.0)</td>
<td>39.4 (10.5)</td>
</tr>
<tr>
<td>Intervention (n=26)</td>
<td>104.2 (46.7)</td>
<td>32.2 (4.9)</td>
<td>59.1 (13.6)</td>
<td>11.7 (3.0)</td>
<td>58.4 (18.1)</td>
<td>38.5 (10.1)</td>
<td>17.2 (5.9)</td>
<td>21.8 (6.5)</td>
<td>39.5 (9.6)</td>
</tr>
<tr>
<td>Whole group (n=50)</td>
<td>103.8 (44.6)</td>
<td>32.2 (4.5)</td>
<td>57.6 (14.2)</td>
<td>11.5 (2.8)</td>
<td>58.4 (19.7)</td>
<td>40.5 (10.1)</td>
<td>17.5 (5.5)</td>
<td>23.0 (6.9)</td>
<td>39.5 (10.0)</td>
</tr>
<tr>
<td><strong>10-week follow-up</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Control (n=21)</td>
<td>70.0 (40.6)</td>
<td>28.4 (6.6)</td>
<td>50.4 (16.4)</td>
<td>11.8 (2.5)</td>
<td>52.2 (22.2)</td>
<td>43.0 (13.4)</td>
<td>19.9 (6.0)</td>
<td>23.1 (8.2)</td>
<td>34.8 (12.8)</td>
</tr>
<tr>
<td>Intervention (n=18)</td>
<td>67.2 (45.9)</td>
<td>26.5 (9.1)</td>
<td>46.1 (19.3)</td>
<td>10.2 (3.0)</td>
<td>43.4 (18.8)</td>
<td>44.8 (15.6)</td>
<td>20.4 (7.3)</td>
<td>24.4 (9.2)</td>
<td>33.3 (9.2)</td>
</tr>
<tr>
<td>Whole group (n=39)</td>
<td>68.7 (42.6)</td>
<td>27.5 (7.8)</td>
<td>48.4 (17.7)</td>
<td>11.1 (2.8)</td>
<td>48.3 (20.9)</td>
<td>43.8 (14.3)</td>
<td>20.1 (6.5)</td>
<td>23.7 (8.6)</td>
<td>34.1 (11.1)</td>
</tr>
<tr>
<td><strong>22-week follow-up</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Control (n=17)</td>
<td>62.1 (46.6)</td>
<td>25.8 (7.0)</td>
<td>46.4 (18.0)</td>
<td>11.0 (2.3)</td>
<td>49.7 (17.4)</td>
<td>45.1 (10.6)</td>
<td>21.1 (5.2)</td>
<td>23.9 (6.2)</td>
<td>33.5 (10.7)</td>
</tr>
<tr>
<td>Intervention (n=13)</td>
<td>46.5 (50.4)</td>
<td>22.6 (8.1)</td>
<td>39.7 (18.5)</td>
<td>9.6 (2.4)</td>
<td>41.9 (24.3)</td>
<td>43.9 (14.3)</td>
<td>21.9 (7.0)</td>
<td>22.0 (7.9)</td>
<td>28.6 (11.5)</td>
</tr>
<tr>
<td>Whole group (n=30)</td>
<td>55.3 (48.0)</td>
<td>24.4 (7.5)</td>
<td>43.5 (18.2)</td>
<td>10.4 (2.4)</td>
<td>46.3 (20.7)</td>
<td>44.6 (12.1)</td>
<td>21.5 (6.0)</td>
<td>23.1 (6.9)</td>
<td>31.4 (11.1)</td>
</tr>
</tbody>
</table>
Comparison between treatment groups

The mean improvement in the intervention group was larger than in the control group for all outcome measures. These differences were not significant (See Table 6).

Table 6. Comparison of the two groups in terms of change in score between baseline and follow-up.

