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The efficacy of compassion training programmes for healthcare professionals: a systematic review and meta-analysis

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Abstract

Continuous exposure to the suffering and death of patients produces certain syndromes such as compassion fatigue in health professionals. The objective of this study was to analyze the effect and the effectiveness of interventions based on mindfulness, aimed at training or cultivating compassion or self-compassion in compassion fatigue, self-compassion, compassion, and compassion satisfaction of health professionals. A systematic review is reported in line with the PRISMA guideline and was registered in PROSPERO. The PubMed, Web of Science, PsycINFO and CINAHL databases were used. Interventions based on compassion training or cultivation were selected, aimed at health professionals. A meta-analysis was performed using a random-effects model. The effect size and hetereogeneity of the studies were calculated. Eight articles were selected. Among the programmes for the cultivation of compassion we highlight Compassion Cultivation Training (CCT), Mindfulness and Self-Compassion (MSC), Compassionate Meditation (CM), and Loving Kindness Meditation (LKM). The interventions decreased compassion fatigue and increased compassion, self-compassion, and compassion satisfaction in healthcare professionals. Compassion fatigue in healthcare professionals is due to a deficit in empathic and compassionate skills. Health systems should incorporate programmes based on the cultivation of compassion and self-compassion in order to improve the work conditions and quality of life of health professionals.

Keywords Compassion · Compassion fatigue · Health professionals · Interventions · Programme · Self-compassion

Introduction

Health professionals are exposed to a great physical, emotional and spiritual requirements associated with the circumstances of the health environment (Ruiz-Fernández et al., 2020b), which have worsened in the context of the global pandemic (Thapa et al., 2021). Among the stressors typical of the healthcare environment are: long working hours (Wasson et al., 2020); a shortage of personnel (Spurlock, 2020); a demanding workload (Shah et al., 2021); and witnessing the pain and suffering of patients and their families (Kartsonaki et al., 2022; Wasson et al., 2020). Continued exposure to suffering and death in patients has been linked with an increased risk of developing compassion

This study was registered on the International Prospective Register of Systematic Reviews (PROSPERO) under registration number CRD42020208619.

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fatigue (Aslan et al., 2022) and decreased compassion satisfaction (Balinbin et al., 2020).

Etymologically, the term compassion comes from the Latin *cumpassio*, from *com* (together with) and *pati* (to suffer), and the latter from the Greek meaning "to suffer with, to suffer together, to feel for" (Papadopoulos et al., 2017; Perez-Bret et al., 2016). In writings the concept of compassion appears as something proper and consubstantial to human beings, being identified as a shared and ineffective sadness or even being equated with pity (Corrêa, 2017; Montero-Orphanopoulos, 2019). In literature, too, compassion sometimes appears as a quality close to empathy (Su et al., 2020). However, the most scientifically accepted definition of compassion is "*a sensitivity to the suffering of self and others, coupled with the motivation to prevent and alleviate it*" (Gilbert & Choden, 2014; Jinpa, 2015).

As a multidimensional response to suffering, compassion involves sensitivity, recognition, understanding, emotional resonance, empathic concern, and tolerance of distress generated by the suffering of others, coupled with motivation and relational actions to alleviate and prevent it (Gilbert et al., 2017; Lown et al., 2015). Compassionate behavior activates areas of the brain such as the frontal cortex, the anterior cingulate cortex, the medial prefrontal cortex, the insula and the periaqueductal grey matter and with changes at the level of autonomic activation involving neurotransmitters such as oxytocin and vasopressin (Tala, 2023; Foerster & Kanske, 2021).

Compassion satisfaction and compassion fatigue are theoretical opposites, compassion satisfaction being identified with the "positive payoff" of caring and compassion fatigue with the "cost of care" (Fahey & Glasofer, 2016). Compassion satisfaction is the gratification that comes from providing care to alleviate the suffering of other people (Radey & Figley, 2007; Sinclair et al., 2016). However, compassion fatigue is the physical, mental, and spiritual exhaustion, as well as the emotional withdrawal of healthcare professionals for a prolonged period of time (Sorenson et al., 2016; Gustafsson & Hemberg, 2022). This phenomenon produces a decrease in the empathic or compassionate capacity, which may affect personal life and professional competence (Cetrano et al., 2017) as it is related to the low quality of health care provided (Chachula, 2022). These problems are more pronounced for nurses caring for highly vulnerable patients: observing the daily suffering, pain, loss and death of others can accelerate the onset of job dissatisfaction, burnout and compassion fatigue (Favrod et al., 2018; McKnight et al., 2020).

The practice of compassion and self-compassion improves care at work, which translates into increased confidence, communication, and performance within the team, decreasing the risk of excess stress and burnout (Campling, 2015). High levels of compassion in professionals lead to fewer hospitalisations, reduced use of intensive care at the end of life and better psychological adjustment to a cancer diagnosis (Lown et al., 2011; Lown et al., 2015).Training in self-compassion or self-kindness increases resilience and thus the ability to adapt to stress in a positive way (Kotera et al., 2021). Resilience involves resisting stress, tolerating pressure in adverse situations, and reacting by deploying strategies to overcome negative or traumatic experiences (Cooper et al., 2020; Henshall et al., 2020). Therefore, compassion and self-compassion are part of resilience, as a multidimensional and dynamic concept (Ruiz-Fernández et al., 2021).

Compassion fatigue in healthcare professionals is not caused by excess compassion but rather by the absence of its basic attributes, in addition to a lack of training in empathy and compassion skills (Ruiz-Fernández et al., 2020b). Among the protective factors for compassion fatigue, we can mention compassion satisfaction and interventions aimed at developing self-compassion (Conversano et al., 2020) and promoting compassion (Anderson & Gustavson, 2016; Ruiz-Fernández et al., 2020a). Compassion is defined as a feeling of affection or closeness towards other human beings who are suffering, in addition to the intention to alleviate their suffering (Brito, 2015).

Furthermore, self-compassion is kindness, support, and compassion towards oneself, accepting one's own suffering, and adopting an understanding and non-judgmental attitude towards one's own failures, acknowledging mistakes as part of the common human experience (Pavlova & Consedine, 2023).

