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The Third Half: a positive psychoeducational program to promote well-being and mental health among early career researchers

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Keywords

Doctoral students
Health promotion
Early-career researcher support
Affective distress reduction

Abstract

The decreasing well-being among doctoral candidates, coupled with a high prevalence of distress problems, is a topic of increasing concern in the field of higher education and research policy. The present study aimed to replicate, implement, and evaluate the effectiveness of The Third Half, a multi-component psychoeducational program in doctoral students. To address the limitations of the pilot study, we conducted a non-randomized controlled study using a repeated measures pre-post design with a total of 97 participants (M_{age} = 32.5; SD = 8.23), of whom 26 participated in the experimental group. Results showed that Third Half program participants reported significant decreases in indicators of negative affect (F = 4.01; p = .04) and anxiety (F = 4.95; p = .02) compared to the general control group; in the matched sample analysis (n = 20) significant decreases were found in indicators of negative affect (F = 4.72; p = .03), anxiety (F = 4.09; p < .001), and depression (F = 4.95; p = .03). It is concluded that the Third Half program is an effective and implementable psychoeducational program to improve the skills of early-career researchers in wellness management.

The Third Half: un programa psicoeducativo para promover el bienestar y la salud mental entre los investigadores que inician su carrera

Palabras clave

Estudiantes de doctorado
Promoción de la salud
Apoyo a investigadores en inicio de carrera
Reducción del malestar afectivo

Resumen

El bienestar cada vez menor entre los estudiantes de doctorado y una alta prevalencia de problemas de angustia es un tema de creciente preocupación en el campo de la educación superior y las políticas de investigación. El presente estudio tuvo como objetivo replicar, implementar y evaluar la efectividad de The Third Half, un programa psicoeducativo multicomponente para estudiantes de doctorado. Para abordar las limitaciones del estudio piloto, realizamos un estudio controlado no aleatorio utilizando un diseño de medidas repetidas pre-post con un total de 97 participantes (M_{edad} = 32.5; DE = 8.23), de los cuales 26 participaron en el grupo experimental. Los resultados mostraron que los participantes del programa Third Half informaron disminuciones significativas en los indicadores de afecto negativo (F = 4.01; p = .04) y ansiedad (F = 4.95; p = .02) en comparación con el grupo de control general; en el análisis de la muestra emparejada (n = 20) se encontraron disminuciones significativas en los indicadores de afecto negativo (F = 4.72; p = .03), ansiedad (F = 4.09; p < .001) y depresión (F = 4.95; p = .03). Se concluye que el programa Third Half es un programa psicoeducativo eficaz e implementable para mejorar las habilidades de los investigadores en el inicio de su carrera en la gestión del bienestar.

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Well-being and mental health management are gaining attention in the European Research Area (ERA) due to the rising mental health problems reported in early career researchers (ECR; (Kismihók et al., 2022). Well-being is a state of balance and satisfaction across social, emotional, mental, and physical aspects, characterized by a positive life perception, sense of purpose, and self-compassion (Sverdlik et al., 2020). Despite the high work motivation and satisfaction with their training process, ECRs face significant distress and pressure from the competitive nature of research careers, leading to self-doubt and decreased well-being (Muro & Jiménez-Villamizar, 2023; Nori & Vanttaja, 2022; Sverdlik et al., 2020). Doctoral candidates also deal with job and financial precarity (Charles et al., 2021), as systemic issues such as low salaries, long hours, or temporary contracts that contribute to professional uncertainty and burnout (Nori et al., 2023). Additionally, the pressure to publish for career advancement exacerbates stress and anxiety due to insufficient support (González-Betancor & Dorta-González, 2020). Quality of supervision is another critical concern for ECRs mental health: inadequate guidance can lead to isolation and frustration, while harassment can affect emotional and psychological safety (Cahill et al., 2023). Given the important role of ECRs in science advance, facilitating their emotional well-being from doctoral schools is essential, in line with the guidelines and recommendations on mental health in educational settings (United Nations, 2022; WHO, 2022).

