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Mental health promotion and suicide prevention in emerging adulthood: importance of psychoeducational interventions in University students

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Abstract

Emerging adulthood is a stage that involves significant changes in emotional, social, academic, and work domains, which can often lead to high levels of stress and mental health challenges. The purpose of this study is to explore the potential benefits of an online intervention program that is based on mental health psychoeducation and suicide risk prevention for emerging adults who are studying at university. A psychoeducational intervention was conducted with 567 participants, of whom 82.2% were female, aged between 18 and 29 years (M = 20.31; SD = 2.089). The study examines the intervention's direct impact on adaptive knowledge of suicide risk and mental health, as well as its indirect effect on mental health indicators. The results showed that after the intervention, participants exhibited reduced stigma associated with mental health and suicide, improved knowledge, and more adaptive attitudes towards suicide. Significant changes were observed in various psychological variables, including self-esteem, resilience, emotional regulation, anxiety, depression, stress, and suicide risk, in the expected direction. These findings suggest that integrating psychoeducational interventions and suicide prevention programs into university curricula could promote mental well-being and address suicide risk among emerging adult students.

Keywords Emerging adulthood · Suicide · Stigma · Mental health · Psychoeducation

Introduction

Emerging adulthood is a concept that was developed by Arnett (2007) to describe the transition between adolescence and adulthood in western industrialized countries. This transition is influenced by various factors, including labour market characteristics, globalization, changing societal roles for women, and increased support from parents during the development stage between the ages of 18 and 30. Emerging adulthood is a developmental period that is characterized by the transition for individuals who do not

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identify as adolescents but have not yet achieved the typical psychosocial tasks of adulthood (García-Álvarez et al., 2022; Rodrich Zegarra, 2020). From a developmental psychology perspective, it can be argued that the university phase coincides with the period of life known as Emerging Adulthood. This stage is generally considered to occur between the ages of 18 and 29, during which young people do not see themselves as adolescents, yet most do not feel that they have reached adulthood either (Arnett, 2000, 2004, 2007, 2011, 2012). This period of life is often associated with the exploration of identity, instability, optimism, self-centeredness, and a sense of being in between adolescence and adulthood. It is important to note that these characteristics may vary depending on the cultural context in which the individual develops (Arnett et al., 2011).

This phase is characterized by unique demographic, social, and subjective psychological features (Hochberg & Konner, 2020). This broader range acknowledges that emerging adulthood is a culturally constructed period influenced by both developmental markers and the evolutionary context, which contributes to its lack of universal definition (Arnett et al., 2014; Hochberg & Konner, 2020; Keating et al., 2021). During this phase, individuals undergo essential developmental processes, including acquiring the necessary characteristics for self-sufficiency, engaging in mature and committed relationships, assuming adult roles and responsibilities, and obtaining education and training that lay the groundwork for their future adult work (Barrera-Herrera & Vinet, 2017; Wood et al., 2018).

During emerging adulthood, it is common for individuals to undergo significant developmental changes, including emotional and neuroanatomical variations (Baggio et al., 2017). Additionally, they often establish specific goals in various domains such as relationships, family, education, vocation, and residential autonomy. However, if these outcomes do not align with the social expectations of this stage or those set by the individual, it may result in increased stress and anxiety levels. According to research conducted by Orth et al. (2015) and Tetzner et al. (2016), university students may experience lower self-esteem scores during their early years due to academic demands being perceived as anxiety-inducing. This is a matter of concern as low self-esteem is a known predisposing factor for depression and suicidal behaviours during emerging adulthood, as noted by Bennik et al. (2019).

Emerging adulthood is a period where stress management is crucial, and research suggests that low resilience may be linked to stress-related issues (Wilks & Spivey, 2010). In the academic setting, low resilience has been associated with decreased psychological well-being and procrastination (Hernández et al., 2019). It has been suggested that emerging adults who struggle with emotional regulation may be at a higher risk of developing clinical symptoms, including but not limited to anxiety, depression, stress, somatic complaints, and suicidal behaviours (Jiménez-Ballester, 2022).

Suicide remains a significant global public health concern, with approximately 700,000 deaths attributed to it each year worldwide (World Health Organization [WHO], 2021). In 2021, there were 4,003 suicide deaths in Spain, with 316 occurring in individuals aged between 15 and 30 (National Institute of Statistics [INE], 2022a, b). While suicide is more prevalent among males, females exhibit higher rates of suicidal ideation and behavior (Lacomba-Trejo et al., 2022).

Suicide encompasses affective, cognitive, and motor aspects. Mental health problems and suicide have been associated with individuals' erroneous beliefs and significant social stigma (Lacomba-Trejo et al., 2022). Socially established myths contribute to the stigma surrounding individuals with mental health difficulties or suicidal ideation, reducing the likelihood that these individuals or those around them will seek help (Pan American Health Organization [PAHO], 2020), preventing them from accessing treatment and, therefore, distancing them from the necessary help to improve their health problems and reduce the risk of suicide (Zamorano et al., 2022). The scientific literature suggests that certain factors may increase the risk of suicide during emerging adulthood, including higher age, anxiety, and depression, greater misinformation and stigmatization towards suicide, and low self-esteem, resilience, and emotional regulation (Siqueira Pereira et al., 2016; Siqueira Pereira et al., 2018).

