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ORIGINAL PAPER

Healthy Minds: A School-Based Prevention Programme for Deliberate Self-harm in Adolescence

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Abstract

In recent years, there has been a notable increase in the prevalence of deliberate self-harm (DSH) among adolescents, which has led to the recognition of this issue as a significant public health challenge. However, school-based prevention programmes for DSH remain scarce. This study aimed to develop, implement, and evaluate the effectiveness of the Healthy Minds programme, a universal school-based prevention intervention targeting DSH in adolescents. Conducted in a Lisbon school, the programme sought to reduce DSH and suicidal ideation, change beliefs about DSH, and promote help-seeking. A quasi-experimental design with experimental and control groups included 137 participants aged 13–19 ($M = 14.73$; $SD = 1.03$), assessed at three time points: pre-intervention, post-intervention, and follow-up. The intervention showed partial effectiveness, with delayed reductions in DSH and significant improvements in reducing false beliefs. In addition, both groups showed increased help-seeking behaviours, and these effects were sustained over the follow-up period, suggesting long-term effectiveness. However, no significant improvements were observed in the ability to recognise warning signs of DSH, nor were there reductions in levels of suicidal ideation. The Healthy Minds programme shows promise in reducing DSH, improving mental health literacy and promoting help-seeking behaviours in adolescents, with sustained benefits observed over time. These findings highlight the importance of implementing well-structured, methodologically robust school-based interventions aimed at preventing DSH in this population. To maximise programme effectiveness, longer follow-up periods and more integrated, multifaceted approaches are essential.

Keywords School-based universal prevention · Deliberate self-harm · Adolescence · Mental health literacy · Skills training

Introduction

Deliberate self-harm (DSH) and suicidal behaviours are a serious public health problem in several European countries and in Portugal, with a high prevalence, especially among adolescents (Duarte et al., 2020; World Health Organization, 2020a). A meta-analysis involving more than over 600,000 adolescents aged 12–18 from 41 countries, based on studies published up to 2015, reported a lifetime prevalence of DSH of 17%, with an increasing trend in these rates up to that year (Gillies et al., 2018). Recent research in Portugal by Duarte et al. (2020) highlights that the lifetime prevalence of DSH in community samples of adolescents aged 12–20 is approximately 41%, increasing to as high as 83% in clinical samples of those aged 12–21. The alarming prevalence of DSH among adolescents further underscores the urgent need for effective prevention strategies.

In this study, we define DSH as deliberate self-harm behaviours, both with and without suicidal intent. These behaviours may include actions such as jumping from heights, overdosing on drugs, cutting oneself, hitting oneself, ingesting inedible substances and hanging (Duarte et al., 2019). DSH are closely linked to suicidal behaviours and carries a high risk of suicide attempts (Barzilay et al., 2019; Westers, 2019; World Health Organization, 2020a).

Although DSH and suicidal behaviours are distinct phenomena, studies (e.g. Carvalho et al., 2013; Hawton et al.,

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2012; Nock, 2010) have shown a strong association between them, highlighting the challenge of treating these phenomena separately. For example, Whitlock et al. (2013) found that DSH often preceded or co-occurred with suicidal behaviour in 62% of cases. This relationship was corroborated by Duarte et al. (2020), who found that among 101 adolescents, only one exhibited suicide attempts behaviour without prior engagement in DSH behaviours.

The 'gateway theory' (Hamza et al., 2012) provides an integrative framework that suggests the existence of a continuum of suicidal behaviour. In this model, non-suicidal DSH is positioned at one end, while more severe behaviours, such as suicide attempts and completed suicide, occupy the other end (e.g. Grandclerc et al., 2016; Hamza et al., 2012; Whitlock et al., 2013). According to this theory, DSH may act as a 'gateway' to more severe forms of suicidal behaviour, as repetition of these behaviours may lead to habituation to pain, increasing the likelihood of transitioning to suicidal behaviour (Grandclerc et al., 2016; Joiner & Silva, 2012). This model is based on the idea that DSH and suicidal behaviours share common characteristics, regardless of the underlying intent, and that DSH is a significant risk factor for progression to suicide (Grandclerc et al., 2016; Hawton et al., 2012). We therefore conceptualise DSH as an integral part of this continuum of suicidality, encompassing behaviours with and without suicidal intent.

DSH behaviour in adolescents is a major concern for professionals working with adolescents, particularly in clinical, community, and school settings (Heath et al., 2014) due to their high prevalence and their association with suicidal behaviours (Bem et al., 2017; Heath et al., 2014) and other psychiatric comorbidities, such as depression, anxiety, and suicidal ideation (Plener et al., 2018; Westers, 2019). In addition, the stigma associated with mental illness and limited mental health literacy significantly prevent adolescents from seeking help, contributing to the increasing prevalence and worsening severity of DSH in this population (Guerreiro et al., 2017; Waqas et al., 2020; Wei et al., 2017).

Given the high prevalence and severity of DSH, early intervention and mental health promotion are essential to adolescent prevention efforts (Bürger et al., 2023; Wasserman, 2016, 2019; World Health Organization, 2020b; Zalsman et al., 2016).

Schools offer an optimal setting for preventive interventions against DSH, providing access to a large and diverse adolescent population, including those who might not otherwise engage with mental health services. In addition, schools are well placed to integrate evidence-based mental health promotion programmes into the wider curriculum. Furthermore, the daily interactions and relationships within the school environment facilitate the early identification of at-risk students, enabling timely and effective support. Given these advantages, schools have an important role to play in promoting mental health literacy and reducing stigma, effectively addressing the barriers that prevent adolescents from seeking help (De Riggi et al., 2017; Heath et al., 2014; Singer et al., 2019).

According to the literature, most prevention programmes for self-harm behaviour developed in schools are universal prevention programmes that raise awareness of mental health, targeting the entire student population (Bürger et al., 2023; Singer et al., 2019; Zalsman et al., 2016). Universal prevention programmes are interventions that target the general population, regardless of individual risk factors, to prevent the occurrence of problem behaviours such as DSH. These programmes are designed for the general population and can be implemented in a variety of settings, including health services, schools and communities, to ensure wide accessibility and impact (Gordon, 1987).

Various school-based universal prevention mental health awareness programmes have shown promising results in increasing knowledge about mental health and DSH, increasing the ability to recognise warning signs, reducing stigma and promoting help-seeking, which can prevent the escalation of DSH and subsequent suicides (Bem et al., 2017; Brás, 2013; Singer et al., 2019; Waqas et al., 2020; Wasserman et al., 2015; Wei et al., 2017; Zalsman et al., 2016). The literature also shows that these programmes also seem to have a significant effect on reducing suicidal ideation and suicide attempts (Wasserman et al., 2012, 2015; Zalsman et al., 2016). However, significant methodological limitations can be found in these studies (Bürger et al., 2023; Singer et al., 2019). One of these limitations is the absence of DSH measurement before and after interventions, making it difficult to draw definitive conclusions about the impact of these interventions on DSH (Baetens et al., 2020; Brás, 2013; Bürger et al., 2023; Muehlenkamp et al., 2010; Santos et al., 2013). Other methodological limitations identified were the absence of control groups, brief interventions, and the absence of long-term follow-up studies precludes the possibility of determining whether new cases of DSH will emerge in the future (Baetens et al., 2020; Bürger et al., 2023; Cipriano et al., 2022; Muehlenkamp et al., 2010).

Therefore, there is a need to develop universal programmes for the specific prevention of DSH in school settings, with more robust methodologies to assess the effectiveness of these programmes and combat this scourge in adolescence (Bürger et al., 2023; Singer et al., 2019).

Singer et al. (2019) in a systematic review of the literature on universal school-based DSH prevention programmes identified the Signs of Self-Injury Programme (SOSI, Muehlenkamp et al., 2010) and the Youth Aware of Mental Health Programme (YAM, Wasserman et al., 2012) as effective interventions with high-quality research.

