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Feasibility and Acceptability of the Multi-Modal Approach to Preventing Suicide in Schools (MAPSS) programme in England: A cluster-randomised controlled trial

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Research Article

Keywords: suicide prevention, school-based interventions, adolescents, pilot study, mixed-methods

Posted Date: September 4th, 2026

DOI: https://doi.org/10.21203/rs.3.rs-9587948/v1

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Additional Declarations: No competing interests reported.

Abstract

Background

The Multi-Modal Approach to Preventing Suicide in Schools (MAPSS) was initially developed and trialled in Australia. It consists of universal, selective, and indicated components, with evidence to suggest it may improve help-seeking and reduce suicide ideation. However, cultural transferability of interventions cannot be assumed, and so we needed to establish whether it would be feasible to trial MAPSS in English schools.

Aim

To assess the feasibility of delivering the MAPSS intervention in English secondary schools, including the acceptability and safety of delivering MAPSS, the social validity of MAPSS, and the feasibility of a future large-scale efficacy trial. Secondary aims were to assess changes over time in mental health and wellbeing outcomes for students.

Method

A two-year cluster-randomised controlled trial (RCT) design was conducted. Schools (n = 6) were randomly assigned to implement MAPSS (n = 4) or continue their usual practice (UP) (n = 2). Participants were students (n = 887) in Year 10 (aged 14–15 years) attending participating schools. Quantitative data were collected from participants online at four timepoints (baseline, post-universal component, post-indicated component, one-year follow-up). Trial feasibility was assessed through monitoring of recruitment, attrition, missing data, participant engagement, acceptability of intervention components, and estimated change across time and variability in the primary outcome measures. Safety was assessed through the monitoring of adverse events.

Results

The progression criteria indicated strong feasibility for advancing MAPSS to a full effectiveness trial, with six of nine stop/go criteria fully achieved and three partially met but with solutions identified. The intervention was shown to be acceptable and safe, with no adverse events reported. Post-intervention, scores for suicidal ideation, depressive symptoms, and hopelessness in the MAPSS group were lower than in the control group, and help-seeking also improved in the MAPSS group.

Conclusion

All progression criteria were met or appropriate solutions were identified, supporting further evaluation of the intervention in a full-scale effectiveness trial. These findings add to the growing evidence base supporting the utility of multi-modal suicide prevention programmes in schools. MAPSS has potential as a school-based intervention for those struggling with suicidal thoughts and/or behaviours.

Registration:

The trial was pre-registered on clinicaltrials.gov (ISRCTN41891301) on 9th February 2024.

Introduction

Rates of suicidal crisis among children and young people (CYP) have been rising steadily, with adolescent suicide rates in the UK increasing by 7–9% per year since 2010 (1). The suicide rate among people aged under 20 years in England and Wales is currently 5.8 deaths per 100,000 population, representing a significant public health concern (2). Suicide prevention in CYP is central to the National Suicide Prevention Strategy (3) in the UK, with CYP identified as a priority group in the Government's recent 5-year suicide prevention strategy for England. It also aligns with national awareness initiatives such as the Three Dads Walking campaign (4) and the subsequent introduction of suicide prevention into the National Curriculum for England (5). The death of one CYP aged 10–14 years is estimated to cost the economy at least £2.85 million (6); thus, early intervention may reduce both immediate and long-term burdens on families, communities, and health services, as well as the economic cost to society (7, 8).

Given that half of lifetime mental health conditions emerge by age 14, and 7.4% of 17-year-olds have attempted suicide (9, 10), intervening early in schools may help to reduce early suicidal behaviour and support better mental health into adulthood (11, 12). School communities are also deeply affected by suicide, and bereavement can increase risk among peers (14). As such, schools are recognised as key settings for prevention, given the universal access to many CYP (15–21), yet few school-based suicide prevention programmes have been rigorously evaluated in the UK (22). Although concerns about iatrogenic effects previously limited school-based suicide prevention initiatives (23, 24), accumulating evidence shows these interventions are safe (15, 25, 26).

In line with best practice guidelines (27), the Multi-Modal Approach to Preventing Suicide in Schools (MAPSS) programme, developed in Australia, integrates a universal suicide prevention workshop, risk screening, and an indicated online self-guided cognitive behavioural therapy (CBT) programme (Reframe-IT) for students with elevated suicidal ideation (15, 25, 26). Each of the MAPSS components has been successfully tested individually in Australia, and the MAPSS programme has shown feasibility, acceptability, and potential for effectiveness in early research (15, 25, 26). A recent effectiveness randomised controlled trial found no clear evidence of effectiveness on primary outcomes but demonstrated that the intervention was safe and feasible to implement (25). However, the cultural transferability of school-based interventions cannot be assumed (28), and the feasibility of delivering and trialling MAPSS in the UK needs to be assessed. A UK scoping study (29, 30) showed strong support among students, school staff, parents, and health professionals for implementing school-based suicide prevention programmes, and identified some minor adaptations needed for MAPSS in the UK context. A subsequent pilot study of the adapted version of MAPSS in two UK schools (22) demonstrated the feasibility of delivering and testing the adapted workshop, screening, and Reframe IT-UK. Pre/post-test analyses indicated significant improvements in depression, hopelessness, and suicide literacy scores, with no safety concerns reports.

The aim of current trial was to determine the feasibility of delivering MAPSS in English secondary schools. Specifically, we aimed to employ a feasibility cluster-RCT to assess: 1) the acceptability and safety of delivering MAPSS in schools in England; 2) the social validity (feasibility, utility, and acceptability) of the MAPSS intervention; and 3) the feasibility of delivering a large-scale, appropriately powered, cluster-RCT and economic evaluation of this intervention in the future. Secondary aims were to assess changes over time in mental health and wellbeing outcomes for students taking part in MAPSS.