When focusing on protective factors against suicide risk, according to the literature (Hochberg & Konner, 2020; Pereira et al., 2018; Wood et al., 2018), the relevant factors are: sociodemographic (normative gender, younger age, having a partner, higher education level, higher socioeconomic status, economic stability), personal (healthy habits, problem-solving skills, high self-esteem, high resilience, emotional competence, and emotional regulation skills), or social ones (positive and functional dynamics and communication within the family, friendships, and romantic relationships). These protective factors can help individuals cope with and mitigate their difficulties.

During emerging adulthood, high self-esteem and resilience, as well as emotional regulation skills, significantly reduce anxiety and improve coping skills in the face of challenges in the university context (Mao et al., 2020). These factors facilitate adaptive responses to stressful events during this crucial period, reducing the potential for maladaptive emotional responses and promoting positive moods (Gilmore, 2019; Lacomba-Trejo et al., 2022). Young people with higher levels of self-esteem and greater emotional competence demonstrate greater resilience in coping with emotional symptoms (Reed-Fitzke et al., 2015). Furthermore, high resilience is associated with greater perceptions of environmental support and

adaptive coping strategies (Hernández et al., 2019). In emerging adulthood, effective emotional regulation promotes a sense of openness to new experiences and helps to approach change with optimism (Jiménez-Ballester, 2022). It is also associated with higher levels of self-esteem and a hopeful outlook on the future (Webster et al., 2018).

Our research focuses specifically on this population, recognising the challenges and pressures that people face during the transitional period of university life, a time when emotional stress can arise and increase the risk of suicide. Typically, emerging adults have a lack of knowledge about suicide and mental health (beliefs about suicide myths) and show psychological distress and mental health problems (depression, anxiety, stress and suicide risk) (Ibáñez-Vizoso et al., 2020; Jiménez-Ballester, 2022; Russell & Anderson, 2019; WHO, 2021). Regarding their socio-demographic variables (gender identity and age), female students show higher scores on psychopathological variables (anxiety, depression, stress, suicide risk) (González et al., 2020; Vallejo-Martín et al., 2018), than males (who are expected to have higher levels of psychological variables such as self-esteem, emotional regulation and resilience) (Jiménez-Ballester, 2022), and finally, the use of psychopathological risk increases with age (González, 2017; Jiménez-Ballester, 2022).

In general, differences based on academic variables are also observed. In terms of academic disciplines, psychology students show less stigma towards suicide than other disciplines. Unfortunately, at the same time, health and social care students tend to score higher on psychopathological indicators (Nayak & Sahu, 2022).

Studies have indicated that psychoeducational interventions are a valuable tool for providing knowledge, skills, and strategies to improve the emotional well-being of emerging adults and reduce the stigma associated with these mental health issues (Paula Amaral et al., 2020; Zapata-Ospina, 2021). Using psychoeducational interventions as a resource can lead to changes in attitudes, behaviors, and personal and social understanding of mental health and suicide risk. They serve as a prevention and transformative tool involving three processes (biological, cognitive, and social), which can enhance the quality of life and autonomy (Godoy et al., 2020; Irarrázaval et al., 2016). It provides individuals with tools and strategies to understand and address their own mental health challenges. This strengthens their ability to make informed decisions about their emotional well-being and to actively participate in their own recovery process. Psychoeducation helps prevent mental health problems by providing information about risk factors, warning signs and adaptive coping strategies. It helps individuals identify and understand the nature of their problems, promotes self-care practices and emotional regulation skills, and provides a more informed and optimistic perspective on recovery and resilient coping.

Firstly, our research will focus on examining the characteristics of our sample in order to highlight the relevance of applying a psychoeducational intervention programme to improve their mental health. Therefore, we started by describing their profile before looking at the changes that occurred in them after receiving the psychoeducational intervention. The aim of our study is based on the following research question “What are the benefits of implementing an online intervention programme based on mental health psychoeducation and suicide risk prevention in emerging adults studying at university?“. The study analyses the direct effect of the intervention on adaptive knowledge of suicide risk and mental health, and the indirect effect of improving mental health indicators.

The use of an online psychoeducational intervention programme is approached from the need to create an accessible resource tailored to the actual time availability, preferences and technological realities of this generation of emerging adults. We seek to understand the extent to which psychoeducation delivered in an accessible and digital manner can influence suicide risk prevention by providing knowledge, tools and resources adapted to the psychological challenges of emerging adults at university. Suicide prevention is not an isolated goal but is intrinsically linked to broader emotional well-being. We see psychoeducation as an accessible and valuable tool in terms of its contribution to mental health, providing knowledge, skills and resources that facilitate better understanding and management of one’s emotional experiences. Studies show how psychoeducation interventions promote a new integration in the mental maps of those who receive them, facilitating the reduction of mental health stigma and a greater awareness of the social and personal risk of suicide. Psychoeducation provides accurate information about mental health and indicators of suicide risk and mental health difficulties. It increases awareness of suicide and mental disorders, promotes a more understanding and supportive social context, more effective suicide prevention, and improves personal resources to better manage mental health difficulties (Godoy et al., 2020; Irarrázaval et al., 2016; Maple et al., 2022; Paula Amaral et al., 2020; Zalsman et al., 2016; Zhao et al., 2015; Zapata-Ospina, 2021).