<table>
<thead>
<tr>
<th></th>
<th>Post-intervention minus baseline</th>
<th>Week 12 minus baseline</th>
<th>p-value*</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>SD</td>
<td>n</td>
</tr>
<tr>
<td>SIQ</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C</td>
<td>-31.6</td>
<td>42.8</td>
<td>21</td>
</tr>
<tr>
<td>I</td>
<td>-37.3</td>
<td>39.1</td>
<td>18</td>
</tr>
<tr>
<td>RADS</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C</td>
<td>-3.5</td>
<td>4.8</td>
<td>21</td>
</tr>
<tr>
<td>I</td>
<td>-4.8</td>
<td>7.8</td>
<td>19</td>
</tr>
<tr>
<td>BHS</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C</td>
<td>-1.7</td>
<td>5.7</td>
<td>21</td>
</tr>
<tr>
<td>I</td>
<td>-1.8</td>
<td>4.2</td>
<td>18</td>
</tr>
<tr>
<td>NPOQ</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C</td>
<td>-3.8</td>
<td>8.4</td>
<td>21</td>
</tr>
<tr>
<td>I</td>
<td>-5.3</td>
<td>12.6</td>
<td>19</td>
</tr>
<tr>
<td>CDRS-R</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C</td>
<td>-5.4</td>
<td>16.9</td>
<td>21</td>
</tr>
<tr>
<td>I</td>
<td>-9.2</td>
<td>15.6</td>
<td>19</td>
</tr>
<tr>
<td>MASC</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C</td>
<td>-4.6</td>
<td>14.0</td>
<td>21</td>
</tr>
<tr>
<td>I</td>
<td>-9.6</td>
<td>14.9</td>
<td>18</td>
</tr>
<tr>
<td>CBTSQ</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C</td>
<td>0.4</td>
<td>10.3</td>
<td>21</td>
</tr>
<tr>
<td>I</td>
<td>6.1</td>
<td>11.8</td>
<td>19</td>
</tr>
<tr>
<td>CBTSQ-BA</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C</td>
<td>2.2</td>
<td>5.2</td>
<td>21</td>
</tr>
<tr>
<td>I</td>
<td>2.9</td>
<td>5.2</td>
<td>19</td>
</tr>
<tr>
<td>CBTSQ-CR</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C</td>
<td>-1.8</td>
<td>6.9</td>
<td>21</td>
</tr>
<tr>
<td>I</td>
<td>3.1</td>
<td>9.7</td>
<td>19</td>
</tr>
</tbody>
</table>

* P-values of linear mixed-effects modelling comparing the two groups with school as a random factor.
Abbreviations: Control group (C); Intervention group (I).
Self-reported suicidal ideation at all three time points can be seen in Figure 2.

**Figure 2.** Change in self-reported suicidal ideation as measured using the SIQ at baseline, 10-week and 22-week follow up for the control group, intervention group, and the whole sample.

---

**Mediation analysis**

Both groups evidenced increases in cognitive behavioural skills, with the intervention group showing a larger improvement compared with the control group; this can be seen in Figure 3. Of note is that cognitive restructuring skills improved in the intervention group, while they decreased in the control group. However, none of the differences observed were significant. There was a significant amount of missing data (up to 50% at 22-week follow-up).

**Figure 3:** Change in self-rated use of cognitive and behavioural skills as measured by the CBTSQ at baseline, 10-week and 22-week follow up for the control group, intervention group, and the whole sample.

---

A mediation analysis was also carried out in order to explore whether changes in the CBT skills at the 10-week follow up point impacted on improvements in suicidal ideation, self-reported and clinician-reported depression. Table 7 shows the correlations between changes in various symptom measures and mediator variables from baseline to 22-week follow-up. There is a significant association between changes in general CBT skills and self-report and clinician rated depression, which appear to impact on the primary outcome - suicidal ideation. There is also a significant association between changes in general CBT skills and in hopelessness, which appear to impact on suicidal ideation and self-report and...
clinician rated depression. Finally, there is a significant association between changes in behavioural skills specifically and anxiety, which appear to impact on self-reported depression.

Looking at the association between the CBTSQ and these variables at the 22-week follow up point (Table 8), changes in the CBTSQ are associated with changes in hopelessness, which again may be impacting on changes in self-reported and clinician rated depressive symptoms.
### Table 7: Significant correlations between symptom measures and mediator variables between baseline and 12-week follow-up