Method

Study Design

A two-year (January 2024–2026) feasibility cluster-RCT design was conducted (ISRCTN: 41891301), with participating schools as the unit of randomisation. To create balance in terms of deprivation, ethnicity, rurality and educational, outcomes, a minimisation algorithm was used at an intervention-to-control ratio of 2:1. Schools were randomly allocated to one of two arms by an independent statistician: 1) MAPSS (intervention; n = 4) or 2) usual practice (usual practice; UP, n = 2). Schools allocated to UP were offered MAPSS post-trial if considered safe and acceptable. The trial protocol is available via Ashworth et al (30). MAPSS delivery was commissioned by the Cheshire and Merseyside Public Health Collaborative (CHAMPS), while the RCT was funded by the National Institute for Health and Care Research (NIHR156862). Ethical approval for the trial was granted via Liverpool John Moores University Research Ethics Committee (ref: 23/PSY/003).

Intervention

1. Suicide Prevention Workshop: “Breaking the Silence,” a single 3-hour or two 1.5-hour workshop(s) developed for and tested with young people, delivered by trained external facilitators via Grassroots Suicide Prevention. The workshop focuses on suicide warning signs, help seeking, supporting yourself and others, and signposting to trusted adults or external services. Sessions included up to 30 students with a teacher present for behavioural support.
2. Screening: this consisted of self-report measures embedded into the quantitative outcomes surveys at each timepoint to identify ‘at-risk’ students. Students were considered at-risk if they reported suicidal ideation within the past four weeks via the Suicide Ideation Attributes Scale (SIDAS; score of 21 or higher; (32)), or if they indicated any thoughts in the past two weeks on a single-item measure of the Patient Health Questionnaire (PHQ-9; 33) at T1 or T2.
3. Reframe IT-UK (16): An adapted UK version of the Australian Reframe-IT (15) programme, offered to all students who were identified as ‘at-risk’ as part of the screening. Reframe IT-UK comprises eight 20-minute self-guided online CBT modules, completed independently during the school day with a member of wellbeing staff present. An adult “host” character guides the user through the modules. Each module consists of two activities based on standard CBT exercises. Users progress sequentially through the modules, with modules automatically unlocking when the preceding module is complete. There is also a safety plan to complete, a message board for the participant to communicate with a moderator, a mood diary function, and a series of factsheets and information on local and national

helplines and services. UK adaptations were surface-level and included British actors, updated scenarios, UK support pathways, and making the safety plan mandatory as part of the first module.

For further details about the intervention components, procedures, and associated safety mechanisms, see Ashworth et al. (15).

Recruitment

Eligible schools were mainstream secondary schools in Cheshire and Merseyside, England. Recruitment was completed between February and September 2024. Schools were approached via Local Authorities, and as more than six expressed interest, purposeful maximum variation sampling was used to ensure diversity (e.g., deprivation, ethnicity, rurality, academic performance) (34). Schools completed a memorandum of understanding before randomisation. School participation required consent from the schools' Headteachers. Individual students' participation required student assent and parental opt-out consent. In total, 77/954 parents (8.1%) exercised their right to opt their children out of the trial.

Participants

Six state-funded mainstream secondary schools were recruited. One school was single sex (all female), while the remaining five were co-educational. The composition of participating schools generally mirrored that of English secondary schools regarding the percentage of students eligible for free school meals (25.7%) and the proportion with a special educational need or disability (19.5%), although the number of students speaking English as an additional language was below the national average (21.4%) (Table 1) (35).

Table 1. School level demographic information

	Overall	MAPSS	UP*
Size – number of students on roll (mean)	1270	1216	1379
Sex – proportion of male students (%)	43.0	51.0	27.1
FSM – proportion of students eligible for free school meals (%)	24.2	26.6	19.6
EAL – proportion of students speaking English as an additional language (%)	6.5	7.2	5.3
SEND – proportion of students with special educational needs or disabilities (%)	18.1	18.8	16.7

*Usual Practice (UP)

877 Year 10 students (aged 14–15 years) were recruited, consented, and completed baseline data collection (see Fig. 1). Table 2 shows the student level demographic information; 37.6% (n = 328) identified as a boy/man, 57.6% (n = 503) as a girl/woman, and 2.5% (n = 22) as transgender/non-binary/other. Five percent (n = 44) indicated they were diagnosed as autistic, and 6.3% (n = 55) reported they had an attention deficit hyperactivity disorder (ADHD) diagnosis. 12.8% (n = 112) reported they had a diagnosis of anxiety, while 3.4% (n = 30) reported a diagnosis of depression.

Table 2
Student level demographic information

Number of students	Overall	MAPSS	UP
	877	**484**	**393**
Sex – proportion of male students (%)	37.6	43.4	30.5
Diagnosis of depression (%)	3.4	2.3	4.9
Diagnosis of anxiety (%)	12.8	11.6	14.3
Attention deficit hyperactivity disorder (ADHD) diagnosis (%)	6.3	5.2	7.7
Diagnosed as autistic (%)	5.0	4.5	5.6

Six hundred and ninety students in intervention schools received the suicide prevention workshop and 58 (8.4%) students scored in the at-risk range during the screening. Of those 40.5% (n = 17) decided to participate in Reframe IT-UK.

Sample size

As this was a feasibility study, a formal sample size calculation was not required. Six schools were chosen based on the assumption of recruiting 150 students per school and a potential attrition rate of 50% at T3 (the primary outcome point of Reframe IT-UK). This allowed for the expected attrition rate to be estimated with a precision of 3.25% for a single are study and 4.62% for a two-arm study, if drop-out was intervention dependent. This sample size is also considered suitable for estimating the standard deviation of the primary outcome measure (36), which is required for determining the sample size for the proposed effectiveness trial.