Overview of mental health and well-being in doctoral students

On the one hand, research in various contexts reports that the rates of depression and anxiety among doctoral students are around the 40% (Evans et al., 2018). Compared to the general population, which shows rates of around the 28% (Jiménez-Villamizar et al., 2023), a significantly higher prevalence is observed in doctoral students. These data reflect a worrying picture regarding the deterioration of well-being and the increase in psychological distress in the academic field (Levecque et al., 2017), understanding well-being as a general state of satisfaction and emotional balance (Schmidt & Hansson, 2018). On the other hand, psychological distress refers to an experience of anguish or emotional discomfort, that manifests in symptoms such as anxiety, depression, and stress (Twenge & Joiner, 2020). Psychological distress in doctoral students shows rates between 30% and 50% (González-Betancor & Dorta-González, 2020; Martinez et al., 2021), with a 42% risk of developing mental disorders and up to a 80% of risk for mental exhaustion (Abreu et al., 2018). In addition, different studies aimed at identifying the antecedents of psychological distress and well-being of doctoral students have found that social and psychological support, and perceptions of inclusion within the work context, are related to greater life satisfaction and psychological well-being (Milicev et al., 2023; Muro et al., 2022). In response to these alarming data, the European Charter for Researchers (European Commission, 2011), the European Doctoral Council (EURO-DOC, Kismihók, et al., 2021) or the Mental Health Observatory for Researchers (Remo, 2023) recommend that higher education institutions should urgently develop methods and trainings to enhance the softskills of researchers and to provide the much-needed support to safeguard researchers' well-being in the workplace and to foster the training offers that guarantee the development of their talent.

Programs that promote well-being in doctoral students

Doctoral schools in the ERA are slowly expanding their training offers to develop soft skills among ECRs to increase their employability in their future labour market (Valeeva et al., 2020). They are just beginning to implement upskilling programs focused on mental health management in research careers, thus empirical evidence for the effectiveness of psychoeducational programs to upskill ECRs in well-being remains scarce (Muro et al., 2022). For example, coaching in doctoral education has been shown to improve self-efficacy, time management, self-expectations, and communication skills, which correlate with lower stress and greater emotional well-being (Lane & Wilde, 2018; Reche et al., 2023). Another study at the University of Witwatersrand found coaching psychology interventions improved studentsupervisor partnerships, self-awareness, and career progression, while it enhanced tangible research outcomes like publications and grant applications (Geber, 2010).

In Spain, some pilot psychoeducational programs like the Third Half (Jiménez-Villamizar et al., 2023; Muro et al., 2022) were developed to address pandemic-related challenges and the declining mental health among university students and ECRs. The Third Half program uses evidence-based psychological tecniques and a holistic approach, integrating coaching, positive psychology and motivational components – such as the self-determination theory (Ryan & Deci, 2000) and humanistic principles like unconditional acceptance (Rogers, 1985)– and other techniques including outdoor activities (Muro et al., 2022), gamification (Manzano-León et al., 2021), and peer-mentoring (Gauttier & McCashin, 2023; Kismihók et al., 2022). This approach not only sets it apart from typical psychological support but also promotes well-being training through culturally adapted sessions that encourage participants to incorporate behavioural, cognitive and emotional practices into their daily lifes. The pilot implementation results show increased well-being and reduced distress among participants (Muro et al., 2022), but limitations of the study such as the small sample sizeor the lack of control group suggest the need of further research..

The present study

Accordingly, this study aimed to replicate the pilot study of the Third Half improving the study design by incrasing the sample size and including a control group. Based on the pilot study results (Muro, Bonilla et al., 2022), we hypothesized that the Third Half group would demonstrate (H1) greater well-being and (H2) lower psychological distress compared to the control group at post-test.

Method

Participants

A sample of 97 doctoral students, aged 23 to 61 years (M = 32.48; SD = 8.23) took part in this study. To be eligible for inclusion participants had to be active on-site students enrolled in any year of the Autonomous University of Barcelona (UAB) doctoral program. A non-probabilistic sampling method was used as students self-selected themselves into the intervention or control group. The control group was composed of 71 doctoral students and the experimental group of 26 doctoral students. The sociodemographic characteristics of the participants are shown in Table 1. No significant differences were found between the participants of the Third Half vs. the control group.

Procedure

Recruitment and retention of participants

On 2 February 2023, the Doctoral School sent a call via email and UAB social networks to all 4,587 doctoral students at UAB, inviting them to participate in an online questionnaire and/or the Third Half program. The initial survey garnered 183 responses, leading to the formation of a control group (students not interested in participating in the program but willing to complete a future survey) and an intervention group (students expressing interest in the Third Half program). The low response rate is attributed to the high volume of emails students receive from the Doctoral School and their limited availability due to heavy workloads. Students prioritize their theses and research publications, leaving little time for other activities. To be included in the program, participants had to meet specific eligibility criteria, including being over 18 years old and actively enrolled in a doctoral program at UAB. Exclusion criteria encompassed those enrolled in training programs other than doctoral programs, individuals with serious mental disorders or psychiatric conditions requiring specialized treatment, and students currently receiving active treatment from mental health professionals.