| Y       | X     | M     | Y and X | Y and M | X and M | Y and X|M* | Y and X | Y and M | X and M | Y and X|M* |
|---------|-------|-------|---------|---------|---------|--------|--------|---------|---------|---------|--------|
| SIQ     | CBTSQ | BHS   | -0.37   | 0.69    | -0.34   | -0.20  | 0.021  | 0.000   | 0.033   | 0.240   |
| RADS    | CBTSQ | BHS   | -0.60   | 0.43    | -0.34   | -0.53  | 0.000  | 0.007   | 0.033   | 0.001   |
| RADS    | CBTSQ-BA | MASC | -0.49   | 0.63    | -0.33   | -0.37  | 0.001  | 0.000   | 0.038   | 0.022   |
| CDRS-R  | CBTSQ | BHS   | -0.48   | 0.38    | -0.34   | -0.38  | 0.002  | 0.017   | 0.033   | 0.020   |
| SIQ     | CBTSQ | RADS  | -0.37   | 0.42    | -0.60   | -0.16  | 0.021  | 0.008   | 0.000   | 0.327   |
| SIQ     | CBTSQ | CDRS-R | -0.37  | 0.50    | -0.48   | -0.18  | 0.021  | 0.001   | 0.002   | 0.280   |
| SIQ     | CBTSQ-BA | RADS | -0.46   | 0.42    | -0.49   | -0.33  | 0.003  | 0.008   | 0.001   | 0.044   |
| SIQ     | CBTSQ-BA | CDRS-R | -0.46  | 0.50    | -0.46   | -0.31  | 0.003  | 0.001   | 0.003   | 0.058   |

### Table 8: Significant correlations between symptom measures and mediator variables between baseline and 22-week follow up

| Y       | X     | M     | Y and X | Y and M | X and M | Y and X|M* | Y and X | Y and M | X and M | Y and X|M* |
|---------|-------|-------|---------|---------|---------|--------|--------|---------|---------|---------|--------|
| RADS    | CBTSQ | BHS   | -0.46   | 0.68    | -0.62   | -0.06  | 0.012  | 0.000   | 0.000   | 0.759   |
| RADS    | CBTSQ-CR | BHS | -0.38   | 0.68    | -0.48   | -0.09  | 0.037  | 0.000   | 0.007   | 0.647   |
| CDRS-R  | CBTSQ | BHS   | -0.36   | 0.57    | -0.62   | -0.02  | 0.049  | 0.001   | 0.000   | 0.937   |
Satisfaction

Five participants completed the satisfaction questionnaire (see Tables 9 and 10). Two participants found the program to be either very enjoyable or somewhat enjoyable and two rated it as either somewhat helpful or very helpful. All five found the program to be worthwhile and said that they would recommend it to a friend. None of the participants reported that the Reframe-IT intervention made them feel upset or suicidal.

Table 9: Participant perceptions of the helpfulness of the skills in the Reframe-IT program

<table>
<thead>
<tr>
<th>Perception</th>
<th>Very unhelpful</th>
<th>Somewhat unhelpful</th>
<th>Neither helpful nor unhelpful</th>
<th>Somewhat helpful</th>
<th>Very helpful</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recognising my emotions</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>Identifying my ‘problem situations’</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Identifying my ‘tipping point’</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Recognising my ‘unhelpful thoughts’</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>Learning who I can go to for help</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td>Scheduling activities I enjoy</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td>Problem solving</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Replacing unhelpful thoughts with helpful thoughts</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>3</td>
<td>1</td>
</tr>
</tbody>
</table>

Table 10: Participant perceptions on how much they have used various skills since completing the Reframe-IT program

<table>
<thead>
<tr>
<th>Perception</th>
<th>Never used it</th>
<th>Used it occasionally</th>
<th>Used it fairly frequently</th>
<th>Used it a lot</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recognising my emotions</td>
<td>1</td>
<td>0</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>Identifying my ‘problem situations’</td>
<td>1</td>
<td>0</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Identifying my ‘tipping point’</td>
<td>1</td>
<td>0</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Recognising my ‘unhelpful thoughts’</td>
<td>1</td>
<td>0</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Learning who I can go to for help</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>Scheduling activities I enjoy</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td>Problem solving</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>Replacing unhelpful thoughts with helpful thoughts</td>
<td>0</td>
<td>2</td>
<td>1</td>
<td>2</td>
</tr>
</tbody>
</table>
Discussion

Key findings and implications

Overall we observed improvements in suicidal ideation, depression, hopelessness, anxiety and problem solving ability in both the intervention and control groups. While the improvements were larger in the intervention group, there were no statistically significant differences. It is possible that the non-significant results are due to lack of power. The other consideration is that treatment as usual was received by all of the participants in the trial, which variously included contact with the school wellbeing staff as well as interventions by various mental health professionals outside of school. As a result it may be difficult to detect an effect of a relatively benign intervention such as Reframe-IT over and above the effects of clinical treatment.

The current study however, is consistent with the pilot study and with previous research in showing that the intervention does not result in harm and is acceptable and potentially efficacious.\textsuperscript{38,53,54} The fact that the message board was used appropriately also supports the fact that this type of intervention is safe to deliver if done so carefully. Indeed, a deliberate decision was made not to include any social networking functionality in the program based on concerns that exist regarding ethical issues, including client confidentiality and duty of care.\textsuperscript{22-24} Whilst we should continue to remain cautious, these findings give us some confidence that there are safe and acceptable ways for professionals to engage with suicidal young people via online platforms.