Suicide is a complex phenomenon that can be influenced by various psychological, biological, social, and hereditary factors. Additionally, it is affected by socio-cultural and environmental aspects, making it a multifactorial issue related to suicidal behaviours. Recent theoretical frameworks, such as Turecki et al.‘s (2019) integrative model, propose distal, mediating, and proximal factors

that contribute to this complex issue. According to this model, it is suggested that the development of suicide risk is a complex process that involves various factors, including biological factors such as genetics, psychological factors such as certain personality traits, clinical factors such as comorbid psychiatric illnesses, social factors, and environmental factors. Due to the involvement of multiple risk factors in the transmission of suicide risk, it can be challenging to determine an individual's suicide risk. This challenge involves focusing on universal prevention and the development of timely, effective, low-cost, and highly efficient early detection and intervention resources.

In line with our objective, the following working *hypothesis* is proposed:

It posits that there will be significant intrasubject differences between pre- and post-psychoeducational intervention scores. Specifically, it is anticipated that the psychoeducational intervention will yield the following effects (Godoy et al., 2020; Irarrázaval et al., 2016; Maple et al., 2022; Paula Amaral et al., 2020; Vale & Míguez, 2021; Zalsman et al., 2016; Zhao et al., 2015; Zapata-Ospina, 2021):

a) A direct effect, an increase in the presence of healthier ideas regarding suicide myths and a reduction in stigma related to suicide and mental health.
b) An indirect effect, leading to an improvement in mental health indicators (decrease in anxiety, depression, stress and suicide risk scores and increase in self-esteem, emotional regulation and resilience).

Table 1 General information on sociodemographic and academic variables

Variable	General Sample ($n = 567$)
Type of Study	
University Degree	97,5%
Postgraduate Degre (Master)	2,5%
Discipline	
Psychology	62,6%
Other health-related disciplines	14,4%
Sociosanitary disciplines	10,6%
Educational disciplines	7,8%
Communication and public relations disciplines	1,2%
Legal-criminological disciplines	1,2%
Prior suicide Training	34,9%
Yes	65,1%
No	82,2%
Gender	16,9%
Woman	5%
Men	
Non-binary	
Nationality	92,9%
Spanish nationality	3,2%
Other european nationalities	2,8%
Latin american nationalities	0,5%
Asian nationalities	0,5%
African antionalities	

Methods

Participants

Initially, a total of 1,128 students from various university and postgraduate courses at the Universitat de València, Universidad Miguel Hernández, Universidad Rey Juan Carlos, and ESIC Business & Marketing School participated in the research across different courses in 7 different knowledge areas. After applying the inclusion criteria, the final sample consisted of 567 students.

The total number of students enrolled in the Spanish University System (SUE) in the academic year 2022–2023 was 1,722,247. Undergraduate students accounted for 78.6% of enrolled students, Masters students for 16.0% and Doctoral students for 5.4% (data retrieved from https://www.universidades.gob.es/wp-content/uploads/2023/06/Principales-resultados_EEU_2022-23.pdf). According to these data, with a confidence level of 95% and a margin of error of 5%, our sample should be at least 385 people. Therefore, our final sample of 567 university students is representative of this population in Spain.

The inclusion criteria for participation were as follows: (a) being students at a Spanish university at the time of the evaluation, (b) pursuing any of the graduate or postgraduate disciplines included in this research, research (the 23 disciplines included in the study were grouped into the following 7 categories or fields: psychology, medicine, other health disciplines, social health disciplines, educational disciplines, legal-criminological disciplines, and communication and public relations disciplines), (c) falling within the age range of 18–29 years at the time of evaluation, (d) having completed the assessment protocol twice (before and after attending the psychoeducational intervention) and having attended the psychoeducational intervention on suicide prevention and risk.

Table 1 shows the distribution of socio-demographic variables and academic disciplines. Among the students included in the study, almost all were enrolled in a university degree programme (97.5%). More than half of the students came from psychology (62.5%) or other health disciplines (14.4%), followed by those studying social health disciplines (10.6%). Smaller percentages were also represented by students of education, communication and public relations, and law and criminology.

Notably, most of the participants had not received any previous training on suicidal ideation and behaviour. In

terms of gender, the majority of the sample were women (82.2%). Participants were aged between 18 and 29 years, with a mean age of 20.31 and a standard deviation of 2.089. In terms of nationality, the majority of participants were Spanish (92.9%).

Instruments

An ad hoc registry was developed to collect *sociodemographic* and *academic variable*s and assess the cognitive evaluation of the student population regarding a list of *suicide myths* (Pan American Health Organization [PAHO], 2020; WHO, 2021). This registry consists of 16 questions, with each statement corresponding to a suicide myth, and two response options for each question (true/mostly agree with the statement or false/mostly disagree). In the present study, the ad hoc registry demonstrated a reliability coefficient of 0.448, indicating a certain level of reliability for the measurement instrument.

The socio-demographic variables examined in the sample were gender, age, nationality and studies completed or in progress at the time. On the other hand, clinical variables related to mental health and suicide risk were recorded, such as the presence of mental health problems, suicidal ideation and suicide attempts, as well as the presence of suicidal behaviour or verbalisations in family members or people close to the subject. We also asked about previous training in suicide risk prevention.