Procedure

Schools participated in the trial in two cohorts (beginning January and September 2024 respectively), with two intervention schools and one control school participating in each cohort. Participants completed online quantitative surveys during the school day at four timepoints: baseline (T1), at 2–4 weeks post-baseline (T2), 12 weeks post-baseline (T3), and 1-year post-baseline (T4). Schools were supported with IT guidance and a resource pack. A researcher visited at T1 to explain the survey procedures and students' rights during the process, in line with good practice guidelines (34). Surveys were identifiable to allow risk monitoring and screening for Reframe IT-UK eligibility.

At T1, a minimum of six staff (Mean = 13.5, SD = 5.09, range = 6–20) from each school (intervention and control) received training from Papyrus Prevention of Young Suicide (a national charity), known as 'Suicide Prevention–Overview Tutorial' (SP-OT), to ensure staff were equipped to manage any risk identified from the screening. It was the schools' decision as to which staff members attended the training. SP-OT was delivered in a single session over 1.5 hours online. Papyrus also provided an online information session, 'Suicide Prevention – Awareness, Resource, Knowledge' (SP-ARK), along with support packs, for parents of all children in Year 10 at each participating school, to help equip them with awareness of warning signs, and knowledge of how and where to seek help.

Intervention schools delivered the suicide prevention workshop between T1 and T2. At T2, the survey system in all schools (intervention and control) flagged students scoring in the at-risk range. Schools were provided with the names of at-risk students on the same day, and were asked to follow-up with the students within 24 hours, following their usual safeguarding procedures (i.e., the process they would follow if a student disclosed suicidal thoughts during the school day). Intervention schools were also asked to offer at-risk students Reframe IT-UK, while those in UP schools received usual care only. Reframe IT-UK was completed over ~ 10 weeks between T2 and T3, with pastoral staff supervising sessions and providing on-site support. Fortnightly supervision was offered to pastoral staff by an external therapist working within suicide prevention.

Measures

Demographics

Demographic information (age, gender, diagnosed mental health conditions, and neurodiversity) were collected from participants as part of the online surveys at T1.

Primary outcomes

Acceptability and social validity. Students' acceptability of the suicide prevention workshop, including whether or not participants thought it was "useful", "interesting", or "upsetting", was assessed in the surveys at T2 using purpose designed items on a three-point scale (not at all/somewhat/very). Participant views on the Reframe IT-UK intervention were similarly assessed at T3, in terms of whether they found it "useful", "easy to use", and "upsetting", scored on a five-point scale (strongly disagree-strongly agree). They were also asked whether they would recommend them to other young people (yes/no). Additionally, Reframe IT-UK participants were asked to rate each module on a five-point scale (Strongly disliked-really liked).

Safety. Safety was assessed as part of routine monitoring of Adverse and Serious Adverse Events (AEs; SAEs), following NIHR guidance (38). Any unfavourable and unintended clinical sign, symptom, or observation temporally associated with the use of an intervention was considered to be an AE. AEs that resulted in hospitalisation for any reason, life-threatening situations (including a suicide attempt), or death were regarded as SAEs. Schools were required to inform the research team of any AEs or SAEs that occurred during the course of the study, and these would be logged in a study database. The causality of AEs and SAEs (i.e., their relationship to intervention treatment) would then

be assessed by a suitably qualified study team member, to determine the plausibility of the SAE being due to the intervention. Any SAE would be reported to the funder and to the relevant ethics committees within 24 hours of the research team becoming aware of its occurrence, where a decision would be made about next steps.

Feasibility of an effectiveness trial. A set of nine stop/go progression criteria were established, to determine whether an effectiveness RCT was warranted. Data were collected for progression criteria relating to: school recruitment, student recruitment, school staff training recruitment, the number of students scoring in the at-risk range on the screening, participant engagement (measured as attendance rates at the suicide prevention workshop, recorded via Grassroots Suicide Prevention, and the proportion of eligible students engaging with Reframe IT-UK, recorded via the Reframe IT-UK platform), the acceptability of the intervention (scored using the measures identified above), the proportion of students completing baseline data collection, and attrition rates at T3. A traffic light system was implemented for progression criteria, with each scored as green (go – within the target range), amber (discuss and amend – slightly below the target range), or red (stop – outside of the target range).

Trial feasibility was also considered in terms of change or variability on outcome measures (see below).

Secondary Outcome Measures

Students' outcomes. Secondary outcomes were assessed via the online surveys for students. Measures were administered at all four timepoints, with the exception of the SIDAS, which was not administered at baseline.

Suicidal ideation: The SIDAS (32) is a self-report measure designed to screen individuals for presence and severity of suicidal thoughts. It comprises five items, each targeting an attribute of suicidal thoughts: frequency, controllability, closeness to attempt, level of distress, and impact on daily functioning. Responses are measured on a 10-point scale. A higher total score reflects more severe suicidal thoughts (range = 0–50). Items 2–5 are only presented to those reporting some ideation (scoring ≥ 1 on item 1). Scores of 21 or over are considered to indicate significant suicide ideation; this was used to help determine eligibility for Reframe IT-UK. The SIDAS has demonstrated high internal consistency and good convergent validity (α = 0.91; 32).

Depression: The PHQ-9 (36) assessed changes in depressive symptoms. Participants are asked to indicate how often they have been bothered by nine problems over the past two weeks on a four-point Likert scale. Scores are summed, with higher scores indicative of greater distress (range = 0–27). The final question of the PHQ-9 asks participants to indicate the number of days they have had thoughts that they would be better off dead or hurting themselves in some way. Responses on this item were used to help determine eligibility for Reframe IT-UK. The PHQ-9 has been validated for use with adolescents, with good psychometric properties and high internal consistency (37).