Reframe-IT provided school wellbeing staff with an additional resource to be used with students at risk of suicide. Although there were issues with recruitment of students into the trial, of those who were recruited, over half completed four or more modules. This rate of treatment adherence is comparable to face-to-face care. For example data reported by headspace indicates that the average number of face-to-face sessions attended by young people is around four.\textsuperscript{55}

It also appeared that participants benefited from the intervention in terms of increased use of CBT skills, with those in the intervention group using cognitive and behavioural skills more so than those in the control group. While between group differences were not significant, there was an association between the use of CBT skills and symptom improvement. Mediation analysis showed that the acquisition of general CBT skills, as well as behavioural skills specifically, caused an improvement in depression, which in turn caused an improvement in suicidal ideation. The acquisition of general CBT skills also led to an improvement in hopelessness, which in turn caused an improvement in both self-reported and clinician rated depressive symptoms and in suicidal ideation. Finally, the acquisition of CBT skills caused an improvement in hopelessness, which in turn caused an improvement in both self-reported and clinician rated depressive symptoms.

Finally, while there were significant difficulties in obtaining satisfaction data, participants reported that they liked, and used, a number of the specific skills taught in Reframe-IT, particularly behavioural activation skills. This is consistent with the mediation analysis that showed that these skills may be particularly beneficial to young people with depression and suicidal ideation.

It is important to note the real-world nature of this study that included young people who were experiencing high levels of depression, anxiety and distress, including significant levels of suicidal ideation. Moreover, many participants had a history of suicide attempts. We did not exclude anyone on the basis of the level of severity of suicidal ideation, but managed this in the context of the study safety protocols. This is seldom done in research; indeed, it is not uncommon for
young people at risk of suicide to be excluded from mental health intervention trials. As a result this study provides a valuable contribution to the field by demonstrating the safety and acceptability of testing this type of intervention among suicidal young people.

**Study limitations**

The key limitation of the study was the poor recruitment of participants into the trial, limiting the statistical power of the study. A number of steps were taken to address this. These included increasing the number of schools recruited to the project; taking a more proactive approach to recruiting students by providing information about the study in school newsletters and on the schools’ intranet; obtaining ethical approval to cease the requirement for parental consent for those over the age of 18; lowering the age limit to 13 instead of 14 years; increasing the research team’s involvement in obtaining parental and student consent to relieve burden on school wellbeing staff; offering professional development for school staff; and scheduling regular meetings with wellbeing staff at each school to identify and attempt to resolve barriers to recruitment. Despite these efforts recruitment was still poor and as a result the study was underpowered. In the future this could be addressed by employing different means of recruiting participants into such a trial.

There were also large amounts of missing data for outcome measures, particularly the measure of CBT skill acquisition. Additionally, we had difficulty obtaining satisfaction data because this was collected via postal return of a paper-based questionnaire after the intervention.

Notwithstanding these limitations, this novel trial employed high quality methods and was conducted in line with the Spirit guidelines and reported in line with the Consort guidelines; for example, it included randomisation of participants, allocation concealment and blinding of outcome assessors.
Section Three: Qualitative Component – Interviews with Staff and Students

A secondary component of the study comprised a series of qualitative interviews with participating staff and students. Data are provided regarding: 1) the acceptability and feasibility of delivery of the Reframe-IT program from the perspective of school wellbeing staff; and 2) students’ satisfaction and experience of participating in the Reframe-IT program.

Staff interviews

All school wellbeing staff (n = 47) who worked at a participating school at the conclusion of the project were invited to complete an interview with a member of the research team. This invitation was sent to all staff by email in August of 2016. A second reminder email was sent two weeks later to a select group of staff who had been very involved in the project but who had not responded to the first email.

Methods

An interview schedule was developed by the research team based on their experience of implementing the study. The interview schedule covered the following topics:

1) The extent of suicide risk in school students;
2) Appropriateness of schools as settings for suicide prevention activities and programs;
3) Perceived confidence and skill when working with students at risk of suicide;
4) Views on Reframe-IT and any influence it had on staff skill, confidence, or behaviour;
5) Barriers to recruitment;
6) Views and experiences regarding the internet and suicide prevention.

The interviews were conducted by a research assistant (EB) and each took approximately 40 minutes to complete. The interviews were audio recorded and transcribed verbatim; key issues were identified and are described below.