This study complied with the Declaration of Helsinki and was approved by the Doctoral School, the Campus-SIS Unit of the Campus Vice-Rectorate and by the Ethics Committee of the UAB (CEEAH6007).

Intervention program design and implementation: The Third Half

The intervention program was conducted during the 2022-2023 academic year, consisting of six three-hour sessions held bi-weekly from March to May. Each session included two blocks: the first focused on promoting well-being through gamified outdoor activities based on positive psychology (Muro et al., 2023), while the second facilitated peer support through social interactions over snacks on campus.

Table 1

Participants' demographic and preintervention characteristics (chi square test)

Variable	Third Half (n = 26) n (%)	Control (n = 71) n (%)
Age (χ^2 = 0.25, p = .62)		
£ 30	13 (50)	42 (59.2)
> 30	13 (50)	29 (40.8)
Gender (χ^2 = 15.67, p = .07)		
Female	16 (61.5)	44 (61.9)
Male	9 (34.6)	25 (35.1)
Non-binary	1 (3.9)	2 (3)
Nationality (χ^2 = 7.32, p = .12)		
European	16 (61.5)	53 (74.6)
South American	9 (34.6)	17 (23.9)
Asian	1 (3.9)	1 (1.5)
International PhD (χ^2 = 0.35, p = .35)		
Yes	13 (50)	17 (23.9)
No	13 (50)	54 (76.1)
PhD year (χ^2 = 12.36, p = .41)		
1st	14 (53.9)	19 (26.8)
2nd	5 (19.2)	15 (21.1)
3rd	5 (19.2)	19 (26.8)
> 3rd	2 (7.7)	18 (25.3)

Originally implemented in 2021-2022, the Third Half program successfully met its objectives (Muro, Bonilla et al., 2022). It is grounded in five evidence-based pillars: a) gamification activities (Manzano-León et al., 2021) to enhance motivation and participation through team-building exercises and games; b) outdoor activities in green spaces (Muro et al., 2022) to promote relaxation and overall health; c) application of positive psychology techniques in educational settings (Vázquez & Hervás, 2018) to foster improvement and growth; d) physical activities (Devoto et al., 2023) to encourage teamwork and cooperation; and e) mentoring and peer support (Kismihók et al., 2022) to provide reflection, dialogue, and reduce social isolation, promoting shared learning and mutual support. A detailed program description is available in Muro & Jiménez (2023).

This intervention program was implemented during the 2022-2023 academic year and consisted of six sessions, lasting three hours each, delivered once every two weeks, from March to May. Each session was divided into two blocks, with the first two hours dedicated to promoting well-being in outdoor spaces on campus using gamified and physical activities, positive psychology (Muro et al., 2023). The second block was devoted to the facilitation of peer support through social connections in which participants shared a drink or a snack somewhere on the university campus. The group of trainers was made up of five psychologists, ECR with experience in training in educational environments, and with a high degree of motivation and academic well-being. They were trained by the research team in the specific techniques and application of the Third Half.

Data collection

Data collection was conducted including assessments one week before the start of the intervention (baseline) and one week after the end of the intervention (post-intervention), in both the intervention and control groups.

Instruments

Baseline survey. The survey was designed in collaboration with several researchers from the School of Psychology and an invitation that included the link to the online form was sent to the doctoral candidates by means of an email sent by the Doctoral School. The first part of the online survey captured sociodemographic data of the participants. The second part of the survey encompassed different relevant, construct valid, and reliable questionnaires, widely used in research on emotional well-being and psychological distress.