Hopelessness: This was measured using the two item Brief-H-Pos (38), a two-item positively worded measure of hopelessness. Respondents indicate agreement on a five-point scale (range = 2–10), with higher scores indicating higher hopelessness. The Brief-H-Pos has been adapted from the Beck Hopelessness Scale, which has been used extensively with adolescents. Its psychometric properties are satisfactory, with good internal consistency (α = 0.77) and concurrent validity with the Beck Hopelessness Scale (38).

Help-seeking intentions: assessed using part two of the General Help Seeking Questionnaire (GHSQ; 39). The GHSQ presents participants with a list of potential sources of help and asks them to indicate the likelihood that they would approach that source if they were experiencing suicidal thoughts, on a five-point scale. Higher scores indicate greater levels of intended help-seeking (range = 0–50). The GHSQ has been validated for use in high school students, with satisfactory reliability and validity (α = 0.83; test-retest = 0.88; 39).

Suicide literacy: assessed using an adapted version of the Literacy of Suicide Scale (LOSS; 40). The LOSS contains 12 statements rated on a "true/false/don't know" scale. The scale provides a total literacy score (percent correct) where higher scores indicate greater suicide literacy.

Health-related quality of life (HRQoL): assessed using the Child Health Utility–9 (CHU9D; 41), a nine-item multi-attribute (five response levels). generic, preference-based measure for CYP aged 7–17 years. The CHU9D has demonstrated good internal consistency (α > 0.7) and strong test-retest reliability (r > 0.6; 41). The UK-value set was applied to derive utility scores that can be used to derive quality-adjusted life years (QALYs) in future economic evaluations (42). These data were used for the economic evaluation.

Health service and resource use: assessed using the Resource Use Questionnaire (RUQ), a bespoke questionnaire adapted from the Young Mind Matters Service Use questionnaire (43). The RUQ assesses use of mental health professionals and services, mental health-related hospitalisations and attendances, and school-based mental health services. These data were used for the economic evaluation.

Usual Practice (UP). A member of staff in each school (N = 6) completed a purpose-designed usual practice survey at T1 and T4. This was used to ascertain current provision (i.e., establish a clear counterfactual), identify the level of programme differentiation, and to account for any potential compensatory rivalry or contamination in control schools.

Safety Considerations

Trial oversight was provided by the Trial Steering Committee (TSC), meeting biannually. The TSC comprised the Co-Principal Investigators (EA and PS), trial manager (MM), clinical supervisor, and independent experts in the field. The Data Management and Ethics Committee (DMEC), meeting annually, ensured safety management, data monitoring, endpoint adjudication, and data management strategies. The committee comprised the Co-Principal Investigators and independent experts in the field. The composition of the TSC and DMEC was designed to ensure transparency, so that no one set of competing interests could unduly influence other stakeholders.

A comprehensive safety protocol was activated when students scored ≥ 21 on the SIDAS, reported current suicidal ideation, or indicated risk via Reframe IT-UK. Schools managed risk according to their usual safeguarding procedures, with responses ranging from provision of helpline details to emergency escalation. The study therapist offered fortnightly supervision to researchers and school staff. During the trial, no serious adverse events were reported.

Statistical analysis

Data were analysed in IBM SPSS (44). Data were initially cleaned and checked for missing values; where possible missing values were obtained from source when available. Key outcomes from the study, for example recruitment and retention rates, were assessed using counts and percentages, along with 95% confidence intervals. Secondary outcomes, for example depression scores on a continuous scale, were assessed using means and medians (for non-normally distributed data). Differences between the intervention and the control groups in key outcome variables was also calculated and reported graphically, along with 95% confidence intervals. As this was a feasibility study, no formal hypothesis testing was conducted and no p values are reported. All analysis was carried out on an intention-to-treat basis, and some sensitivity analyses were undertaken including only per-protocol participants.

Economic evaluation

Data were analysed in Stata (version 19.5; 44). Data completeness and summary statistics (means, standard deviations, median, or interquartile ranges, percentages, 95% confidence intervals for mean differences, as applicable) were provided for all economic outcomes and summarised for each trial arm at each time point. Given that the goal was to establish the feasibility of collecting HRQoL and resource use data from the study population. costs and QALYs were not estimated. No imputation methods were used to address data missingness (44).

Public and Patient Involvement and Engagement (PPIE)

PPIE was embedded throughout study development. The work was co-designed with PPIE co-applicants (included as authors), including parents, individuals with lived experience, and youth worker leads. A public advisory group (PAG) and young people's advisory group (YPAG) were established for the trial and met three times per year over the two-year period. The PAG and YPAG co-designed study materials and resources for parents and students to ensure informed consent.

Results

Acceptability and Social Validity

250 students responded to the social validity measures at T2 for the suicide prevention workshop. Approximately nine in ten students reported that it was 'somewhat' or 'very' interesting (88.4%; n = 221) and 'somewhat' or 'very' useful (89.9%; n = 223). 86.3% (n = 214) said they would recommend it to other young people. 80.7% (n = 201) said they found it 'not at all' upsetting, 18.5% said it was 'somewhat' upsetting (n = 46), and 0.8% found it 'very upsetting' (n = 2).

11 students (out of 17 who participated in Reframe IT-UK) responded to the social validity measures at T3 for Reframe IT-UK. Six students 'agreed' or 'strongly agreed' that it was useful, two 'neither agreed nor disagreed', and three 'disagreed' or 'strongly disagreed'. Nine students 'agreed' or 'strongly agreed' that it was easy to use (with the remainder 'neither agreed nor disagreed') and 10 said that they would recommend it to other young people. No students said they found it upsetting.

