Received: 2 November 2022 | Revised: 12 December 2022 | Accepted: 4 January 2023

DOI: 10.1111/jocn.16634

Journal of Clinical Nursing WILEY

REVIEW

Effects of eHealth interventions on stress reduction and mental health promotion in healthcare professionals: A systematic review

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Abstract

Aims: To evaluate the effectiveness of eHealth interventions to reduce stress and promote mental health in healthcare professionals, and to compare the efficacy of different types of programs (guided vs. self-guided; 'third-wave' psychotherapies vs. other types).

Background: Healthcare workers present high levels of stress, which constitutes a risk factor for developing mental health problems such as depression and anxiety. eHealth interventions have been designed to reduce these professional's stress considering that the characteristics of this delivery method make it a cost-effective and very appealing alternative because of its fast and easy access.

Design: A systematic review of quantitative studies.

Methods: A comprehensive database search for quantitative studies was conducted in PubMed, EMBASE and Cochrane (until 1 April 2022). The systematic review was conducted in accordance with the PRISMA and SWiM reporting guidelines. The quality of the studies was assessed using the National Heart, Lung and Blood Institute tools.

Results: The abstracts of 6349 articles were assessed and 60 underwent in-depth review, with 27 fulfilling the inclusion criteria. The interventions were classified according to their format (self-guided vs. guided) and contents ('third-wave' psychotherapies vs. others). Twenty-two interventions emerged, 13 of which produced significant posttreatment reductions in stress levels of health professionals (9 self-guided, 8 'third wave' psychotherapies). Significant effects in improving depressive symptomatology, anxiety, burnout, resilience and mindfulness, amongst others, were also found.

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Conclusion: The evidence gathered in this review highlights the heterogeneity of the eHealth interventions that have been studied; self-guided and 'third-wave' psychotherapy programs are the most common, often with promising results, although the methodological shortcomings of most studies hinder the extraction of sound conclusions.

Protocol registration: PROSPERO CRD42022310199. No Patient or Public Contribution.

KEYWORDS
eHealth, health personnel, healthcare professionals, mental health, online interventions, stress, systematic review, telehealth

1 | INTRODUCTION

Health professionals normally present high levels of stress which have been accentuated by the COVID-19 pandemic (Greenberg et al., 2020; Pfefferbaum & North, 2020). Stress refers to the individual non-specific response caused by stressors, including physiological and psychological responses (Kruk et al., 2019). In addition to the main stressors that healthcare workers usually deal with (e.g., long shifts, emergency situations, exposure to human suffering), the COVID-19 pandemic forced many health professionals to make extra efforts, and the frequency of distressful work-related events such as workplace violence and lawsuits has increased notably in the last 2 years (Chirico et al., 2022; Magnavita et al., 2021). Such levels of sustained stress represent a risk factor for developing mental health problems, including anxiety disorders, depression, somatoform disorders, post-traumatic stress disorders and even suicidal ideation (Karasu et al., 2021; Williamson et al., 2018).

The World Health Organisation (WHO) has formally recognised that health professionals are at risk of developing mental health problems, especially if they work in public health, primary care, emergency services and intensive care units (Cullen et al., 2020; WHO, 2020). The reported high levels of stress amongst healthcare workers not only represent a threat to their individual health but also have consequences on the organisation and societal level since psychological distress has been clearly associated with an increase in absenteeism and turnover intention in healthcare workers (Chirico et al., 2021; Lavoie-Tremblay et al., 2022). It is, therefore, highly relevant to find effective ways to help health professionals to reduce and manage their levels of stress, not only to improve their well-being and job performance but also to prevent a potential shortage of professionals and the subsequent overload of healthcare systems.

Different approaches have been designed for this aim; interventions based on cognitive behavioural therapy (CBT), which includes techniques such as relaxation, time management or problem-solving, have proved to be effective in reducing stress and other psychopathological symptoms such as anxiety and depression in different clinical populations (Cuijpers et al., 2014; Kowalik et al., 2011; Lewis et al., 2020). The so-called 'third wave' CBT psychotherapies, which are based on the promotion of mindfulness, acceptance, compassion and spirituality, have been increasingly popular over the last decades and proved to be effective in reducing various psychopathological symptoms, also in samples of health professionals (Aranda Auserón et al., 2018; Asuero et al., 2014; Brinkborg et al., 2011; Chirico, 2021; Kriakous et al., 2021; Rudaz et al., 2017).

These interventions used to employ the classic face-to-face format (group or individual therapy), but in the last years, particularly due to the COVID-19 pandemic, electronic health (eHealth) interventions have proliferated; eHealth refers to health services and information delivered or enhanced through the Internet and related technologies (Eysenbach, 2001). Different types of digital health services can be found: telehealth, mobile APPs, serious games and wearable technology are some examples (Liu et al., 2011). The characteristics of this delivery method make it a cost-effective and very appealing alternative because of its fast and easy access (Eriksson et al., 2018). Health professionals often have to deal with schedules that are difficult to reconcile with attending therapy sessions limiting their access to the needed support (Gruber et al., 2021). eHealth programs have resulted effective for reducing stress and promoting mental health in different populations, such as relatives of patients with severe mental disorders (Barbeito et al., 2020), informal caregivers (Suntai et al., 2021), and even medical students (Yogeswaran & El Morr, 2021), amongst others, which means that these interventions may also be beneficial for health professionals. Therefore,

What does this paper contribute to the wider global community?

- This review draws attention to the need of offering healthcare professionals accessible resources to take care of their own mental health. This review has found that different eHealth interventions have been designed for this purpose, although the high degree of heterogeneity and the methodological shortcomings of some studies hinder the comparison amongst them.
- To maximise the effects of eHealth interventions, it is proposed to design self-guided programs with some punctual online support from an external professional: this format could benefit from the flexibility of a self-guided intervention whilst lowering the risk of losing adherence to it.

considering the need of finding effective evidence-based programs addressed at promoting healthcare workers' mental health (Chirico & Magnavita, 2020), it is deemed relevant to review and assess the quality of the studies conducted on this topic.

The main aim of this systematic review was to assess the effectiveness of different types of eHealth interventions to reduce stress in healthcare professionals, and secondarily, to evaluate their effects on other mental health-related outcomes such as depressive symptomatology, anxiety, burnout, resilience, and 'third wave' psychotherapy-related variables. The interventions were classified in two axes (guided vs. unguided, and 'third wave' psychotherapy-based vs. the rest) for the sake of comparing them and identifying potential differences in terms of efficacy.

2 | METHODS

2.1 | Design

A systematic review of quantitative studies, including randomised controlled trials (RCTs), nonrandomised trials, and single-arm studies, was conducted in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) and the synthesis without meta-analysis (SWiM) reporting guidelines (PRISMA Checklist and SWiM items can be found in Appendix, Table S1; Campbell et al., 2020; Page et al., 2021). The review protocol was registered with an international register of systematic reviews (PROSPERO ID: CRD42022310199).

2.2 | Data sources and search strategy

The searches were conducted between February and April 2022. The systematic review search was guided by the population, intervention, comparison and study design (PICOS) criteria, which can be found in the Appendix (Table S2). A comprehensive search was conducted in three online databases: PubMed, EMBASE, and Cochrane. Search terms were adapted to each database and are detailed in the Appendix S1.

Relevant studies were sought from trial registries (clinicaltrials.gov) and reference lists of included studies were searched to identify additional studies. The titles and abstracts of all potentially eligible studies identified from the search were reviewed against the inclusion and exclusion criteria by three reviewers (SFM, APA, and ABS). The full texts of all potential studies were then independently screened by three reviewers (SFM, APA, and ABS) and disagreements were resolved through discussion with a fourth reviewer (YLH).

2.3 | Eligibility criteria

Regarding the inclusion criteria, only those studies in which the sample was completely or mostly formed by healthcare providers (e.g. nurses, physicians, psychologists, social workers, etc.) were included; studies conducted on students, informal caregivers, or hospital workers who were not healthcare providers were excluded. The intervention needed to be fully delivered via an electronic device (e.g. smartphone, computer, tablet); it could be guided or unguided, but the whole program had to be completely remote (i.e. no in-person sessions or mixed interventions). For what concerns to the outcome, the study had to explicitly refer to a quantitative measure of psychological stress. Other mental health-related outcomes (e.g. depressive symptoms, anxiety, burnout, etc.) reported in the studies were included as secondary outcomes in the present review, as long as stress was also reported. RCTs, non-randomised trials and single-arm studies were eligible for inclusion. Only published research studies written in English were eligible. The search strategy did not establish a time horizon, considering that the development of new eHealth interventions increased during and after the pandemic, but some were developed previously.