Scientific interest in compassion has increased in the last decade because of its health and wellness benefits (Malenfant et al., 2022), with the development of a series of interventions focused on the cultivation and development of compassion based on brain neuroplasticity, which represents the ability of the nervous system to change its reactivity as a result of successive activations (Lee et al., 2008). The main programmes developed are: Compassion Cultivation Training (CCT) (Jinpa & Weiss, 2013); Mindfulness Self-Compassion (MSC) (Neff & Germer, 2013); Self-Compassion for Healthcare Communities (SCHC) (Neff et al., 2020); Compassion Meditation (CM), and Loving Kindness Meditation (LKM) (Amutio-Kareaga et al., 2017). CCT is a programme focused on the cultivation of compassion, empathy, and kindness towards oneself where skills are developed to improve mental and emotional well-being (Goldin & Jazaieri, 2017), and it is one of the most prominent worldwide (Scarlet et al., 2017). In addition, it has been shown to decrease negative feelings, increase compassion, improve interpersonal competence (Weingartner et al., 2019) and self-compassion, and prevent burnout, empathic distress, and depersonalization (Gonzalo Brito et al., 2019). On the other hand, MSC offers a series of

skills to improve self-compassion and integrate it into daily life (Delaney, 2018), with health professionals being one of the populations where this intervention is most suitable both physically and emotionally (Germer & Neff, 2019). SCHC is an adaptation of MSC in which meditation is removed, and the organization, flow, and framework of the exercises are modified to accommodate the time constraints of health professionals (Neff et al., 2020). Finally, Compassion Meditation (CM) is a practice that seeks to develop a sense of common humanity (Lang et al., 2019) and alleviate suffering for oneself and others (Hao et al., 2022; Martin-Allan et al., 2021). Therefore, healthcare professionals are exposed to a stressful and distressing context and are therefore susceptible to developing certain syndromes such as compassion fatigue (Ruiz-Fernández et al., 2020b). There are interventions based on compassion and self-compassion that may help to prevent this problem (Wasson et al., 2020) and its benefits can spill over into people's daily lives and transform their personality traits in a healthier direction (Dahl et al., 2015). However, there are no studies that examine the effects of these compassion and self-compassion-based programmes on compassion fatigue in healthcare professionals.

Objective

The objective of this study was to determine the efficacy and the effectiveness of interventions based on the cultivation of compassion and self-compassion in health professionals in order to reduce compassion fatigue and improve self-compassion, compassion, and compassion satisfaction as outcome variables.

Methods

Register and design

A systematic review and meta-analysis was carried out following the recommendations of the PRISMA guide (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) (Page et al., 2021). This study was registered on the International Prospective Register of Systematic Reviews (PROSPERO) under registration number CRD42020208619.

Research question

This review addressed the following research question: Is the use of a programme or intervention based on the cultivation of compassion effective and efficient in fostering compassion in healthcare professionals? For this purpose, the PIO strategy was used (Table 1).

Databases and search strategy

A search for studies with interventions based on compassion training was carried out between December 2022 and June 2023. In order to carry out this project, structured language terms (MeSH) such as "Health Occupations", "Compassion Fatigue", and the natural language terms "Health professionals", "Intervention", "Programme", "Compassion", "Self-compassion", "Compassion Satisfaction", and "Compassion fatigue" were used. Similar descriptors were combined using the "OR" operator, while the "AND" operator was used to combine intersection concepts. The following specialized databases in health sciences were consulted: PubMed, CINAHL, PsycINFO, and the Web of Science. The references of the articles were reviewed to obtain studies that had not been identified in the search. In addition, a grey literature search was performed in the Google Scholar database. This whole process was carried out by three researchers from the study.

Eligibility criteria

The selection criteria of the studies were: a) original publications in English and Spanish available in full text; b) the study population had to be health professionals (physicians or nurses); c) the interventions had to be based on compassion training or cultivation; d) studies had to have a quasi-experimental design, with or without a control group, with or without randomization and clinical or experimental studies; and e) studies had to measure compassion, compassion fatigue, or self-compassion. The exclusion criteria were: a) duplicate articles, reviews, dissertations, abstracts, book chapters, point of view or expert opinion, monographs and theses; and b) articles in which the sample and evaluation of the population were composed only of individuals with some morbidity. The search period was unlimited until June 2023.

Table 1 PIO strategy for the formulation of the research question

Question PIO	Search
P (Population)	Health professionals
I (Intervention)	Interventions based on the cultivation of compassion and self-compassion
O (Outcome)	Reduce compassion fatigue and improve self-compassion, compassion, and compassion satisfaction

Methodological quality assessment

The quality of the articles was analyzed based on the Cochrane Collaborations' risk of bias assessment tool (Higgins et al., 2011). This instrument is the recommended tool to assess the risk of bias in randomized trials, although they can be used for other types of studies (Cajal et al., 2020). It has 7 items (random sequence generation, allocation concealment, blinding of participants and personnel, blinding of outcome assessment, incomplete outcome data, selective reporting, and other bias), and the evaluation of each item was divided into three categories (yes, no, and unclear). Quality assurance was performed by two independent investigators (author 1 and author 6), and, in case of disagreement, a third independent reviewer (author 2) was consulted.

Procedure and selection process

The selection was carried out in three phases, with the aim of discerning the suitability of the articles. The first consisted of reading the title, the second of reading the abstract and, finally, reading the full text to verify that they corresponded to the aims of the study. A data collection sheet was designed that included country, authors, aim of the study, sample size, type of intervention, study design, evaluation instruments, pre and post-intervention measures of the variables, and results (compassion, self-compassion or compassion fatigue). The articles were extracted from the databases and entered into the Cochrane Review Manager (Rev Man V.5). The selection was made by two investigators independently and a third investigator resolved disagreements.

Data análisis: meta-analysis

Meta-analysis was performed using the Cochrane Review Manager (Rev Man) statistical programme, Version 5.4 (The Cochrane Collaboration, 2020). Studies were considered that provided sample size, mean, and standard deviation of the outcome variables (self-compassion and compassion satisfaction) of the control and experimental groups in the post-intervention phase. An inverse variance statistical method with a random effects model was used (Borenstein et al., 2010). The results were plotted on a forest pot chart showing the effect size of each study and the weighted mean effect of all studies with their respective 95% confidence intervals. Cohen's d showed whether the effect size was small ($d \leq 0.20$); moderate ($0.20 < d > 0.80$); and large ($d \geq 0.80$) (Cohen, 1988). The contrast statistic Z associated with the probability level ($p \leq .05$) allowed us to test the null hypothesis of a mean effect of the intervention programmes in the studied population equal to 0. The inter-study variance was calculated using the Tau2 test by the DerSimonian and Laird (1986) method and the Q heterogeneity statistic (Chi^2) with its degrees of freedom. The degree heterogeneity of the studies was analysed through the I^2 statistic, interpreting 25% as low, 50% as medium, and 75% as high (Botella-Ausina & Sanchez-Meca, 2015). The probability of publication bias was calculated with Egger's Regression (Egger et al., 1997) and Fail-Safe N using the Rosenthal Approach (Rosenthal, 1979). In addition, a sensitivity analysis by leave-one-out method was performed to detect influential studies by effect size. The R software, version R-4.3.2 for Windows (R Core Team, 2021) was used. Finally, the power analysis was calculated for each meta-analysis at the significance level of 0.05 with the SPSS statistical software, Version 29 (IBM, , 2023). This analysis allows us to detect what is the power to detect an effect given the average sample size.