The SOSI programme (Muehlenkamp et al., 2010) is a programme designed to increase knowledge about mental

health, promote help-seeking attitudes and behaviours, and reduce DSH in adolescents. It is a psychoeducational programme, developed in a single class, which provides basic information about DSH, warning signs and symptoms, followed by group discussion to offer hope and reduce the stigma and fears associated with seeking specialist help. The results showed an increase in the participants' knowledge about DSH and an increase in adaptive attitudes from pre- to post-implementation. However, there were no changes in help-seeking behaviours, and the impact on DSH was not measured.

The YAM programme (Wasserman et al., 2012) is a universal school-based mental health awareness intervention programme, designed to promote mental health among participants, increase their knowledge of DSH, and prevent DSH and suicidal ideation among them. YAM is an interactive programme of 5 h of intervention over 4 weeks, using educational sessions, roleplays and group discussions to address mental health issues, coping strategies and the importance of seeking help. The intervention's effectiveness was evaluated by assessing the participants pre-intervention, 5-week post-intervention, and 12-month post-intervention evaluations of the participants. The results indicate that the YAM programme was effective in reducing suicide attempts and suicidal ideation. A significant increase in mental health knowledge was observed among participants 5 weeks after the intervention. Additionally, there was a positive change in attitudes towards DSH, as well as an increase in help-seeking behaviours. These improvements were sustained over time, with the experimental group exhibiting a 50% reduction in suicide attempts compared to the control group 12-month post-intervention.

The SOSI and YAM programmes have demonstrated the potential of structured interventions to address DSH and related mental health problems. SOSI focuses on psychoeducation aiming to increase knowledge about DSH and promote help-seeking attitudes among adolescents. While it effectively increase awareness and promote adaptive attitudes, its direct impact on help-seeking behaviour and DSH outcomes remains unclear. In comparison, the YAM programme employs a more comprehensive and interactive methodology, demonstrating a sustained impact with significant reductions in suicide attempts and suicidal ideation. Furthermore, it enhances mental health literacy, fosters positive attitudes towards DSH, and increases the likelihood of individuals seeking help, thereby rendering it a more robust and effective intervention for addressing these challenges.

These findings highlight the need for evidence-based, universal school interventions and are consistent with other studies demonstrating the effectiveness of psychoeducational programmes in raising mental health awareness, improving knowledge, recognising warning signs, reducing stigma and encouraging help-seeking behaviour (Bem et al., 2017; Singer et al., 2019; Waqas et al., 2020; Wei et al., 2017; Zalsman et al., 2016).

In Portugal, universal school-based programmes mainly focus on promoting mental health and socio-emotional skills (Gaspar et al., 2018; Simões et al., 2021). The specific programmes targeting DSH prevention are limited (Carvalho et al., 2013) and mainly aim to prevent suicidal behaviour through mental health promotion, but their impact on DSH outcomes has not been evaluated (Brás, 2013; Brás & Santos, 2014; Santos et al., 2013).

For example, Brás (2013) implemented and evaluated a psychoeducational intervention to prevent suicidal acts in schools, using a quasi-experimental method. The intervention focused on demystifying incorrect beliefs, identifying warning signs, and improving attitudes towards peers who may be at risk of suicide. While the results demonstrated improvements in recognising warning signs, fostering adaptive attitudes, and reducing false beliefs and maladaptive attitudes, the study did not assess the intervention's effectiveness in addressing DSH behaviours specifically.

This gap in the literature underscores the need for a programme specifically designed to address DSH. While existing interventions focus on broader mental health issues, they often lack targeted strategies to address DSH behaviours directly. A dedicated programme focus on DSH would address a critical unmet need within Portuguese schools.

Several literature reviews on school-based universal DSH prevention programmes (Bürger et al., 2023; Singer et al., 2019; Waqas et al., 2020; Wasserman, 2019; Wasserman et al., 2015) suggest that the most effective methodologies for universal school intervention programmes are those that involve multiple strategies implemented simultaneously, such as:

(i) Specific psychoeducational interventions, designed to facilitate the acquisition of knowledge about deliberate self-harm and its psychological aspects. The objective of these approaches is to educate and raise awareness about deliberate self-harm and mental health. These interventions include the provision of information on the aetiology of mental illnesses, the dissemination of statistics on the prevalence of these issues, and the enhancement of awareness about what constitutes healthy and pathological behaviours. The programme teaches adolescents to identify warning signs of mental illnesses and DSH risks, as well as to demystify taboos and false beliefs about mental illness and DSH. This is done in order to reduce the stigma associated with mental health, and therefore promotes appropriate help-seeking behaviours;
(ii) Skills training interventions, designed to enhance protective factors against deliberate self-harm. These interventions facilitate the development of

self-awareness of emotions, mentalisation, problem-solving abilities, adaptive coping strategies, decision-making skills, self-efficacy, emotional crisis regulation, communication skills, cognitive abilities, stress management and relaxation techniques, among other skills. These interventions focus on addressing the areas in which DSH adolescents typically experience the greatest challenges.

Thus, based on the findings of previous studies and the identified need for school-based universal prevention programmes for adolescent DSH, our study aims to develop, implement and evaluate a universal intervention programme, which we have named 'Healthy Minds', with 9th-grade adolescents at a school in the Lisbon area, with the purpose of:

(i) Reduce the prevalence of DSH;
(ii) Reduce levels of suicidal ideation;
(iii) Change beliefs about DSH;
(iv) Promote the ability to recognise the warning signs of adolescents at risk of DSH;
(v) Promote help-seeking behaviour among adolescents at risk.

Healthy Minds design combine psychoeducational, mental health awareness, and skills training components. Effectiveness of the intervention is tested using a quasi-experimental methodology, with intervention and control groups randomly selected from several 9th-grade classes. This study aims to address the lack of empirically validated universal prevention programmes for DSH, and to help fill the gaps in the literature by providing evidence on the effectiveness of DSH prevention programmes in school settings.

The implementation of Healthy Minds is expected to result in a reduction in DSH and suicidal ideation, a change in beliefs about DSH and an improvement in the ability to recognise the warning signs of DSH risk. Furthermore, the programme aspires to enhance mental health literacy, diminish the stigma associated with DSH, and consequently, to enhance help-seeking behaviours, thereby contributing to the reduction of DSH in adolescents.

Methods

Sample

The sample size was calculated to ensure the statistical power of the analyses that we intended to perform, with some margin, by predicting some associated experimental mortality in community samples (Marôco, 2011).

In this regard, before data collection, the sample size was calculated using G*power 3.1.9.2 software package based on the medium effect size ($f = .25$). A sample size of 28 adolescents was required for conducting a mixed ANOVA (2 groups × 3 moments) with a power of 0.80 and a significance at 0.05, assuming a non-sphericity correction ($\varepsilon = 1.0$).

A quasi-experimental study was conducted using a convenience sample from a single school in Lisbon, chosen for its availability for intervention. The study focused on 9th-grade classes, as DSH typically shows the highest prevalence around the age of 15 (Plener et al., 2018). In this study, there were 137 participants (51.1% male) aged from 13 to 17 ($M = 14.73$; SD = 1.03). Of these, three classes were part of the experimental group (EG; $n = 70$), and three classes were part of the control group (CG; $n = 67$).

The project's inclusion criteria were as follows: the school administration must agree to integrate it into the school's health education programme, show interest and willingness to participate, and the participants' parents/legal guardians must accept and authorise them to participate. The criteria for exclusion were absence of assurance of project completion for the entire academic year, rejection of the informed consent document by parents/guardians or participants, and rejection of the consent document by participants.

The study began with 137 participants, with the number decreasing to 132 at the second assessment point and to 126 at the third. This resulted in a total mortality of 11 participants over the course of the study. This reduction was due to participants missing one or more assessment points, leading to their exclusion from the analysis.

Measures

Sociodemographic Questionnaire

A brief sociodemographic questionnaire was developed to characterise the participants. The questionnaire included questions about the participants' gender, age, nationality, and familial typology.