2.4 | Search outcomes

After the duplicates were removed, a total of 6349 articles were identified and screened by three reviewers; the full-text manuscripts for 60 studies were then reviewed, of which 27 met the inclusion criteria (Figure 1). These articles were published between 2007 and 2021, and they had been conducted across 14 different countries. Twelve studies were RCTs, three were non-randomised trials, and 11 were single-arm studies. Only 8 studies reported follow-up assessments, ranging from 1 to 6 months.

A total of 4480 healthcare providers were included across the 27 studies; whilst most of the studies combined different professionals, nurses were the most represented subgroup in 7 of them. Twenty-one studies reported the sex distribution of their sample: females represented 100% of the sample in three of them and at least 75% in 14. The format of the intervention (18 self-guided vs. 4 guided) and its theoretical background (12 'third wave' psychotherapy-based vs. 10 others) was identified to compare the effects of different types of eHealth programs. All the reviewed studies assessed perceived levels of stress in their samples, along with some other mental health-related variables that were included in the present review as secondary outcomes.

2.5 | Quality appraisal

A quality assessment was undertaken for included studies by two reviewers (MB and SR); disagreements were solved by a third reviewer (MGS). It was conducted using the Heart, Lung, and Blood Institute assessment tools: one for controlled intervention studies and one for single-arm studies. The quality assessment is provided in the Appendix (Tables S3 and S4) along with a link to the assessment tools and its items.

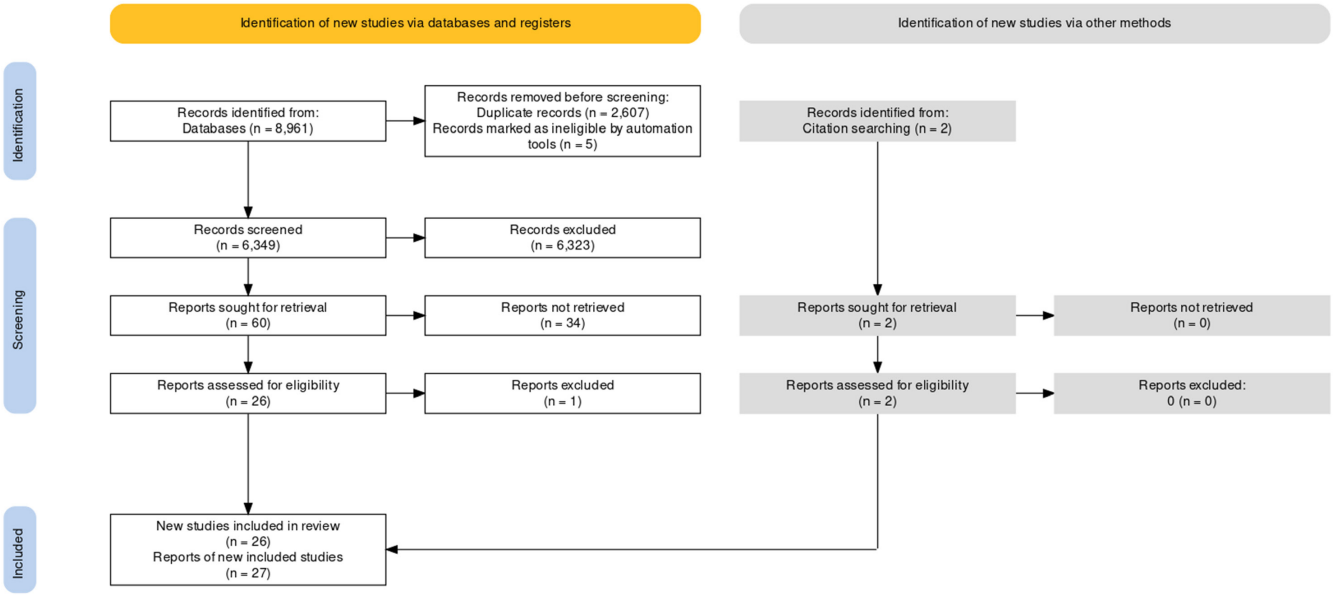

FIGURE 1 PRISMA diagram of study flow.

2.6 | Data abstraction

For each study, the following data were extracted and presented in tables: in Table 1, the study design, sample, intervention, comparator(s), duration of the intervention, follow-up assessment, stress assessment, and other mental health-related outcomes; in Table 2, the intervention, intragroup and intergroup changes in stress posttreatment and, if the study included it, changes in the follow-up assessment, and a brief outline of the main findings; and in the Appendix (Table S5), the same information for the secondary outcomes (i.e., other mental health-related variables). Different measures of intervention effect were included, considering the high heterogeneity of the studies reviewed; *p* values were considered the standardised metric.

2.7 | Synthesis

A narrative synthesis, which adopts a textual approach to summarise the findings of systematic reviews, was performed in accordance with the Economic and Social Research Council (ESRC) methods program guidance on narrative synthesis in systematic reviews (Popay et al., 2007). The study outcomes and results were tabulated in Tables 2 and Table S5.

3 | RESULTS

3.1 | Summary of the findings

The 27 studies reviewed tested the efficacy of 22 eHealth interventions that addressed health professionals' stress, which differed in terms of format and contents (see Table 1 and a summary can be found in the Appendix, Table S6). Most of these interventions ($n = 18$) were self-guided, that is, they did not count on any instructor who conducted any part of the program. Guided interventions were presented in a group format through a teleconference platform. Most self-guided interventions were web-based ($n = 14$), whilst three were presented as smartphone APPs and one was based on text messages. The duration of the interventions was heterogeneous, ranging from only 1 day to 3 months, although most of the programs had a duration between 2 and 6 weeks. The contents of the interventions were at least partially based on 'third wave' psychotherapy principles (e.g. mindfulness, compassion, acceptance, mind–body skills) in 12 programs, whilst the rest presented a variety of techniques based on different conceptual backgrounds, with CBT being present in 4 programs.

The most used measure of stress was the Perceived Stress Scale (PSS; Cohen et al., 1983), followed by the stress subscale of the Depression, Anxiety, and Stress Scales (DASS-21; Lovibond & Lovibond, 1995). Only two studies did not use a validated questionnaire to evaluate stress but a visual analogue scale. Other mental-health-related variables included in the studies were depressive symptomatology, anxiety, burnout, resilience and 'third wave' psychotherapy-related variables, amongst others.

3.2 | Study quality

The overall quality of the 27 included studies was rated as fair. Only 8 (29.6%) included studies (4/16 controlled trials and 4/11 single-arm studies) were rated as good, whilst 11 (40.7%; 7/16 controlled trials and 4/11 single-arm studies) were rated as poor. For controlled trials, the risk of bias was mainly due to a lack of blinding, the high dropout rate at the endpoint (>20%), or the lack of sample size/power calculation. For the single-arm studies, the