Results

Prisma diagram

Figure 1 shows the article selection process. A total of 1277 articles were identified, selecting 1260 studies after eliminating duplicates. Of these, the full texts of 71 were reviewed, after being filtered by title and abstract. Only 8 articles were selected for the systematic review and four for the meta-analysis. The rest of the studies were removed for various reasons.

The aims of the different studies were: to evaluate the effects of an MSC intervention on self-compassion and mindfulness in health professionals (Aranda-Auserón et al., 2018); to examine the efficacy of the SCHC programme to improve wellbeing and reduce burnout among professionals (Neff et al., 2020); to analyze the benefits of a CCT programme on compassion fatigue and mindfulness (Scarlet et al., 2017); to determine the efficacy of MBSRT and CCT on mindfulness, self-compassion, fatigue compassion, and compassion satisfaction (Sansó et al., 2019); to compare the efficacies of the abbreviated MBSR and MSC training programmes in relation to the standard training programme on the levels of mindfulness, self-compassion, and self-perceived empathy (Pérula-de Torres et al., 2021); to test the feasibility and acceptability of a shorter intervention on compassion training for professionals providing end-of-life care and to explore its impact and psychological discomfort, occupational burnout, compassion fatigue, self-compassion, and mindfulness (Watts et al., 2021); to investigate the effect of LKM on compassion fatigue of nurses working in the NICU of selected hospitals in Tehran (Asadollah et al., 2023) and, finally, to investigate the capacity of a programme of short structured meditations on compassion fatigue and compassion satisfaction in healthcare professionals (Hevezi, 2015). Table 2 shows the characteristics of the main studies.

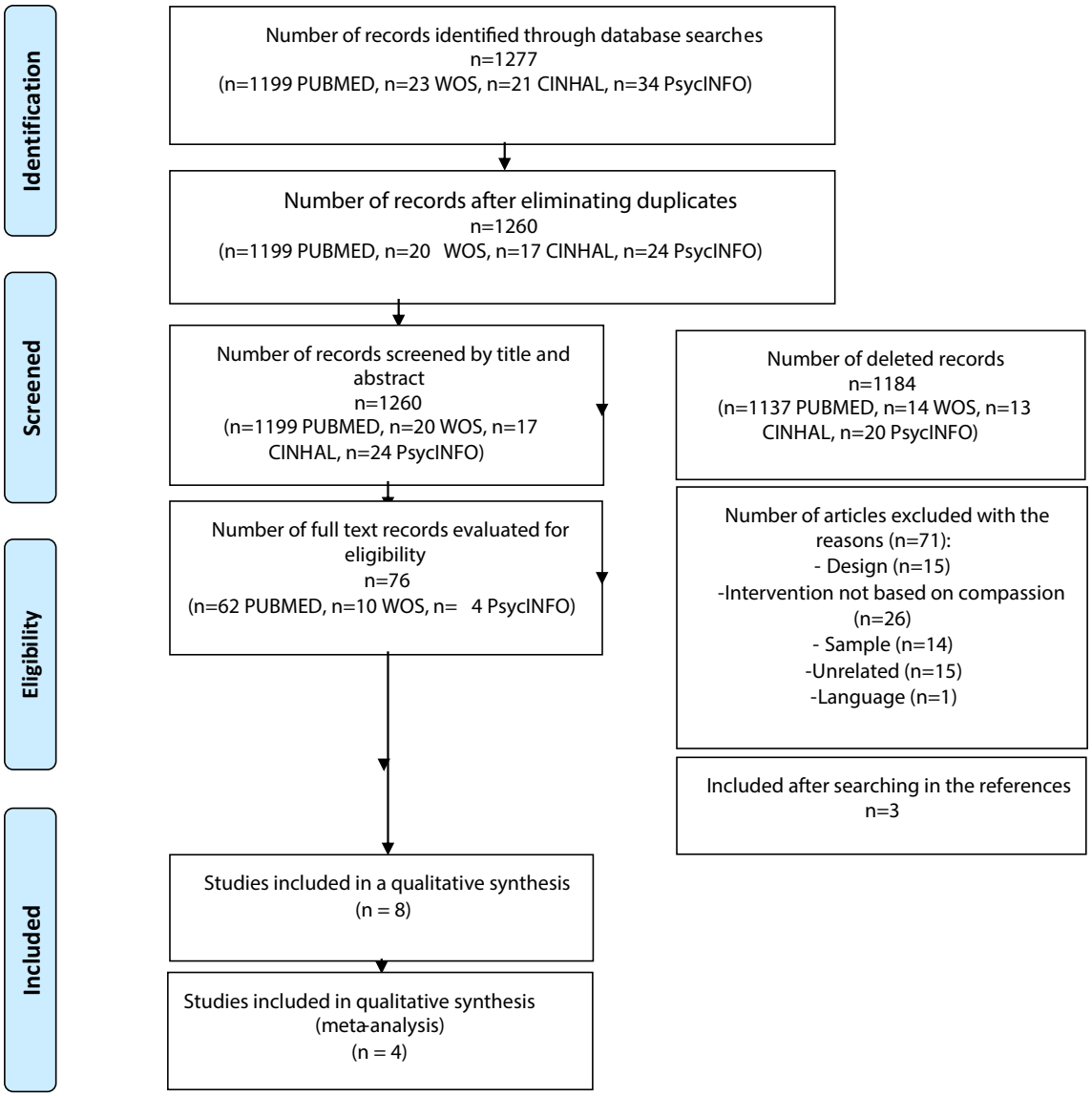

Fig. 1 Process of the selection of articles

Design

This review included four quasi-experimental studies (Hevezi, 2015; Neff et al., 2020; Sansó et al., 2019; Scarlet et al., 2017), three randomized clinical trials (Aranda-Auserón et al., 2018; Asadollah et al., 2023; Pérula-de Torres et al., 2021); and a pre/post observational pilot study (Watts et al., 2021).