Deliberate Self-harm

DSH was measured using the Portuguese version of the Inventory of Deliberate Self-Harm Behaviours (ICAL; Duarte et al., 2019) This self-report inventory assesses the lifetime frequency of 13 DSH behaviours, with and without suicidal intent, such as 'cutting' or 'biting', assessed through a four-option response: '*No*'; '*Yes, one time*'; '*Yes, 2 to 10 times*'; and '*Yes, more than 10 times*' (Duarte et al., 2019).

In the present study, the global inventory showed good internal consistency at the three moments of assessment (Cronbach' αs > .82) based on DeVellis criteria (1991).

Suicidal Ideation

Suicidal ideation (SI) was measured through the Portuguese version of the Suicidal Ideation Questionnaire (SIQ; Ferreira & Castela, 1999). The SIQ is a unidimensional self-report measure designed to assess the severity of suicidal thoughts in adolescents and adults. The scale comprises 30 items, such as 'I thought about committing suicide' and 'I thought about death' evaluated on a 7-point Likert response scale ranging from 0 (*I never thought about it*) to 6 (*almost every day*) with higher scores indicating greater severity of suicidal ideation, and a maximum score of 180 indicating almost daily suicidal ideation.

In this study, the reliability of the instrument was considered excellent at all moments of assessment (Cronbach' $\alpha s > .97$).

Beliefs About Deliberate Self-harm

Beliefs about suicidal acts (BSA) were measured with the Beliefs on Suicidal Acts Inventory (BSAI; Brás, 2013). The BSAI is a self-report measure designed to assess the degree of agreement with different types of false beliefs that can interfere negatively with the prevention of suicidal acts. The BSAI comprises 22 items such as: 'Suicidal acts take place without previous warning' and 'Suicidal acts are always to attract attention' evaluated on a 5-point Likert response scale ranging from 1 (*Totally disagree*) to 5 (*Totally agree)*. This inventory comprises 4 subscales, but in this study, only the global score of the scale was considered.

In the present study, this measure showed adequate reliability (Cronbach' $\alpha s > .70$) at all assessment moments.

Warning Signs Recognition for Suicidal Acts

The recognition of warning signs for suicidal acts was assessed using the Warning Signs Recognition for Suicidal Acts Inventory (WSSAI, Brás et al., 2017).

The WSSAI comprises 23 items such as: 'I talk frequently about suicidal acts' evaluated on a 5-point Likert response scale ranging from 1 (*Totally disagree*) to 5 (*Totally agree*). This inventory comprises three dimensions, but in this study, only the global score of the scale was considered.

In the present study, this measure indicated excellent reliability (Cronbach' $\alpha s > .94$) at all assessment moments.

Seek for Help

At the pre-intervention moment, help-seeking was assessed using a single-item question: 'Have you ever asked a psychologist, psychiatrist or a doctor for help with your emotional problems?' (*Yes/no*).

At the time of the intervention and at follow-up, a modified version of the item was presented: 'Have you ever asked a psychologist, psychiatrist or a doctor for help with your emotional problems, since the previous assessment?' (*Yes/no*).

Procedures and Ethical Questions

This study was approved by the Ethics Committee of the Ispa—Instituto Universitário, on January 2022. Subsequently, it was registered with the National Data Protection Commission (CNPD) and the School Survey Monitoring Office (MIME) of the General Directorate of Education of the Ministry of Education.

In collaboration with the school management, this programme was included in the School Health Activity Plan, based on the guidelines of the National School Health Plan (PNSE) 2015. Six 9th-grade classes were randomly selected and assigned to one of the groups (experimental or control).

All participants' parents/guardians receive an active, informed consent form via the schools, and all pupils signed an active, informed consent form. All participants were assured of anonymity, confidentiality of data, the voluntary nature of their participation, and their right to ask for clarification or to withdraw from the study at any time without consequence.

Due to the nature of this study and the sensitivity of the content covered, special ethical care was taken throughout the research project. Specifically, a network of collaborators was established in the school prior to the start of the project, involving the school counselling and psychological service (SPG). The school health team and the health centre in the area of the school, as well as raising awareness among parents and guardians, so that any participant at risk on any of the variables assessed was monitored and, if necessary, referred to specialist services, which were also partners in the project. This intended to ensure the principle of 'do no harm'.

Regarding the experimental group, given the sensitivity of the content covered, it was anticipated that the number of reported cases would increase at an intermediate stage of the intervention. Consequently, an additional precaution was taken to define, a priori, a referral and support network for the cases identified, as previously mentioned. In this context, participants who recognise their own need for assistance during the intervention are encouraged to seek immediate help from the school psychologist, who addressed any cases that arise during the intervention. Alternatively, participants may contact a mental health professional, as detailed in the information booklet provided.

To ensure the integrity of the study, the control group received minimal intervention in the form of educational posters with information on where to seek help. In addition, the control group received a booklet summarising the core content covered during the EG intervention, including key concepts to be retained and guidance on where to seek further support. Furthermore, the control group was able to benefit from the existing support network within the school.

Intervention Design with Adolescents

The Healthy Minds is a programme, inspired, among others, by the Youth Aware of Mental Health (YAM) programme (Wasserman et al., 2012) and combines specific psychoeducational component, and emotional skills training.

The EG benefited from 8 classroom sessions of 45 min each, led by the research team. It consisted of 5 sessions of interactive workshops combined with a psychoeducational component, training in emotional regulation skills through group activities, and 3 sessions of participant evaluation.

Thus, the content of this intervention was as follows:

Session 1: Baseline assessment of all variables in study; group cohesion activity (skill training activities).

Session 2: Fighting the stigma on mental health (video); Awareness of anxiety, depression and suicidal thoughts through some cases with famous people on the video (debate); Self-diagnose of emotional state by filling the Hospital Anxiety and Depression Scale (HADS) (Pais-Ribeiro et al., 2007) adapted online, with immediate results. Participants identified as at risk were referred to the psychological services provided by the project (psychoeducational activities).

Session 3: Awareness of impulsivity, errors and consequences; awareness of emotional state; emotional regulation techniques including mindfulness (skill training activities).

Session 4: Management and self-control of negative emotions (anger and frustration), problem-solving strategies and techniques, mindfulness training (skill training activities).

Session 5: Self-awareness of positive emotions (being loved; happy moments in life), awareness of the reasons for living, mindfulness training (skill training activities).

Session 6: Truths and myths about DSH; identification and recognition of warning signs of suicidal risk (psychoeducational activities).

Session 7: Adaptive and non-adaptive attitudes to the prevention of suicidal behaviour; participants' assessment after intervention (psychoeducational activities).

Session 8: Follow-up assessment.

To consolidate the information worked on during the sessions and as an additional preventive tool, a booklet was also developed, summarising all the key content covered during the intervention with key concepts to remember and places to ask for help. This booklet was given to all participants at the end of the intervention as a manual/guide for future suicide prevention support.

The intervention was based on active methodologies, which included video screenings, debates, case studies, psychoeducational activities and skills training exercises.

The methods chosen encouraged and empowered adolescents, under the supervision of an experienced facilitator, to reflect on and rehearse some of the conflicting issues or feelings they experience in their everyday life (with parents, peers, teachers, and so on), and to acquire skills for resolving them.

For ethical reasons, the control group also received the aforementioned booklet at the end of the programme, which contained all the information and content that had been worked on in the experimental group, as well as places to go for help.

In order to assess the impact of the intervention on the participants, we developed a questionnaire with the instruments that assessed the variables under study (see description in the Measures section) at three times points: at the beginning of the intervention (pre-test), immediately after the intervention (post-test) and 3 months after the intervention (follow-up).