TABLE 1 Description of the studies reviewed

Reference	Study design	Sample (% females)	e-health intervention(s) (*n*)	Comparator(s) (*n*)	Post-treatment	Follow-up	Stress assessment	Secondary outcomes
Barrett and Stewart (2021) Ireland	RCT	*N* = 42 (88%) Age = 37.12 (SD = 12.18) Professions: 26 social workers 10 nurses 4 radiation therapists 2 medical doctors	ACT (*n* = 22) • Self-guided • Web-based program • 'Third-wave' 3 sessions CBT (*n* = 20) • Self-guided • Web-based program • Not 'third-wave' (CBT) 3 sessions	–	2 weeks	No	PSS	GHQ MBI WAAQ
Concilio et al. (2021) USA	RCT	*N* = 22 (95.5%) Age range: 21–30 years Newly graduated nurses (1st year of hire)	Resilience and stress messages (*n* = 11) • Self-guided • Smartphone text messages • Not 'third-wave' (motivational messages)	Medical facts messages (*n* = 11) • Self-guided • Smartphone text messages • Not 'third-wave' (informative message)	6 weeks	No	PSS	CD-RISC SSS Intention to leave
Dincer and Inangil (2021) Turkey	RCT	*N* = 72 (88.9%) Age = 33.45 (SD = 9.63) Nurses involved in the treatment of COVID-19 patients	The emotional freedom techniques (*n* = 35) • Guided • Videoconference • Not 'third wave' (acupressure techniques) One group session of 20 min	Passive control group (*n* = 37) 15 min with indications to stay "comfortable and calm"	20 min	No	Subjective units of distress (SUDs)	STAI BS
Divya et al. (2021) India	Single-arm pre-post-follow-up study	*N* = 92 (58.7%) Age = 43.1 (SD = 11.1) Doctors, podiatrists, dentists, chiropractors, psychologists, optometrists, nurses and social workers	Online Sudarshan Kriya Yoga workshop (*n* = 92) • Guided • Videoconference • 'Third wave' Four 2-h long sessions	–	4 days	40 days after finishing the workshop	DASS-21 (Stress)	DASS-21 (Depression and anxiety) PSQI CD-RISC SWLS
Dutton and Kozachik (2020) USA	Single-arm pre-post study	*N* = 31 (93%) Age range 30–49 (mostly) Nurses and nursing assistants working on a rehabilitation unit with older adults	*BREATHE*: Stress management for nurses (*n* = 31) • Self-guided • Web-based program • Not 'third wave' (psychoeducation and different stress-management tools, not specified) 6 modules	–	8 weeks	No	NSS	–

(Continues)

TABLE 1 (Continued)

Reference	Study design	Sample (% females)	e-health intervention(s) (*n*)	Comparator(s) (*n*)	Post-treatment	Follow-up	Stress assessment	Secondary outcomes
Eriksson et al. (2018) Sweden	RCT	*N* = 101 (96%) Age = 36.2 (SD = 8.2) Psychologists	Mindful and self-compassion program (*n* = 52) • Self-guided • Web-based program • 'Third wave' 6 modules, 10 hours of training	Wait-list control (*n* = 49)	6 weeks	No	PSS	SMBQ SCS FFMQ
Finlay-Jones et al. (2017) Australia	Single-arm pre-post-follow-up study	*N* = 37 (89%) Age 32.61 Psychology trainees (postgraduate psychologists)	Self-compassion cultivation program (*n* = 37) • Self-guided • Web-based program • 'Third wave' 6 modules, 1–2 h each one	–	6 weeks	12 weeks after end of the intervention	PSS DASS-21 (Stress)	SCS AHI DERS DASS-21 (Anxiety and Depression)
Fiol-DeRoque et al. (2021) Spain	RCT	*N* = 482 (83.2%) Age 41.37 (SD = 10.40) Healthcare providers working with COVID patients: nurses, physicians, and nurse assistants	PsyCovid (*n* = 248) • Self-guided • Smartphone APP • 'Third wave' + CBT	Generic mental health care recommendations (*n* = 234) • Self-guided • Smartphone APP • Not 'third wave'	2 weeks	No	DASS-21 (Stress)	DASS-21 (Depression and Anxiety) DTS MBI-HSS ISI GSES
Gollwitzer et al. (2018) Germany	RCT	*N* = 129 Age = 40.22 (SD = 10.18) Nurses	Mental Contrasting with Implementation Intentions (*n* = 41) • Self-guided • Web-based program • Not 'third wave' (self-regulation technique based on conscious imagery strategies) Modified Mental Contrasting (*n* = 41) • Self-guided • Web-based program • Not 'third wave' (same as MCII, but the participants had to make explicit where and when they were going to engage with the MCII exercises)	Passive control group (*n* = 47) Instructions to "explore your wishes to reduce your stress"	3 weeks	No	PSQ BOSS	UWES-9

TABLE 1 (Continued)

Reference	Study design	Sample (% females)	e-health intervention(s) (*n*)	Comparator(s) (*n*)	Post-treatment	Follow-up	Stress assessment	Secondary outcomes
Hersch et al. (2016) USA	RCT	*N* = 104 (87.5%) Age = 41 (range 22–65) Nurses	*BREATHE: Stress Management for Nurses* (*n* = 52) • Self-guided • Web-based program • Not 'third wave' (psychoeducation and different stress-management tools, not specified) 6 modules for nurses; 7 for nurse managers	Wait-list (*n* = 52)	3 months	No	NSS	SDS CWSS NJSS
Hosseinzadeh Asl (2021) Turkey	RCT	*N* = 49 (55.1%) Age = 33.06 (SD = 6.02) Social workers working at a social services center	Cognitive therapy and mindfulness-based program (*n* = 28) • Guided • Videoconference • 'Third wave' + CBT 4 sessions plus 10–20 min of daily meditation as homework (70 min per session)	Wait-list (*n* = 21)	4 weeks	1 month after finishing the program	DASS-21	SCS AAQ-II
Jakel et al. (2016) USA	Quasi-experimental	*N* = 25 (76%) Age range = 18–35 Oncology nurses	Provider Resilience mobile application (*n* = 16) • Self-guided • Smartphone APP • Not 'third wave' (psychoeducation and different stress-management tools, not specified)	Wait-list control group (*n* = 9)	6 weeks	No	ProQOL	–
Kemper et al. (2015) USA	Quasi-experimental	*N* = 218 (73%) Age = 28 (SD = 9.5) Professionals: 26 dietetics 77 medicine 29 nursing 51 social work 45 others	Mind–Body Skills Training (*n* = 60) • Self-guided • Web-based program • Included 'third wave' psychotherapy contents 12 one-hour modules organised in 4 general topics: 1. focused attention meditation 2. mindfulness meditation 3. positive affect meditation 4. guided imagery-hypnosis	Online course on herbs and dietary supplements (*n* = 7) • Self-guided • Web-based program • Not 'third wave' 14 one-hour modules No treatment (*n* = 36)	12 weeks	No	PSS	CAMS-R SCS CCCS IRI SCBCS

(Continues)

TABLE 1 (Continued)

Reference	Study design	Sample (% females)	e-health intervention(s) (*n*)	Comparator(s) (*n*)	Post-treatment	Follow-up	Stress assessment	Secondary outcomes
Kemper and Khirallah (2015) USA	Single-arm pre-post study	*N* = 513 Professionals: 73 dietitian 169 nurse 152 physician/physician assistant 103 social work 69 researcher 271 others	Mind–Body Skills Training (*n* = 60) • Self-guided • Web-based program • Included 'third wave' psychotherapy contents Twelve 1-hour modules, of which 5 were completed by at least 100 individuals and thus included in the analyses: 1. Introduction to stress and resilience 2. Autogenic training 3. Guided imagery- hypnosis for pain, insomnia and changing habits 4. Introduction to mindfulness 5. Mindfulness in daily life	–	1 h	No	Visual analog scale (VAS) PSS	MBI CAMS-R MAAS BRS IRI
Kemper and Rao (2017) USA	Single-arm pre-post study	*N* = 379 (85%) Professionals: 116 nurse 81 physician 39 social work, psychologist, or licensed counsellor 143 other	Focused attention meditation training (*n* = 379) • Self-guided • Web-based program • 'Third wave' (part of the Mind–Body Skills Training) 3 one-hour modules, only one assessed stress changes: 1. Introduction to stress, resilience and relaxation response	–	1 h	No	Numeric rating scale (from 0 to 10)	Numeric rating scale (from 0 to 10) to assess relaxation and resilience PANAS FS
Ketelaar et al. (2014) The Netherlands	Single-arm pre-post study	*N* = 128 (77%) Age = 40 (SD = 12) Occupation: 89 nurse 12 nurse practitioner 27 allied health professional	e-mental health interventions (*n* = 128; *n* = 26 logged at least once in an online program) • Self-guided • Web-based program • Not 'third wave' (personalised feedback + recommendation of CBT-based programs: Psyfit, Strong at work, Colour your Life, Do not Panic Online, Drinking less)	–	3 months	No	DSQ	NWFQ QEEW

TABLE 1 (Continued)