Participants and interventions

The studies included in this review were conducted in Spain (Aranda-Auserón et al., 2018; Sansó et al., 2019; Pérula-de Torres et al., 2021), USA (Hevezi, 2015; Neff et al., 2020; Scarlet et al., 2017), Iran (Asadollah et al., 2023) and Australia (Watts et al., 2021). The sample size ranged from 165 to 17 participants, who were multidisciplinary health professionals (Aranda-Auserón et al., 2018; Neff et al., 2020; Pérula-de Torres et al., 2021; Scarlet et al., 2017; Watts et al., 2021) and nurses (Asadollah et al., 2023; Hevezi, 2015). On the other hand, the professionals belonged to different fields: primary care (Aranda-Auserón et al., 2018; Pérula-de Torres et al., 2021; Sansó et al., 2019); hospitals (Asadollah et al., 2023; Hevezi, 2015; Neff et al., 2020; Scarlet et al., 2017); and both (Watts et al., 2021). The total number of participants in this review was 577, of whom 341 were members of the intervention group and 174 members of the control group. Participants were designated into an intervention group (Hevezi, 2015; Neff et al., 2020; Scarlet et al., 2017; Watts et al., 2021), two intervention and control

Table 2 Characteristics of the studies included in the review

Article	Country	Objective of the study	Design of the study	Sample size/Participants	Type of intervention	Evaluation instruments	Results
(Aranda-Auserón et al., 2018)	Spain (Navarra)	To evaluate the efficacy of an MSC programme on stress levels and burnout in primary care health professionals.	ECA	$N = 48$ **IG**: $n = 25$ **CG**: $n = 23$	MSC: 8 sessions of 2.5 hours per week, with a minimum attendance in 75% of the sessions and a daily practice of 45 minutes.	Pre and post-intervention measures: - FFMQ - SCS - PSQ - MBI	-Significant IG improvement after mindfulness and self-compassion (self-kindness, shared humanity and mindfulness) intervention -Significant decrease in burnout and perceived stress
(Asadollah et al., 2023)	Iran (Tehran)	To investigate the effect of LKM on compassion fatigue of nurses working in the NICU of selected hospitals in Tehran	ECA	$N = 66$ **IG:** $n = 33$ Dropouts: $n = 2$ **CG:** $n = 33$ Dropouts: $n = 1$	LKM: Six-week programme that consists of listening to audio files at least 3 times a week during break times.	Pre and post-intervention measures: -NCFI	-Significant decrease in compassion fatigue in GI.
(Hevezi, 2015)	USA (California)	To analyze the effect of short structured meditations on decreasing compassion fatigue and improving compassion satisfaction in oncology nurses.	Quasi-experimental	$N = 17$; Excluded $n = 2$ **IG:** $n = 15$	One-on-one educational session (CI, PowerPoint and CD with 4-minute mindful breathing technique, 8-minute breathing meditation, and a 4-minute LKM for the cultivation of compassion Meditation 5 days a week for 4 weeks.	Pre and post-intervention measures: -ProQOL	-Compassion fatigue. Significantly decreases -Statistically significant improvement in compassion satisfaction. -Statistically significant decrease in burnout and secondary stress.

Table 2 (continued)

Article	Country	Objective of the study	Design of the study	Sample size/Participants	Type of intervention	Evaluation instruments	Results
(Neff et al., 2020)	Southwest of US	The research was divided into two studies. The objective was to examine the efficacy of the SCHC programme in improving well-being and reducing burnout among health professionals.	Quasi-experimental	First study: $N = 58$ **IG:** $n = 25$ Dropouts: $n = 1$ **CG**: $n = 33$ Dropouts: $n = 2$ Second study: $N = 23$ **IG**: $n = 23$	SCHC, MSC adapted programme: 6 sessions of one hour each.	Pre and post-intervention measures: First study: -SCS -CAMS-R -SCBCS -DASS -ProQol (sub-dimension satisfaction through compassion) -IRI New measures were taken 3 months after IG. Second study: -SCS -CAMS -CS -DASS -ProQol -MBI	-First study: -Significant increase in self-compassion, mindfulness, and compassion satisfaction. -Significant decrease in depression. The change in the level of compassion for others was $p = .068$, approaching significant results ($p < .05$). There were no significant changes in personal anguish and anxiety. There were no significant differences between the post-test and the follow-up. -Second study: -Significant increase in self-compassion, mindfulness, and compassion for others. -Increased satisfaction through compassion and feelings of personal fulfillment -Decrease in post-traumatic stress, burnout, and emotional anguish.

Table 2 (continued)

Article	Country	Objective of the study	Design of the study	Sample size/Participants	Type of intervention	Evaluation instruments	Results
(Sansó et al., 2019)	Spain (Mallorca)	- To assess the effectiveness of MBSRT and CCT to increase the levels of mindfulness, empathy, and self-compassion of healthcare professionals. - To improve the quality of professional life, burnout, compassion fatigue, and compassion satisfaction in this population.	Quasi-experimental	$N = 50$; **CG**: $n = 25$ Dropouts: $n = 6$ **IG:** $n = 25$ Dropouts: $n = 6$	CG: MBSRT IG: CCT Each programme lasted 60 hours over 3 months (3 intensive weekend workshops + weekly practical sessions).	Pre and post-intervention measures: - FFMQ - IRI - SCS - Short ProQOL	Both IG and CG significantly increase empathy, mindfulness, professional quality of life, and self-compassion among healthcare professionals.
(Scarlet et al., 2017)	USA (California)	To investigate the effects of CCT on burnout, interpersonal conflict, job satisfaction, resilience, and self-compassion in healthcare workers.	Quasi-experimental	$N = 119$; Excluded $n = 57$ **IG:** $n = 62$	CCT: 8 weekly 2 h group sessions: teaching Mindfulness, LKM, compassion skills, self-compassion, and experimental practices (20-minute guided meditation or informal practices). Participants were encouraged to carry out the experimental practices at home.	Measures: before the CCT, in the middle of the programme, immediately after, and one month after the intervention: - SCS - TMS - CBI - BIAJS - ICS - FOCS	-Significant improvement in self-compassion, mindfulness, and job satisfaction. -Significant decrease in fear of compassion and showing compassion to others. A decrease in burnout and interpersonal conflicts was not seen.