Data Preparation and Statistical Analysis

Prior to statistical analysis, missing values were identified and analysed. The percentage of missing data ranged from 2.5% (pre-intervention) to 17.5% (post-intervention). Missing data were completely at random (Little's MCAR tests with $p > .05$). These missing values were imputed using the expectation maximisation (EM) algorithm in which values were estimated by regression methods based on means and covariances of available data (Enders, 2003). Statistical analyses were performed as follows: (1) mean and standard deviation for each instrument's score were calculated for each assessment moments across groups; (2) t tests for equal or unequal variances (Welch-Satterthwaite) and chi-square of association tests were carried out to examine potential confounders (sociodemographic and clinical variables) among the experimental groups (experimental vs. control); (3) a three moment (pre vs. post vs. follow-up) x two groups (control vs. experimental) mixed ANOVAs were performed to assess the effect of the intervention on DSH, SI, BSA and WSSA scores between groups (experimental vs. control); (3) A generalised estimating equations (GEE) were performed in order to examine whether the percentage of adolescents who seek for an appointment with a psychologist or a psychiatrist varied across moments. The GEE presents the advantage that does not require the outcome variable to have a particular distribution (Cosme et al., 2021; Rosa et al., 2020; Ziegler & Vens, 2014). The GEE model used a

binomial probability distribution with a logit link function and an independent correlation structure, similar to logistic regression. This type of working correlation structure was preferred as the Correct Quasi-likelihood under the Independence model Criterion (QQIC) showed the lowest value (Cui & Qian, 2007; Rosa et al., 2019). The Wald test was used for inference and Greenhouse–Geisser corrections were applied to adjust degrees of freedom in mixed ANOVAs. Bonferroni adjustment was used to explore significant effects. All *p*-values correspond to two-sided tests, with a level of significance of 5%. Effect sizes were calculated and interpreted according to the guidelines proposed by Cohen (1988). All statistical analyses were carried out using IBM SPSS 28.

Results

Descriptive statistics

In the global sample, 41.6% of participants had experienced at least one episode of DSH over the course of their lives. This prevalence was observed to be 48.9% among girls ($n=67$) and 38.6% among boys ($n=70$). Furthermore, it was observed that only a small minority of participants (11.2%) had sought or requested any form of healthcare assistance. It was also observed that a greater proportion of female participants (16.4%) had sought healthcare assistance compared to male participants (5.7%).

Table 1 displays the descriptive statistics for the instruments of interest at all moments of assessment between control and experimental group in adolescents.

Control for Confounding Factors

All sociodemographic and clinic variables were examined across groups to ensure that the intervention group was equivalent to control group in adolescents and therefore to control potential confounding factors. As shown in Table 2, the two groups were equivalent in respect of sociodemographic variables as well as clinical aspects. (all $p_s > .05$).

Effectiveness of the Intervention Programme

The results indicated a significant interaction effect of moment and group on *DSH scores* with a small effect size (see Table 3).

The simple effects analysis showed, in the intervention group, a reduction on *DSH scores* between the post-intervention assessment ($M=2.39$) and the follow-up ($M=1.54$; $t(57)=2.63$, $p=.029$, $d=1.81$). However, in the control group, a reduction on DSH scores was only found between the pre-intervention ($M=1.45$) and the post-intervention assessment ($M=0.71$; $t(64)=3.57$, $p=.001$, $d=1.54$) as depicted in Fig. 1. A significant main effect of moment was also found.

The results also revealed a main effect of moment on BSA scores with a significant decrease in *scores of* BSA between the pre-intervention ($M=49.42$) and the post-intervention assessment ($M=46.10$, $p<.001$, $d=4.21$), regardless of the group.

Seek for a Consult with a Psychologist or a Psychiatrist

A logistic regression model was constructed using GEEs to examine the effect of moment and group on seeking behaviour for psychological or psychiatric consultation. Only the adolescents who never had a psychological or psychiatric consultation before pre-intervention were included in this analysis ($n=112$). We excluded adolescents who had a psychological or psychiatric consultation before pre-intervention from the analysis due to two main reasons: (1) adolescents without prior consultations provide a baseline for understanding initial/first-time help-seeking behaviours; (2) by gathering participants with similar background regarding mental health service utilisation, we reduced variability that could arise from differing

Table 1 Mean and standard deviation for the psychological instruments in the three moments of assessment

Variable	Pre-intervention		Post-intervention		Follow-up	
	CG	EG	CG	EG	CG	EG
	M (SD)	*M* (SD)	*M* (SD)	*M* (SD)	*M* (SD)	*M* (SD)
Deliberate self-harm	1.43 (2.48)	2.04 (4.59)	0.70 (2.48)	2.04 (5.29)	0.92 (1.92)	1.54 (3.97)
Suicidal ideation	14.39 (20.86)	18.90 (32.53)	13.05 (21.26)	15.94 (29.76)	11.90 (18.89)	16.45 (30.92)
Beliefs	47.90 (7.95)	51.86 (8.72)	45.95 (8.30)	45.88 (10.70)	45.50 (9.74)	46.98 (12.11)
Warning signs	74.99 (16.46)	75.53 (16.69)	77.75 (14.70)	76.99 (19.92)	77.23 (17.43)	77.41 (17.40)

CG Control group, *EG* Experimental group

Table 2 Potential sociodemographic and clinical confounding variables as a function of the groups (control vs intervention) in adolescents

Sociodemographic variables	Experimental group ($n=70$) % (n)	Control group ($n=67$) % (n)	χ^2
Sex			
Male	51.4 (36)	50.7 (34)	0.01^{ns}
Female	48.4 (34)	49.3(33)	
Nationality			
Portuguese	81.4 (57)	86.6 (58)	3.57^{ns}
African country	7.1 (5)	9.0 (6)	
Brazilian	4.3 (3)	3.0 (2)	
Eastern European Countries	2.9 (2)	1.5 (1)	
Other	4.3 (3)	0.0 (0)	
Who she/he lives with?			
Mother, father, and brothers/sisters	39.1 (27)	38.8 (26)	3.20^{ns}
Mother and father	8.7 (6)	14.9 (10)	
Mother and brothers/sisters	18.8 (13)	19.4 (13)	
Mother	7.2 (5)	7.5 (5)	
Fathers	1.4 (1)	1.5 (1)	
Mother, stepfather (with or without brothers/sisters)	10.1 (7)	6.0 (4)	
Father, stepmother (with or without brothers/sisters)	1.4 (1)	1.5 (1)	
Grandparents or other relatives	7.2 (5)	3.0 (2)	
Other	5.8 (4)	7.5 (5)	
Parents' civil status			
Married	50.7 (35)	58.2 (39)	0.84^{ns}
Divorced or separated	43.5 (30)	35.8 (24)	
Widow	18.8 (13)	19.4 (13)	
	M (SD)	M (SD)	t
Age	14.86 (1.18)	14.60 (0.82)	1.50^{ns}
Clinical variables (baseline)			
Deliberate self-harm	1.43 (2.48)	2.04 (4.59)	0.96^{ns}
Suicidal ideation	14.39 (20.86)	18.90 (32.53)	0.98^{ns}
Beliefs	47.90 (7.95)	51.86 (8.72)	0.75^{ns}
Warning signs	74.99 (16.46)	75.53 (16.69)	0.19^{ns}

M Mean, *SD* Standard deviation, χ^2 Pearson's Chi-squared test, *t* Student *t* test for independent samples, *ns* Non-statistically significant

past experiences with mental health services, thus enhancing the internal validity of the study.

A statistically significant effect of moment was found as shown in Table 4.

Results showed an adjusted OR = 24.80, suggesting that adolescents are almost 24.8 times more likely to seek a psychological or psychiatric consultation between pre-intervention and follow-up, regardless of the group, which is a large effect according to Cohen (1988). No other significant ORs were found between moments.

Discussion

The present study evaluated the effectiveness of a school-based universal preventive programme (Healthy Minds) on reducing DSH and suicidal ideation, promoting knowledge about beliefs of DSH, promoting the ability to recognise the warning signs of DSH and promoting help-seeking by participants.

