



The PositivaMente Program: Universal Prevention of Suicidal Behaviour in Educational Settings

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Abstract

Suicidal behaviour is a major socio-health problem worldwide. However, there are few empirically validated programs for universal prevention of suicidal behaviour in school settings. The aim of the present study was to design and validate the *PositivaMente* program for the prevention of suicidal behaviour in school-age adolescents aged 14–15 from the North of Spain. A quasi-experimental design was used with pre- and post-treatment evaluation with experimental and control groups and a six-month follow-up. The final sample consisted of 264 participants ($M=14.30$ years, $SD=0.56$; 54.5% girls), with 161 participants in the experimental group and 103 in the control group. Measuring instruments were administered to assess suicidal behaviour, emotional and behavioural difficulties, depressive symptomatology, prosocial behaviour, subjective well-being, and self-esteem. The *PositivaMente* program was designed and implemented in educational settings. A statistically significant improvement in subjective well-being was found, as well as a statistically significant reduction in emotional problems and problems with peers among female participants in the experimental group versus those in the control group at the 6-month follow-up. However, male participants did not seem to benefit from the program. The overall evaluation from the sample and satisfaction with *PositivaMente* were positive. Empirically supported actions for the prevention of suicidal behaviour need to be designed in order to make informed decisions. Future studies should implement the *PositivaMente* program with other populations and contexts, develop a brief version, and collect information on cost-effectiveness.

Keywords Adolescents · Suicidal behaviour · Assessment · Universal prevention · Program · School settings

Suicidal behaviour is a public socio-health problem among adolescents worldwide. As this issue has become global, it is crucial to enhance comprehension of its underlying factors and develop effective intervention strategies. The World Health Organization has stated that suicide is the fourth leading cause of death in 15- to 29-year-olds (World Health Organization, WHO, 2021a). The most recent data in Spain

from the National Statistics Institute (INE, 2022) indicate that suicide in the 15–29-year-old population is the leading non-natural cause of death and that 2021 saw the most deaths recorded from suicide since records began. In this regard, a meta-analysis by Lim et al. (2019) which included 686,672 children and adolescents showed that during the previous 12 months, 4.5% had attempted to end their lives, 7.5% had a plan for suicide, and 14.2% had had suicidal ideation. There have been various epidemiological studies in Spain with representative samples of adolescents from the general population that have produced similar results (e.g., Díez-Gómez et al., 2020; Fonseca-Pedrero et al., 2022a) and even include self-harming behaviours (Bousoño et al., 2021). Although these are different in terms of function (Kuehn et al., 2022), they are a notable risk factor, particularly in the adolescent population (Robinson et al., 2021; Witt et al., 2021).

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Suicidal behaviour involves numerous manifestations beyond suicide deaths (O'Connor & Pirkis, 2016; Wasserman, 2021). These expressions range from suicidal ideation, which would include the desire and ideas of death, ideation and planning, through suicidal communication, including both verbal and non-verbal signals as well as the threat of suicide to the suicidal act, consisting of attempts, self-harm with suicidal intent and death by suicide (O'Connor & Nock, 2014). In this sense, it is a multidimensional, dynamic, plural, and interactive phenomenon (Al-Halabí & Fonseca-Pedrero, 2021; Fonseca-Pedrero et al., 2022b). Suicidal behaviour has negative consequences in the short and the long term on people, their families, and their social, educational, and health environments. Specifically in education, it affects academic performance, self-concept, self-esteem, the formation of identity, and learning processes, among other things (Black et al., 2021). The available empirical evidence emphasises that suicide is preventable (Mann et al., 2021). Although there is evidence to support the effectiveness of some interventions in preventing suicidal behaviour in schools (Wasserman et al., 2021), more comprehensive and rigorous research is needed on these programs and, in particular, on the effective components of each intervention (Black et al., 2021).

Schools are the ideal setting for activity to promote emotional wellbeing, and specifically the prevention of suicidal behaviour or other mental health problems in adolescents (Fonseca-Pedrero et al., 2023, b; González-Roz et al., 2023). Most adolescents spend a significant amount of time in class, and schools are one of the main agents involved in socialization, education, and promotion of proper development. In addition, maintaining a safe, supportive school environment is an essential part of a school's general mission. In this regard, the *Guidelines on School Health Services* (WHO, 2021b) emphasizes that the school is a favourable setting for learning knowledge and for acquiring socio-emotional skills. Programs for the prevention of suicidal behaviour in schools may be grouped together as universal or selective prevention (Al-Halabí & Fonseca-Pedrero, 2023).

The following types of programs have demonstrated effectiveness in the school context (Arango et al., 2021; Carli et al., 2021; Gijzen et al., 2022; Walsh et al., 2022): (a) awareness and education via the curriculum; (b) peer leadership training; (c) skill training; (d) training school personnel; and (e) screening for at-risk students. Nonetheless, the scientific evidence for these programs is still limited, as there is a huge variety of them and few random controlled trials producing good evidence and recommendations for use (Carli et al., 2021; Gijzen et al., 2022). Some of the most recent systematic reviews have indicated that educational interventions—for example, *Youth Aware of Mental health* and *Signs of Suicide*—are effective for preventing suicidal

ideation and suicide attempts (Carli et al., 2021; Hayes et al., 2023). The meta-analysis by Gijzen et al. (2022) found that the size of the effect at post-test was small both for suicidal ideation ($g=0.15$) and for suicide attempts ($g=0.30$), but that it seemed to maintain its positive effects in the medium term (3–12 months) and cause no harm (Pistone et al., 2019; Robinson et al., 2018). Another meta-analysis, by Walsh et al. (2022), showed that interventions in educational contexts were, compared to controls, associated with a 13% reduction in probability of ideation (*Odds Ratio* (OR)=0.87, 95% Confidence Interval (CI) [0.78, 0.96]), and a 34% reduction for attempts (OR=0.66, 95% CI [0.47, 0.91]). Altogether, these findings highlight the central role of the school context for the prevention of suicidal behaviour.