Anxiety, depression, and *stress* were assessed using the Depression Anxiety Stress Scales (DASS-21), utilizing the validated abbreviated version for Spanish university students (Bados et al., 2005), derived from the original DASS-42 scale (Lovibond & Lovibond, 1995). The DASS-21 consists of the subscales DASS-A (anxiety), DASS-S (stress) and DASS-D (depression). The DASS-21 is an instrument composed of 21 items, 7 for each subscale, with a Likert-type rating from 0 to 3 points (0: Not at all applicable to me, 1: applicable to me to some degree, or a small part of the time, 2: applicable to me to a considerable degree, or a good part of the time, 3: Very applicable to me, or applicable most of the time). Based on the ratings obtained, participants are classified in each of the 3 subscales as follows: Anxiety: normal (0–7 points), mild (8–9), moderate (10–14), severe (15–19), and extremely severe (> 19). Depression: Normal (0–9 points), mild (10–13), moderate (14–20), severe (21–27) and extremely severe (> 27). Stress: Normal (0–14 points), mild (15–18), moderate (19–25), severe (26–33) and extremely severe (> 33).The psychometric properties of the DASS-42 and DASS-21 were analyzed in the study by Bados et al. (2005), and other studies conducted on the DASS-21 in Spanish samples indicate that it demonstrates adequate psychometric properties (Fonseca et al., 2010). In this study, the reliability of the DASS-21 is 0.929, and when analyzed by subscales, it is 0.862 for DAS-A, 0.877 for DAS-D, and 0.844 for DAS-E.

Self-esteem was evaluated using the Rosenberg Self-Esteem Scale (RSE; Rosenberg, 1965; Spanish version by Martín et al., 2007). The scale assesses attitudes towards the self using a 4-point Likert-type items, where 1 corresponds to 'strongly disagree' and 4 corresponds to 'strongly agree'. The scale score is obtained by summing the scores of the individual items, taking into account that half of the items are reversed (items 2, 5, 8, 9 and 10). A score equal to or higher than 30 indicates high self-esteem, between 26 and 29 indicates moderate self-esteem, and equal to or lower than 25 indicates low self-esteem. In our study, the reliability of the RSE is 0.89.

Resilience was assessed using The Connor-Davidson Resilience Scale (CD-RIESGO). Resilience was assessed using the Spanish version of the Connor-Davidson Resilience Scale (Connor & Davidson, 2003). The original questionnaire consists of 25 items; however, in this research, the reduced version of 10 items was used due to its simplicity and brevity, as well as its favourable psychometric properties (Notario-Pacheco et al., 2011). It assesses resilience to aversive events using a 5-point Likert scale, where 0 corresponds to 'strongly disagree' and 4 to 'strongly agree'. In the study, the reliability is 0.83.

Emotional regulation was evaluated using the Emotion Regulation Questionnaire (ERQ) (Gross & John, 2003) in its Spanish adaptation (Cabello et al., 2013). The questionnaire consists of 10 items on a 7-point Likert scale, where 1 is 'strongly disagree' and 7 is 'strongly agree'. It has a factorial structure with two unrelated factors: cognitive reappraisal and emotional suppression. The first factor assesses the ability to create new meanings for events or emotions that have been processed negatively with 6 items (items 1, 3, 5, 7, 8 and 10). The second factor refers to the containment of the emotional reaction, mainly in the case of negative punctuation, with 4 items (items 2, 4, 6 and 9). The scale score is obtained by summing the scores of the items of each dimension. For this study, the overall reliability of the ERQ is 0.70. Specifically, the reliability of the *cognitive* reappraisal subscale is 0.764, and the reliability of the *emotional* suppression subscale is 0.806.

Suicide risk was assessed using the abbreviated SENTIA-Breve suicidal behavior risk scale, validated for the Spanish population (Díez-Gómez et al., 2020). This version of the questionnaire, which consists of 5 dichotomous scale items (yes/no), is useful as a screening tool to identify people at risk of suicide. The scale score is obtained by adding the scores of the items, so the higher the score, the higher the risk. In our study, the reliability of this scale was 0.788.

Procedure

Using non-probabilistic, purposive or convenience sampling, the 42 university professors involved in the project informed their students about this study and asked them to participate voluntarily and anonymously. The study was disseminated in different university curricula (23 different disciplines (with their respective degrees and 6 associated Master's degrees) in the different undergraduate and Master's degree courses in different Spanish universities (4 participating universities) during the academic year 2022/2023.

The project had a longitudinal design and the evaluation was carried out at two different time points, pre-test and post-test, before and after the students' participation in the online intervention on suicide, a 3-hour online psychoeducational intervention (via Zoom) on mental health and suicide risk prevention, entitled "Opening Taboos on Suicide": Promoting Interdisciplinary University Education". Students completed the surveys and attended the conference for only one quarter of the course.

Using the described measurement instruments, a computerized questionnaire was created using the LimeSurvey platform for online assessment. Upon accessing the platform, students had to read the project information sheet and provide informed consent. They were also informed about the confidential use of the data solely for research purposes and the anonymity of their responses. This study received approval from the Ethics Committee. The student sample participated in the study during the academic year 2022–2023.