Reference	Study design	Sample (% females)	e-health intervention(s) (*n*)	Comparator(s) (*n*)	Post-treatment	Follow-up	Stress assessment	Secondary outcomes
Lee et al. (2018) Republic of Korea	RCT	*N* = 37 (100%) Age: MBT: 36.77 (SD = 8.18) Control: 34.07 (SD = 6.28) Health care providers	Mind–Body Training (*n* = 19) • Self-guided • Web-based program • 'Third wave' Once per day, 5 days per week, 10 min sessions	Wait-list control group (*n* = 18)	4 weeks	No	KOSS	SCL-90-R RSES STAXI PANAS
Jung et al. (2016) Lee et al. (2020) Republic of Korea	Quasi-experimental	*N* = 87 (100%) Age: MBT: 35.0 (SD = 8.20) Control: 36.6 (SD = 7.6) Female healthcare providers, mostly nurses *N* = 56 Age: MBT: 36.20 (SD = 8.17) Control: 35.00 (SD = 6.74)	Mind–Body Training (*n* = 42) • Self-guided • Web-based program • 'Third wave' Once per day, 5 days a week, 10 min sessions	No intervention control group (*n* = 45)	8 weeks	– 1 month after intervention ended	SRI KOSS	CSI STAXI EIQ PANAS CD-RISC
Mistretta et al. (2018) USA	RCT	*N* = 60 (86.7%) Age = 46 (SD = 12.6) Healthcare workers with at least 5 points on the DASS-21 stress subscale	Mindfulness-based resilience training APP (*n* = 23) • Self-guided • Smartphone APP • 'Third wave' Self-guided, every 7–10 days participants can select one of four possible topics: sleep, happiness and positivity, energy and focus and productivity	In-person Mindfulness-based Resilience training (*n* = 22) • Guided • In-person program • 'Third wave' No intervention control group (*n* = 15)	6 weeks	3 months	DASS-21 (stress)	DASS-21 (depression and anxiety) WHO-5 MBI-HSS SCS COS PANAS
Osman et al. (2021) South Africa	Single-arm pre-post quantitative study + qualitative analysis	*N* = 47 Age = 34 (IQR = 18) 46% medical doctors and trainees 16% psychologists, 14% physiotherapists, 14% occupational therapists 10% other allied health (podiatrist, chiropractor and two radiographers)	Brief online mindfulness-based intervention (*n* = 47) • Guided • Videoconference • 'Third wave' 1-hour weekly group sessions.	–	4 weeks	No	PSS	MAAS aMBI

(Continues)

TABLE 1 (Continued)

Reference	Study design	Sample (% females)	e-health intervention(s) (*n*)	Comparator(s) (*n*)	Post-treatment	Follow-up	Stress assessment	Secondary outcomes
Rao and Kemper (2017) USA	Single-arm pre-post-study	*N* = 273 (84% females) Age: not reported 34% registered nurses 20% physicians 14% trainees 14% social workers 5% registered dietitians 27% others	Focused attention meditation training (*n* = 273) • Self-guided • Web-based program • 'Third wave' (part of the Mind–Body Skills Training) 3 one-hour modules, only one assessed stress changes: 1. Autogenic training	-	1 h	No	PSS	PROMIS IRI SEND
Smoktunowicz et al. (2021) Poland	RCT	*N* = 1240 Age = 36.21 (SD = 10.18) 36.13% physicians 24.84% nurses 7.50% dentists 5.24% midwives 5% paramedics 15.4% other medical professionals	Different variations of the *Med-Stress program* • Self-guided • Web-based • Not 'third wave' Cultivation process: Self-efficacy + social support modules (*n* = 311) Enabling process: Social support + self-efficacy modules (*n* = 311) Self-efficacy module (*n* = 309) Social support module (*n* = 309)	–	6 weeks (3 for those with only one module)	6 months after the end of the intervention	PSS	PHQ9 UWES PSDC
Wang et al. (2021) China	Single-arm pre-post study	*N* = 210 (58.7% females) Age: 127 (60.48%) between 20–25 years old. Anaesthesia, paediatric, internal medicine and surgical residents	Mindfulness decompression and psychoeducation program (*n* = 210) • Self-guided + counselling • Web-based program + chat (APP) • 'Third wave' 8 sessions of mindfulness 30–45 min + psychoeducational counselling once a week, 1–3 h	–	3 months	No	DASS-21 (stress)	DASS-21 (depression and anxiety) MBI
Wright (2018) USA	Single-arm pre-post study	*N* = 10 (100%) Age = 40 (range 31–64) Midwives	*Benevolent Midwifery Project* (*n* = 10) • Self-guided • Web-based program • 'Third wave' 16 modules (5–30 min each), minimum 4 days per week	–	4 weeks	No	PSS	CSES

TABLE 1 (Continued)

Reference	Study design	Sample (% females)	e-health intervention(s) (*n*)	Comparator(s) (*n*)	Post-treatment	Follow-up	Stress assessment	Secondary outcomes
Yamagishi et al. (2007) Japan	Single-arm pre-post study	*N* = 32 Age = 32.7 (SD = 7.1) Nurses	*Internet Navigware: Assertion in the Workplace* (*n* = 32) • Self-guided • Web-based program • Not 'third wave' 70-min sessions	-	3 weeks	1 month after the training finished	JSBQ	AMS ACL BJSQ
Yamagishi et al. (2008) Japan	RCT	*N* = 60 Age = 33.0 (SD = 7.1) Nurses	Career Identity training (*n* = 30) • Self-guided • Web-based program • Not 'third wave' 60-min sessions	Waiting list (*n* = 30)	3 weeks	4 weeks after the training finished	JSBQ	BJSQ

risk of bias was related to the lack of information on the sample's representativeness, no sample size calculation, and lack of blindness of people assessing outcomes.

3.3 | Effects of the eHealth interventions on stress

3.3.1 | Self-guided vs. guided interventions

These results are presented in Table 2, and a summary can be found in Table S6. Of the 18 self-guided interventions that were tested in the reviewed studies, 7 were compared to a passive control group. Four interventions, all of which were web-based programs, resulted superior to passive comparators for reducing stress: the BREATHE program (Hersch et al., 2016), which also presented significant effects in a subsequent pre-post single-arm study (Dutton & Kozachik, 2020); the Mindful Self-Compassion Online Program (Eriksson et al., 2018); the Mental Contrasting with Implementation Intentions program (Gollwitzer et al., 2018); and the Mind–Body Skills Training (Kemper et al., 2015), a program whose individual modules also presented acute pre-post effects on stress (Kemper & Khirallah, 2015; Kemper & Rao, 2017; Rao & Kemper, 2017). A similar program (i.e. Mind–Body Training) was tested with inconclusive results: it resulted superior to the control group both posttreatment and in a follow-up assessment (Jung et al., 2016; Lee et al., 2020), but another study reported no significant effects (Lee et al., 2018). The Provider Resilience Mobile APP (Jakel et al., 2016) and the Career Identity Training (Yamagishi et al., 2008) did not result superior to their respective passive control conditions.

Three RCTs compared the eHealth program to an active control group; two of them tested the efficacy of APPs (Fiol-DeRoque et al., 2021; Mistretta et al., 2018), and both presented effects with tendencies close to statistical significance; the other was a text message-based intervention which was not superior to the comparator (Concilio et al., 2021). Two more studies were RCTs, but in this case comparing different variations of the same interventions, such as the Med-Stress program (Smoktunowicz et al., 2021), all of which reduced stress (although one version, the "cultivation process", presented better outcomes), or comparing two different online programs, such as web-based ACT and web-based CBT (Barrett & Stewart, 2021), both of which reduced stress equally.