Table 2 (continued)

Article	Country	Objective of the study	Design of the study	Sample size/Participants	Type of intervention	Evaluation instruments	Results
(Pérula-de Torres et al., 2021)	Spain	To compare the effectiveness of the abbreviated training programmes MBSR and MSC programmes in relation to the standard training programme on the levels of mindfulness, self-compassion, and self-perceived empathy in tutors and resident specialists in Family and Community (doctors and nurses).	ECA	$N = 165$ **CG**: $n = 63$ Dropouts: $n = 12$ **IG1**: $n = 39$ Dropouts: $n = 15$ **IG2**: $n = 63$ Dropouts: $n = 26$	MBSR supplemented with MSC practices. GI1: 4 sessions per week of 2.5 h duration. Complemented by a daily practice of 15 minutes (abbreviated programme). GI2: 8 sessions per week of 2.5 h duration. Complemented by a daily practice of 30 minutes (standard programme)me.	Measures before, after the intervention and three months after the intervention. -FFMQ -SCS short version -JSPE	There was no significant improvement in self-compassion, mindfulness, and perceived empathy in the GI1 (abbreviated programme). -Significant improvement in self-compassion and mindfulness levels in the GI2 (standard programme) and the effects were maintained over time. There was no significant improvement in the levels of perceived empathy.
(Watts et al., 2021)	West Australia Occidental (Perth)	1) To test the feasibility and acceptability of a shorter intervention in mindfulness-based compassion training for professionals providing end-of-life care. 2) To explore its impact on psychological discomfort, occupational burnout. Compassion fatigue, self-compassion, and mindfulness.	Pre/post observational pilot study.	$N = 31$ **IG**: $n = 31$	Programme based on MBSR, CCT and MSC where formal and informal mindfulness was carried out, and practices on compassion were included. 6 weekly sessions, with a total of 7 hours, organized as follows: first and last session lasting 90 minutes +30 minutes to complete the questionnaires. The rest of the sessions were 1 hour each.	Measures immediately before, after the intervention and 8 weeks after the intervention. -MBI-HSS -ProQOL version 5 -DASS-21 -MASS -SCS short version	-Significant decrease in compassion fatigue (burnout only) -Significant improvement in satisfaction for compassion and self-compassion. No significant effect was found for compassion fatigue (secondary traumatic stress).

BIAJS Brief Index of Affective Job Satisfaction, *CAMS-R* Cognitive and Affective Mindfulness Scale—Revised, *CBI* Copenhagen Burnout Inventory, *CCT* Compassion Cultivation Training, *CD-RISK* Connor-Davidson Resilience Scale, *CM* Compassionate Meditation, *CS* Compassion Scale, *DASS-21* Depression, Anxiety and Stress Scale, *RCT* Randomized Clinical Trial, *FFMQ* Five Facets of Mindfulness Questionnaire, *FOCS* Fear of Compassion Scale, *CG* control group, *IG* intervention group, *HCP* Healthcare professionals, *ICS* Interpersonal Conflict Scale, *IRI* Interpersonal Reactivity Index, *JSPE* Scale of Physician Empathy, *LKM* Loving Kindness and Compassion Meditation, *MASS* Mindful Attention Awareness Scale, *MBI* Maslach Burnout Inventory, *MBI-HSS* Maslach Burnout Inventory-Human Services Survey, *MBSRT* Mindfulness-Based Stress Reduction Programme, *MM* Mindfulness Meditation, *MSC* Mindfulness and Self-compassion, *NCFI* Nursing Compassion Fatigue Inventory, *ProQOL* Professional Quality of Life Scale, *PSQ* Perceived Stress Questionnaire, *SCBCS* Santa Clara Brief Compassion scale, *SCHC* Self-Compassion for Healthcare Communities, *SCS* Self-Compassion Scale, *Short ProQOL* short version of the Professional Quality of Life Scale, *Short version FMI* Short version of the Freiburg Mindfulness Inventory, *TMS* Toronto Mindfulness Scale

groups (Pérula-de Torres et al., 2021), and a control and intervention group (Aranda-Auserón et al., 2018; Asadollah et al., 2023; Neff et al., 2020; Sansó et al., 2019).

The studies used different programmes based on the cultivation of compassion as interventions. The studies by Sansó et al. (2019) and Scarlet et al. (2017) used the CCT programme, while Aranda-Auserón et al. (2018) used the MSC programme. On the other hand, Neff et al. (2020) used an adaptation of the MSC programme called SCHC. In addition, two studies used a combination of interventions based on the cultivation of compassion: MBSR, CCT, and MSC (Watts et al., 2021); and, MBSR and MSC (Pérula-de Torres et al., 2021). Finally, Asadollah et al. (2023) used a LKM programme that consists of listening to audio files .and Hevezi (2015) used a meditation-focused programme that combined breathing, mindfulness, and LKM based on the cultivation of compassion.

The duration of the intervention programme was different in the various studies: 4 weeks (Hevezi, 2015; Pérula-de Torres et al., 2021); 6 weeks (Asadollah et al., 2023; Neff et al., 2020; Watts et al., 2021); 8 weeks (Aranda-Auserón et al., 2018; Pérula-de Torres et al., 2021; Scarlet et al., 2017); and 12 weeks (Sansó et al., 2019).

Variables

The instruments used to measure self-compassion were: the short version (Aranda-Auserón et al., 2018; Sansó et al., 2019; Scarlet et al., 2017; Pérula-de Torres et al., 2021; Watts et al., 2021); and the long version of the Self-Compassion Scale (SCS) (Delaney, 2018; Neff et al., 2020). On the other hand, the studies by Watts et al. (2021) and Hevezi (2015) measured compassion fatigue and compassion satisfaction using the professional quality of life scale (ProQoL version 5). In their first study Neff et al. (2020) used 10 items of the compassion satisfaction dimension on the ProQol scale, and, in the second, they used the complete ProQol scale. The short version of this scale (Short ProQol) was used by Sansó et al. (2019). Furthermore, Asadollah et al. (2023) used the scale Nursing Compassion Fatigue Inventory (NCFI) to measure compassion fatigue. Lastly, the study by Neff et al. (2020) measured compassion through the Santa Clara Brief Compassion Scale in their first study and through the "Compassion Scale" in their second study.

Methodological quality assessment

High scores were obtained for selection bias (random sequence generation and allocation concealment) and performance bias (blinding of participants and personnel). In addition, unclear scores were found in the blinding of outcome assessment and selective reporting due to lack of information (Fig. 2).