Safety

No adverse events or serious adverse events relating to the study were reported by the schools to the research team over the course of the study.

Effectiveness Trial Feasibility

An overview of the nine progression criteria and the extent to which each were met is available in **Supplementary Table A1**. In total, six were fully met, two were mixed green and amber, and one was mixed green and red. Overall recruitment criteria were all green; the target number of schools (6) and students (810) were recruited, with 877 students participating in baseline data collection across six schools. The number of school staff participating in the training was also above the target (> 6 staff per school), with an average of 14 staff members taking part across the six schools (range = 6–20).

All progression criteria were also green with regards to the suicide prevention workshops and screening. 100% of the scheduled workshops were delivered, which met the target, and acceptability was above the target (> 80%). The number of students screening at high-risk of suicide was also within the target range (10–15 students per school), with an average of 14 students identified as high-risk across the six schools (range = 8–23).

However, Reframe IT-UK criteria were mixed. While recruitment was below the target (> 70%) and therefore red, with 29.3% of eligible students signing up, those who did participate completed above the target number of modules and completion was therefore green, with 71% completing > 75% of modules. Furthermore, while acceptability targets (> 80%) were met in terms of ease of use and whether students would recommend it to others (100% and 90.9% respectively), the proportion of students reporting it as useful was below the target (72.7%) and therefore amber. Qualitative feedback collected as part of a parallel implementation evaluation (42) suggested that the time of year (GCSE examination period for Year 10 students), reduced students' willingness to enrol, as they felt unable to miss revision sessions or extra enrichment classes. Qualitative data also suggested that acceptability was influenced by the relatability of the content of some of the modules (e.g., while some students found scenarios about friendship difficulties relatable, others felt certain topics did not reflect their lived experience). Therefore, adjusting the timing of delivery and adapting the content for future trials may help improve acceptability ratings.

Regarding data collection progression criteria, baseline data collection was conducted with 92% of students, which was above the target (> 80%) and therefore green. Conversely, attrition at T3 was in the amber range (21–40%), with an average attrition rate of 26.7% across the six schools. However, the attrition rates varied considerably between schools (1.5–67.7%), with three schools within the target range. Analysis of qualitative data (45) suggested this was potentially due to the time of year in the first cohort, beginning January, with a short lead-in time from the trial start date and Easter and summer holidays disrupting progress. Participants also felt GCSE examinations took precedent at this time of year (given they occur in May-June), and attrition would be reduced if the trial was implemented earlier in the year and with Year 9 students instead. Our attrition rates support this, with better rates seen in the second cohort of schools, beginning delivery in September.

Secondary Outcomes

Table 3 presents descriptive statistics for each of the secondary outcome measures, for each timepoint. Students in the intervention arm had lower median depression scores (median change = 1) and higher intended help-seeking (median change = 1) after the suicide prevention workshop (T1 vs. T2), whereas scores for those in the usual practice condition remained the same for depression and decreased for help-seeking (median change = 2). Suicide literacy and hopelessness scores did not change for either group.

Table 3
Median (IQR) scores for secondary outcome measures

	MAPSS				**Usual Practice**			
	T1	**T2**	**T3**	**T4**	**T1**	**T2**	**T3**	**T4**
Depression	5 (8)	4 (7)	4 (7)	4 (7)	6 (9)	6 (9)	5 (10)	5 (9)
Help-seeking	25 (13)	26 (14)	24 (12)	25 (11)	21 (10)	19 (11)	22 (13)	23 (1)
Suicide literacy	6 (2)	6 (2)	6 (2)	6 (1)	6 (2)	6 (2)	6 (2)	6 (2)
Hopelessness	4 (3)	4 (2)	4 (3)	3 (3)	4 (3)	4 (3)	4 (4)	4 (3)

Table 4 presents the proportion of students identified as at-risk of suicide ideation at each timepoint. On average, 16.8% of participants indicated thoughts of suicide on the PHQ-9 at baseline, across both conditions (15.8% intervention, 17.8% usual practice). For students in the intervention condition, this decreased to 11.6% and 11.7% at T2 and T3 respectively, but remained higher in the usual practice condition at 16.5% and 15.0% at T2 and T3.

Table 4
Participants scoring in at-risk range for suicide ideation

	MAPSS				Usual Practice			
	T1	T2	T3	T4	T1	T2	T3	T4
	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)
SIDAS score ≥ 21	-	12 (3.4%)	12 (3.5%)	6 (5.5%)	-	6 (2.6%)	7 (4.7%)	9 (6.0%)
PHQ9 item 9	75 (15.8%)	46 (11.6%)	51 (11.7%)	29 (9.5%)	69 (17.8%)	41 (16.5%)	25 (15.0%)	32 (10.4%)
	Median (IQR)	Median (IQR)	Median (IQR)	Median (IQR)	Median (IQR)	Median (IQR)	Median (IQR)	Median (IQR)
SIDAS score (for individuals indicating ideation on item 1 only)	-	10 (12)	9.5 (13)	12.5 (9)	-	10.5 (10)	11 (13)	10 (18)

Table 5 presents descriptive statistics for each of the secondary outcome measures, for CYP who took part in Reframe IT-UK. All students participating in Reframe IT-UK indicated thoughts of suicide on the PHQ9 at either T1 or T2 (100%), although only 28.4% scored in the at-risk range on the SIDAS. The percentage of students indicating thoughts of suicide on the PHQ9 decreased to 40.0% after Reframe IT-UK (T3). Mean scores before (T2) and after (T3) Reframe IT-UK improved for depression (mean change = -3.05; CI = -1.29-8.04), suicide ideation (mean change = -0.82; CI = -8.80-11.05), help-seeking intentions (mean change = 0.60; CI = -7.52-4.52), quality of life (mean change = -3.36; CI = 0.19–7.15), and hopelessness (mean change = -0.31; CI=-1.16-1.82). Changes were sustained or improved further at T4 for all outcomes.