The psychoeducational intervention on suicide prevention and risk was delivered online (via the Zoom platform) by an expert psychologist in the field, with a duration of 2 h of training (in which the explanation was combined with dynamic reflection with questions posed to the participants, who responded via chat), plus 1 h of subsequent debate-colloquium between the participants and four expert psychologists. During these 3 h, it was possible to inform and reflect on essential topics to promote awareness, understanding and action in relation to mental health and suicide. The main contents of the intervention were:

1. Suicide prevention and risk: definition: Clarification of the concept of suicide and its impact on society; risk and protective factors: Identification of factors that increase or decrease the risk of suicide, including individual, social and environmental aspects.
2. Reducing the stigma of mental health: Demystifying mental health and the stereotypes and prejudices associated with mental disorders.
3. Explain and clarify myths associated with suicide: Dismantling common myths: Addressing misconceptions about suicide to promote a more realistic and empathetic understanding.
4. Epidemiological data: Current statistics: Presenting figures on suicide and mental health.
5. Data on psychopathological diagnoses: Major mental disorders associated with suicide risk: information on disorders such as depression, bipolar disorder, anxiety disorders, etc. and their association with suicide risk.
6. Recognising warning signs of mental health problems and suicide risk: behaviours and expressions: Identifying signs that may indicate suicide risk, such as changes in behaviour, verbal and emotional expressions.
7. Psychological Resources to Use: Therapeutic Tools: Description of effective therapeutic approaches and resources to address mental health and suicide risk.
8. Emergency and Crisis Action Plan: Steps to take in critical situations: Explanation of a plan for dealing with crisis and emergency situations related to suicide risk.
9. Crisis support for the suicidal person: Immediate intervention techniques: Information on how to approach and support someone in crisis.
10. Family and social group support: Information on how family and friends can play an active role in providing emotional support and seeking professional help.
11. Resources to turn to: Websites, blogs, associations and public/private resources: List of online resources, organisations and services available for information and support.

Data analysis

The statistical analyses were conducted using SPSS version 28.0 for Windows. The analyses included reliability analysis, descriptive statistics (T-tests, one-way ANOVA, Cohen's d, partial Eta squared, Pearson correlation, linear regression), and within-subject analysis (repeated measures T-test).

Results

Regarding the participants' mental health history, 11.8% currently experience mental health problems, while 18.3% have experienced them in the past. Approximately 41.1% believe they have never experienced such issues, and 28.7% are unsure.

In terms of suicide risk, approximately one-third of participants (33.9%) reported having thoughts about suicide, while the majority (66.1%) did not report such thoughts. Furthermore, 64.9% of participants mentioned having a close person who exhibited suicidal behaviors or expressed

Table 2 General information on psychological variables

Variable	General Sample		
	M (SD)	*Skewness (SE)*	*Kurtosis (SE)*
Anxiety	8,05 (7,748)	1,279 (,103)	1,311 (,205)
Depression	9,94 (8,745)	1,231 (,103)	1,219 (,205)
Stress	18,93 (8,548)	,382 (,103)	-,437(,205)
Self-esteem	28,81 (5,738)	-,229 (,103)	-,504 (,205)
Resilience	24,86 (6,045)	-,439 (,103)	,607 (,205)
Cognitive reappraisal	28,46 (6,071)	-,421(,103)	,350 (,205)
Emotional suppression	13,74 (5,800)	,190 (,103)	-,712 (,205)
Suicide risk	1,13 (1,457)	1,114 (,103)	,118 (,205)
Suicide myths	2,83 (1,892)	,624 (,103)	,271 (,205)

suicidal thoughts. Additionally, 15% of participants had experienced a close loss due to suicide.

Prior to the psychoeducational intervention, as we can observe in Table 2, participants displayed the following levels in main psychological variables: (a) mild anxiety and depression, as well as a moderate level of suicide risk; (b) moderate levels in stress, self-esteem and emotional regulation, and also moderate scores in cognitive reappraisal and emotional suppression; and finally, (c) low resilience levels.

In terms of participants' knowledge of suicide issues prior to the educational intervention, the mean scores for the myths assessed did not exceed 3 out of 10. Higher scores indicate greater misinformation and stigma. Thus, the participants had a considerable level of knowledge about suicide issues.

According to Table 3, there were no significant differences based on gender for the variables of *anxiety, depression, self-esteem, resilience, cognitive reappraisal, suicide risk*, and *suicide myths*. However, in the case of stress, higher levels were observed among female participants, while in the case of emotional suppression, higher levels were found among male participants.

Upon analyzing Table 4, no significant differences were found in the variables of *anxiety, depression, stress, self-esteem, resilience, cognitive reappraisal*, and *suicide risk* based on the academic disciplines of the university students.

However, statistically significant differences were observed in *emotional suppression* and *suicide myths* variables across academic disciplines. Specifically, students in other health-related disciplines exhibited higher emotional suppression levels than psychology students.

Regarding suicide myths/stigma, significant differences were observed between psychology students and students from other health-related disciplines. The latter group displayed higher levels of misinformation and stigma towards suicide, while students in the education disciplines had higher mean scores than psychology students. Comparing students from other health-related disciplines with those in legal-criminological disciplines, the former group showed higher misinformation and stigma.

Furthermore, it was observed that students in sociosanitary disciplines exhibited higher stigma levels than those in legal-criminological disciplines. However, it is important to note that the effect sizes were small, as indicated by the partial eta-squared values.

The relationships between the psychological variables and age demonstrated a weak magnitude, with correlation coefficients ranging from 0 to 0.20. Among these variables, the association between age and suicide myths before the psychoeducational intervention showed the strongest linear relationship, albeit still weak, with a negative correlation coefficient of -0.148. This finding suggests that as age decreased, there was a slight increase in stigma and misinformation surrounding suicide. However, it is important to note that the strength of this relationship was minimal, indicating that age alone cannot fully account for the variations observed in stigma and suicide myths.