The remaining studies did not include a control group; some reported significant reductions in stress posttreatment, such as the Self-compassion Cultivation Program (Finlay-Jones et al., 2017), with effects that lasted 12 weeks after the end of the program; and the Benevolent Midwifery Project (Wright, 2018), which reported some positive preliminary effects. On the contrary, other eHealth programs did not produce significant pre-post reductions in stress: the CBT-based programs assessed by Ketelaar et al. (2014), the Mindfulness Decompression and Psychoeducation Program (Wang

TABLE 2 Effects of the interventions on the primary outcome (stress)

Ref.	Intervention(s) [vs. comparator]	Post-treatment intragroup changes	Post-treatment intergroup changes	Follow-up intragroup changes	Follow-up intergroup changes	Summary of the main findings
Barrett and Stewart (2021)	Web-based ACT vs. Web-based CBT	$F = 7.30$, $p = .010$, $\eta^2 = .154$	$F = 0.64$; $p = .430$; $\eta^2 = .016$	–	–	Both interventions significantly reduced stress (PSS) posttreatment, but no differences were observed between groups
Concilio et al. (2021)	Supportive text messages vs. medical facts text messages	–	Bayes factor = 2.366	–	–	No significant differences between the two groups were observed in the primary outcome (PSS)
Dincer and Inangil (2021)	Online EFT session vs. control group	–	Wilcoxon test = 16.58, $p < .001$	–	–	The EFT group achieved a statistically significant pre-post change in stress (SUDs) whilst the control group did not
Divya et al. (2021)	SKY online workshop	$p < .001$, $d = 0.57$	–	$p = .490$	–	Significant reductions were observed in stress (DASS-21 Stress) posttreatment with a medium effect size, but no effect was observed in the follow-up
Dutton and Kozachik (2020)	*BREATHE* online program	$t = 2.30$, $p = .026$	–	–	–	Significant reductions were observed in the NSS total score
Eriksson et al. (2018)	Mindful Self-Compassion Online Program vs. wait-list control	–	$F = 11.64$, $p < .001$, $d = 0.59$	–	–	The online program reduced stress levels (PSS) significantly compared to the control group, with a medium effect size
Finlay-Jones et al. (2017)	Online Self-compassion cultivation program	PSS: $t = 3.16$, $p = .002$, $d = 0.52$ DASS-21 Stress: $t = 5.15$, $p < .001$, $d = 0.85$	–	PSS: $t = 2.92$, $p = .005$, $d = 0.48$ DASS-21 Stress: $t = 2.79$, $p = .007$, $d = 0.46$	–	Significant reductions were observed in stress (PSS and DASS-21 Stress) both posttreatment and in the 12-week follow-up assessment, mostly with medium effect sizes
Fiol-DeRoque et al. (2021)	PsyCovid APP vs. Control APP	–	$Z = -0.06$ [−0.14 to 0.01], $p = .050$	–	–	The PsyCovid APP did not produce significant reductions in stress (DASS-21 Stress) compared to the control APP, although a tendency close to significance was observed
Gollwitzer et al. (2018)	MCII vs. no treatment MCII vs. IIMCII IIMCII vs. no treatment	–	$t = 2.39$, $p = .019$, $\eta^2 = .053$ $t = 1.30$, $p = .198$, $\eta^2 = .016$ $t = 1.09$, $p = .277$, $\eta^2 = .012$	–	–	The MCII was superior to the no-treatment condition (large effect size) in stress reduction (PSQ & BOSS-II). No significant differences were observed when comparing MCII and IIMCII. This latter was not superior to the no-treatment condition
Hersch et al. (2016)	*BREATHE* vs. Wait-list	–	$t = -2.954$, $p = .003$	–	–	Participants of the BREATHE program reported significantly greater reductions than the control group on the NSS total score

TABLE 2 (Continued)

Ref.	Intervention(s) [vs. comparator]	Post-treatment intragroup changes	Post-treatment intergroup changes	Follow-up intragroup changes	Follow-up intergroup changes	Summary of the main findings
Hosseinzadeh Asl (2021)	Mindfulness online vs. Wait-list	–	$F = 3.22$, $p = 0.79$, $\eta^2 = .065$	–	$F = 3.84$, $p = .069$, $\eta^2 = .070$	Although the experimental group had a decrease in the stress scores (DASS-21) at both the post-test and follow-up, these were not significant compared to the control group
Jakel et al. (2016)	Provider Resilience Mobile APP vs. Wait-list	–	$p = .500$	–	–	No significant differences in the level of stress (ProQOL) were observed between both groups
Kemper et al. (2015)	MBST online vs No-MBST (i.e., no treatment or HDS online course)	–	$p = .006$	–	–	The MBST group significantly reduced their levels of stress (PSS) compared to the no-MBST group
Kemper and Khirallah (2015)	MBST modules: 1. Introduction to stress and resilience 2. Autogenic training	$p = .02$ $p = .0001$	–	–	–	Significant acute reductions in stress (VAS and PSS) were observed right after finishing the two modules
Kemper and Rao (2017)	Focused attention training modules: Introduction to Stress, resilience, and relaxation response	$p < .010$	–	–	–	Acute effects on stress were reported (numeric scale rating) after completing the module
Ketelaar et al. (2014)	EMH EMH-logged at least once in the online program	$t = 1.65$, $p = .102$, $d = 0.14$ $t = 1.12$, $p = .273$, $d = 0.23$	–	–	–	Although stress (DSQ) decreased both in the complete sample and in the subsample who logged on at least to an EMH intervention, this was not significant
Lee et al. (2018)	Mind–Body Training vs. Wait-list	–	$t = 1.90$, $p = .080$ $t = -1.38$, $p = .190$	–	–	There were no significant changes in occupational stress (KOSS) over time for any of the groups
Jung et al. (2016) [Pre-post] & Lee et al. (2020) [Follow-up]	Mind–Body training program vs. No intervention	–	SRI [week 4]: $F = -10.29$, $p = .014$ [week 8] $F = -14.68$, $p = .002$ KOSS [week 4]: $F = -2.03$, $p = .073$ [week 8] $F = -0.33$, $p = .810$	–	SRI: $p = .021$ KOSS: $p = .807$	Significant reductions were observed in the intervention group in the three assessment points (mid-program, post-treatment, and 1-month follow-up) in stress (SRI), but not in job stress (KOSS)

(Continues)

TABLE 2 (Continued)

Ref.	Intervention(s) [vs. comparator]	Post-treatment intragroup changes	Post-treatment intergroup changes	Follow-up intragroup changes	Follow-up intergroup changes	Summary of the main findings
Mistretta et al. (2018)	Mindfulness-based resilience intervention APP vs. no intervention	$p > .050$, $d = 0.50$ $p > .050$, $d = 0.19$	$p > .050$	$p > .050$, $d = 0.13$ $p > .050$, $d = 0.29$	$p > .050$	The APP reduced stress (DASS-21 Stress) post-treatment, but not significantly after correcting for multiple testing. The in-person program did produce significant reductions in stress both posttreatment and in the follow-up, although not significant compared to the other groups
	Mindfulness-based resilience intervention APP vs. in person mindfulness-based resilience program	$p < .050$, $d = 0.59$		$p < .050$, $d = 0.62$		
Osman et al. (2021)	Online mindfulness-based intervention	$p < .001$	–	–	–	Significant reductions in stress levels (PSS) were observed posttreatment
Rao and Kemper (2017)	Guided imagery modules: Autogenic training	$p < .001$	–	–	–	Significant acute reductions in stress (PSS) were observed right after finishing the module
Smoktunowicz et al. (2021)	Cultivation process vs. Social support only Cultivation process vs. Self-efficacy only Cultivation process vs. Enabling process	–	$d = 0.21$	–	$d = 0.41$ $d = 0.24$ $d = 0.24$	Stress (PSS) was reduced by all the different variations of the program. The cultivation program resulted superior to the "social support only" condition posttreatment, and it was superior to all the others in the follow-up
Wang et al. (2021)	Mindfulness decompression and psychoeducation online program	$p > .050$, $d = 0.40$	–	–	–	No significant effects of the intervention on stress (DASS 21 Stress) were observed posttreatment
Wright (2018)	*Benevolent Midwifery Project*	– (Not reported)	–	–	–	Improvement in reported levels of perceived stress (PSS) of 25% compared to baseline
Yamagishi et al. (2007)	Internet Navigware: Assertion in the Workplace program	All p values > .290	–	All p values > .085	–	No significant reductions in stress (subscales of the JSBQ) were reported
Yamagishi et al. (2008)	Career identity program vs. Wait list	All p values > .100	All p values > .090	JSBQ Personal relationships: $p < .050$ JSBQ Support from others: $p < .010$	–	Significant reductions in some stress-related aspects (subscales of the JSBQ) were observed in the follow-up assessment. No significant differences between the study groups were reported at posttreatment

Note: The questionnaires' abbreviations and their bibliographic reference can be found in pages 15–21 of the Annex.

et al., 2021), and the Internet Navigware: Assertion in the Workplace program (Yamagishi et al., 2007).