Table 5
Scores for secondary outcome measures for Reframe IT-UK participants

	T1	T2	T3	T4
	M (SD)	M (SD)	M (SD)	M (SD)
Depression	15.47 (6.15)	11.85 (6.89)	8.80 (6.56)	10.22 (6.98)
Suicide ideation	-	13.93 (10.85)	13.11 (14.83)	9.38 (13.46)
Help-seeking	19.75 (9.16)	23.44 (5.37)	23.20 (7.16)	31.60 (4.88)
Suicide literacy	5.27 (1.67)	5.31 (0.57)	5.90 (1.79)	6.22 (12.12)
Quality of life	24.47 (7.30)	21.36 (7.86)	18.0 (6.02)	19.89 (8.65)
Hopelessness	6.33 (1.99)	5.31 (2.10)	5.0 (2.26)	4.67 (1.66)
	n (%)	n (%)	n (%)	n (%)
SIDAS score ≥ 21	-	4 (28.4%)	4 (40%)	2 (28.6%)
PHQ9 item 9	11 (73.3%)	11 (78.6%)	4 (40.0%)	3 (33.3%)

Usual Practice

Responses to the usual practice survey indicated variability in staff training, parental engagement, and identification practices. Half of the schools reported offering no staff training on suicide or self-harm (n = 3; 50%), while five schools (83.3%) indicated they provided generic mental health information or signposting to online and external support, mostly facilitated by school staff. All schools employed multiple methods to identify students at risk of suicidal thoughts/behaviours, most frequently through external referrals, self-disclosure, or concerns raised by parents, carers, or peers. Five schools (83.3%) relied on staff judgement to identify CYP at-risk, with the final school explicitly stating they did not aim to proactively identify at-risk students.

Each school had formal procedures for responding to suicide and self-harm, though practices differed in scope. In cases of immediate danger (e.g., suicide attempt), all schools (n = 6, 100%) described procedures involving parental contact and transfer to emergency departments, alongside safeguarding or agency referrals.

Five schools (83.3%) also highlighted barriers to delivering effective suicide support, including limited staff knowledge, lack of capacity, financial constraints, poor inter-agency communication, and fear of unintended consequences.

Economic evaluation

Descriptive statistics for the HRQoL outcomes are reported in Table 6, alongside the number (n) and proportion of students (n/N) for whom a CHUD9 score could be estimated. The proportion of students with a measurable CHU9D score ranged between 97.0% (T1) and 29% (T4) for the usual practice arm, and between 96.0% (T1) and 39.3% (T4). Students in the usual practice arm had lower completeness for this score compared to those in the intervention arm at T2 (42.5% vs 55.8%) and T3 (29.0% vs 61.4%), but higher completeness at T4 (49.1% vs 39.3%). The patterns of completeness for CHU9D responses at item and overall score level by treatment arm and at each time point were similar (see Supplementary Table A1). Students in the intervention arm had consistently higher mean HRQoL scores compared to usual practice at every time point. Differences between treatment arms were modest and greater at T4 (mean difference: 0.018; 95% CI: 0.005; 0.031); this was the only timepoint at which differences were statistically significant.

The resource use outcomes and response completeness are reported in Supplementary Table A2). Response completeness was below 45% at T2-T4 for all categories of resource use. The professionals most frequently visited for mental health related care were nurses, GPs, paediatricians, and counsellors with around 10%-20% of respondents reporting use in the recent 3 months, and similar proportions observed between the two arms. The only categories of resource showing statistically significant differences between the intervention and the usual practice arms were visits to psychologists at T1 (mean difference: -0.035; 95% CI: -0.062; -0.009) and occupational therapists at T4 (mean difference: -0.012; 95% CI: -0.021; -0.002). The responses suggest a skewed distribution of resource use (as median and interquartile ranges were equal to zero for all categories and timepoints), indicating that only a small proportion of students in both arms used any services at each timepoint.

Table 6
Health-related quality outcomes – CHU9D scores

	MAPSS					Usual Practice					Unadjusted Difference		
	n (n/N))	Mean	SD	Median	IQR	n (n/N))	Mean	SD	Median	IQR	diff.	p-value	(95% CI)
T1	465 (96.1%)	0.837	0.120	0.866	0.177	381 (97.0%)	0.821	0.129	0.844	0.169	0.016	0.183	(-0.010,0.042)
T2	270 (55.8%)	0.852	0.110	0.869	0.150	167 (42.5%)	0.837	0.128	0.872	0.171	0.016	0.363	(-0.025,0.057)
T3	297 (61.4%)	0.854	0.114	0.875	0.175	114 (29.0%)	0.847	0.140	0.891	0.176	0.007	0.659	(-0.032,0.047)
T4	190 (39.3%)	0.854	0.116	0.881	0.171	193 (49.1%)	0.836	0.130	0.867	0.164	0.018	0.018	(0.005,0.031)

Abbreviations: CI, confidence interval, n, number of observations; IQR, interquartile range; SD, standard deviation

Discussion

This trial is the first in the UK to explore the feasibility and acceptability of the delivery of MAPSS in school settings. The primary objective of this study was to determine if the delivery of MAPSS is feasible, acceptable and safe within UK school settings. The progression criteria indicated strong feasibility for advancing MAPSS to a full effectiveness RCT, with six of nine stop/go criteria fully achieved and three partially met. The partially met criteria largely reflect contextual rather than structural limitations of the intervention, namely time of year, with solutions identified that could be implemented ahead of an effectiveness RCT. The main barrier identified for both Reframe IT-UK sign-up and data collection was MAPSS implementation/evaluation coinciding with the examination period for Year 10 students. Delivering MAPSS earlier in the year, with Year 9 students, would resolve this issue. In addition, acceptability ratings for Reframe IT-UK were mixed; while most participants reported they would recommend MAPSS, fewer perceived direct personal benefits, highlighting variability in the relatability of scenarios that could be amended before a futher trial.