Well-being. Well-being was operationalized in terms of satisfaction with life and affective experiences related to well-being indicators. Specifically, to assess global satisfaction with life, we used the *Satisfaction with Life Scale* (SWLS; Vázquez et al., 2013), a valid and reliable measure that consists of 5 items (e. g., "In most ways my life is close to my ideal") with scores ranging from 1 = *Not at all or very slightly* to 5 = *A lot*. In the present study, it showed an adequate internal consistency of Cronbach's α = .84. To assess the affective aspect of well-being, we used the *Positive and Negative Affect Scale* - PANAS (Watson et al., 1988), which assesses positive and negative affective experiences using 20 items, 10 of which measure positive and pleasant affect (e. g., "Interested in many things") and 10 which measure negative or unpleasant affect (e. g., "Annoyed"). Responses were provided on a Likert response scale with five response options ranging from 1 = *Not at all or almost nothing* to 5 = *Very much*, and with scores from 10 to 50 for each of the two subscales: higher scores indicate greater positive or higher negative affect in the present study, scale reliabilities were high for both negative affect (α = .90) and positive affect (α = .92).

Psychological distress. We measured psychological distress using the *Patient Health Questionnaire* (PHQ-9; Kroenke et al., 2001), General Anxiety Disorder measure (7 GAD7; García et al., 2010) and the *Brief Emotional Profiles Scale* - POMS (Andrade et al., 2010).

PHQ-9 (Kroenke et al., 2001) reflects the nine criteria specified in the diagnostic manual for the detection of depressive disorder. It includes nine items that are scored on a Likert-type response scale ranging from 0 = *Not at all* to 3 = *Almost every day*, and is used to evaluate the presence of depression symptoms in the previous two weeks. Scores ≥ 7 indicate the presence of depressive symptoms. In the present study, the PHQ-9 showed a good reliability (Cronbach's α = .87). GAD-7 (García et al., 2010) assesses anxiety symptoms over the past two weeks using seven items that are scored on a Likert-type response scale ranging from 0 = *None of the days* to 3 = *Almost every day*, where a score ≥ 10 indicates the presence of anxiety symptoms. In the present study it showed a good reliability (α = .87). The *Brief Emotional Profiles Scale* - POMS (Andrade et al., 2010) measures six mood states by means of 30 items: Anger (e. g., "Angry"), fatigue (e. g., "Exhausted"), vigour (e. g., "Energetic"), friendliness (e. g., "Comprehensive"), tension (e. g., "Nervous"), and depression (e. g., "Alone") that scored from 0 = *Not at all* to 4 = *Extremely*. They are emotional states, and therefore are variable depending on situations and context. Although the mood states can indicate the presence of possible psychopathologies, they lack clinical relevance and only indicate emotional profiles at the time of measurement. For the present study, internal consistency was adequate for anger (α = .81), fatigue (α = .92), vigour (α = .92), friendship (α = .86), tension (α = .87), and depression (α = .83).

For the evaluation of the program itself, a 20 items questionnaire with a Likert-type rating scale, from 1 = *Not at all satisfied* to 5 = *Very satisfied*, was developed ad-hoc. The factors assessed were the criteria followed in the program design: career perspective and motivation, perceived impact on well-being, perceived impact on social support, adequacy of the psycho-pedagogical approach, and feelings of respect and acknowledgment. Finally, an item asking whether participants would recommend the program to colleagues was also included.

Statistical analyses

Data collection for this study was conducted using Kobo-Toolbox, and subsequent data analysis was performed with IBM SPSS Statistics version 27. Descriptive statistics such as frequencies and percentages were calculated for the sociodemographic data. To measure the internal quality of the measurement instruments, Cronbach's internal consistency analysis was used. A 2 x 2 (phase x group) factorial model analysis of variance (ANOVA) was planned to test hypothesis H1 and H2 for all the outcomes (satisfaction with life, positive and negative affect, anxiety, depression, and emotional profiles), with a between groups factor (intervention group vs. control group) and a within-subject factor (pre-program vs post-program). ANOVA was carried out in two related but different samples: (1) The total sample of 97 participants, made up of 26 subjects from the experimental group and 71 from the control group, and (2) a subset called "matched sample analysis", consisting of 40 participants –made up of 20 subjects from the experimental group and 20 subjects from the control group–. Second analysis was performed on order for statistically controlling baseline differences among the compared groups potentially induced by the lack of randomised allocation of study participant to the intervention or control group. In our study, we successfully matched 20 participants from the intervention group with individuals from the control group, out of an initial pool of 26. Cohen's kappa interrater reliability was $k = .80$ (Cohen, 1960), and the differences were resolved by reaching an agreement between the two evaluators.