Results

Ten school wellbeing staff from nine different schools participated in the interviews. All were female, and the majority had been in their current role for between three and five years. All reported that suicide risk was a significant problem at their school with suicidal ideation being more common than suicide plans or attempts. Many also noted that self-harm was also a significant issue.

Appropriateness of schools as settings for suicide prevention activities

All school wellbeing staff agreed that schools were an appropriate setting for suicide prevention activities and programs. This was largely attributed to the fact that the majority of young people attend school, making it an ideal place to educate this population about suicide. Additionally, some school wellbeing staff discussed the benefit of school being a contained environment, allowing for easy follow-up if students become distressed.

Potential barriers that were identified included limited time and resources, the need to balance the curriculum, and false perceptions that suicide prevention programs induce suicide risk. For
example, one staff member said, “I know that talking about [suicide] with young people doesn’t increase the likelihood of suicidal behaviour, but I do think some parents would be concerned about that.” Another said, “[Suicide] is one area that is pretty taboo – especially in mainstream education where teachers might not want to talk about it, thinking they might put the idea in young people’s heads.”

**Perceived confidence and skill when working with suicidal students**

All school wellbeing staff had undergone previous training in suicide prevention and most indicated that they felt reasonably confident working with students at risk of suicide. However they reported feeling more confident performing risk assessments and providing support in a crisis situation than providing ongoing support and interventions. Many also reported feeling more confident when the student was also supported by external services.

**Views on Reframe-IT and influence on skills, confidence or behaviour**

Overall, feedback regarding Reframe-IT was positive. In particular, school staff liked the fact that it was video- and not text-based, making it accessible for students with literacy or language issues. Many also reported that they thought the characters were relatable to young people. However, one staff member emphasised the difficulty of creating a program like Reframe-IT that is engaging and educational for all young people. Another commented that although the program was highly beneficial for a student she referred, the issues the student faced were substantially more complex than the issues covered in Reframe-IT. She suggested Reframe-IT be modified to contain multiple characters experiencing a range of issues, from which participants could choose depending on their relevance to them.

School wellbeing staff also reported liking that comprehensive assessments were carried out with the students. Two key reasons were given; firstly several school wellbeing staff reported that they were able to learn new information about their students’ level of suicide risk. Secondly, some school wellbeing staff indicated that students felt supported because someone else was coming out to see them, and potentially even benefited from the assessments alone.

Finally, school wellbeing staff reported that they felt well supported by the research team and they all said they would continue to use Reframe-IT and recommend it to others if they had access to it.

Many school wellbeing staff did not feel that access to the Reframe-IT program had impacted on their knowledge, skills, behaviour, or relationships with students. However, some reported that it had: improved their understanding of the value of thorough and specific risk assessment; increased their knowledge and likelihood of using

“I really liked the fact that they didn’t need to do a lot of reading, because literacy is a major problem and that would just count out a bunch of kids straight away.”

“I think the program has been really positive … and it’s always been available if I needed it.”
additional resources; facilitated students’ engagement with counselling; and enhanced their confidence.

**Barriers to recruitment to Reframe-IT**

**The requirement for parental consent**

Many of the school wellbeing staff cited the need to obtain parental consent as a barrier to students choosing to participate in Reframe-IT. Often this was due to students not wanting their parents to know they were feeling suicidal. Less commonly they spoke about logistical concerns with returning the paperwork, and one staff member discussed how some parents did not want their children to participate in research.

**Students’ suicide risk considered too high or too low**

A second issue concerned how comfortable school wellbeing staff were, or what level of priority they gave, to discussing a research project with students experiencing frequent or severe suicidal ideation. Many reported that without an established relationship with the student they felt uncomfortable to talk about research. For example, one said, “If a student presents to me saying they’re suicidal, my priority is to make them feel safe and heard, rather than saying there is a research team that might want to work with you.”

Conversely, school wellbeing staff also experienced issues referring students with low-level or fleeting suicidal ideation. Usually this was either because the student did not think they needed Reframe-IT, or because by the time the School Wellbeing Counsellor was able to make the referral the student had not experienced suicidal ideation within the past four weeks and was no longer eligible.

**Concerns that the student would be “over-serviced”**

A third commonly-reported barrier was fact that students eligible for Reframe-IT were often linked in with several other services, and either the school counsellor, student, or student’s parents did not want the student to be engaged in yet another program.