Overall, trial results add to the growing evidence base supporting the utility of school-based suicide prevention programmes (15-21). Our findings show a positive trend towards reductions in suicide ideation, depression, and hopelessness for students randomised to MAPSS compared with students receiving UP. Students receiving MAPSS also showed improvements in help-seeking, suicide literacy, and quality of life. Workshops were well attended by students, and feedback across sessions was consistently positive. Students also reported generally favourable experiences with Reframe IT-UK, although engagement declined during examination periods and some feedback was mixed.

Importantly, no adverse events were recorded in the MAPSS trial, indicating that the intervention was safe to implement within secondary school settings. This finding is particularly salient given longstanding concerns that school-based suicide prevention and identification

activities may inadvertently increase distress or risk among vulnerable students. However, a growing body of evidence suggests that, when delivered within structured systems of care and accompanied by appropriate follow-up, such interventions are not associated with iatrogenic harm (46,47). The absence of adverse events in MAPSS therefore contributes to the expanding evidence base supporting the safety of comprehensive, school-based approaches, while reinforcing the importance of clear safety protocols, staff training, and pathways to external support in mitigating potential risks (15). Qualitative feedback from students, parents, and staff in our implementation evaluation (45) highlighted that conducting school-based suicide-prevention research with young people requires navigating complex logistical, engagement and implementation challenges inherent to school environments, underscoring the importance of flexible and context-sensitive delivery approaches. These insights will inform any adaptations needed for MAPSS implementation ahead of a full trial (48,49).

Strengths and Limitations

A key strength of this feasibility trial was that all core procedures including recruitment, data collection, and follow-up were implemented successfully and without major obstacles, despite the trial coinciding with the GCSE examination period. This suggests that trial processes were acceptable and manageable for schools and students, and that similar procedures are likely to be feasible in a larger-scale evaluation. Conducting a future trial with a younger cohort may further mitigate concerns about exam-related burden. Furthermore, public involvement and engagement was embedded from the outset and likely contributed to the acceptability of the trial design; we recommend maintaining this approach in future work, while also broadening involvement to include a more diverse group of CYP across a wider geographic area (52,53).

Several limitations should also be acknowledged. First, outcome data for both trial arms relied on self-reported online surveys, which are subject to bias and inaccuracies (54). Second, we did not control for the non-specific effects associated with receiving a psychological or supportive school-based intervention. As such, some of the observed effects of MAPSS may have arisen from increased contact with pastoral staff or other contextual factors. However, previous studies involving comparable levels of contact have not demonstrated significant improvements across similar outcomes (55,56), although some CBT-based school interventions have reported benefits beyond those of routine care (57). Thirdly, there were some issues with missing data/attrition, particularly for the Reframe IT-UK cohort, meaning sample sizes were small. While attrition was higher for Reframe IT-UK in the first cohort, influenced by mid-year delivery and holiday disruption, this improved when the programme commenced in September; accordingly, future implementation will begin at the start of the academic year and target Year 9 to minimise academic conflict and optimise retention. Fourthly, while 8.1% of parents exercised their right to opt their child out of the trial, this was largely skewed by high opt-out rates in one school. However, reasons for parental opt-out were not explicitly collected, limiting interpretation of this finding. Future trials should seek to systematically capture reasons for non-participation to inform acceptability and guide implementation of school-based suicide prevention interventions.

Finally, the economic analysis suggested low completeness for the resource use outcomes beyond baseline, and for the HRQoL at T3 (usual practice) and T4 (intervention). This can be in part explained by the same issues highlighted previously for study attrition and retention over time. For the resource use completeness, it is possible lack of response relates to lack of resource use, given the skewed nature of these data. The authors will investigate how to further adapt the questionnaires to mitigate this issue in the full trial. Differences between treatment arms for the economic outcomes were modest and largely non-significant. Due to the lack of diversity within the sample, future trials should include widening participation to more diverse locations with more varied demographics. It would also be important to explore whether the Reframe IT-UK intervention needs further tailoring for those from different ages, special educational needs and ethnic minority backgrounds and thus ensuring trial sites include schools in areas with higher levels of diversity.

Future work and clinical implications

Crucially, students who are identified in school as experiencing suicidal ideation represent a critical opportunity for targeted intervention to reduce subsequent risk of death by suicide. Evidence from school-based screening and follow-up processes highlights both challenges and opportunities for improvement, including schools' limited capacity to manage increased numbers of students communicating suicide risk (15,22). For example, qualitative implementation research from the trial indicated that such system-level changes can place additional demands on staff, while also revealing opportunities to strengthen responses through clearer protocols and enhanced staff capability (45). Collectively, this underscores the importance of training and equipping school staff to confidently respond to young people at risk and to effectively monitor wellbeing and signpost to external mental health supports. For students who communicate suicide risk, we have shown that suicide ideation, depressive and hopelessness symptoms can be reduced after an online CBT intervention. Planned content refinements with our youth advisory group will enhance relevance and applicability across diverse student experiences.

Conclusion

Findings from this trial show that it is feasible, acceptable, and safe to implement MAPSS in UK schools, with potential for improvements in suicide ideation, depression, and hopefulness, help-seeking, suicide literacy, and quality of life. Thus, the trial provides evidence to support a future large-scale RCT, in order to assess potential effectiveness for students. However, some adjustments may be needed for an effectiveness trial to be successful, including testing MAPSS with a younger age group who are not undergoing formal academic assessments, implementing MAPSS earlier in the academic year before examinations begin, and potentially updating Reframe IT-UK content to ensure it is relatable to a wider variety of young people.