At an international level, only a few studies have scientifically demonstrated the effectiveness and efficiency of prevention programs in school settings (Groselli et al., 2022). This reality becomes even more pressing in Spain, where we only have the results of the multi-school SEYLE project (Wasserman et al., 2015). The “Saving and Empowering Young Lives in Europe (SEYLE)” is a European initiative aimed at the prevention and early intervention of mental problems, suicide, and risk behaviours [registered at the US National Institute of Health (NIH) clinical trial registry (NCT00906620), and the German Clinical Trials Register (DRKS00000214)]. The effectiveness of SEYLE has been examined in a randomized controlled trial (RCT) that included three different school-based interventions and one control group (Wasserman et al., 2010). Participants in this study were adolescents from randomly chosen schools in 11 European countries.

The main objective of this study was to develop and validate a universal program called *PositivaMente* for the prevention of suicidal behaviour in educational contexts aimed at 14- and 15-year-old adolescents (*PositivaMente* is a play on words in Spanish, the word *positivamente* means positively, and the two words *mente positiva* mean positive mind). The goal was to reduce the prevalence of suicidal behaviours in school-going adolescents and improve their academic and school adjustment, along with their quality of life and their wellbeing.

Method

Design

The study used a longitudinal quasi-experimental design with repeated pre-test and post-test measures with a follow-up at six months. The study had a control group and a treatment/intervention group. The unit of selection was the

school class. Class groups were assigned to the experimental and control groups randomly.

Participants

We used incidental sampling. The sample was made up of 443 students in the third year of compulsory secondary education (ESO) at four schools in the autonomous community of La Rioja (in the north of Spain). Two of the schools were state-funded and two were independent [*concertado* schools which receive state funds but are educationally more independent]. Almost half (216; 48.8%) of the sample were boys, 227 (51.2%) were girls. The mean age was 14.31 years ($SD=0.61$), and ages ranged from 13 to 16.

Students who did not participate in the majority of the program sessions and those who did not complete the post-test evaluation ($n=76$) or the six-month follow-up ($n=91$) were removed from the study. The final sample comprised 264 participants ($M=14.30$ years, $SD=0.56$ years; 54.5% girls). The control group was made up of $n=103$ participants ($M=14.40$ years; $SD=0.72$ years; 60.19% girls). The experimental group was made up of $n=161$ participants ($M=14.20$ years; $SD=0.41$ years; 50.93% girls). Importantly, participants from the control and experimental groups significantly differed in several study variables before the intervention (see Results for detailed information).

Instruments

Paykel Suicide Scale (Paykel et al., 1974)

This is a scale designed to evaluate suicidal behaviour. It has 5 items with yes/no responses. It has been used previously with Spanish adolescents with suitable psychometric quality (Fonseca-Pedrero & Pérez de Albéniz, 2020).

Adolescent Suicidal Behaviour Assessment Scale - Brief (SENTIA-Brief) (Díez-Gómez et al., 2021)

This is a self-reported evaluation with yes/no responses. It has 5 items that measure a general factor of suicidal behaviour. It has demonstrated suitable psychometric properties in Spanish adolescents (Díez-Gómez et al., 2021).

Strengths and Difficulties Questionnaire (SDQ) (Goodman, 1997)

This is an instrument used to evaluate behavioural and emotional difficulties and capacities in the social setting. It is made up of 25 items with 3-option Likert-type responses grouped into 5 subscales. Previous studies indicate that

SDQ scores demonstrate suitable psychometric behaviour in Spanish adolescents (Ortuño-Sierra et al., 2022).

Reynolds Adolescent Depression Scale Short Form (RADS-SF) (Reynolds, 2002)

The RADS-SF is a self-report used to evaluate the seriousness of depressive symptomatology in adolescents. It has 10 items with 4-option Likert-type responses. The present study used the Spanish version of the RADS-SF adapted for and validated with Spanish adolescents (Ortuño-Sierra et al., 2017).

Rosenberg Self-Esteem Scale (Rosenberg, 1965)

This instrument is a unidimensional scale for assessing self-esteem. It has 10 items which are responded to on a 4-point Likert-type scale. This study used the Spanish version which has suitable psychometric properties (Oliva et al., 2011).

Personal Wellbeing Index-School Children (PWI-SC) (Cummins & Lau, 2005; Tomy & Cummins, 2011)

This instrument was developed to evaluate subjective wellbeing in children and school-age adolescents. It has eight items with responses given between 0 and 10. It has demonstrated suitable psychometric properties in previous studies (González-Carrasco et al., 2016).