A linear regression model was used to analyze the data and assess the predictive ability of the study variables. The dependent variable was the suicide risk measured at evaluation time 2 (post-treatment). In contrast, the independent variables consisted of two sociodemographic factors (age and gender) and the remaining psychological variables examined in the study.

Table 3 Comparison of means by gender

Variable	Gender		t	*p*	d
	Female *M (SD)*	Male *M (SD)*			
Anxiety	8,08 (7,906)	6,96 (8,055)	1.263	,104	7,932
Depression	9,26 (8,543)	9,90 (8,980)	−0.673	,251	8,619
Stress	18,68 (8,696)	15,70 (8,077)	3,111***	,001	8,593
Self-esteem	29,13 (5,589)	29,25 (5,741)	-,193	,424	5,616
Resilience	25,44 (5,503)	26,24 (5,299)	-1,313	,095	5,469
Cognitive reappraisal	28,85 (6,317)	28,38 (5,724)	,678	,249	6,219
Emotional suppression	13,36 (5,907)	15,81 (5,546)	-3,764***	,001	5,847
Suicide risk	1,0107 (1,44650)	1,0825 (1,46962)	-,443	,329	1,450
Suicide myths	2,18 (1,804)	2,55 (1,826)	-1,703	,405	1,808

Note t: T−test statistic; *p*: significance; *$p \leq 0.05$; **$p \leq 0.01$; ***p 0.001; Cohen's d = Small effect size ≈ 0.20; Moderate effect size ≈ 0.50; Large effect size ≈ 0.80

Table 4 Comparison of means based on the academic discipline of origin

Variable	Disciplines					F	*p*	η^2
	Psychology(*SD*)	Health D. *(SD)*	Sociosan. D. *(SD)*	Educ. D. *(SD)*	Legal-CriM D. *(SD)*	Com & PR D. *(SD)*			
Anxiety	7,31 (7,515)	9,13 (7,797)	7,99 (8,787)	10,64 (9,935)	5,96 (4,861)	9,33 (10,777)	2,021	,074	,018
Depression	9,02 (8,562)	10,87 (8,904)	8,63 (9,254)	10,98 (8,229)	5,83 (4,381)	13,00 (11,015)	1,506	,186	,013
Stress	17,90 (8,902)	19,08 (7,531)	18,68 (9,604)	18,81 (8,599)	15,17 (8,477)	18,25 (6,134)	0,501	,775	,004
Self-esteem	29,48 (5,671)	28,10 (5,288)	29,76 (5,856)	27,41 (6,032)	28,83 (5,672)	30,57 (4,429)	1,966	,082	,017
Resilience	25,94 (5,497)	24,30 (5,390)	26,21 (5,425)	24,16 (5,874)	28,67 (4,844)	22,57 (4,392)	2,878*	,014	,025
Cognitive reappraisal	28,71 (6,395)	28,71 (5,272)	28,95 (5,630)	28,00 (8,055)	31,83 (8,542)	29,29 (3,904)	,435	,824	,004
Emotional suppression	13,04 (5,896)	16,14 (5,258)	14,52 (6,225)	14,34 (6,160)	10,33 (2,066)	13,00 (5,066)	4,955***	,001	,042
Suicide risk	1,1124 (1,50071)	,7872 (1,26892)	,6724 (1,27579)	1,5 (1,66356)	1,3333 (1,75119)	,7143 (1,25357)	2,477*	,031	,022
Suicide myths	1,68 (1,483)	3,49 (2,033)	3,22 (1,781)	2,68 (1,847)	1,40 (,894)	3,00 (2,00)	21,541***	,001	,178

Note Health D. = Health discipline; Sociosan. D. = Sociosanitary discipline; Educ. D. = Education discipline; Legal–Crim D. = Legal–Criminological discipline; Com & PR D. = Communication and Public Relations discipline; *$p \leq 0.05$; **$p \leq 0.01$; η^2 = Partial Eta squared; Partial Eta squared: Small effect size ≈ 0.02; Medium effect size ≈ between 0.15 and 0.3; Large effect size ≈ 0.3

Table 5 Linear regression of suicide risk and psychological variables, age, and gender

Predictor	Suicide risk				
	R^2_{aid}	ΔR^2	ΔF	β	*t*
1	,019*	,019	*4,923*		
Age Post				,138	3,112
Gender Post				,014	,323
2	,044*	,025	*6,348*		
Age Post				,112	2,498
Gender Post				,026	,579
Suicide myths Pre				-,108	-2,095
Suicide myths Post				-,074	-1,449
3	,321*	,277	*66,826*		
Age Post				,101	2,678
Gender Post				-,009	-,231
Suicide myths Pre				-,082	-1,888
Suicide myths Post				-,083	-1,915
Anxiety Post				,107	1,891
Depression Post				,525	9,347
Stress Post				-,141	-2,812
4	,322*	*,001*	*,217*		
Age Post				,100	2,642
Gender Post				-,007	-,183
Suicide myths Pre				-,079	-1,787
Suicide myths Post				-,083	-1,895
Anxiety Post				,105	1,850
Depression Post				,526	9,071
Stress Post				-,141	-2,799
Cognitive R. Pre				-,022	-,557
Emotional S. Pre				-,013	-,318
5	,343*	,021	7,820		
Age Post				,107	2,822
Gender Post				,010	,259
Suicide myths Pre				-,079	-1,809
Suicide myths Post				-,072	-1,668
Anxiety Post				,104	1,844
Depression Post				,445	7,322
Stress Post				-,149	-3,004
Cognitive R. Pre				-,004	-,092
Emotional S. Pre				-,048	-1,167
Self-esteem Pre				-,206	-3,851
Resilience Pre				,049	1,012
Durbin-Watson			1,311		