To account for covariates in the ANOVA, chi-square tests were carried out to examine whether the matched groups differed from one another on any of the demographic variables. The results revealed no significant differences on these variables, confirming the commensurability of the groups. To estimate the magnitude of the effects observed in the total sample, within-group effects in the intervention group were also estimated using Cohen's *d*. Conversely, for between-group effect size estimation in the total sample (post-test differences), Hedges' *g* was employed. This choice was premised on the disparity in sample sizes between the two groups, ensuring a robust analysis of the effect size across the entire dataset. Within the matched samples analysis, Cohen's *d* was computed for both within and between-group effect sizes. Finally, to evaluate the internal quality and levels of satisfaction in the program, we calculated the means and standard deviations obtained in each scale of the ad-hoc designed questionnaire, based on five activity design criteria: social connection, motivation, methods and techniques used in emotional well-being, research perspective, and perspectives of the self.

Results

Outcomes in total sample

There were no significant differences between groups in terms of the outcome variables at the pre-intervention stage. Analysis of the total sample for life satisfaction showed a significant main effect of phase ($F(1,94) = 8.63$, $p < .001$) and group ($F(1,94) = 5.4$, $p = .02$); however, there was no phase by group interaction effect ($F(1,94) = 2.71$, $p = .1$). The results suggest that both groups improved over time, but changes did not differ between groups. Analyses on the outcomes of positive and negative affect as assessed by PANAS showed a main effect of time for both positive affect ($F(1,94) = 5.27$, $p = .02$) and negative affect ($F(1,94) = 9.71$, $p < .001$), a significant main effect of group for positive affect ($F(1,94) = 1.38$, $p = .24$), and a significant interaction effect of phase by group on negative affect ($F(1,94) = 4.01$, $p = .04$). The results suggest that while both groups experienced improvements over time in positive and reductions in negative affect, the means differed between groups, indicating that the Third Half group showed a greater 18% decrease in negative affect compared to the control group, which showed a reduction of only 3.7%.

Similar to negative affect, the analysis for anxiety, as assessed by the GAD-7, showed a significant main effect of phase ($F(1,94) = 11.34$, $p < .001$) and a significant phase by group interaction effect ($F(1,94) = 1.9$, $p = .17$); however, there was no significant main effect of group ($F(1,94) = 4.95$, $p = .02$). The results indicate that the Third Half intervention group showed a 34.4% decrease in anxiety symptoms from pre-test to post-test when compared to the control group, which reported a slighter reduction of 6.7%. Analysis of the total sample for PHQ-9 depression identified a significant main effect of both phase ($F(1,94) = 11.95$, $p < .001$) and group ($F(1,94) = 7.17$, $p < .001$). However, there was no significant interaction effect of phase by group on depression ($F(1,94) = 2.06$, $p = .15$). The results suggest that depression symptoms decreased in both groups but were not significant.

As indicated in Table 2, participants in the Third Half exhibited significant a main effect of time in the POMS depression ($F(1,94) = 6.63$, $p = .01$) and tension ($F(1,94) = 14.8$; $p < .001$). However, the remaining variables, including friendship, fatigue, cholera, and vigour, did not show any main effects of time or group, nor did they exhibit any interaction effect of time by group.

Outcomes in matched sample

In the matched sample analysis, satisfaction with life only showed a significant effect of phase ($F(1,37) = 4.16$, $p = .04$). For positive and negative affect, the results from the total sample did not persist in the restricted sample, as an exception of the phase by group interaction effect on negative affect ($F(1,37) = 4.72$, $p = .04$). For anxiety, the results from the total sample for the phase by group interaction persisted in the matched sample ($F(1,37) = 4.09$, $p = .05$). However, in the analysis for PHQ-9 depression, no significant effect was found ($F(1,37) = 1.54$, $p = .22$).

For POMS depression, effects endured in the matched sample (as compared to the total sample) as depression showed a significant phase by group interaction effect ($F(1,37) = 4.95$, $p = .03$). Friendship showed a significant effect on phase

Table 2

Outcomes (satisfaction with life, affect, anxiety, depression, and POMS): total sample