Other barriers cited included: concerns about missing class to complete the program; not wanting to use a web-based intervention; the school wellbeing staff forgetting, or not having the time, to talk to students about Reframe-IT and make the referral; and feeling disheartened by only having students in the control group.

**Views and experiences regarding the internet and suicide prevention**

School wellbeing staff were asked their opinion of the internet and its role in suicide prevention. Nearly all responded by discussing both benefits and limitations.

Benefits included the ability of the internet to reach a large audience, the potential efficacy of well-designed and evidence-based content and resources, the fact that it is “always there” and is free or low-cost, students being able to easily access contact details for services, and

“It’s a way of reaching everyone with a good message, but then it is so often used as a way of reaching people with a bad message.”
schools’ ability to detect students at risk via content posted on Facebook.

Limitations or risks included technical difficulties that were experienced in some schools, the fact that low-quality or pro-suicide content exists and can be accessed easily, and the lack of education about which sites are helpful and which are harmful. For example, one staff member said, “Parents are not skilled enough to understand what is a good website and what isn’t... so there’s no understanding of where to get the right information.”

**Student interviews**

Participants who completed at least one of the follow-up assessments (either at 10 or 22 weeks) were invited to participate in this component of the study.

**Methods**

Qualitative data were collected through semi-structured interviews with open questions derived from a topic list, following the methodology used by Gerhard and colleagues. Similar to above, an initial list was created by the research team based on their experiences in implementing the study. This covered the following topics:

1) Views on recruitment into the trial;
2) Accessibility and usefulness of participating in suicide prevention research;
3) Experience of not being randomised to Reframe-IT (control participants only)
4) Experience of being randomised to Reframe-IT (intervention participants only), including:
   a. Views on the location of Reframe-IT
   b. Disclosure of the use of Reframe-IT to others
   c. Views on the Reframe-IT
   d. Effects of Reframe-IT
   e. Acceptability and feasibility of online treatment for suicidal ideation

Interviews were conducted by a research assistant (GC) and audiotaped for transcription. As participants were asked questions about their experience of the initial and subsequent assessment sessions, the research assistant that conducted those assessments did not conduct the qualitative interview with the same participant.

One of our primary aims was to assess whether including vulnerable young people in research regarding suicide causes undue distress. In order to explore this, we followed the methodology employed by Biddle and colleagues. Participants were asked to rate their mood before and after the interview using a visual analogue scale (VAS) measuring current emotional state. They were presented with a scale ranging from 1-10, depicted by a thermometer. A sad face was placed next to 0, a happy face next to 10, and a neutral face next to 5. The research assistant gave a brief explanation of the scale, and asked participants to rate how happy or sad they were feeling at that moment. At the end of the interview, participants were asked to rate their mood again on a blank scale, without seeing their previous score.
Results

Three participants completed a semi-structured interview following participation in the study (female=2, male=1, mean age=15.9, SD= 0.94). All three participants were allocated to the control condition.

Participant characteristics

All three young people who participated in the interviews began the trial with different supports around them. One was being supported by a psychologist, psychiatrist and GP, and was soon to be linked in with a school counsellor, whereas the other two were being supported by the school counsellor only. None of the young people were taking medication for a mental health related issue. By the end of the trial, one participant had seen a headspace clinician, another had weekly support from a school psychologist as well as taking antidepressant medication, and another had been assessed at hospital having felt they could not keep themselves safe. Follow-up support for the latter participant included regular meetings with a psychologist and school counsellor. At the start of the trial all three participants reported depressive symptoms that indicated that a depressive diagnosis might be confirmed by a full diagnostic assessment. Somatic symptoms (presence of physical symptoms such as headaches, backaches), difficulties with sleep and fatigue were reported by all participants. Although none of the participants had ever attempted suicide, all were experiencing suicidal ideation.

Impact of the interview on mood

All participants reported that their mood improved following the interview.

Figure 4: VAS ratings before and after qualitative interview.

Reasons for participating in the study

For two participants, taking part in the trial helped them acknowledge they were experiencing suicidal thoughts. One said, “[I] wanted to help myself, and get rid of the thoughts as much as I could…“.

There was also an aspect of participating in a research project that was appealing: “I thought it was relatively interesting like because there’s not much going on about it, and I don’t know many research things about it, so I reckon it was quite interesting to take part”.
Barriers to participation

Parental consent

For two of the three participants a key barrier was disclosing their suicidality to their parents. One reported avoiding using the word suicide when getting parental consent, and another spoke about ‘depression and self-harm’, rather than using the word suicide.