Note ΔR2=change in R2; *ΔF=change in F;* β=regression coeficient; t= t–test statistic; **p* ≤0,05; ***p* ≤0,01

The model consisted of five differential steps, as shown in Table 5. The two sociodemographic variables (age and gender at post-treatment) were included. Secondly, the variables related to suicide myths and stigma were added before and after the intervention (pre and post). Next, the variables from the DASS-21 questionnaire (anxiety, depression, and stress) were included (post). The two subscales of emotional regulation (pre) were added. Lastly, the psychological variables of self-esteem and resilience (pre) were included in the model.

Firstly, the results reveal a significant increase in variance across the five steps.

As for the beta coefficient, positive associations were found for age, gender, anxiety, depression, and resilience, indicating that higher levels of these variables are linked to an increased risk of suicide.

Conversely, negative beta coefficients were observed for suicide myths before and after the educational intervention and for stress, cognitive reappraisal, emotional suppression, and self-esteem. This suggests that higher levels of these variables are associated with a decreased risk of suicide. However, it is important to note that the beta coefficients, in general, are relatively low, except for the depression and self-esteem variables. Thus, higher levels of depression are associated with a heightened risk of suicide, whereas higher levels of self-esteem indicate a lower risk of suicide.

The results obtained from the related means comparison tests between the two time points, namely before and after the psychoeducational intervention, are as follows.

In Table 6, significant differences are evident in the variables of *suicide myths, depression, stress, self-esteem, resilience*, and *suicide risk*, with p-values below the chosen significance level ($\alpha = 0.05$). These findings indicate that, following the treatment, participants reported reduced levels of stigma towards suicide and lower levels of depression, stress, and suicide risk. Moreover, there was an increase in self-esteem and resilience.

As for the remaining variables, *anxiety, cognitive reappraisal*, and *emotional suppression*, no statistically significant differences were observed at the 0.05 level.

Discussion

This study aims to analyze the benefits of implementing an online intervention program based on mental health psychoeducation and suicide risk prevention in emerging adults studying at university.

Table 6 Comparison of related means

Pairs	Variables	t	*p*
1	Anxiety Pre & Anxiety Post	,325	,373
2	Depression Pre & Depression Post	1,815*	,035
3	Stress Pre & Stress Post	2,236*	,013
4	Self-esteem Pre & Self-esteem Post	-2,132*	,017
5	Resilience Pre & Resilience Post	-4,055***	,001
6	Cog. R. Pre & Cog. R. Post	-1,155	,124
7	Emot. S. Pre & Emot. S. Post	-,320	,375
8	Suicide risk Pre & Suicide risk Post	2,514**	,006
9	Suicide myths Pre & Suicide myths Post	6,680***	,001

Note Cog. R. = cognitive reappraisal; Emot. S. = emotional suppression; *$p \leq 0.05$; **$p \leq 0.01$; ***$p \leq 0.001$

The relevance of applying a psychoeducational intervention program was assessed by examining the characteristics of our sample. Based on our study, we confidently recommend a psychoeducational intervention for the individuals we have assessed.

As supported by scientific literature, emerging adulthood is a stage where psychological difficulties are common due to the various stressors that university students face. Our sample exhibited mild to moderate symptoms of psychopathological variables, including anxiety, depression, stress, and suicide risk. Previous scientific studies have shown moderate levels of psychological variables such as self-esteem, emotional regulation, and resilience, with the exception of resilience, which demonstrated comparatively lower scores (Ibáñez-Vizoso et al., 2020; Jiménez-Ballester, 2022; Russell & Anderson, 2019; WHO, 2021).

The findings on socio-demographic factors were consistent with data from previous scientific literature. Females show higher levels of stress than males (González et al., 2020; Vallejo-Martín et al., 2018).Conversely, males show higher levels of emotional suppression than females. Furthermore, differences in suicide stigma and emotional regulation are observed between academic disciplines. The group of other health-related disciplines shows higher levels of suicide stigma and emotional suppression compared to psychology students. Furthermore, there are more cognitive distortions towards suicide among health, social welfare and education disciplines compared to psychology and law and criminology disciplines (Nayak & Sahu, 2022). However, the results regarding the relationship between age and the psychological variables of the study are not consistent with the scientific literature, as negligible relationships were observed (González, 2017; Jiménez-Ballester, 2022). A possible explanation is that the majority of the sample falls within a narrow age range of 18–21 years.

In our sample, the predictors of suicide risk are consistent with the existing scientific literature (Siqueira Pereira et al., 2016; Siqueira Pereira et al., 2018). The results indicate that higher levels of anxiety, depression, age and female gender are associated with an increased risk of suicide. Conversely, higher levels of self-esteem, cognitive reappraisal and knowledge about suicide are associated with a lower risk of suicide. However, the results also reveal data that require further investigation in future studies. In particular, higher levels of resilience were unexpectedly associated with an increased risk of suicide. In contrast, higher levels of stress, emotional suppression and suicide stigma are unexpectedly associated with a lower risk of suicide.