Table 3 Inferential statistics for all the variables of interest in adolescents

Variable	*F*	*df*	*p*	η_p^2
DSH				
Moment	4.96	1.68	.012*	.04
Group	2.88	1.00	.092	.02
Moment*group	3.87	1.68	.029*	.03
SI				
Moment	1.49	1.94	.228	.01
Group	0.93	1.00	.337	.01
Moment*group	0.18	1.94	.823	.00
BSA				
Moment	11.40	1.84	< .001***	.09
Group	1.73	1.00	.191	.01
Moment*group	2.43	1.84	.094	.02
WSSA				
Moment	1.20	1.99	.302	.01
Group	0.00	1.00	.996	.00
Moment*group	0.09	1.99	.910	.00

F, ANOVAS with repeated measurements; *df*, Degrees of freedom; η^2, Effect dimension Eta^2; DSH, Deliberate self-harm; SI, Suicidal ideation; BSA, Beliefs on suicidal acts; WSSA, Warning signs recognition for suicidal acts

*$p < .05$; **$p < .01$; ***$p < .001$

In the overall sample, prior to the intervention, over 40% of the participants had already experienced at least one episode of DSH in their lifetime. These results corroborate a markedly elevated prevalence of DSH among adolescents in the community, in accordance with other national studies in community-based samples (Duarte et al., 2020) and international studies (Gillies et al., 2018; Heath et al., 2014; Plener et al., 2018). This evidence supports the World Health Organization (2020a) assertion that DSH represents a significant public health concern.

Table 4 Results for the GEE model ($n = 112$)

Variable	Wald χ^2	*df*	*p*
Group	0.30	1	.583
Moment	35.28	2	< .001*
Moment*intervention group	2.57	2	.277

The results indicated that the prevalence of DSH was higher in girls than boys, in accordance with the findings of other studies (e.g. Duarte et al., 2019; Guerreiro et al., 2017; Westers, 2023). It is also worth noting that of all the participants, only a small minority had sought or asked for help from a health professional before the intervention. These findings are consistent with previous studies confirming low help-seeking among adolescents with DSH, which is a significant barrier to early identification and prevention of these behaviours (Guerreiro et al., 2017; Wasserman, 2019; Wei et al., 2017). One potential explanation for this phenomenon is the stigma associated with mental illness and the low levels of mental health literacy among adolescents, as highlighted in the literature (Direcção Geral de Saúde, 2013; Waqas et al., 2020; Wei et al., 2017).

In terms of the intervention programme's effectiveness, the results showed that the intervention was only partially successful in reducing DSH, with different patterns of change over time across groups. In the intervention group, the DSH score significantly decreased from

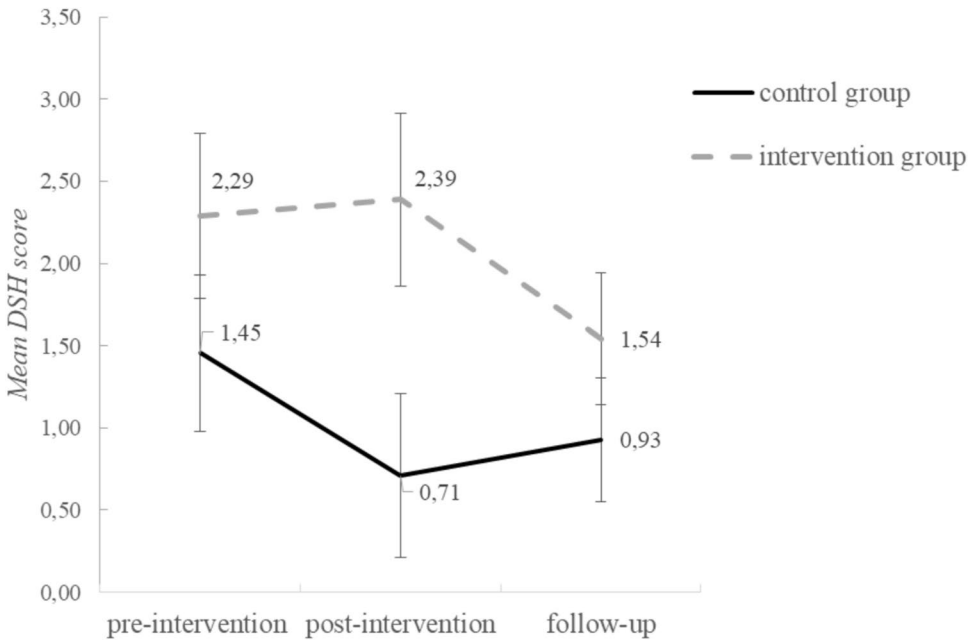

Fig. 1 DSH scores as a function of moment and group. Error bars represent the standard error of the mean

post-intervention moment to follow-up moment, but not between pre-intervention and post-intervention, suggesting that the effects of the intervention may manifest over time rather than immediately. This delayed effect can be attributed to a number of factors, including the duration of the intervention and the nature of the therapeutic processes involved (Kazdin, 2007). It is possible that some interventions may necessitate an interval of time for participants to internalise and apply the skills acquired, which could result in a delayed impact, or a 'sleeper effect', where the full benefit of the intervention may only become apparent after a period of time has elapsed following the conclusion of the treatment. (Flückiger & Del Re, 2017). Moreover, a brief intervention such as our may not allow sufficient time for participants to fully grasp and integrate the skills training, resulting in delayed observable benefits.

Our findings are in accordance with those of the YAM programme (Wasserman et al., 2012), which similarly demonstrated delayed therapeutic effects. Although participants in the YAM programme exhibited initial enhancements in their mental health literacy and attitudes within a 5-week period following the intervention, the most substantial outcomes, such as a reduction in suicidal ideation and suicide attempts, only became apparent 12 months later. This suggests that short-term psychoeducational and skills training interventions may require a longer period of time for their full benefits to manifest, as participants gradually internalise and apply the skills and knowledge acquired. Similarly, this delayed effect may account for the reduction in DSH symptoms observed in the intervention programme.

In addition, it is noteworthy that a reduction in DSH scores was also observed in the control group. However, this reduction was only evident between the pre-intervention and post-intervention moments. Notably, this reduction was not sustained in the follow-up 3 months after the intervention. The observed changes in the control group may be attributed to external factors that are not specific to the intervention. In particular, the level of intimacy between the EG and CG participants may have influenced the outcome. As a convenience sample, both groups were drawn from the same school and were in the same year, which may have facilitated the sharing of information about the content of the sessions. Therefore, future research must endeavour to control for this effect.

Regarding suicidal ideation, no statistically significant differences were observed between the three phases of the intervention. This finding is consistent with the delayed effects observed for DSH reduction and supports the notion that therapeutic benefits may take longer to become apparent. As previously discussed, complex interventions often require time for participants to process and integrate newly acquired skills, resulting in observable changes only after a longer period of time (Flückiger & Del Re, 2017). This is consistent with the findings from the YAM programme, where a significant reduction in suicidal ideation was only observed at the 12-month follow-up. This underscores the need for extended follow-up periods to fully assess therapeutic effects, especially for complex outcomes like suicidal ideation. This underscores the need for extended follow-up periods to fully assess therapeutic effects, especially for complex outcomes like suicidal ideation.

The 'gateway' theory (Hamza et al., 2012), which describes a progression from non-suicidal self-harm to more severe suicidal behaviours, provides a valuable framework for interpreting the findings of this study. According to this theory, the significant reduction in deliberate self-harm observed in this study is likely to have played a significant role in preventing its escalation and averting the development of more severe suicidal behaviours. This interpretation is supported by evidence in the literature (Hamza et al., 2012; Singer et al., 2019; Zalsman, 2016).