Satisfaction Questionnaire for the PositivaMente Program

This was developed according to international guidelines (Muñiz & Fonseca-Pedero, 2019). It is a self-report with 30 items about specific aspects of the program (5-point Likert-type scale). The participants were also asked for an overall assessment of the program, whether they would repeat the course, and whether they would recommend it (10-point Likert-type scale).

Procedure

The study was approved by the Department of Education of La Rioja (Spain). The instruments were administered via computer to groups of between 15 and 30 students during school hours in a classroom prepared for that purpose, under the supervision of someone collaborating with the study.

It was presented to the students as a study about emotional wellbeing, and they were assured of the confidentiality of their responses, as well as that participation was voluntary. Meetings were held beforehand with families and form teachers at the school to inform them about the *PositivaMente* program.

Table 1 The PositivaMente program: content and sessions

Block 1: Awareness, what is emotional health?	
1st Session.	Emotional health
2nd Session.	Myths about mental disorders and suicidal behaviour
3rd Session.	The Werther/contagion effect
Block 2: Risk factors and protective factors	
4th Session.	Risk factors
5th Session.	Protective factors
6th Session.	Where to ask for help
Block 3: Managing stress and crises	
7th Session.	Managing stress
8th Session.	Relaxation and breathing
Block 4: Thinking and emotion	
9th Session.	What are emotions?
10th Session.	Cognitive distortions
11th Session.	Irrational beliefs

The PositivaMente Program

The aim of the program is universal prevention of suicidal behaviour in 14 to 16 year-olds in educational contexts. It is the fruit of incorporating the components that the literature had previously shown to be most important (Table 1) (Fonseca-Pedrero et al., 2019, 2023). The specific objectives are (a) improve students' knowledge of and attitudes towards mental health, (b) develop socio-emotional competencies, (c) promote help-seeking, (d) reduce the stigma surrounding mental health problems, and (d) promote management and control of crisis situations in adolescence.

The modules of the *PositivaMente* program are taken from those programs that are effective and efficient in the prevention of suicidal behaviour. The first of these is the QPR program (Question, Persuade and Refer), a program developed in the USA that aims to train teachers and school professionals to recognise the signs of risk of suicidal behaviour in students. In addition, they try to promote communication skills in young people to seek help in case they

find themselves in risky situations (Holmes et al., 2021). The YAM (Youth Aware of Mental Health Program) aims to raise awareness about mental health and the importance of identifying warning signs in oneself and others, in order to prevent and act before the problem becomes irreversible (Wasserman et al., 2015). There are two programs under the name SOS, one of them, Signs of Suicide, is aimed at identifying risk factors among young people (Schilling et al., 2016) and the other, Sources of Strength, is aimed at identifying protective factors in each learner, as well as recognising strengths in themselves and others and learning how to enhance them (Wyman et al., 2010).

The program format was designed to be delivered over 11 in-person sessions each lasting 45 min, once a week. It uses participation as the methodology, with both group and individual work, and the use of various audio-visual techniques (e.g., videos, presentations) and classroom techniques (e.g., role playing, group work). It works on both theoretical aspects, attitudes, and skills, with one hour of additional homework each week. Individual work with homework activities was expected to take approximately 11 h. Therefore, in total, the program involves 22 h of work (11 in-person, 11 individual work) over a period of about 11 weeks (Table 2). It is worth noting that by working from universal prevention, all students in the experimental group received the same program. The in-person sessions are split into four modules, which have been designed on the basis of those programs that have shown evidence of good results in reducing suicidal behaviour and suicidal ideation in young people (Katz et al., 2013):

- Module I: awareness. The objectives are: (a) raise awareness of the importance of a healthy mental lifestyle; (b) promote positive mental health; (c) develop guidelines for promoting emotional wellbeing; (d) understand the myths about mental health and mental disorders and improve detection of warning signs for intervention and

Table 2 Structure of the PositivaMente program

Block	Sessions	Objectives	Activities
Awareness. What is mental health?	1. Mental health	Assess students' knowledge of mental disorders and emotional health. Learn the myths surrounding mental health problems and provide the correct information.	Prepare a list of ten commandments for emotional wellbeing.
	2. Mental health myths		Identify truths and myths about mental health.
	3. The Werther effect and the Papageno effect		How does someone with problems act?
Risk factors and protective factors	4. Risk factors	Identify warning signs in yourself and others. Develop skills for learning to help and listen properly.	Role Playing.
	5. Protective factors		Personal safety plan.
	6. Where to ask for help		Active listening techniques.
Stress and crises	7. Managing stress	Identify functional and dysfunctional strategies for stress. Learn techniques to deal with anxiety and solve problems.	Practice relaxation and breathing.
	8. Relaxation and breathing		Practical solutions for individual problems.
Thinking and emotions	9. Emotions	Develop emotional competencies to improve physical, social and emotional development. Identify cognitive distortions and irrational beliefs and learn how to manage them.	The 6 hats dynamic.
	10. Cognitive distortions		The ABC thinking model.
	11. Irrational beliefs		Alternative solutions for cognitive distortions.

prevention; and (e) work on the contagion effect and the importance of proper treatment of information as a preventive measure.