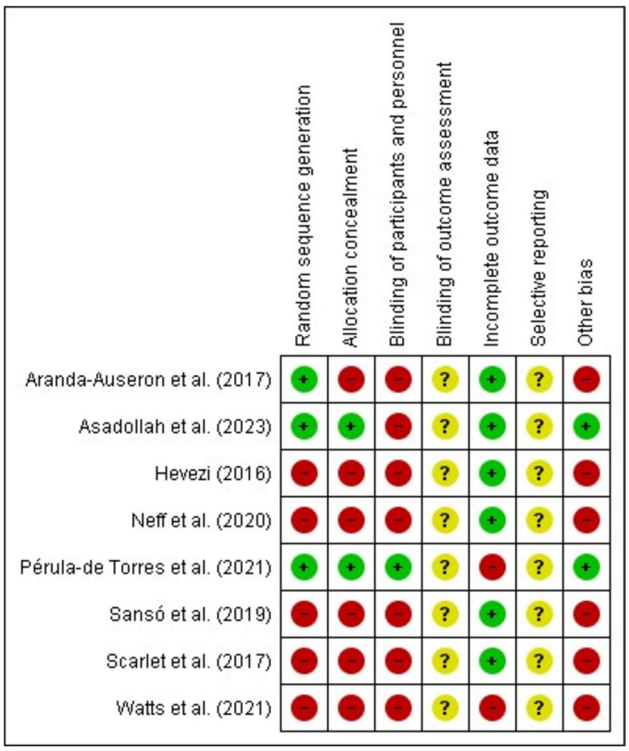

Fig. 2 Risk of bias in the selected studies

Results of the intervention programmes

Six of the seven studies used obtained a significant improvement in self-compassion (Aranda-Auserón et al., 2018; Neff et al., 2020; Sansó et al., 2019; Scarlet et al., 2017; Pérula-de Torres et al., 2021; Watts et al., 2021). In the studies by Aranda-Auserón et al. (2018), Neff et al. (2020), and Scarlet et al. (2017) the self-compassion variable improved when comparing the pre and post-intervention measures. Similarly, in the study by Pérula-de Torres et al. (2021) self-compassion showed statistically significant differences in the control group and the second intervention group, the latter showing the most pronounced increase. In addition, in a study by Sansó et al. (2019) both the CCT and the MBSRT interventions obtained significant pre-post intervention results in the self-compassion variable. Finally, Watts et al. (2021) found no significant pre-post intervention results for self-compassion. However, significant increases were obtained when comparing the pre-intervention and follow-up measures eight weeks later. The effect of the intervention on self-compassion varied from a large effect (Sansó et al., 2019) to a small one (Pérula-de Torres et al., 2021). Regarding the maintenance over time of the effect of the intervention, only four studies made this measurement (Neff et al., 2020; Pérula-de Torres et al., 2021; Scarlet et al., 2017; Watts et al., 2021), finding a sustained effect over time (Neff et al., 2020; Pérula-de Torres et al., 2021; Scarlet et al., 2017) or an

increase (Watts et al., 2021) in the levels of self-compassion. Compassion for others as a variable was only studied by Neff et al. (2020) in their two studies. In the first study the increase in the level of compassion was close to significant ($p = 0.068$). In the second study significant improvements were obtained in the pre-post compassion intervention variable. A follow-up was carried out in the first study, showing an effect maintained over time of the programme.

Four studies analyzed compassion fatigue as an outcome variable after applying compassion-based programmes (Asadollah et al., 2023; Hevezi, 2015; Sansó et al., 2019; Watts et al., 2021). Compassion fatigue was measured through the ProQOL instrument, which evaluates two elements of the variable: burnout and secondary traumatic stress. Compassion fatigue decreased significantly in the pre-post intervention measures of the studies by Hevezi (2015) and Sansó et al. (2019). Specifically, in the study by Sansó et al. (2019) the decrease in the level of compassion fatigue was greater with the MBSRT programme than with CCT. On the other hand, Watts et al. (2021) obtained a significant decrease in burnout, a component of compassion fatigue. In addition, only these authors carried out a follow-up measure, discovering that the decrease in burnout was maintained over time. On the other hand, Asadollah et al. (2023) measured compassion fatigue with the NCFI, obtaining a significant improvement in the intervention group.

Lastly, the compassion satisfaction variable was analyzed in four studies (Hevezi, 2015; Neff et al., 2020; Sansó et al., 2019; Watts et al., 2021). In three of them programmes based on the cultivation of compassion significantly increased pre-post measures of compassion satisfaction (Hevezi, 2015; Neff et al., 2020; Watts et al., 2021). However, in the study by Sansó et al. (2019) the CCT intervention did not significantly improve compassion satisfaction. Regarding follow-up measures, only two studies examined the effect of long-term interventions on compassion satisfaction (Neff et al., 2020b; Watts et al., 2021). In the study by Watts et al. (2021) statistically significant differences were found in the pre-intervention and follow-up measures, with no significant relationship between post-intervention and follow-up. Similarly, Neff et al. (2020) found no significant differences between the post-intervention and follow-up measures, suggesting that the acquired skills were maintained over time.

Meta-analysis results

Meta-analysis: self-compassion variable

Six studies measured the self-compassion variable as an outcome variable (Aranda-Auserón et al., 2018; Neff et al., 2020; Pérula-de Torres et al., 2021; Sansó et al., 2019; Scarlet et al., 2017; Watts et al., 2021). Two of these studies were excluded because they did not have a control group (Scarlet et al., 2017; Watts et al., 2021). The total number of participants was 253, taking into account the two intervention groups of the study by Pérula-de Torres et al. (2021). Self-compassion was measured in all the studies through the SCS instrument, both in the short version of 12 items (Aranda-Auserón et al., 2018; Sansó et al., 2019; Pérula-de Torres et al., 2021) and in the full version of 22 items (Neff et al., 2020). In the studies by Aranda-Auserón et al. (2018) and Sansó et al. (2019) the average score of the total scale was calculated through the average scores of the different dimensions of the questionnaire. All the studies identified a positive effect on the development of self-compassion, that is, the interventions based on compassion and self-compassion showed an increase in the experimental group with respect to the control group. The standardized mean difference was 0.29 [0.17,0.42], considered a small effect according to Cohen (1988), while the total effect was significant ($Z = 4.63$, $p \leq 0.01$).

In terms of heterogeneity, studies show that variability is absent ($Tau^2 = 0.00$), not statistically significant ($Chi^2 = 4.75$, $p = 0.31$) and low ($I^2 = 16\%$) at a 95% confidence interval. However, when interpreting the results we must consider the differences between the studies such as the intervention programme and the control group. In this aspect, the studies of Pérula-de Torres et al. (2021), Aranda-Auserón et al. (2018), and Neff et al. (2020) did not make any intervention in the control group; however, in the study by Sansó et al. (2019) the group that received the MBSRT intervention was considered the control group (Fig. 3). Since Egger's test suggested

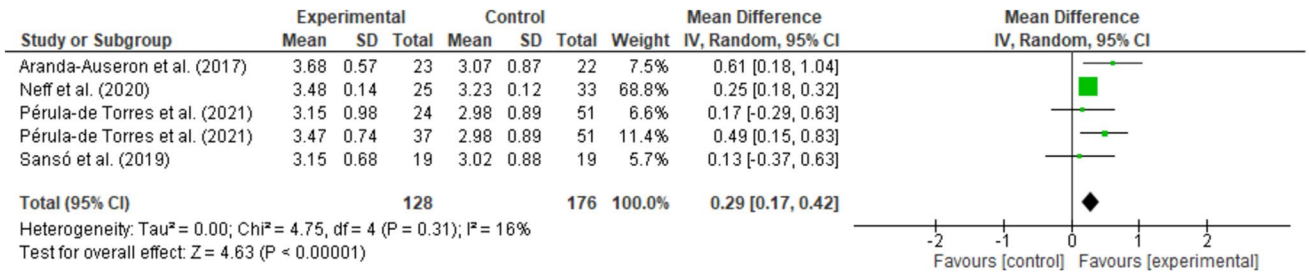

Fig. 3 Difference of standardized means for the self-compassion variable

that the publication distribution might be symmetric (*Egger's test* = 0.74, p = 0.48, respectively), the meta-analysis results might not be affected by the publication bias. The Fail-safe N self-compassion variable was 53 ($p < 0.001$). In other words, further studies are needed to negate the effects on this variable.