For what concerns to guided interventions, these were assessed in 4 studies, two of which compared the program to a control group; the Emotional Freedom Techniques session reduced stress significantly compared to the control condition (Dincer & Inangil, 2021), whilst the guided mindfulness program tested by Hosseinzadeh Asl (2021) did not result superior to the wait-list control group, neither posttreatment nor in the follow-up assessment. The remaining two interventions were tested in single-arm studies: a 4-day workshop on Sudarshan Kriya Yoga produced significant effects posttreatment that were not maintained in the follow-up assessment (Divya et al., 2021), and a brief mindfulness-based intervention produced significant reductions posttreatment (Osman et al., 2021).

3.3.2 | 'Third wave' psychotherapy-based interventions vs. other approaches

Ten interventions (8 self-guided and 2 guided) were fully based on 'third wave' psychotherapy principles (e.g. mindfulness, compassion, mind–body skills) and 2 programs (one self-guided and the other guided) combined them with classic CBT techniques; in total, 12 interventions included 'third wave' psychotherapy contents.

When compared with passive control groups, the study groups undergoing the Mindful Self-Compassion Online Program (Eriksson et al., 2018) and the Mind–Body Skills Training (Kemper et al., 2015) obtained significant benefits, whilst the Mind–Body Training presented both positive (Jung et al., 2016; Lee et al., 2020) and no significant effects (Lee et al., 2018). A guided mindfulness program was not superior to the passive control group (Hosseinzadeh Asl, 2021). The APPs developed by Mistretta et al. (2018) and Fiol-DeRoque et al. (2021) were compared to active control groups and, despite showing some effects, these did not reach statistical significance. Amongst those studies in which intragroup effects were reported, web-based ACT (Barrett & Stewart, 2021), the self-compassion Cultivation Program (Finlay-Jones et al., 2017), some individual modules of the Mind–Body Skills Training (Kemper & Khirallah, 2015; Kemper & Rao, 2017; Rao & Kemper, 2017), the Benevolent Midwifery Project (Wright, 2018), the guided workshop on Sudarshan Kriya Yoga (Divya et al., 2021), and the brief mindfulness-based intervention tested by Osman et al. (2021) presented positive results on stress reduction, whilst the Mindfulness Decompression and Psychoeducation Program (Wang et al., 2021) did not. Long-term effects were reported in the studies conducted by Finlay-Jones et al. (2017) and Lee et al. (2020); however, three 'third wave' eHealth interventions resulted not effective in the follow-up assessments (Divya et al., 2021; Hosseinzadeh Asl, 2021; Mistretta et al., 2018).

Amongst the 10 interventions (9 self-guided, 1 guided) not based on 'third wave' psychotherapy principles, 5 were compared to passive control groups. The guided Emotional Freedom Techniques session (Dincer & Inangil, 2021), the Mental Contrasting with Implementation Intentions (Gollwitzer et al., 2018), and the BREATHE program (Hersch et al., 2016) resulted superior to the comparators, whilst the Provider Resilience Mobile APP (Jakel et al., 2016) and the Career Identity Training (Yamagishi et al., 2008) did not. Similarly, the text message-based intervention to promote resilience did not result superior to the active control condition (Concilio et al., 2021). The study conducted by Smoktunowicz et al. (2021) compared different versions of the Med-Stress program, finding that the "cultivation process" version was the most effective for reducing stress. On its part, web-based CBT reduced stress, although no more than web-based ACT (Barrett & Stewart, 2021), whilst the Internet Navigware: Assertion in the Workplace program (Yamagishi et al., 2007) and the CBT-based programs offered by Ketelaar et al. (2014) did not produce any significant effects on stress.

3.4 | Effects of the eHealth interventions on other mental health-related outcomes

3.4.1 | Depressive symptoms

Depressive symptomatology was assessed in 7 studies; 3 interventions produced significant reductions posttreatment: the guided Sudarshan Kriya Yoga workshop (Divya et al., 2021), the online self-compassion cultivation program (Finlay-Jones et al., 2017), and the mindfulness decompression and psychoeducation program (Wang et al., 2021). None of these studies was compared to control conditions; Smoktunowicz et al. (2021) did compare different versions of the Med-Stress program but found no differential effects on depression. Two interventions were tested in a follow-up assessment and in both cases, the effects were no longer observed (Divya et al., 2021; Finlay-Jones et al., 2017). The interventions tested in the remaining three studies (Fiol-DeRoque et al., 2021; Mistretta et al., 2018; Yamagishi et al., 2007) did not produce significant reductions in depressive symptoms.

3.4.2 | Anxiety symptoms

Anxiety was included as an outcome in 8 studies. The emotional freedom techniques guided session (Dincer & Inangil, 2021) and the Mindful-Body Training (Lee et al., 2018) resulted superior to their respective control groups for reducing anxiety posttreatment. The guided Sudarshan Kriya Yoga workshop (Divya et al., 2021), the brief online guided imagery training (Rao & Kemper, 2017), and the mindfulness decompression and psychoeducation program (Wang et al., 2021) produced significant reductions in anxiety levels posttreatment. On the other hand, the PsyCovid APP (Fiol-DeRoque et al., 2021) only produced significant effects on those health professionals who attended to a psychotherapy or consumed psychotropic medications compared to a control APP,

and the mindfulness-based resilience training APP did not present significant effects on anxiety compared to those who underwent a similar in-person intervention or were in a no-intervention control group (Mistretta et al., 2018). Two studies included follow-up assessments; the effects observed posttreatment by the Sudarshan Kriya Yoga workshop were no longer reported after 40 days, whilst the online self-compassion cultivation program, which did not produce significant reductions in anxiety posttreatment, presented a significant effect in the 12 weeks follow-up (Finlay-Jones et al., 2017).

3.4.3 | Burnout

The impact of the intervention on burnout levels was reported in 7 of the studies reviewed. Five of them observed significant reductions in this outcome: web-based ACT and web-based CBT (Barrett & Stewart, 2021), and the mindfulness decompression and psychoeducation program (Wang et al., 2021) produced significant reductions posttreatment; also, the study conducted by Osman et al. (2021) reported effects on the emotional exhaustion and personal accomplishment facets of burnout, but not on depersonalization. Moreover, the mindful and self-compassion program (Eriksson et al., 2018) and the guided session teaching emotional freedom techniques (Dincer & Inangil, 2021) produced significant improvements in burnout compared to control groups. None of these studies conducted a follow-up assessment. The two remaining studies did not report significant effects on burnout of the eHealth interventions, both consisting of 'third wave' psychotherapy-based smartphone APPs (Fiol-DeRoque et al., 2021; Mistretta et al., 2018).

3.4.4 | Resilience and stress coping

Resilience was included as an outcome in 6 studies; the guided Sudarshan Kriya Yoga workshop (Divya et al., 2021), the brief focused attention meditation training (Kemper & Rao, 2017), a module of the Mind–Body Skills Training program (Kemper & Khirallah, 2015), and the Mind–Body Training (Jung et al., 2016) were reported to improve significantly the levels of resilience posttreatment. In the latter case, the intervention was compared to a passive control group and resulted in superior, also in the 1-month follow-up assessment (Lee et al., 2020). On the contrary, the Sudarshan Kriya Yoga workshop did not present significant effects in the follow-up assessment. The intervention based on supportive text messages studied by Concilio et al. (2021) did not produce significant effects on resilience compared to the control group.

The effects of the BREATHE program on coping with stress compared to a waiting-list control group were evaluated in one study, but no significant results were reported (Hersch et al., 2016). The Mindful-Body Training had significant effects on improving some coping strategies such as problem-solving and social support compared to a no-intervention control group; these effects were presented both posttreatment and in the follow-up assessment (Jung et al., 2016; Lee et al., 2020), and Wright (2018) reported similar effects of the mindfulness and yoga-based intervention in their pre-post single-arm study.

3.4.5 | Mindfulness and self-compassion

Changes in mindfulness levels were assessed in 4 studies; all of them studied 'third wave' psychotherapy-related interventions which produced significant improvements posttreatment (Eriksson et al., 2018; Kemper et al., 2015; Kemper & Khirallah, 2015; Osman et al., 2021). Two of the studies observed that the tested interventions were superior to their respective control groups (Eriksson et al., 2018; Kemper et al., 2015). No follow-up assessments were conducted.