- Module II: risk factors and protective factors. The objectives are: (a) learn to identify warning signs in oneself and in one's peers; (b) train with communication tools and active listening; (c) learn each student's strengths and know how to reinforce them to develop and improve resilience; (d) give the student resources they can call on for help if necessary; and (e) encourage peer communication networks.
- Module III: stress and crisis. The objectives are: (a) understand how stress and anxiety really operate in our bodies; (b) improve emotional regulation through breathing and relaxation techniques in day-to-day life and in times of crisis; and (c) train problem-solving skills.
- Module IV: thinking and emotion. The objectives are: (a) communicate the importance of perceiving, understanding, recognizing, managing, and expressing emotions; (b) identify and modify cognitive distortions that affect the interaction between thoughts, action, and emotion; and (c) guide students towards recognizing their own irrational beliefs so that they can learn to manage them.

Data Analysis

The first step was to explore possible prior differences in the study variables based on participants' gender and the group they belonged to (control or experimental). To do that, we performed multivariate analysis (MANOVA) on the pre-test scores in all of the instruments used in the study (PSS, SENTIA, SDQ subscales, RADS-SF, PWI-SC, and the Rosenberg Self-esteem Scale) along with a univariate analysis of variance (ANOVA) on each of those scores, including group (experimental, control) and gender (boy, girl) as fixed factors. Then, we analysed the effect of the *PositivaMente* program by calculating the differences in all scores between pre-test and post-test, and between pre-test and follow-up. We performed multivariate and univariate analysis of covariance (MANCOVA and ANCOVA) on these differences using the group (control or experimental) as a fixed factor and the pre-test scores in the instruments as covariables. Wilks' λ was used for the multivariate analysis. The partial eta squared (η^2p) was used as an index of effect size. Finally, we calculated the descriptive statistics for the measure of satisfaction with the program and explored potential gender differences using Student's t-test for independent samples. All analyses were performed using JAMOV (version 2.3).

Results

Differences in the Study Variables Before the Intervention

The results of the MANOVA showed that girls and boys had overall significantly different scores before the intervention (Wilks $\lambda = 0.76$; $F_{(9, 252)} = 8.90$, $p < .001$). There was no significant effect for the group, control or experimental, in the pre-test scores altogether (Wilks $\lambda = 0.95$; $F_{(9, 252)} = 1.57$, $p = .127$).

However, the results for the individual ANOVAs showed that members of the control group exhibited significantly higher scores than the experimental group in suicidal behaviour (PSS $M_{exp} = 0.47$, $M_{cont} = 0.92$, $F_{(1, 262)} = 9.66$, $p = .002$, $\eta^2p = 0.036$; and SENTIA $M_{exp} = 0.26$, $M_{cont} = 0.77$, $F_{(1, 262)} = 15.38$, $p < .001$, $\eta^2p = 0.055$), depressive symptomatology ($M_{exp} = 16.2$, $M_{cont} = 17.7$, $F_{(1, 262)} = 7.21$, $p = .008$, $\eta^2p = 0.027$), and emotional problems ($M_{exp} = 2.98$, $M_{cont} = 3.68$, $F_{(1, 262)} = 6.23$, $p = .013$, $\eta^2p = 0.023$). There was also a marginally significant difference in the SDQ hyperactivity subscale, with the control group scoring higher ($M_{exp} = 4$, $M_{cont} = 4.5$, $F_{(1, 262)} = 3.35$, $p = .068$, $\eta^2p = 0.013$). In contrast, participants in the experimental group had significantly higher scores in the Rosenberg Self-esteem Scale than the control group ($M_{exp} = 31.3$, $M_{cont} = 29.7$, $F_{(1, 262)} = 5.86$, $p = .016$, $\eta^2p = 0.022$) (see Table 3).

Regarding gender, the ANOVAs showed that in the pre-test phase, girls scored significantly higher than boys in suicidal behaviour (PSS $M_{boys} = 0.47$, $M_{girls} = 0.8$, $F_{(1, 262)} = 5.38$, $p = .021$, $\eta^2p = 0.02$; and SENTIA $M_{boys} = 0.29$, $M_{girls} = 0.59$, $F_{(1, 262)} = 5.24$, $p = .023$, $\eta^2p = 0.02$), emotional problems ($M_{boys} = 2.62$, $M_{girls} = 3.78$, $F_{(1, 262)} = 19.04$, $p < .001$, $\eta^2p = 0.07$), and prosocial behaviour ($M_{boys} = 8.03$, $M_{girls} = 8.89$, $F_{(1, 262)} = 23.42$, $p < .001$, $\eta^2p = 0.08$), and had marginally higher scores in depressive symptomatology ($M_{boys} = 16.2$, $M_{girls} = 17.2$, $F_{(1, 262)} = 3.42$, $p = .066$, $\eta^2p = 0.013$). In contrast, boys had higher scores in self-esteem ($M = 32.6$) than did girls ($M = 29$), $F_{(1, 262)} = 34.76$, $p < .001$, $\eta^2p = 0.117$ (Table 3).

Because girls and boys exhibited differences in almost all of the study variables prior to the intervention, we decided to explore the effects of the *PositivaMente* program independently for each gender, both at post-test and at the six-month follow-up. Similarly, in order to account for the differences between the groups (control and experimental) in the pre-test scores in some of the instruments, we decided to include those pre-test scores as covariables in all of the analyses of covariance presented below.