Regarding the effect of the intervention on beliefs about DSH, the results showed a significant effect of the intervention in reducing false beliefs between the pre-and post-assessment, as expected. The results tend to be maintained at follow-up, referring to the first pre-intervention moment. Results are in line with those obtained by Brás (2013) and Portzky and Van Heeringen (2006). However, it is noteworthy that similar changes were also observed within the control group, which was not expected, and contrary to what was observed by Brás (2013). This result, which was previously observed in relation to the DSH, may be due to the extent of information sharing that occurred between the experimental and control groups, due to their close proximity within the same school setting. This factor highlights the challenges of isolating the direct effects of the intervention in such closely linked cohorts.

The fact that the intervention did not significantly improve the recognition of warning signs of suicidal acts may be linked to adolescents' difficulty in identifying subtle risk signs in themselves and others. Studies indicate that adolescents are better at recognising more explicit signs of psychological distress, such as direct verbalisations about suicide or self-harm, but struggle with indirect or subtle signs (Gaspar et al., 2018; Simões et al., 2021). The literature suggests that the ability to recognise warning signs for suicidal and deliberate self-harming behaviours requires experience and ongoing training, proving more effective when applied to trained adults, such as teachers and health professionals, rather than to the adolescents themselves (Wasserman et al., 2015; McPherson et al., 2021; Pierret et al., 2022). Therefore, adolescents' effective recognition of these signs may require more prolonged contact with the subject and opportunities for practice and reflection.

Regarding the impact of the intervention on participants' intention to seek specialist help, there was a significant

increase in their willingness to seek psychological or psychiatric support observed across both groups. This finding may be in part explained by the dynamics within the control group, as even minimal interventions, such as the provision of standard mental health information, can have a positive impact on help-seeking behaviour. Previous research supports this notion, showing that exposure to basic mental health information to control groups can positively influence help-seeking behaviours (Gulliver et al., 2010).

These findings align with previous studies, including those conducted by Wasserman et al. (2012) and Waqas et al. (2020), which highlighted the positive impact of interventions on adolescents' willingness to seek professional help for mental health problems. This effect can be attributed to an increase in mental health literacy and a reduction in the stigma associated with seeking help—key factors in promoting help-seeking behaviour among adolescents (Waqas et al., 2020; Wasserman et al., 2015; Wei et al., 2017).

Collectively, these outcomes highlight the partial success of the intervention programme in reducing DSH and promoting help-seeking while indicating areas for refinement to better address suicidal ideation, recognition of warning signs, and intervention-specific contributions to help-seeking behaviour. Furthermore, there was a noteworthy increase in participants' propensity to seek professional help, observed in both the experimental and control groups. This suggests a broader reduction in the stigma associated with mental health and a general improvement in adolescents' mental health literacy, likely influenced not only by the exposure to mental health-related information provided to all participants, but also by the proximity between the two groups.

Strengths, Limitations and Future Direction

This study has a number of important strengths. One of the main strengths of this study is its robust methodology, which includes a quasi-experimental design with experimental and control groups and assessments at multiple time points (pre-intervention, post-intervention and follow-up). The inclusion of multiple assessment points allows not only the immediate impact of the programme to be analysed, but also its long-term effectiveness, which is crucial when evaluating intervention programmes. The use of validated psychometric instruments to measure DSH and suicidal ideation also strengthens the reliability of the data collected.

The trial's results provide strong evidence of its effectiveness, showing a partial reduction in the prevalence of DSH in the intervention group, a decrease in false beliefs about DSH, and a significant boost in help-seeking behaviour. These effects were sustained over the follow-up period, indicating the long-term effectiveness of the programme. For these reasons, this universal school-based intervention for adolescents appears to be a potentially effective programme for the prevention of DSH in adolescents.

However, it is important to acknowledge several limitations of this study. Firstly, the sample was not randomly selected from the Portuguese population but was instead a convenience sample from a single school, which limits the generalisability of the findings. In order to overcome this limitation, it is recommended that future research includes a more diverse range of schools and adopts a randomised controlled trial design. This would enhance the representativeness of the sample and ensure more robust and reliable outcomes. The proximity of participants in the intervention and control groups may have resulted in cross-contamination, potentially diluting the distinct effects of the intervention. In order to mitigate the influence of social connections between participants, it is recommended that future research employ multiple schools in the study design.

The follow-up period of 3 months may not have been sufficient to capture sustained or delayed changes in attitudes, knowledge, and behaviours. Variables such as DSH and suicidal ideation might require longer observation periods to fully reflect the effects of the intervention. In future studies, the incorporation of extended and more frequent follow-ups is recommended in order to facilitate more comprehensive evaluation of long-term outcomes. Furthermore, the provision of information on how to seek help to the control group could have influenced the observed increase in help-seeking behaviours in both groups. While this approach was ethically sound, it is plausible that it introduced a confounding factor. In future research, the employment of neutral or waitlist control groups could prove beneficial in more effectively isolating the effects of the intervention and minimising potential biases.

In view of the efficacy observed of early interventions and in consideration of the 'gateway' theory, it is recommended that future research explore how interventions vary in efficacy based on the severity of initial self-harming behaviour and to examine the underlying psychological and social mechanisms that facilitate the transition to more severe suicidal behaviours. This is essential for the development of more targeted and theoretically grounded interventions.

The reliance on self-report measures also poses a risk of bias due to social desirability and uncontrolled external influences, which may have affected the accuracy of responses. Incorporating validated and comprehensive scales, particularly for measuring help-seeking behaviours, would provide deeper insights and a more precise evaluation of intervention outcomes.

Furthermore, this study did not assess the social validity of the intervention, which could have provided valuable insights into its relevance, feasibility, and appropriateness. Assessing social validity is important for understanding how well the intervention meets participants' needs and

could inform future adaptations to enhance its effectiveness. Future research should include such measures to better evaluate its practical applicability. Finally, this study only captured data on binary gender identities (male and female), which limits inclusivity. Given that queer adolescents are at higher risk of DSH and suicidal ideation (Macedo et al., 2024), future research should include diverse gender identities to ensure a more inclusive analysis and to explore how interventions might differentially impact students of various gender identities. Expanding the scope in this way would support the development of more tailored and effective programmes.

Conclusion

This study evaluated the Healthy Minds programme, a universal school-based intervention designed to prevent DSH among adolescents. The results suggest that the programme has some efficacy in reducing DSH and related mental health issues, although the intervention only demonstrated a delayed reduction in DSH within the intervention group, and immediate effects were limited. This highlights the necessity for extended follow-up periods to fully assess its benefits. The programme effectively reduced false beliefs about DSH, highlighting the value of psychoeducation in improving mental health awareness.

One of the most encouraging findings was the significant increase in participants' willingness to seek professional psychological or psychiatric help in both groups, suggesting an overall improvement in mental health literacy and a reduction in the stigma associated with seeking help. However, the lack of significant effects on suicidal ideation and the limited differentiation between experimental and control groups highlight areas for improvement, such as refining the structure of the intervention and addressing potential information sharing between groups.

These findings highlight the value of psychoeducational interventions in raising awareness and reducing stigma associated with mental health issues in adolescents. They reinforce the importance of structured, school-based programmes with robust methodologies to address and prevent DSH effectively. To enhance its impact, future iterations of the Healthy Minds programme should adopt a more integrated and multifaceted approach, extend follow-up periods, and refine its structure to maximise its effectiveness and sustainability within school settings.

Data Availability The datasets generated during and/or analysed during the current study are available from the corresponding author on reasonable request.

Declarations

Conflict of interest The authors declare that they have no conflict of interest.

Ethics Approval All procedures performed involving human participants were in accordance with the ethical standards of the institutional and national research committee and with the 1964 Helsinki declaration and its latter amendments or comparable ethical standards. This study was approved by the Ethics Committee of the Ispa—Instituto Universitário and was registered with the National Data Protection Commission (CNPD) and the School Survey Monitoring Office (MIME) of the General Directorate of Education of the Ministry of Education.

Informed Consent Informed consent from all participants in this study was obtained.