Abbreviations

ADHD – Attention deficit hyperactivity disorder

AE – Adverse events

CBT – Cognitive behavioural therapy

CHAMPS – Cheshire and Merseyside Public Health Collaborative

CHU – Child Health Utility

CI – Confidence interval

CYP – Children and young people

DMEC – Data Management and Ethics Committee

EAL – English as an additional language

FSM – Free school meals

GHSQ – General Help Seeking Questionnaire

HRQoL – Health-related quality of life

IQR – Interquartile range

LOSS – Literacy of Suicide Scale

MAPSS – Multi-Modal Approach to Preventing Suicide in Schools

N – Number of observations

NIHR – National Institute for Health and Care Research

PAG – Public advisory group

PHQ – Patient Health Questionnaire

PPIE – Public and patient involvement and engagement

QALYs – Quality-adjusted life years

RCT – Randomised controlled trial

RUQ – Resource Use Questionnaire

SAE – Serious adverse event

SD – Standard deviation

SEND – Special educational needs or disabilities

SIDAS – Suicide Ideation Attributes Scale

SP-ARK - Suicide Prevention—Awareness, Resource, Knowledge

SP-OT - Suicide Prevention–Overview Tutorial

T1 – Baseline

T2 – 2-4 weeks post-baseline

T3 – 12-weeks post baseline

T4 – 1-year post baseline

TSC – Trial steering committee

UP – Usual practice

YPAG – Young people advisory group

Declarations

Ethics Approval and Consent to Participate: Ethical approval for the study was granted via Liverpool John Moores University Research Ethics Committee (ref: 23/PSY/003). All procedures performed involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and within the 1964 Helsinki declaration and its later amendments. Informed consent and where required assent was obtained from all individual participants.

Consent for publication: Not applicable.

Supplementary material: The supplementary material is available online at [add weblink]

Availability of data and materials: The data that support the findings of this study are available [add weblink]

Competing Interests: JR is funded by a National Health and Medical Research Council Investigator Grant (ID2008460) and a Dame Kate Campbell Fellowship from the University of Melbourne. The other authors declare they have no conflicts of interest.

Funding: This study was funded by NIHR PHR programme (NIHR156862).

Author Contributions: Study conception and design were performed by PS, EA, JR, and SM. Data collection and analysis were performed by EA, SW, PS, MM, and LS. The first draft of the manuscript was written by PS and all authors commented on previous versions. All authors read and approved the final manuscript.

Acknowledgements: Papyrus Prevention of Young Suicide and Grassroots Suicide Prevention delivered the MAPSS intervention in schools. We would like to thank all organisations for their contributions and ongoing collaborations. Finally, we would like to thank all the schools, students, and parents who participated in the trial, and the public advisors who have contributed to the study design to date, including the '3 dads walking' and Merseyside Youth Association.

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Figures

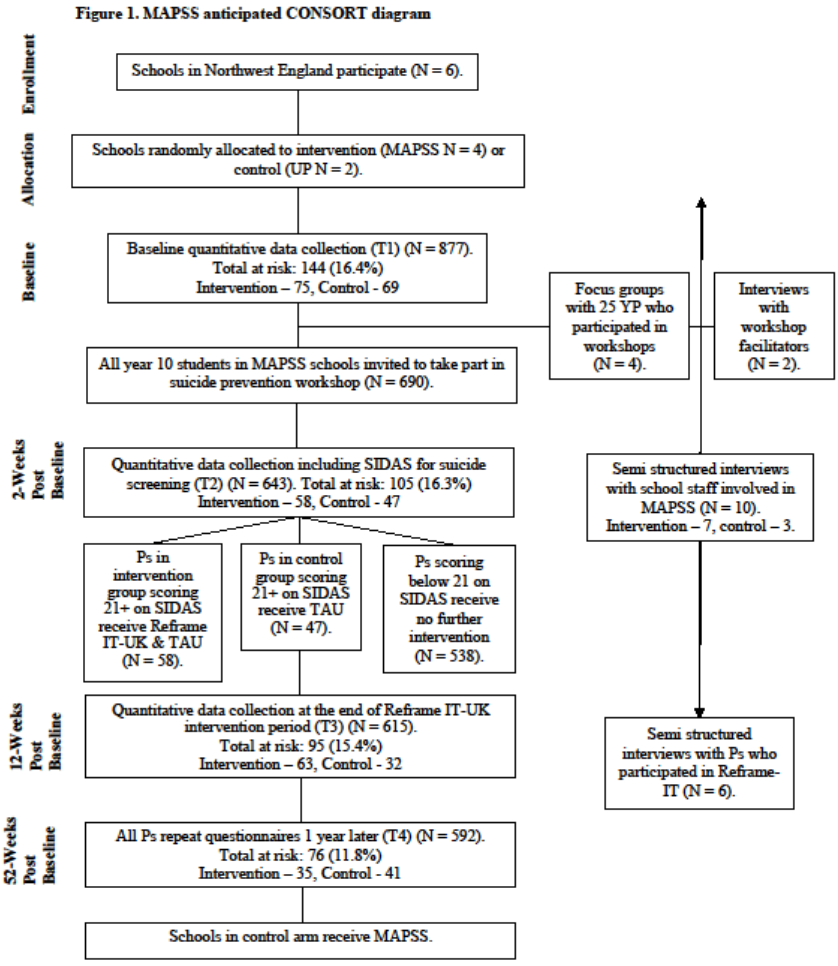


Figure 1

See image above for figure legend.

Supplementary Files

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