Phase	Third Half (*n* = 26)	Control (*n* = 71)	Effect size (95% *CI*)		Effect of phase by group	
	Mean (*SD*)	Mean (*SD*)	Cohen's *d*	Hedges's *g*	*F*	*p*
SwF			0.53 (0.11; 0.93)	0.61 (0.15; 1.06)	2.71	.1
Pre	17.04 (4.81)	15.42 (4.46)				
Post	19.04 (3.75)	15.98 (5.35)				
PA			0.34 (-0.44; 1.1)	0.66 (0.2; 1.12)	1.38	.24
Pre	33.58 (8.01)	29.68 (8.29)				
Post	36.31 (8.58)	30.55 (8.72)				
NA			-0.54 (-1.24; -0.3)	-0.51 (-0.97; -0.06)	4.01	.04
Pre	24.12 (9.82)	25.39 (9.06)				
Post	19.77 (8.7)	24.45 (9.32)				
Anxiety			-0.63 (-1.05; -0.2)	-0.5 (-0.96; -0.05)	4.95	.02
Pre	7.81 (5.06)	8.14 (4.89)				
Post	5.12 (4.17)	7.59 (5.12)				
Depression (PHQ-9)			-0.57 (-0.99; -0.15)	-0.69 (-1.15; -0.22)	2.06	.15
Pre	6.77 (3.95)	9.1 (5.5)				
Post	4.65 (4.87)	8.23 (5.28)				
POMS						
Depression			-0.42 (-0.83; -0.02)	-0.42 (-0.87; 0.03)	3.53	.06
Pre	7.96 (5.04)	9.1 (5.5)				
Post	5.62 (5.46)	7.99 (5.68)				
Friendship			0.35 (-0.05; 0.74)	0.57 (0.12; 1.03)	4.33	.13
Pre	14.15 (4)	12.86 (3.92)				
Post	15.5 (4.09)	12.96 (4.51)				
Tension			-0.53 (-0.94; -0.11)	-0.39 (-0.85; 0.59)	1.51	.22
Pre	9.76 (5.06)	10.63 (4.96)				
Post	7.4 (4.86)	9.42 (5.15)				
Fatigue			-0.34 (-0.73; 0.05)	-0.47 (-0.93; -0.02)	2.71	.1
Pre	10.92 (6.08)	11.46 (5.22)				
Post	8.77 (4.99)	11.93 (4.93)				
Cholera			-0.37 (-0.77; 0.02)	-0.34 (-0.79; 0.11)	1.09	.29
Pre	6.49 (5.33)	6.9 (4.97)				
Post	4.71 (4.65)	6.23 (4.37)				
Vigour			0.51 (0.09; 0.91)	0.59 (0.13; 1.04)	1.6	.2
Pre	10.35 (4.33)	8.62 (4.71)				
Post	11.92 (4.39)	9.06 (5.01)				

Note. SwF = Satisfaction with Life; PA = Positive Affect; NA = Negative Affect; PHQ-9 = Patient Health; POMS = Questionnaire Profile of Mood States. Cohen's *d* within group comparisons pre- to post-test; Hedges's *g* between groups comparisons (post-test differences).

Table 3

Outcomes (satisfaction with life, affect, anxiety, depression, and POMS): matched samples

	Third Half (n = 20)	Control (n = 20)	Effect size (95% *CI*)		Effect of phase by group	
	Mean (*SD*)	Mean (*SD*)	Cohen's *d*	Hedges's *g*	*F*	*p*
SwL			0.43 (-0.02; 0.89)	0.00 (-0.62; 0.62)	0.95	.33
Pre	16.85 (4.49)	17.95 (3.53)				
Post	18.55 (3.84)	18.55 (5.01)				
PA			0.36 (-0.81; 0.09)	0.06 (-0.56; 0.68)	2.76	.1
Pre	32.3 (8.49)	35.6 (5.94)				
Post	35.5 (9.25)	35 (6.98)				
NA			-0.61 (-1.08; -0.12)	-0.12 (-0.74; 0.49)	4.72	.03
Pre	24.05 (9.84)	19.95 (9.46)				
Post	19.8 (9.4)	21 (10.03)				
Anxiety			-0.7 (-1.18; -0.2)	-0.11 (-0.73; 0.5)	4.09	.05
Pre	8 (4.75)	6.25 (3.98)				
Post	5.35 (4.61)	5.9 (4.93)				
Depression (PHQ-9)			-0.49 (-0.94; -0.02)	0.11 (-0.5; 0.73)	1.54	.22
Pre	7.10 (4.21)	6.15 (4.71)				
Post	5.15 (5.36)	5.75 (4.88)				
POMS						
Depression			-0.49 (-0.95; -0.02)	0.14 (-0.48; 0.75)	4.95	.03
Pre	8.2 (4.83)	4.4 (3.91)				
Post	6.2 (5.58)	5.45 (5.26)				
Friendship			0.57 (0.12; 1.03)	0.09 (-0.52; 0.71)	1.99	.16
Pre	13.75 (4.31)	14.8 (4.08)				
Post	15.8 (3.96)	15.4 (4.35)				
Tension			-0.39 (-0.07; 0.84)	0.05 (-0.57; 0.66)	1.4	.24
Pre	9.38 (4.97)	7.69 (5.66)				
Post	7.69 (5.08)	7.44 (5.37)				
Fatigue			-0.24 (-0.68; 0.2)	-0.07 (-0.69; 0.55)	2.07	.15
Pre	10.7 (6.68)	8.45 (5.05)				
Post	9.15 (5.05)	9.5 (4.89)				
Cholera			-0.3 (-0.74; 0.15)	0.14 (-0.48; 0.76)	1.77	.19
Pre	6.5 (5.42)	4 (4.12)				
Post	5.12 (5.09)	4.44 (4.59)				
Vigour			0.45 (0; 0.91)	0.06 (-0.55; 0.68)	1.7	.19
Pre	10.15 (4.64)	11.25 (4.12)				
Post	11.6 (4.65)	11.3 (4.1)				