Table 3 Descriptive analysis and variance of all study variables by group and gender at pre-test

	Group					Gender				
	Experimental	Control	$F_{(1,262)}$	p	η^2p	Boys	Girls	$F_{(1,262)}$	p	η^2p
Suicidal Behaviour										
Paykel	0.47 (0.93)	0.92 (1.43)	9.66	0.002	0.036	0.47 (0.95)	0.8 (1.30)	5.383	0.021	0.02
SENTIA-Breve	0.26 (0.66)	0.77 (1.44)	15.38	< 0.001	0.055	0.29 (0.79)	0.59 (1.23)	5.24	0.023	0.02
Depressive symptomatology										
RADS-SF	16.2 (3.96)	17.70 (4.7)	7.21	0.008	0.027	16.2 (4.24)	17.2 (4.35)	3.42	0.066	0.013
SDQ										
Emotional problems	2.98 (2.25)	3.68 (2.17)	6.23	0.013	0.023	2.62 (2.03)	3.78 (2.27)	19.04	< 0.001	0.067
Behavioural problems	1.7 (1.65)	2.02 (1.60)	2.37	0.125	0.009	1.99 (1.7)	1.69 (1.58)	2.27	0.133	0.008
Peer-related problems	1.08 (1.63)	1.35 (1.53)	1.79	0.182	0.007	1.27 (1.65)	1.12 (1.55)	0.57	0.45	0.002
Hyperactivity	4 (2.33)	4.50 (1.94)	3.35	0.068	0.013	4.21 (2.32)	4.19 (2.10)	0.01	0.94	
Prosocial behaviour	8.52 (1.57)	8.47 (1.36)	0.09	0.768	< 0.001	8.03 (1.61)	8.89 (1.26)	23.42	< 0.001	0.082
Self-esteem										
Rosenberg scale	31.3 (5.18)	29.70 (5.16)	5.86	0.016	0.022	32.6 (4.71)	29 (5.08)	34.76	< 0.001	0.117
Personal wellbeing										
PWI-SC	61.10 (13.9)	58.60 (15.3)	1.85	0.175	0.007	61.8 (14.9)	58.8 (14.1)	2.97	0.086	0.011

The Effects of the PositivaMente Program Post-Test

The values of Wilks' λ from the MANCOVAs showed that the effect of the group was not statistically significant for either gender (Boys: $Wilks \lambda = 0.87$, $F_{(10, 100)} = 1.42$, $p = .181$; Girls: $Wilks \lambda = 0.89$, $F_{(10, 123)} = 1.46$, $p = .164$). In other words, belonging to either the control or the experimental did not affect the changes between pre-test and post-test in the set of study variables. The univariate analyses (ANCOVAs) for each variable, including each variable's pre-test score as a covariable, confirmed this result (see Tables 4 and 5). We found no significant changes due to the intervention in boys or girls in any of the variables being studied.

The Effects of the PositivaMente Program at the 6-Month Follow-up

The results of the MANCOVAs again indicated that the effect of the group was not statistically significant for boys ($Wilks \lambda = 0.94$, $F_{(10, 100)} = 0.70$, $p = .724$) and this was confirmed by the ANCOVAs for each study variable (see Table 4). In other words, the intervention did not produce significant changes for boys at the follow-up. In contrast there was a significant group effect for girls ($Wilks \lambda = 0.74$, $F_{(10, 124)} = 4.28$, $p < .001$). More specifically, the ANCOVAs for each variable showed that the female participants in the experimental group demonstrated significant improvements in subjective wellbeing (PWI-SC) compared to the control group. In addition, there was a significantly larger fall in emotional problems (SDQ) and a marginally significant drop in peer problems (SDQ) in the girls from the experimental group compared to the control (see Table 5).

Participants' Satisfaction with PositivaMente

Table 6 shows the ratings for each satisfaction item. Given that the effect of *PositivaMente* was significantly different for girls and boys, we also explored potential gender differences. The mean participant satisfaction score for the program was 7.5 out of 10 ($SD = 1.84$). Moreover, 83% of participants would recommend the program to a friend and almost two thirds (65.1%) of participants would repeat the course. No gender differences were found in these overall satisfaction ratings. However, girls scored higher than boys in 6 items related to the teachers' attitude and pedagogical skills (e.g., "the teachers treated us with respect and affection", "the teachers gave clear explanations") and the attractiveness of content (e.g., "the practical exercises were interesting", "the group dynamics were fun") (Table 6). By contrast, boys reported higher benefits than girls in anxiety control and stress management.

Discussion

The main objective of this study was to develop and analyse the effectiveness of a universal program for preventing suicidal behaviour in educational settings. We explored the impact of the *PositivaMente* program on suicidal behaviour along with behavioural and socio-emotional adjustment in 14 to 15 year-olds from the North of Spain.

The results suggest that, unlike other programs with similar aims, *PositivaMente* did not reduce the rates of suicidal behaviour in the experimental group compared to the control group. The fact is that generally, programs that have demonstrated reductions in suicidal behaviour in adolescents have reported small effect sizes (Gijzen et al., 2022).