References

Baetens, I., Decruy, C., Vatandoost, S., Vanderhaegen, B., & Kiekens, G. (2020). School-based prevention targeting non-suicidal self-injury: A pilot study. *Frontiers in Psychiatry*. https://doi.org/10.3389/fpsyt.2020.00437

Barzilay, S., Apter, A., Snir, A., Carli, V., Hoven, C. W., Sarchiapone, M., & Wasserman, D. (2019). A longitudinal examination of the interpersonal theory of suicide and effects of school-based suicide prevention interventions in a multinational study of adolescents. *Journal of Child Psychology and Psychiatry, 60*(10), 1104–1111. https://doi.org/10.1111/jcpp.13119

Bem, D., Connor, C., Palmer, C., Channa, S., & Birchwood, M. (2017). Frequency and preventative interventions for non-suicidal self-injury and suicidal behaviour in primary school-age children: A scoping review protocol. *British Medical Journal Open, 7*(7), e017291. https://doi.org/10.1136/bmjopen-2017-017291

Brás, M. (2013). *Condutas Suicidas: Vulnerabilidade e Prevenção em Adolescentes* [Tese de Doutoramento, Universidade do Algarve].

Brás, M., Carmo, C., & de Jesus, S. N. (2017). Estudo das Propriedades Psicométricas do Inventário de Reconhecimento de Sinais de Alerta para Atos Suicidas *Revista Iberoamericana de Diagnóstico y Evaluación*. *Psicologica, 43*(1), 89–105. https://doi.org/10.21865/RIDEP43_89

Brás, M., & Santos, J. C. (2014). Prevenção do suicídio em meio escolar. In C. B. Saraiva, B. Peixoto, & D. Sampaio (Eds.), *Suicídio e Comportamentos Autolesivos. Dos conceitos à prática clínica.* Lidel.

Bürger, A., von Schoenfeld, C., Scheiner, C., Seidel, A., Wasserscheid, A., Gad, D., & Reiter, A. M. F. (2023). Universal prevention for non-suicidal self-injury in adolescents is scarce—A systematic review. *Frontiers in Psychiatry, 14*, 1130610. https://doi.org/10.3389/fpsyt.2023.1130610

Carvalho, Á., Peixoto, B., Saraiva, C., Sampaio, D., Amaro, F., Jorge, C., & Santos, N. (2013). *Plano Nacional de Prevenção do Suicídio 2013/2017*. Direcção Geral de Saúde.

Cipriano, A., Aprea, C., Bellone, L., Cotrufo, P., & Cella, S. (2022). Non-suicidal self-injury: A school-based peer education program for adolescents during COVID-19 pandemic. *Frontiers in Psychiatry*. https://doi.org/10.3389/fpsyt.2021.737544

Cohen, J. (1988). *Statistical power analysis for the behavioral sciences*. L. Erlbaum Associates.

Cosme, G., Rosa, P. J., Lima, C. F., Tavares, V., Scott, S., Chen, S., & Prata, D. (2021). Pupil dilation reflects the authenticity of received nonverbal vocalizations. *Scientific Reports, 11*(1), 1–14. https://doi.org/10.1038/s41598-021-83070-x

Cui, J., & Qian, G. (2007). Selection of working correlation structure and best model in GEE analyses of longitudinal data. *Communications in Statistics: Simulation & Computation, 36*(5), 987–996. https://doi.org/10.1080/03610910701539617

De Riggi, M. E., Moumne, S., Heath, N. L., & Lewis, S. P. (2017). Non-suicidal self-injury in our schools: A review and research-informed guidelines for school mental health professionals. *Canadian Journal of School Psychology, 32*(2), 122–143.

DeVellis, R. F. (1991). *Scale development: Theory and applications*. Sage Publications, Inc.

Direcção Geral de Saúde. (2013). *Plano Nacional de Prevenção do Suicídio (2013/2017)—Programa Nacional Para a Saúde Mental*. Direcção Geral de Saúde.

Duarte, E., Gouveia-Pereira, M., & Gomes, H. S. (2019). Development and factorial validation of the inventory of deliberate self-harm behaviours for portuguese adolescents. *Psychiatric Quarterly, 90*, 761–776. https://doi.org/10.1007/s11126-019-09660-1

Duarte, T. A., Paulino, S., Almeida, C., Gomes, H. S., Santos, N., & Gouveia-Pereira, M. (2020). Self-harm as a predisposition for suicide attempts: A study of adolescents' deliberate self-harm, suicidal ideation, and suicide attempts. *Psychiatry Research*. https://doi.org/10.1016/j.psychres.2019.112553

Enders, C. K. (2003). Using the expectation maximization algorithm to estimate coefficient alpha for scales with item-level missing data. *Psychological Methods, 8*(3), 322–337. https://doi.org/10.1037/1082-989X.8.3.322

Ferreira, J. A., & Castela, M. C. (1999). Questionário de ideação suicida (Q.I.S). In M. Simões, M. Gonçalves, & L. S. Almeida (Eds.), *Testes e provas psicológicas em Portugal* (Vol. 2, pp. 123–130). Sistemas Humanos e Organizacionais, Lda.

Flückiger, C., & Del Re, A. C. (2017). The sleeper effect between psychotherapy orientations: A strategic argument of sustainability of treatment effects at follow-up. *Epidemiology and Psychiatric Sciences, 26*(4), 442–444. https://doi.org/10.1017/S2045796016000780

Gaspar, T., Cerqueira, A., Branquinho, C., & Matos, M. G. (2018). The effect of a social-emotional school-based intervention upon social and personal skills in children and adolescents. *Journal of Education and Learning, 7*(6), 57–66.

Gillies, D., Christou, M. A., Dixon, A. C., Featherston, O. J., Rapti, I., Garcia-Anguita, A., & Christou, P. A. (2018). Prevalence and characteristics of self-harm in adolescents: Meta-analyses of community-based studies 1990–2015. *Journal of the American Academy of Child & Adolescent Psychiatry, 57*(10), 733–741. https://doi.org/10.1016/j.jaac.2018.06.018

Gordon, R. (1987). An operational classification of disease prevention. In J. A. Steinberg & M. M. Silverman (Eds.), *Preventing mental disorders: A research perspective* (pp. 20–26). National Institute of Mental Health.

Grandclerc, S., De Labrouhe, D., Spodenkiewicz, M., Lachal, J., & Moro, M.-R. (2016). Relations between nonsuicidal self-injury and suicidal behavior in adolescence: A systematic review. *PLoS ONE, 11*(4), 1–15. https://doi.org/10.1371/journal.pone.0153760

Guerreiro, D. F., Sampaio, D., Figueira, M. L., & Madge, N. (2017). Self-harm in adolescents: A self-report survey in schools from Lisbon. *Portugal. Archives of Suicide Research, 21*(1), 83–99. https://doi.org/10.1080/13811118.2015.1004480

Gulliver, A., Griffiths, K., & Christensen, H. (2010). Perceived barriers and facilitators to mental health help-seeking in young people: A systematic review. *BMC Psychiatry, 10*, 113. https://doi.org/10.1186/1471-244X-10-113

Hamza, C., Stewart, S., & Willoughby, T. (2012). Examining the link between nonsuicidal self-injury and suicidal behavior: A review of the literature and an integrated model. *Clinical Psychology Review, 32*, 482–495. https://doi.org/10.1016/j.cpr.2012.05.003

Hawton, K., Saunders, K., & O'Connor, R. (2012). Self-harm and suicide in adolescents. *The Lancet, 379*(9834), 2373–2382. https://doi.org/10.1016/s0140-6736(12)60322-5

Heath, N. L., Toste, J. R., & MacPhee, S.-D. (2014). Prevention of nonsuicidal self-injury. In M. K. Nock (Ed.), *The Oxford handbook of suicide and self-injury* (pp. 397–408). Oxford University Press. https://doi.org/10.1093/oxfordhb/9780195388565.013.0022