The sensitivity analysis showed the robustness of the analysis obtained in the meta-analysis, as none of the studies influenced the overall effect size measure. Figure 4 shows the "leave one out" sensitivity analysis, eliminating one study at a time. The meta-analysis suggests that there is significant variability among the included studies. The pooled estimate indicates a positive effect, but heterogeneity is high. The omission of study 2 seems to have a particular impact on heterogeneity.

Meta-analysis: satisfaction compassion variable

Four studies measured compassion satisfaction as an outcome variable (Hevezi, 2015; Neff et al., 2020; Sansó et al., 2019; Watts et al., 2021). However, only two studies were included in the meta-analysis as they included a control group (Neff et al., 2020; Sansó et al., 2019). The total number of participants was 96. Compassion satisfaction was measured through the ProQOl instrument (Neff et al., 2020) and the short version of this scale (Sansó et al., 2019). The standardized mean difference was 0.03 [−0.02, 0.09], with the effect not being significant ($Z = 1.07$, $p = 0.28$). There was no variation between the different studies ($Tau^2 = 0.00$) and hetereogeneity was not statistically significant ($Chi^2 = 0.01$, $p = 0.93$), in addition to being considered as low ($I^2 = 0\%$) at a 95% confidence interval (Fig. 5). Sensitivity analysis and publication bias could not be performed as there were only two studies.

Power analysis

A power analysis was then performed for each meta-analysis conducted. For the variable self-compassion, the power analysis indicated that for a mean sample of $N = 22$ the observed statistical power was 80.9. For the variable compassion satisfaction for a mean sample of $N = 72$ the power was 80.5.

Discussion

The aim of this study was to determine the efficacy and the effectiveness of interventions based on the cultivation of compassion and self-compassion in health professionals in order to reduce compassion fatigue and improve self-compassion, compassion, and compassion satisfaction as outcome variables. Despite the fact that all the studies had interventions based on the cultivation of compassion, there are differences between the interventions: MSC (Aranda-Auserón et al., 2018); SCHC (Neff et al., 2020); MBSRT supplemented with MSC (Pérula-de Torres et al., 2021); CCT (Sansó et al., 2019); meditation and LKM to cultivate compassion (Asadollah et al., 2023; Hevezi, 2015); and a programme based on MBSR, CCT and MSC (Watts et al., 2021).

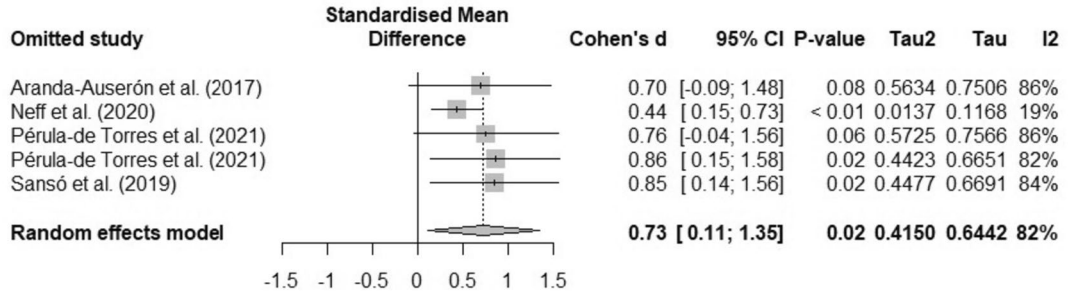

Fig. 4 Sensitivity analysis of pooled prevalence of self-compassion for each study being removed one at a time

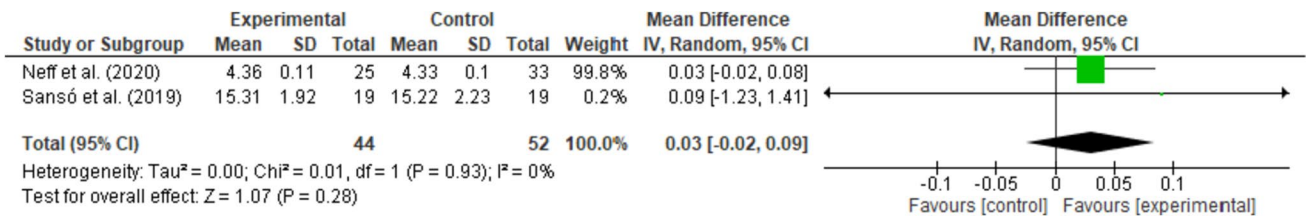

Fig. 5 Difference of standardized means for the compassion satisfaction variable

Self-compassion has been associated with numerous benefits for health professionals, especially a decrease in anxiety and depression, improvement in psychological well-being and physical health, as well as interpersonal relationships (Chwyl et al., 2021). In our meta-analysis, a significant, albeit small, a positive effect was found for the self-compassion variable. Therefore, all interventions based on the cultivation of compassion and self-compassion were effective in increasing self-compassion in health professionals (Aranda-Auserón et al., 2018; Neff et al., 2020; Pérula-de Torres et al., 2021; Sansó et al., 2019). Another study not included in the metaanalysis also showed an increase in self-compassion after the intervention (Scarlet et al., 2017). In addition, Ratu and Tondol (2022) conducted a systematic review on the effect of the full and modified MSC programme. These authors found an improvement in self-compassion and other psychological well-being outcomes in various age groups and in non-clinical and clinical contexts. Another systematic review also found that the MSC programme in nurses had medium-to-large effect sizes for self-compassion and compassion satisfaction (Biber, 2022). On the other hand, it was found that the increase in self-compassion can be maintained and increased after the intervention (Neff et al., 2020; Watts et al., 2021). Along the same lines, the application of these programmes has shown positive results in strengthening self-compassion in the general population (Guo et al., 2020; Irons & Heriot-Maitland, 2021) and professions other than healthcare (Andersson et al., 2021; Ko et al., 2018; Neff & Germer, 2013).