Table 4 Descriptive analysis and analysis of covariance of all variables at pre-test, post-test, and follow-up for boys

	Pre-test			Post-test			Follow-up			Pre-test-Post-test			Pre-test-Follow-up		
	Experimental		Control	Experimental		Control	Experimental		Control	$F_{(1,117)}$		p	$F_{(1,117)}$		p
	$M(SD)$	n		$M(SD)$	n		$M(SD)$	n		$F_{(1,117)}$	η^2p		$F_{(1,117)}$	η^2p	
Suicidal Behaviour															
Paykel	0.51 (0.96)		0.39 (0.95)	0.37 (0.80)		0.46 (1.07)	0.58 (1.14)		0.61 (1.05)	2.33	0.13	0.84	0.04	0.84	<0.001
SENTIA-Breve	0.27 (0.66)		0.34 (1.02)	0.24 (0.66)		0.37 (0.99)	0.33 (0.83)		0.42 (1.02)	0.57	0.45	0.74	0.11	0.74	0.001
Depressive symptomatology															
RADS-SF	16.1 (3.90)		16.4 (4.88)	15.8 (3.19)		15.9 (4.36)	17.5 (4.83)		16.4 (4.80)	0.05	0.83	0.25	1.35	<0.001	0.011
SDQ															
Emotional problems	2.59 (2.14)		2.66 (1.82)	2.38 (1.93)		2.68 (2.02)	3.09 (2.74)		3.05 (2.10)	0.74	0.39	0.93	0.01	0.93	<0.001
Behavioural problems	1.97 (1.70)		2.02 (1.72)	1.94 (1.84)		2.02 (1.78)	1.95 (1.81)		1.98 (1.80)	0.04	0.84	0.97	0.00	0.97	<0.001
Peer-related problems	1.23 (1.66)		1.34 (1.64)	1.27 (1.42)		1.59 (1.88)	1.52 (1.80)		1.54 (1.76)	0.95	0.33	0.99	<0.001	0.99	<0.001
Hyperactivity	4.20 (2.40)		4.22 (2.17)	4.32 (2.58)		4.39 (2.84)	4.37 (2.42)		4.63 (2.29)	0.00	0.87	0.55	0.36	0.55	0.003
Prosocial behaviour	8.00 (1.71)		8.1 (1.43)	7.85 (1.87)		8.34 (1.62)	8.44 (1.82)		8.27 (1.78)	2.50	0.12	0.55	0.35	0.55	0.003
Self-esteem															
Rosenberg scale	32.5 (4.85)		32.9 (4.45)	32.9 (4.53)		33.4 (5.49)	31.2 (5.69)		32.8 (5.66)	0.13	0.72	0.15	2.08	0.15	0.017
Personal wellbeing															
PWL-SC	62.1 (14.1)		61.3 (16.4)	65.0 (10)		64.1 (13.9)	58.1 (17.8)		60.2 (15.5)	0.10	0.75	0.48	0.51	0.48	0.003

In Spain, the SEYLE project produced robust significant differences, but from much larger sample sizes (Wasserman et al., 2015). Also in Spain, Sarrionandia and Garaigordobil (2017) designed a program to promote adolescents' emotional intelligence and found significant improvements in the experimental group compared to the control. Along similar lines, we found an improvement in the experimental group's socio-emotional variables compared to the control group at the 6-month follow up. However, these differences only appeared for girls. As other studies have found, young people aged between 11 and 14 are more likely to suffer mental health problems, and this particularly affects girls. Furthermore, the difficulties girls report in relation to mental health problems and subjective wellbeing are usually significantly greater than those of boys (Yoon et al., 2022). According to some authors, this is likely due to differential pressure for girls and boys to conform to normative gender roles when entering adolescence (Gender Intensification Theory, Avison & McAlpine, 1992). Femininity has been traditionally linked to concerns about interpersonal relations which may result in girls being more emotion-focused than boys. Furthermore, girls typically experience greater stressors to meet social expectancies (e.g., body image, social relationships, etc.) and tend to develop ruminative coping strategy in response to such stressful situations (Yoon et al., 2022). In line with this, here we found that girls presented worse mental health indicators in the pre-test than did boys. Tentatively, this baseline gender difference may have made improvements among girls more likely.

Few studies on suicidal behaviour explored the differences between boys and girls after the implementation of prevention programs (see Hamilton & Klimes-Dougan, 2015). In line with our findings from *PositivaMente*, the Sources of Strength program (Calear et al., 2016) showed that girls benefitted more than boys from that type of intervention (peer modelling and interactive activities). Similarly, Kirchner et al. (2011) found more notable improvements in women in relation to coping strategies for suicidal ideation and suicidal behaviour in general. There was a similar result from the program by Jegannathan et al. (2014) to reduce risk factors associated with suicidal behaviour through promoting life skills. Girls demonstrated higher scores in interpersonal communication, maintaining health, and life skills following the application of the program, whereas boys only exhibited improvement in interpersonal communication. The fact that in our study, girls evaluated several aspects of the program more positively (in particular, those related to the teachers' skills and positive attitude, and the attractiveness of the content) may have also contributed to higher engagement with the intervention, and ultimately to the larger improvements observed in girls (vs. boys). Altogether, this shows that a gender-based perspective needs to

Table 5 Descriptive analysis and analysis of covariance of all variables at pre-test, post-test, and follow-up for girls