Self-compassion was assessed in 5 studies; again, all of them were 'third wave' psychotherapy-based programs, and in all cases, significant effects were observed posttreatment (Eriksson et al., 2018; Finlay-Jones et al., 2017; Hosseinzadeh Asl, 2021; Kemper et al., 2015; Mistretta et al., 2018). Four of these studies included a control group, and the tested intervention resulted superior in all cases. In the follow-up assessments, the effectiveness of the mindfulness-based resilience training APP studied by Mistretta et al. (2018) was no longer significant, but the self-compassion cultivation program (Finlay-Jones et al., 2017) and the guided mindfulness program (Hosseinzadeh Asl, 2021) did maintain their effects on self-compassion.

4 | DISCUSSION

Different eHealth interventions have been designed to reduce healthcare providers' stress levels and promote their mental health, not only in the context of the COVID-19 pandemic, since only four studies (Dincer & Inangil, 2021; Fiol-DeRoque et al., 2021; Gollwitzer et al., 2018; Osman et al., 2021) were explicitly framed into it, but as a way of providing health professionals some tools that can be easy to adapt to their schedules and that can help them with their day-to-day stress.

The heterogeneity of the interventions is notable in different aspects: format (guided vs. self-guided), platform (web-based, APP, text messages), duration (from a few minutes to several weeks) and contents and theoretical bases ('third wave' psychotherapy-based, CBT, or others). The most common eHealth programs were those self-guided, web-based and with 'third wave' psychotherapy concepts that lasted between 2 and 6 weeks. Four eHealth programs included in the reviewed studies met these criteria and presented significant reductions in stress levels: web-based ACT (Barrett & Stewart, 2021), the mindful and self-compassion program (Eriksson et al., 2018), the self-compassion cultivation program (Finlay-Jones et al., 2017), and the Benevolent Midwifery Project (Wright, 2018). Apart from these programs, 5 more self-guided interventions, each

with different characteristics (i.e. duration, contents), resulted effective. This highlights the promising therapeutic potential of this format for healthcare providers, which presents numerous advantages including increased availability, flexibility and convenience, along with high user satisfaction and acceptance (Stoll et al., 2020).

Nonetheless, it cannot be overlooked that 9 self-guided programs did not produce significant stress reduction effects; this could be attributed to methodological shortcomings of the studies in some cases, although most of them presented at least fair quality according to the quality assessment conducted. Thus, different hypotheses could be established: first, that smartphone APPs and text messages may be either too flexible or have a too subtle effect to get the individual to engage with the contents of the intervention and delve into them; second, that programs which do not address stress explicitly but indirectly through other contents may be too unspecific to generate significant reductions in stress; and third, that self-guided online programs (regardless of their format and contents), precisely because of their flexible nature which is considered a strength in most cases, may favour high attrition rates, which would hinder the intervention's efficacy (Lippke et al., 2021; Stoll et al., 2020).

Guided eHealth interventions, on the other hand, were scarce. Only 4 studies tested guided programs, three of which were 'third wave' psychotherapy-based, delivered via videoconferences: the emotional freedom techniques session (Dincer & Inangil, 2021), the Sudarshan Kriya Yoga workshop (Divya et al., 2021), the cognitive therapy and mindfulness-based program (Hosseinzadeh Asl, 2021), and the brief online mindfulness-based intervention (Osman et al., 2021). Two of these programs were compared to passive control groups, with one resulting as superior (Dincer & Inangil, 2021) and the other equivalent (Hosseinzadeh Asl, 2021); follow-up assessments were included in two studies, with none of them reflecting significant effects on stress (Divya et al., 2021; Hosseinzadeh Asl, 2021). These findings do not go in line with previous research which reported that the changes produced by guided interventions—not 'third wave'-based—were maintained in the long term for different clinical populations (Andersson et al., 2018).

This might indicate that health professionals constitute a particular case in this regard; it could be hypothesised that, whilst guided eHealth interventions may produce a significant short-term impact in stress reduction, this improvement could possibly be due in part to the therapeutic alliance. Interestingly, of the five studies that assessed the effects of self-guided interventions in a follow-up, three found that stress levels were significantly reduced (Finlay-Jones et al., 2017; Lee et al., 2020; Smoktunowicz et al., 2021). With due caution, it could be suggested that self-guided eHealth interventions promote the user's autonomy, making it easier for them to incorporate the recommendations and exercises practised during the program once it finishes. As previously stated, the problem with self-guided interventions is that high rates of attrition might be a consequence of their flexibility, which would hinder detecting those at risk for dropping out (Lippke et al., 2021). Some degree of guidance has been associated with better outcomes (Baumeister et al., 2014) and, thus, a mixed format, such as a self-guided web-based program that includes some occasional online guidance (e.g. telephone or video call, text message) to foster motivation and accompany the user could be a good way of finding a balance between the benefits of each format. Blended interventions (i.e. those which combine eHealth with face-to-face sessions) could also be considered an alternative; however, although some studies conducted on clinical samples have proved their efficacy (Erbe et al., 2017), these interventions might not be the best fit for healthcare professionals since the face-to-face element reduces very significantly their flexibility, which is considered key for this population. Another aspect that remains unclear is whether interventions addressed specifically at health professionals would be more effective than generic programs which could be used by any given population; in their systematic review, Pospos et al. (2018) suggested that eHealth interventions should address the particular needs of healthcare providers; in the present review, only 5 studies presented specific contents for this population (i.e. BREATHE, PsyCovid-APP, Provider Resilience-APP, Med-Stress, and Career Identity Training) with different results. Thus, these hypotheses need to be tested in further studies.

Finally, for what concerns to the contents of the intervention, 'third wave' psychotherapies have been the most common amongst the reviewed studies. The efficacy of such interventions had already been tested in samples of healthcare workers (Aranda Auserón et al., 2018; Asuero et al., 2014; Brinkborg et al., 2011; Kriakous et al., 2021; Rudaz et al., 2017), and the present review corroborates that, generally, eHealth 'third wave' psychotherapies produce significant effects not only in stress reduction, but also in other mental health-related outcomes such as depressive symptomatology, anxiety, burnout, resilience, mindfulness and compassion, amongst others. Two CBT-based programs were also included in the reviewed studies with positive outcomes in terms of stress, mental health and burnout (Barrett & Stewart, 2021) and work functioning (Ketelaar et al., 2014), whilst a variety of programs based on different conceptual backgrounds resulted effective to improve stress and promote mental health in healthcare providers.

4.1 | Limitations

This review presents notable strengths, such as conducting searches across different scientific databases and trial registries, verifying the selection decisions by three reviewers, and assessing study quality. Studies reporting no effects of the intervention were found and included, which could indicate that this review has not been sustained to a significant publication bias. However, some limitations need to be acknowledged: first, and since this is a very topical issue, it is possible that new studies were to be published soon after this review was conducted (last search was conducted in April 2022). Several study protocols on the effectiveness of different eHealth interventions on health professional's mental health were published in the last years, which implies that an update of the present review should be conducted when the results of such studies are available. Moreover, only studies published in English were included, which

may have implied that some potentially relevant studies have not been reviewed.

It is noteworthy that, of the 27 studies reviewed, only 8 were assessed as presenting 'good' quality, whilst 11 presented 'poor' quality. The results of such studies should be considered with caution. The statistical analyses used by the studies were in many cases heterogeneous and the results were incomplete (e.g. not reporting effect sizes), which made it very difficult to compare the efficacy of the interventions that each study tested. Also, the lack of follow-up assessments, only included in 8 studies, is another aspect that hinders the extraction of conclusions, since the hypotheses regarding the possible impact of the format (i.e. guided vs. self-guided) were based on very few data and should, therefore, be contrasted in further studies.

5 | CONCLUSION

The present review supports the potential of different eHealth interventions to reduce stress levels in healthcare providers. Self-guided interventions are the most common options, normally presented in a web-based format; these programs are very flexible and easy to adapt to the needs of health professionals, although they might benefit from some occasional guidance to overcome the common attrition problems that have been reported and that hinder their efficacy. 'Third wave' psychotherapy-based interventions were also common, generally with positive outcomes, not only on stress reduction but also on other mental health outcomes such as depressive symptomatology, anxiety, burnout, resilience, and mindfulness, amongst others. Methodologically sound studies are required to deepen into what kind of interventions work for healthcare providers.

6 | RELEVANCE TO CLINICAL PRACTICE

Different stress-managing eHealth resources are available for healthcare providers. Self-guided programs with occasional external guidance could be a good fit for this population.