Allocation to control condition

Although the research team hypothesised that one barrier to participation may be the chance of being allocated to the control group, none of the participants stated that this was a deciding factor on whether to participate. After finding out they had been allocated to the control condition one participant said, “I was kinda disappointed ’cause I really wanted to do it but then again it was a fifty-fifty chance and either way I would have been happy.... I know that it was gonna help in some sort of way if I did participate in the website or not.”

Participants felt that the way that they were recruited into the trial through the school counsellor was appropriate, and having the assessments at school, within school hours was convenient.

Taking part in the assessments

One participant reported that he felt like he was able to be open and honest with the research assistant when talking about his suicidal feelings, because he knew her goal was to help him. However, another said they only told the research assistant what they needed to know for the trial, adding, “There’s some things you just can’t say there’s some things that you just have to keep to yourself ... so I told her what she completely needed to know but not every little detail... I told her things that I think were important.”

Another participant said they felt ‘a bit anxious’ about discussing their suicidal feeling with the research assistant as they had never met her before, but others reported finding it beneficial, one saying, “I got some weight off my shoulders” and another, “I think getting it out helped a lot.”

Participants reported that although the initial assessment lasted over an hour, they were the right length in terms of the information they needed to provide, and felt able to return to class afterwards without any issues. All participants also reported that taking part in the assessments alone were helpful and worthwhile.

In terms of how the trial could be improved, one participant suggested that in future studies those allocated to the control condition could be more clearly been directed to websites such as those by beyondblue or Kids Helpline as an additional way of accessing support.

Discussion

The interviews with school wellbeing staff and students provided insight into the barriers to recruitment to Reframe-IT, as well as information regarding the acceptability of the program and online interventions in general.

Key findings and implications

Extent of suicide risk in students
All school wellbeing staff interviewed believed that suicide risk was a problem at their school. Indeed, the interviews with students provided support for the quantitative finding that the Reframe-IT trial included highly distressed young people who were involved with a range of services. These students experienced fluctuation in their depressive symptoms and suicidal ideation over the course of their participation; this was attributed to life circumstances and often resulted in them accessing additional services.

**Schools as settings for suicide prevention activities and programs**

School wellbeing staff also felt that schools were an appropriate setting for youth suicide prevention activities and programs generally, which echoes previous research conducted in this area. However, several barriers to implementing such programs were also identified, including limited time and resources as well as false perceptions that suicide prevention programs induce suicide risk. Concerns that talking to young people about suicide induces suicide risk is frequently cited as a barrier to conducting youth suicide prevention research, however recent research in the area suggests that this is not the case.

**Staff confidence and skill**

Most of the school wellbeing staff felt reasonably confident in responding to students at risk of suicide, especially when the student was linked in with external services. This finding is positive considering that school staff are often seen as an acceptable source of help and are often the main port of call for young people experiencing mental health issues. School wellbeing staff felt less confident however in their ability to provide long-term support or to ensure students’ safety outside of school hours. This is to be expected as out-of-hours support for students is not the remit of school staff, however it does highlight the importance of ensuring young people at risk of suicide are supported beyond the school environment. Online programs such as Reframe-IT may have an important role to play in providing at least some aspects of this support.

**Acceptability of Reframe-IT**

In general the school wellbeing staff liked Reframe-IT and found it acceptable; this was true of both the Reframe-IT website as well as the overall running of the research project. Some school wellbeing staff indicated that they did not believe Reframe-IT would be suitable for everyone, although more research is required to determine exactly which subgroups of the population stand to benefit most from this type of intervention. There was some indication that, for some school wellbeing staff, Reframe-IT led to positive changes in their knowledge, skill, confidence, or practice.

Participants from both student and staff interviews mentioned that they thought the assessments alone were helpful; this is in line with existing research showing that even brief contact with services results in a reduction in suicidality. This, combined with the fact that some wellbeing staff reported they learnt information about the kinds of questions needed for thorough risk assessment, suggests that thorough training in risk assessment for school staff should be a priority.

**Barriers to recruitment**

Several barriers to recruitment were identified by school wellbeing staff, most commonly: 1) the need to obtain parental consent; 2) students being either too high or low risk; and 3) concern...
that students would be over-serviced. Parental consent was also highlighted as a barrier by the students interviewed, and is a common barrier to recruitment in research of this nature.\textsuperscript{20} Interestingly, the students, despite being often severely unwell, did not seem to mind much about being in the control group and still found it worthwhile being in the trial. The potentially detrimental effects of being in the control group is a concern about randomised controlled trials often cited in the literature\textsuperscript{21}, and was also a barrier mentioned by the school staff. This finding, however, shows that a trial of this nature can be managed in a way that ensures benefit to all, even with those who evidence severe suicidal ideation and previous attempts.