Note. SwF = Satisfaction with Life; PA = Positive Affect; NA = Negative Affect; PHQ-9 = Patient Health; POMS = Questionnaire Profile of Mood States. Cohen's *d* within group comparisons pre- to post-test; Hedges's *g* between groups comparisons (post-test differences).

($F(1,37) = 6.67$; $p = .01$) but the rest of the variables such as tension, fatigue, anger, and vigour did not exhibit any main effects of phase or group, nor did they exhibit any interaction effect of phase by group.

Third Half participants showed a reduction in negative affect by 17.6%, anxiety by 33.1%, and depressive symptoms by 24.4% for the matched samples, indicating that the program might potentially have a positive impact on the mental-health parameters of ECRs. The results are shown in Table 3.

Discussion

The main objective of this study was to assess the efficacy of Third Half, a psychoeducational program designed to enhance well-being management among doctoral candidates. Results corroborate a previous pilot study (Muro, Bonilla et al., 2022), showing increased well-being and decreased psychological distress among participants. The program was implemented over 3 months, and changes in well-being and distress outcomes were compared with a control group. The findings suggest that the program's effectiveness is attributed to its design, based on five evidence-based psychological strategies. This replication study utilized different trainers and a biweekly schedule, addressing some methodological limitations of the pilot study. Overall, results indicate that the intervention effectively increases well-being (H1) and reduces distress (H2), with moderate effect sizes observed in pre-post comparisons and post-test differences with the control group.

However, caution is warranted regarding the matching subsample analysis, which showed similar pre-post variations in both groups, indicating parallel evolution rather than a clear program effect. Baseline differences in mental health indicators between participants and non-participants suggest self-selection bias, with those opting in already exhibiting better well-being. This raises concerns about the cost-effectiveness of the program and highlights the need to target individuals with risk factors. Few programs exist that develop well-being skills among doctoral students, particularly those measuring well-being indicators (Geber, 2010; Reche, 2022). Notably, participants in the Third Half program exhibited improvements in vigour and life satisfaction compared to the control group. These findings align with previous studies showing positive psychology interventions enhance life satisfaction (Lambert et al., 2019; Muro, Bonilla et al., 2022). Techniques such as gratitude exercises and strengths identification may foster self-efficacy and contribute to observed changes in well-being outcomes. Increases in positive affect and friendship further support the program's effectiveness, consistent with the pilot study (Muro, Bonilla et al., 2022).

Regarding the variables related to psychological distress, negative affect, anxiety and depression, compared to pre-intervention levels: these reductions may be attributed to the program's focus on developing positive qualities and strategies to enhance self-esteem, which can mitigate anxiety and depressive symptoms (Pasqualotto & Weber, 2022).

The intervention employed a combination of methods, including gamification activities that foster idea generation, communication, and teamwork in a supportive environment (Fitzgerald & Ratcliffe, 2020). Additionally, the program's humanistic and motivational teaching approaches (Ryan et al., 2008; Treve, 2021) and outdoor activities in green spaces, known for their mental health benefits, contributed to improvements in life satisfaction, mood, and emotional regulation (Muro et al., 2023).