Self-compassion has been closely related to compassion; however, there is currently a debate about the link between both concepts (Strauss et al., 2016), with disparate results: a significant relationship (Rashid et al., 2020); a not very significant relationship (Elices et al., 2017); and a non-significant relationship (López et al., 2018). Compassion has not been included in the meta-analysis due to the paucity of literature on the subject. Only one study analyzes compassion as an outcome variable after the application of programmes based on the cultivation of compassion (Neff et al., 2020).

Another of the variables analysed was compassion satisfaction, which is related to the quality of healthcare, improving job performance, commitment, and competence (Okoli et al., 2020). In the meta-analysis of the compassion satisfaction variable, no significant improvement was found after applying the compassion cultivation and self-compassion programmes. The study of this variable is conditioned by two factors: the limitations of the existing bibliography on the subject and the characteristics of the articles can generate doubtful results. Specifically, in the study by Neff et al. (2020), despite presenting a significant improvement in compassion satisfaction after the intervention, an increase in this variable is not reflected in the metaanalysis. This can be attributed to the fact that the compassion satisfaction variable shows higher pre-test results in the control group compared to the intervention group. In addition, the calculations of the meta-analysis can only be compared to the post-test results of the control and intervention groups, so the pre-post-test difference is not taken into account. On the other hand, in the study by Sansó et al. (2019) two interventions (MBSRT and CCT) were applied, producing a small non-significant improvement in the compassion satisfaction variable. The authors associate these results with the fact that the participants presented high levels of compassion satisfaction before the interventions. Likewise, the study by Hevezi (2015), not included in the meta-analysis, demonstrated that interventions based on the cultivation of compassion increase compassion satisfaction in health professionals. Two studies evaluated the longitudinality of the results, discovering that compassion satisfaction increases and is maintained over time (Neff et al., 2020; Watts et al., 2021).

Compassion satisfaction is an effective tool to counteract compassion fatigue (Kelly et al., 2017) experienced by certain healthcare professionals as a consequence of chronic exposure to work-related stress (Xie et al., 2021). Despite being considered theoretical opposites (Fahey & Glasofer, 2016), compassion satisfaction and compassion fatigue can exist independently or coexist (Braun et al., 2022). Four studies analyzed compassion fatigue as an outcome variable (Asadollah et al., 2023; Hevezi, 2015; Sansó et al., 2019; Watts et al., 2021); however, it was not possible to perform a meta-analysis since three of the studies did not have a control group. Only one study that measured compassion fatigue had a control group, obtaining a significant decrease in the intervention group but no significant difference was observed in the control group (Asadollah et al., 2023). In two of the studies, programmes based on compassion cultivation decreased compassion fatigue in healthcare professionals (Hevezi, 2015; Sansó et al., 2019). In the study by Sansó et al. (2019), the effect of the intervention was very small and was associated with the low levels of pre-intervention compassion fatigue of the participants. Another study analyzed the relationship between compassion cultivation programmes and compassion fatigue although it only found significant results in burnout, one of the components of the outcome variable (Watts et al., 2021). In line with our results, other authors have suggested that interventions based on the cultivation of compassion can reduce the likelihood of compassion fatigue as well as improve therapeutic relationships (Bentley, 2022; Soto-Rubio & Sinclair, 2018).

In terms of risk of bias, none of the selected articles had a low risk of bias in all the domains assessed, so the quality of the data provided by the studies seems rather questionable. Other reviews of similar interventions concur with these results (Li & Bressington, 2019; Zimmermann et al., 2018). However, we agree with the opinion of other studies that this situation is clearly influenced by a possible inadequacy

of the Cochrane Collaborations risk of bias assessment tool for this type of study (Ruiz-Fernández et al., 2020a). These programmes require participants' attendance, motivation and therefore voluntariness and adherence to the practice. It is complex with this need to conduct randomisation and blinding processes similar to other drug interventions.

In the meta-analysis of the variables self-compassion and satisfaction with compassion, it was observed that the hetereogeneity of the studies is very low or non-existent, as well as not being significant for both variables. One of the reasons may be due to the scarcity of studies used in the sample of studies in the meta-analysis for the variables analysed.

Limitations

Among the limitations found when carrying out this systematic review, the scarce scientific evidence available on compassion-based interventions, accentuated when the sample is limited to health professionals, stood out. Another limitation was the lack of a control group in some of the articles found, which made it impossible to include the variables of compassion and compassion fatigue in the meta-analysis. In addition, poor randomization and blinding of interventions is common in studies. The requirement of voluntariness and the involvement of the participants greatly hinders the control of both quality elements since they have to be people committed to dedicating their free time to the programme. The small sample size of the studies, which might influence the results, can also be mentioned. Similarly, most of the participants were women, identifying a difficulty in extrapolating the results to the male gender. In addition, the lack of homogeneity in the selection of professionals may imply a bias when generalizing the results. Another limitation is the lack of post-intervention follow-ups produces a lack of knowledge about the long-term effect of these interventions. Lastly, the impossibility of performing meta-regression, due to the number of included studies, which would allow a sensitivity analysis of the meta-analysis. As recommendations for future lines of research, the scant literature available makes it essential to stress the need to develop new studies on the effects of compassion-based interventions in health professionals in the short and long term.

Conclusion

The available scientific evidence indicates that interventions based on the cultivation of compassion are useful in reducing compassion fatigue and increasing compassion, self-compassion, and compassion satisfaction of health professionals. Health professionals present a risk of developing compassion fatigue and a decrease in compassion satisfaction due to their work environment. Compassion fatigue causes significant alterations in the professional and personal lives of health workers, and it occurs due to a lack of training in empathy and compassion skills.

Therefore, it is necessary for healthcare to incorporate programmes based on the cultivation of compassion and self-compassion in order to improve the work conditions and quality of life of healthcare professionals. These training programmes should be integrated from undergraduate training, in the university environment within the regulated training of the professional curriculum of the health professions. Likewise, in postgraduate development, the insertion of these compassion cultivation programmes should be promoted within the framework of the organization of work in institutions and later provide professionals with space and time for formal practice. in your work environment.

Finally, these programmes should not only target professionals in direct patient care practice, but should also be aimed, especially at managers of institutions, to promote more compassionate leadership in organisations. Indeed, incorporating interventions that improve professional and managerial competencies supports the delivery of quality care in healthcare settings, both for patients and families, and promotes organisations that better accompany people in their suffering.

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Authors' contributions All authors have participated in the development of this study. Ruiz-Fernández, Alcaraz-Córdoba and Ortega-Galán conceived the study and participated in the data collection, data analysis and in writing the manuscript. Ventura-Miranda and García-Navarro managed the data, created the database and participated in the data analysis. Ibañez-Masero participated in the interpretation of the data and in writing the manuscript.

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Data availability Data are available from the first author or corresponding author on reasonable request.

Declarations

Conflict of interest All authors declare that there are no conflicts of interest in this investigation.

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