\textit{Role of the internet for suicide prevention}

Finally, when asked about their views on the internet and the potential role it could play in suicide prevention, school wellbeing staff clearly identified both positive and negative aspects. The positive aspects centred particularly on increasing access to potentially efficacious interventions, whereas the negative aspects concerned the potential for young people to be exposed to harmful context, such as pro-suicide forums. Whilst some technical difficulties were reported, the key concern identified was the importance of ensuring the internet is used correctly in order to maximise benefits and minimise harms and that young people receiving education regarding this. To date no studies have reported on the impact of providing education to young people about how to engage safely with suicidal content online, although work is currently underway.\textsuperscript{63}

\textbf{Study limitations}

There were two key limitations to this component of the project. Firstly, we were only able to successfully recruit three participants to follow-up interviews, and all had been allocated to the control group. This meant that we were unable to obtain qualitative data from the perspective of students who accessed the Reframe-IT website. Secondly, due to the high attrition rate of school staff, we were unable to achieve our original aim of quantitatively measuring change in staff knowledge, confidence, and skill using interviews administered at the beginning and end of the project.

Nonetheless this component of the study showed that students and staff alike found the research acceptable and liked the Reframe-IT program itself. In particular, the assessment appeared to be an important aspect of the intervention as a whole from the perspective of both students and staff. The key barrier to recruitment cited by both students and staff was parental consent.
Section Four: Overarching Conclusions

This study was the first of its kind internationally. Whilst previous research has examined the impact of online programs on adults with mild suicidal ideation, none have examined the impact of these programs among young people. This is despite the fact that young people are the fastest growing group of internet users and they increasingly use online platforms to seek both information and help for mental health related issues, including the management of suicidal feelings. The study was also the first to include young people demonstrating all levels of suicide risk from very mild, fleeting expressions of suicidal ideation to frequent and severe suicide-related behaviour. This is significant as it is not uncommon for young people at risk of suicide to be excluded from studies of this nature, and as a result we are limited in our knowledge of what does and doesn’t work in youth suicide prevention. Given the fact that rates of youth suicide are increasing both in Australia and worldwide, this needs to be addressed as a matter of urgency.

Although underpowered to detect differences between the treatment and control groups, this was a high quality trial and it did demonstrate a reduction in both suicidal ideation and depression from baseline to follow-up for all participants. It also led to improved cognitive and behavioural skills. This suggests taking part in a research study may be beneficial in and of itself, but at the very least it provides evidence to suggest that conducting suicide research of this nature does not increase suicidal ideation. As a result we can be confident that it is safe to include suicidal young people in research projects, including those that are testing the efficacy of online platforms, thereby paving the way for a new generation of suicide research.

There has previously been a reluctance to engage young people in online suicide prevention activities, and research tells us that consumers and professionals tend to use online platforms very differently when it comes to suicide prevention. This has largely been due to safety and ethical concerns, in particular issues relating to duty of care if a young person expresses suicidal ideation on a professionally run platform and fear of contagion. However the findings generated by this study suggest that engaging young people in online suicide prevention activities can be done safely. This is important given the increase in the use of online platforms by this population and the fact that better integration of online platforms into clinical care is now a national priority.

Both students and staff reported finding the intervention acceptable, providing support to previous research that has identified schools as an appropriate place to deliver suicide prevention activities. Schools have long been the target of suicide prevention activities in Australia, however their focus has largely been on training school staff to better identify and assess young people at risk via gatekeeper training programs. Whilst this is important, the data reported here show that school staff may need additional skills to help them support young people in the longer term. Although school staff should not be expected to provide ‘treatment’ per se, they are often a first port of call and are frequently seen as an acceptable source of help. As such they require tools to use when working with a suicidal student, and Reframe-IT clearly has the potential to be used in this way.

It is important to acknowledge that recruitment into the trial was problematic for a number of reasons. For example, the issue of obtaining parental consent was cited as a barrier to recruitment by both staff and students. As a result investigators should consider employing
alternative recruitment strategies and working with ethics committees to find alternative consent processes. Nevertheless, this innovative study demonstrated the feasibility and potential efficacy of the Reframe-IT program, which was shown to be acceptable to young people and safe to administer. This is significant given increasing rates of suicide among young Australians and the ever-increasing use of internet-based platforms for help-seeking among young people.
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