In the matched samples analysis, significant pre-post increases in friendship and vigour, as well as reductions in negative affect, anxiety, and depressive symptoms, were observed in the Third Half group. This is notable given that the intervention lasted only three months, compared to six months in the pilot study, and involved a small sample size. These findings align with Suldo et al. (2014), who noted that while well-being indicators improved, no decreases in affect or psychopathology were observed. This suggests that multicomponent programs aimed at enhancing well-being can also alleviate mental health discomfort, a connection tentatively supported in our pilot study (Muro, Bonilla et al., 2022). Interestingly, despite the control group's better pre-program mental health, they improved independently of Third Half participation. This may result from our careful matching process based on age, gender, nationality, and pre-intervention scores, successfully pairing 20 intervention participants from an initial 26. Furthermore, these improvements may reflect the natural progression of their academic journey and the impact of external support systems, such as peer interactions and resources from the Doctoral School. Their initially higher mental health parameters could indicate greater resilience or more effective coping strategies, contributing to their positive adaptation during the study period.

The Third Half shows promise as an effective program across various researcher profiles and contexts. Institutions at the European level emphasize the need for public policies that promote well-being in academia (Kismihók et al., 2021; Ministry of Universities, 2023; OECD, 2021). However, there is limited research on interventions in academic careers. The pilot experience (Muro, Bonilla et al., 2022) and this study highlight the importance of preventive measures from academic institutions to support students and reduce dropout rates and psychological distress (Jiménez-Villamizar et al., 2023; Woolston, 2019). This study contributes valuable insights into the impact of evidence-based prevention programs in doctoral settings and underscores the need for ongoing implementation and validation of such programs to ensure comprehensive training and mitigate future mental health risks in research careers.

Limitations and further research

While the results of the Third Half implementation are encouraging, the study has limitations, including a small sample size that affects generalizability and a 16% dropout rate. However, this dropout rate is lower than seen in similar studies (Cogollo et al., 2023). To address potential internal validity threats, we controlled for dropout by creating a matched sample of twenty doctoral students, showing no significant pretest differences between those who remained and those who dropped out. A second limitation relates to external validity, because the

program was only implemented at a single university. Hence, replication in other universities and cultural settings is a suggestion for future research to address the generalizability of the results. As a third point, future implementations could include alternative indicators such as motivational factors, relationship with supervisors, professional uncertainty, pressure to publish, as systemic indicators that could be relevant to improve well-being, but also encourage structural changes in the academic system. Without these fundamental changes, mental health support programs, although beneficial, may have a limited impact and not solve the essence of the problem.

Finally, a follow-up assessment is suggested for future studies design that could determine whether changes in the program are sustained in the medium and long term after implementation (Lim & Tierney, 2023; Ura et al., 2020), it is important to highlight that, within the Third Half program, early-career researchers are provided with tools to deal with stressful and challenging situations in their research career, as well as techniques to promote their general well-being. Such a follow up could also seek to establish whether the training also results in reduced doctoral dropouts, evidence that might be more compelling to university decision makers than solely an impact on well-being and mental health.

Conclusions

Our findings indicate that the Third Half program has a positive impact on reducing negative affect by 17.6%, anxiety by 33.1%, and depressive symptoms by 24.4%. These results are important because they provide concrete evidence that multi-component psychoeducational training could be effective in managing the well-being of ECRs and reducing their distress. Following institutional coordination challenges at UAB, we urge other ERA institutions to address the mental health crisis among young researchers through evidence-based interventions that ensure quality, interdisciplinary training, and healthy research environments as strategic priorities (Levecque et al., 2017; Muro, Bonilla et al., 2022; WHO, 2022). Despite not addressing gender or nationality differences, the study provides valuable insight into the effectiveness of health promotion and prevention programmes that should be evaluated and based on evidence-based cost-benefit practices that are easily implementable in educational settings (Muro, Bonilla et al. 2022). In summary, our study demonstrates that it reduced psychological distress in the participating doctoral students, significantly contributing to adding evidence and improving knowledge of much-needed psychoeducational programs from academic settings to address the mental health threat that is affecting younger populations and students in the ERA (Kismihók et al., 2022; WHO, 2022).

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Declaration of interests

The authors declare that there is no conflict of interest.

Data availability statement

The data that support the findings of this study are openly available in OSF – Open Science Framework at https://osf.io/pqym4/?view_only=055f1dc2a7ef4230b79e6d19cf53ca0e.

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