Joiner, T. E., Jr., & Silva, C. (2012). Why people die by suicide: Further development and tests of the interpersonal-psychological theory of suicidal behavior. In P. R. Shaver & M. Mikulincer (Eds.), *Meaning, mortality, and choice: The social psychology of existential concerns* (pp. 325–336). American Psychological Association. https://doi.org/10.1037/13748-018

Kazdin, A. E. (2007). Mediators and mechanisms of change in psychotherapy research. *Annual Review of Clinical Psychology, 3*, 1–27. https://doi.org/10.1146/annurev.clinpsy.3.022806.091432

Macedo, D., McEvoy, M., Crowley, T., Loughhead, M., & Procter, N. (2024). Self-harm and suicidality among trans and gender diverse youth from culturally and linguistically diverse backgrounds—A scoping review. *International Journal of Mental Health Nursing, 33*(4), 781–796. https://doi.org/10.1111/inm.13291

Marôco, J. (2011). *Análise estatística com o SPSS statistics* (5ª ed.). Report Number

McPherson, P., Lloyd-Evans, B., Dalton-Locke, C., & Killaspy, H. (2021). A systematic review of the characteristics and efficacy of recovery training for mental health staff: Implications for supported accommodation services. *Frontiers in Psychiatry, 12*. https://doi.org/10.3389/fpsyt.2021.624081

Muehlenkamp, J. J., Walsh, B. W., & McDade, M. (2010). Preventing non-suicidal self-injury in adolescents: The signs of self-injury program. *Journal of Youth & Adolescence, 39*(3), 306–314. https://doi.org/10.1007/s10964-009-9450-8

Nock, M. (2010). Self-injury. *Annual Review of Clinical Psychology, 6*, 339–363. https://doi.org/10.1146/annurev.clinpsy.121208.131258

Pais-Ribeiro, J., Silva, I., Ferreira, T., Martins, A., Meneses, R., & Baltar, M. (2007). Validation study of a Portuguese version of the Hospital Anxiety and Depression Scale. *Psychology, Health & Medicine, 12*(2), 225–235. https://doi.org/10.1080/13548500500524088

Pierret, A. C. S., Anderson, J. K., Ford, T. J., & Burn, A. M. (2022). Review: Education and training interventions, and support tools for school staff to adequately respond to young people who disclose self-harm—A systematic literature review of effectiveness, feasibility and acceptability. *Child and Adolescent Mental Health, 27*(2), 161–172. https://doi.org/10.1111/camh.12436

Plener, P. L., Kaess, M., Schmahl, C., Pollak, S., Fegert, J. M., & Brown, R. C. (2018). Nonsuicidal self-injury in adolescents. *Deutsches Arzteblatt International, 115*(3), 23–30. https://doi.org/10.3238/arztebl.2018.0023

Portzky, G., & Van Heeringen, K. (2006). Suicide prevention in adolescents: A controlled study of the effectiveness of a school-based psycho-educational program. *Journal of Child Psychology and Psychiatry, 47*(9), 910–918. https://doi.org/10.1111/j.1469-7610.2006.01595.x

Rosa, P. J., Lopes, P., Oliveira, J., & Pascoal, P. (2019). Does length really matter? Effects of number of pages in the informed consent on reading behavior: An eye-tracking study. In H. M. Fardoun, A. A. M. Hassan, & M. E. de la Guía (Eds.), *New technologies to improve patient rehabilitation*.

Rosa, P. J., Luz, F., Júnior, R., Oliveira, J., Morais, D., & Gamito, P. (2020). Adaptive Non-Immersive VR Environment for Eliciting Fear of Cockroaches: A Physiology-Driven Approach Combined with 3D-TV Exposure. *International Journal of Psychological Research, 13*(2), 99–108. https://doi.org/10.21500/20112084.4670

Santos, J. C., Pedro Erse, M., Simões, R., Façanha, J., & Marques, L. (2013). + Contigo: Mental Health promotion and prevention of

suicidal behaviours within the educational community. *Revista de Enfermagem, 10*, 203–207. https://doi.org/10.12707/riii13121

Simões, C., Santos, A. C., Lebre, P., Daniel, J. R., Branquinho, C., Gaspar, T., & de Matos, M. G. (2021). Assessing the impact of the European resilience curriculum in preschool, early and late primary school children. *School Psychology International, 42*(5), 539–566. https://doi.org/10.1177/01430343211025075

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. https://doi.org/10.1007/s12310-018-9245-8

Waqas, A., Malik, S., Fida, A., Abbas, N., Mian, N., Miryala, S., & Naveed, S. (2020). Interventions to reduce stigma related to mental illnesses in educational institutes: a systematic review. *Psychiatric Quarterly, 91*(3), 887–903. https://doi.org/10.1007/s11126-020-09751-4

Wasserman, C., Hoven, C., Wasserman, D., Carli, V., Sarchiapone, M., Al-Halab, S., & Klug, K. (2012). Suicide prevention for youth—A mental health awareness program: Lessons learned from the Saving and Empowering Young Lives in Europe (SEYLE) intervention study. *BMC Public Health, 12*(1), 1–11. https://doi.org/10.1186/1471-2458-12-776

Wasserman, D. (2016). Review of health and risk-behaviours, mental health problems and suicidal behaviours in young Europeans on the basis of the results from the EU-funded Saving and Empowering Young Lives in Europe (SEYLE) study. *Psychiatria Polska, 50*(6), 1093–1107. https://doi.org/10.12740/PP/66954

Wasserman, D. (2019). Difficulties in preventing suicidal behaviours in spite of existing evidence-based preventive methods—An overview. *Archives of Psychiatry & Psychotherapy, 21*(1), 7–12. https://doi.org/10.12740/APP/104408

Wasserman, D., Hoven, C. W., Wasserman, C., Wall, M., Eisenberg, R., Hadlaczky, G., & Carli, V. (2015). School-based suicide prevention programmes: The SEYLE cluster-randomised, controlled trial. *The Lancet, 385*(9977), 1536–1544. https://doi.org/10.1016/S0140-6736(14)61213-7

Wei, Y., McGrath, P. J., Hayden, J., & Kutcher, S. (2017). Measurement properties of mental health literacy tools measuring help-seeking: A systematic review. *Journal of Mental Health, 26*(6), 543–555. https://doi.org/10.1080/09638237.2016.1276532

Westers, N. (2019). Not a fad: Nonsuicidal self-injury and suicide attempts. *Clinical Child Psychology and Psychiatry, 24*, 653–657. https://doi.org/10.1177/1359104519873496

Westers, N. J. (2023). Nonsuicidal self-injury in children and adolescents. In *Handbook of clinical child psychology: Integrating theory and research into practice*. (pp. 1087–1106). Springer. https://doi.org/10.1007/978-3-031-24926-6_50

Whitlock, J., Muehlenkamp, J., Eckenrode, J., Purington, A., Baral Abrams, G., Barreira, P., & Kress, V. (2013). Nonsuicidal self-injury as a gateway to suicide in young adults. *Journal of Adolescent Health, 52*(4), 486–492. https://doi.org/10.1016/j.jadohealth.2012.09.010

World Health Organization. (2020a, 13/09/2023). *Suicide data*. Retrieved September 13, 2023, from https://www.who.int/mental_health/prevention/suicide/suicideprevent/en/

World Health Organization. (2020b). *SUPRE prevention of suicidal behaviours: A task for all*. Retrieved October 01, 2022, from https://www.who.int/mental_health/prevention/suicide/information/en/

Zalsman, G., Hawton, K., Wasserman, D., van Heeringen, K., Arensman, E., Sarchiapone, M., & Zohar, J. (2016). Suicide prevention strategies revisited: 10-year systematic review. *The Lancet Psychiatry, 3*(7), 646–659. https://doi.org/10.1016/s2215-0366(16)30030-x

Ziegler, A., & Vens, M. (2014). Generalized estimating equations. In W. Ahrens & I. Pigeot (Eds.), *Handbook of epidemiology* (pp. 1337–1376). Springer. https://doi.org/10.1016/s2215-0366(16)30030-x