	Pre-test		Post-test		Follow-up		Pre-test–Post-test		Pre-test–Follow-up	
	Experimental	Control	Experimental	Control	Experimental	Control	$F_{(1,112)}$	p	$F_{(1,112)}$	p
Suicidal behaviour										
Paykel	0.44 (0.90)	1.27 (1.58)	0.49 (1.12)	1.08 (1.57)	0.37 (0.96)	0.82 (1.44)	0.661	0.418	0.832	0.363
SENTIA-Breve	0.24 (0.68)	1.05 (1.60)	0.24 (0.71)	0.84 (1.47)	0.20 (0.81)	0.71 (1.34)	0.863	0.354	0.465	0.496
Depressive symptomatology										
RADS-SF	16.3 (4.06)	18.50 (4.44)	16.5 (4.1)	17.5 (4.6)	16.3 (4.29)	17.1 (4.80)	1.66	0.20	0.194	0.661
SDQ										
Emotional problems	3.35 (2.30)	4.35 (2.13)	3.34 (2.43)	3.98 (2.56)	2.72 (2.20)	3.85 (2.39)	0.074	0.786	5.08	0.026
Behavioural problems	1.44 (1.57)	2.02 (1.53)	1.32 (1.27)	1.77 (1.49)	1.28 (1.48)	1.24 (1.35)	1.13	0.29	0.85	0.358
Peer-related problems	0.94 (1.59)	1.35 (1.47)	1.17 (1.66)	1.52 (1.89)	0.94 (1.32)	1.58 (1.75)	0.027	0.869	3.87	0.051
Hyperactivity	3.80 (2.25)	4.69 (1.77)	3.89 (2.238)	4.44 (1.98)	3.66 (2.50)	3.85 (2.02)	0.124	0.725	<0.001	0.983
Prosocial behaviour	9.02 (1.24)	8.71 (1.27)	9.01 (1.24)	8.66 (1.46)	8.73 (1.27)	9 (1.13)	0.124	0.338	2.36	0.127
Self-esteem										
Rosenberg scale	30.1 (5.25)	27.6 (4.51)	30.2 (5.08)	29.2 (4.94)	30.6 (4.98)	30 (5.99)	2.24	0.12	0.613	0.435
Personal wellbeing										
PWL-SC	60.2 (13.8)	56.9 (14.5)	60.9 (13.6)	56 (16.1)	61.1 (15.8)	54 (19.7)	2.21	0.148	4.14	0.04
										0.03

be adopted in this regard to optimize the results of interventions, especially during adolescence. This necessarily involves taking into account the biological (e.g., hormonal and mood changes), social (e.g., gender roles, gender-specific social expectations) and personal (e.g., coping strategies, sense of efficacy, cognitive vulnerability) factors that impact differently on the development of girls and boys, and on this basis, separately design and implement interventions to males and females (Hamilton & Klimes-Dougan, 2015).

When it comes to assessment at different timepoints, although various studies have demonstrated improvements immediately after a program, there are doubts about the long-term efficacy of their results (Holmes et al., 2021). The improvements from the *PositivaMente* program only emerged at the 6-month evaluation. There have been similar results in other programs, such as GBG (the Good Behaviour Game) (Flower et al., 2014; Joslyn et al., 2019), which reported a reduction in young people's risk of suicidal ideation and attempts in the long-term follow-up (Wilcox et al., 2008). The absence of significant changes between pretest and post-test in the present study was unexpected. Although we consider any interpretation to be speculative, we believe that it may have to do with the real-life application of the content acquired during intervention. The post-test assessment took place immediately after the end of the program. Therefore, participants did not yet have time to apply what they had learned in real and meaningful situations. The fact that improvements were observed 6 months after the intervention may signal that, in order for the changes to be effective, the individual needs to make use of the skills acquired in face of life experiences. Additionally, we know that adolescent development is characterized by advances in metacognitive skills (for a review, see Moshman, 2020). Hence, it is possible that the mental health improvements were fostered by the cognitive advances that took place during that 6-month period, which allowed them to reflect on their own capacities, limitations, strengths, etc. In this line, several prevention studies with adolescents highlight the importance to focus on the long-term assessments to bypass possible latent effects (e.g., Botvin et al., 2001; Wasserman et al., 2010), and more importantly, to determine whether the results are maintained over time and whether they are cost-effective (Komro, 2020).

As we noted earlier, schools play an important role in promoting wellbeing and in preventing possible problems and issues in socio-emotional adjustment. In this regard, considering the importance of natural settings for prevention and intervention in childhood and adolescent health, schools, according to the WHO, have become “one of the most important settings for health promotion and preventive interventions in children and young adults”. The school is an ideal place for prevention and intervention because,

Table 6 Mean scores and (SD) for satisfaction with the Positiva-Mente program by gender