Regarding the benefits of receiving a psychoeducational intervention, our results are in line with the literature (Godoy et al., 2020; Irarrázaval et al., 2016; Maple et al., 2022; Paula Amaral et al., 2020; Vale & Míguez, 2021; Zalsman et al., 2016; Zhao et al., 2015; Zapata-Ospina, 2021). In line with our

hypothesis, following the psychoeducational intervention, there was a direct beneficial effect on increasing adaptive cognitions about mental health and suicide risk, such that participants' levels of dysfunctional beliefs and stigma towards suicide significantly decreased. Furthermore, as we hypothesised, the results show an indirect effect of the psychoeducational intervention on psychological variables in the study participants. The results show a significant improvement in psychological variables following the psychoeducational intervention. Specifically, there were notable reductions in psychopathological variables such as anxiety, depression, stress and suicide risk. In contrast, there were positive increases in protective psychological variables, including self-esteem, resilience and emotional regulation. However, no significant differences were found in the two subscales of emotional regulation (cognitive reappraisal and emotional suppression) and anxiety.

This study highlights significant changes when comparing the scores obtained in a large sample of emerging adult university students before and after a psychoeducational intervention on mental health and suicide risk prevention.

Despite these findings, the study is not without limitations, one of the main ones being experimental mortality, as many subjects from the initial sample were lost due to needing to meet all inclusion criteria.

One of the limitations of the study is the need to investigate some findings that are not very consistent with each other or with the literature. In this respect, the association found between high resilience and suicide risk stands out. This result seems to contradict the expected positive effect found after the psychoeducational intervention. Here, the risk of suicide decreased and the subjects' resilience increased, which is the expected and relevant result to highlight, indicating the need to further investigate the confusing association found with resilience.

Another limitation was the predominance of female students, Spanish nationality, and psychology discipline compared to the other participants, which could introduce bias into the study results. Psychology in Spain is a predominantly female profession, with a greater predominance of influence motivation, concern for others and empathy. This makes it difficult to generalise the results to other samples where male gender or power motivation or less empathy could provide different data regarding the results of receiving this psychoeducational intervention. For this reason, we would like to emphasise the need to extend this important study to a larger sample in order to make the results even more generalisable.

We must also point out the need for follow-up evaluations to assess the sustained impact of this type of psychoeducational intervention on participants' mental health and attitudes towards suicide, and the maintenance of the benefits obtained over time. This study only carries out a post-intervention evaluation, and we suggest that future studies should re-evaluate the effects of this psychoeducational support at least after 3, 6 or 12 months.

In addition to expanding the sample and post-intervention follow-up, we also suggest the need to increase the time devoted to this type of intervention. Our data suggest the need to include this type of psychoeducational training on mental health and suicide risk in university curricula on a regular basis. From an integrative and transdisciplinary perspective, these prevention programmes contribute to present and future adults having better mental health conditions and better and more advanced training for the development of their professions, as well as more humane, supportive and empathetic adults with a greater capacity to recognise difficulties and promote help resources. In this sense, our study provides data on the evidence and convenience of these transdisciplinary formative and preventive actions. After only 3 h of training, our intervention programme has reached more than 550 people from 23 different disciplines, demonstrating the benefits of this type of help for the population of emerging adults studying at university. In this sense, the incorporation of this training on a regular basis throughout the academic year, and not only as a one-off activity, would facilitate a better integration of this knowledge and resources in people who are clearly transdisciplinary and fundamental in this stage of evolution.

The research conducted in this study has provided valuable insights into the effectiveness of a single, purely psychoeducational intervention, specifically the three-hour Zoom session entitled "Opening Taboos on Suicide": Promoting Interdisciplinary University Education". The results showed positive outcomes, including a significant reduction in suicide stigma and a decrease in clinical symptoms such as anxiety, depression, stress and suicide risk.

The study participants also showed improvements in self-esteem, resilience and emotional regulation. These findings highlight the importance and potential benefits of integrating socio-emotional education and suicide risk prevention into university curricula. The implications of this research highlight the transformative effects that targeted interventions can have on mental health outcomes and underscore the importance of incorporating comprehensive education on sensitive topics such as suicide into academic programmes.

Online psychoeducational interventions for suicide prevention and suicide risk are a rapidly growing field in psychology and mental health. The benefits of such interventions include their ability to provide accessible and convenient support to those in need.

Research has shown that online interventions have the potential to reach people worldwide, including those with limited access to traditional mental health services. Online interventions can be further improved by incorporating interactive elements such as questionnaires, practical exercises, live chats with professionals, and other participants in their community.

These elements can promote user engagement and potentially enhance intervention effectiveness. Online psychoeducational interventions for suicide prevention and associated risks are considered to be significant contributions to the mental health field. They provide global access to educational and support resources and offer personalized and interactive tools to address the individual needs of people at risk. However, it is important to continue researching and developing best practices in this field to ensure the effectiveness and safety of these interventions for users.

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Data availability The database is not available; it may be requested to the corresponding author for a reasonable reason.

Declarations

Conflict of interest The authors have no conflicts of interest.

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