	Boys (<i>n</i> = 107)	Girls (<i>n</i> = 105)	Total (<i>N</i> = 212)
The content met my expectations	3.36 (1.21)	3.53 (1.04)	3.45 (1.13)
I enjoyed the content	3.40 (1.27)	3.70 (1.01)	3.55 (1.16)
The subject was dealt with as thoroughly as I hoped	3.46 (1.22)	3.77 (0.94)*	3.61 (1.10)
The content I learned have been useful in my life	3.57 (1.26)	3.69 (0.97)	3.63 (1.13)
The practical exercises were interesting	3.36 (1.31)	3.73 (1.01)*	3.55 (1.19)
The group dynamics were fun	3.64 (1.19)	4.00 (1.05)*	3.82 (1.14)
I liked the materials we were given (exercise book, videos, post-its, etc.)	3.52 (1.28)	3.67 (1.07)	3.59 (1.18)
The classroom and the furnishings were appropriate	3.80 (1.09)	3.93 (0.91)	3.87 (1.01)
I liked the media and materials used for the activities	3.64 (1.19)	3.88 (0.94)	3.76 (1.08)
The program seemed short to me	2.45 (1.40)	2.45 (1.37)	2.45 (1.38)
The teachers mastered the material	4.12 (1.03)	4.36 (0.91)	4.24 (0.98)
The teachers gave clear explanations	4.08 (0.93)	4.45 (0.87)*	4.26 (0.92)
The teachers were friendly	4.06 (1.07)	4.50 (0.90)*	4.28 (1.01)
The teachers treated us with respect and affection	4.22 (0.97)	4.57 (0.86)*	4.40 (0.93)
The teachers motivated me and piqued my interest	3.78 (1.16)	3.85 (1.12)	3.81 (1.14)
I think the program has improved my emotional resources	3.55 (1.16)	3.30 (1.26)	3.43 (1.22)
The program has helped me to understand what emotional wellbeing is	3.54 (1.20)	3.71 (1.22)	3.63 (1.21)
Since I did the program, I have a better understanding of my risk factors and protective factors	3.36 (1.26)	3.31 (1.27)	3.34 (1.27)
I think this program should be given by the school	3.69 (1.16)	3.96 (1.10)	3.83 (1.14)
I am happy with my participation in the program	3.78 (1.09)	3.92 (0.95)	3.85 (1.02)
Participating in the program has helped me control my anxiety and manage stress better	3.32 (1.20)*	2.98 (1.22)	3.15 (1.22)
The program has helped me to better understand and work on my thoughts and emotions	3.53 (1.19)	3.35 (1.20)	3.44 (1.20)
How satisfied were you with each block:			
Block 1. Awareness. What is mental health?	3.75 (1.16)	3.92 (1.02)	3.83 (1.09)
Block 2. Risk factors and protective factors	3.68 (1.21)	3.78 (1.03)	3.73 (1.12)
Block 3. Stress and crises	3.71 (1.06)	3.90 (1.10)	3.81 (1.08)
Block 4. Thinking and emotions	3.77 (1.10)	3.90 (1.00)	3.83 (1.05)

Note: All items were assessed on a 5-point Likert- scale format (1 = *completely insatisfied*; 5 = *completely satisfied*)

* $p < .05$ for Student's *t* tests comparing girls' and boys' scores

after the family setting, it is the place where children interact most, producing meaningful experiences that help them construct their identities, establish interpersonal relationships, and develop emotional skills such as resilience and self-control (Al-Halabi & Fonseca-Pedrero, 2021).

Limitations and Future Directions

This study is not without limitations, and the results should be interpreted with care. Firstly, the small sample size and the relative low diversity of the schools undoubtedly influence the extent of our findings. More importantly, the fact that the control group presented worse baseline scores in several mental health issues as compared to the experimental group may have partly masked the impact of the program implementation. However, the quasi-experimental design and the type of intervention program employed (11 sessions over a 3-month period) are strengths of the study. Secondly, it is important not to lose sight of the fact that although suicide is a serious problem, it is not very prevalent from

a statistical perspective. Such low prevalence makes it hard to find variations in the scores between intervention groups. In addition to that, we have to consider the measuring instruments capabilities of detecting possible changes in scores (both because of the nature of the phenomenon being measured, i.e., dynamic and interactive, and because of the metric properties of the instruments) and the potential decrease in participants' motivation. All these obstacles may have affected the results. However, this initial, pioneering study in Spain will allow the activities to be reviewed and modifications to be made to the content and the procedures (e.g., selection of the most active components, inclusion of other variables of functioning, implementation of technological advances such as outpatient evaluation, and longer follow-up periods) (Elosua et al., 2023). Finally, further research is needed to explore alternative therapies that are effective in the indicated prevention of suicidal behaviour, such as DBT. However, these therapies still lack evidence of demonstrated efficacy in universal prevention (Harvey et al., 2023; Martinez et al., 2022). Suicidal behaviour has a

clear impact on society today and in the future. The absence of resources at multiple levels is a real problem in light of the issues mentioned above. This social challenge needs to be addressed through research which will allow informed decision-making. The development and validation of evidence-based programs is still a priority for the prevention of suicidal behaviour and other problematic behaviours in adolescence, as is determining what treatments and which components are effective, and for whom (Ayer et al., 2022). These interventions must be accessible, effective, and evidence-based, they should use standardized protocols that will serve a large group of the population, particularly if they are dealing with young people.

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Declarations

Ethical Approval The research was approved by the Directorate General of Education of the Government of La Rioja (Spain) and the Clinical Research Ethics Committee of La Rioja (CEICLAR). All procedures were performed in accordance with the ethical standards as laid down in the 1964 Declaration of Helsinki and its later amendments or comparable ethical standards.

Informed Consent Informed consent was obtained from the parents.

Conflict of Interest The authors have no competing interests to declare that are relevant to the content of this article.

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