AUTHOR CONTRIBUTIONS

Conceptualization, YLH and SFM; methodology, SFM, ABS and APA; software, SFM, ABS and APA; validation, MB and SR; formal analysis, SFM, ABS and APA; investigation, YLH and JGC; resources, YLH and JGC; data curation, SFM, ABS and APA; writing—original draft preparation, SFM and APA; writing—review and editing, ABS, YLH, MB, SR, FUP, MGS and JGC; visualisation, APA; supervision, JGC and YLH; project administration, YLH. All authors have read and agreed to the published version of the manuscript.

ACKNOWLEDGEMENTS

APA is the holder of a "Sara Borrell" research contract from the Instituto de Salud Carlos III (CD20/00181).

CONFLICT OF INTEREST

None.

DATA AVAILABILITY STATEMENT

Data sharing are not applicable—no new data are generated.

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REFERENCES

Andersson, G., Rozental, A., Shafran, R., & Carlbring, P. (2018). Long-term effects of internet-supported cognitive behaviour therapy. *Expert Review of Neurotherapeutics*, *18*(1), 21–28. https://doi.org/10.1080/14737175.2018.1400381

Aranda Auserón, G., Elcuaz Viscarret, M. R., Fuertes Goñi, C., Güeto Rubio, V., Pascual Pascual, P., de Murieta, S., & García de Galdeano, E. (2018). Evaluation of the effectiveness of a mindfulness and self-compassion program to reduce stress and prevent burnout in primary care health professionals. *Atencion Primaria*, *50*(3), 141–150. https://doi.org/10.1016/j.aprim.2017.03.009

Asuero, A. M., Queraltó, J. M., Pujol-Ribera, E., Berenguera, A., Rodriguez-Blanco, T., & Epstein, R. M. (2014). Effectiveness of a mindfulness education program in primary health care professionals: A pragmatic controlled trial. *Journal of Continuing Education in the Health Professions*, *34*(1), 4–12. https://doi.org/10.1002/chp.21211

Barbeito, S., Sánchez-Gutiérrez, T., Becerra-García, J. A., González Pinto, A., Caletti, E., & Calvo, A. (2020). A systematic review of online interventions for families of patients with severe mental disorders. *Journal of Affective Disorders*, *263*, 147–154. https://doi.org/10.1016/J.JAD.2019.11.106

Barrett, K., & Stewart, I. (2021). A preliminary comparison of the efficacy of online acceptance and commitment therapy (ACT) and cognitive Behavioural therapy (CBT) stress management interventions for social and healthcare workers. *Health & Social Care in the Community*, *29*(1), 113–126. https://doi.org/10.1111/hsc.13074

Baumeister, H., Reichler, L., Munzinger, M., & Lin, J. (2014). The impact of guidance on internet-based mental health interventions — A systematic review. *Internet Interventions*, *1*(4), 205–215. https://doi.org/10.1016/J.INVENT.2014.08.003

Brinkborg, H., Michanek, J., Hesser, H., & Berglund, G. (2011). Acceptance and commitment therapy for the treatment of stress among social workers: A randomized controlled trial. *Behaviour Research and Therapy*, *49*(6–7), 389–398. https://doi.org/10.1016/j.brat.2011.03.009

Campbell, M., McKenzie, J. E., Sowden, A., Katikireddi, S. V., Brennan, S. E., Ellis, S., Hartmann-Boyce, J., Ryan, R., Shepperd, S., Thomas, J., Welch, V., & Thomson, H. (2020). Synthesis without meta-analysis (SWiM) in systematic reviews: Reporting guideline. *The BMJ*, *368*, l6890. https://doi.org/10.1136/bmj.l6890

Chirico, F. (2021). Spirituality to cope with COVID-19 pandemic, climate change and future global challenges. *Journal of Health and Social Sciences*, *6*(2), 151–158. https://doi.org/10.19204/2021/sprt2

Chirico, F., Afolabi, A. A., Ilesanmi, O. S., Nucera, G., Ferrari, G., Sacco, A., Szarpak, L., Crescenzo, P., Magnavita, N., & Leiter, M. (2021). Prevalence, risk factors and prevention of burnout syndrome among healthcare workers: An umbrella review of systematic reviews and meta-analyses. *Journal of Health and Social Sciences*, *6*(4), 465–491. https://doi.org/10.19204/2021/prvl3

Chirico, F., Afolabi, A. A., Ilesanmi, O. S., Nucera, G., Ferrari, G., Szarpak, L., Yildirim, M., & Magnavita, N. (2022). Workplace violence against healthcare workers during the COVID-19 pandemic: A systematic review. *Journal of Health and Social Sciences*, *7*(1), 14–35. https://doi.org/10.19204/2022/WRKP2

Chirico, F., & Magnavita, N. (2020). Burnout syndrome and meta-analyses: Need for evidence-based research in occupational health. comments on prevalence of burnout in medical and surgical residents: A meta-analysis. int. j. environ. res. public. health. 2019, 16, doi:10.3390/ijerph16091479. *International Journal of Environmental Research and Public Health*, *17*(3), 741. https://doi.org/10.3390/ijerph17030741

Cohen, S., Kamarck, T., & Mermelstein, R. (1983). A global measure of perceived stress. *Journal of Health and Social Behavior*, *24*(4), 385. https://doi.org/10.2307/2136404

Concilio, L., Lockhart, J. S., Kronk, R., Oermann, M., Brannan, J., & Schreiber, J. B. (2021). Impact of a digital intervention on perceived stress, resiliency, social support, and intention to leave among newly licensed graduate nurses: A randomized controlled trial. *Journal of Continuing Education in Nursing*, *52*(8), 367–374. https://doi.org/10.3928/00220124-20210714-06

Cuijpers, P., Sijbrandij, M., Koole, S., Huibers, M., Berking, M., & Andersson, G. (2014). Psychological treatment of generalized anxiety disorder: A meta-analysis. *Clinical Psychology Review*, *34*(2), 130–140. https://doi.org/10.1016/j.cpr.2014.01.002

Cullen, W., Gulati, G., & Kelly, B. D. (2020). Mental health in the COVID-19 pandemic. *QJM: Monthly Journal of the Association of Physicians*, *113*(5), 311–312. https://doi.org/10.1093/qjmed/hcaa110

Dincer, B., & Inangil, D. (2021). The effect of emotional freedom techniques on nurses' stress, anxiety, and burnout levels during the COVID-19 pandemic: A randomized controlled trial. *Explore*, *17*(2), 109–114. https://doi.org/10.1016/j.explore.2020.11.012

Divya, K., Bharathi, S., Somya, R., & Darshan, M. H. (2021). Impact of a yogic breathing technique on the well-being of healthcare professionals during the COVID-19 pandemic. *Global Advances in Health and Medicine*, *10*, 216495612098295. https://doi.org/10.1177/2164956120982956

Dutton, S., & Kozachik, S. L. (2020). Evaluating the outcomes of a web-based stress management program for nurses and nursing assistants. *Worldviews on Evidence-Based Nursing*, *17*(1), 32–38. https://doi.org/10.1111/wvn.12417

Erbe, D., Psych, D., Eichert, H. C., Riper, H., & Ebert, D. D. (2017). Blending face-to-face and internet-based interventions for the treatment of mental disorders in adults: Systematic review. *Journal of Medical Internet Research*, *19*(9), e306. https://doi.org/10.2196/JMIR.6588

Eriksson, T., Germundsjö, L., Åström, E., & Rönnlund, M. (2018). Mindful self-compassion training reduces stress and burnout symptoms among practicing psychologists: A randomized controlled trial of a brief web-based intervention. *Frontiers in Psychology*, *9*(Nov), 1–10. https://doi.org/10.3389/fpsyg.2018.02340

Eysenbach, G. (2001). What is e-health? *Journal of Medical Internet Research*, *3*(2), 1–5. https://doi.org/10.2196/jmir.3.2.e20

Finlay-Jones, A., Kane, R., & Rees, C. (2017). Self-compassion online: A pilot study of an internet-based self-compassion cultivation program for psychology trainees. *Journal of Clinical Psychology*, *73*(7), 797–816. https://doi.org/10.1002/jclp.22375

Fiol-DeRoque, M. A., Serrano-Ripoll, M. J., Jiménez, R., Zamanillo-Campos, R., Yáñez-Juan, A. M., Bennasar-Veny, M., Leiva, A., Gervilla, E., García-Buades, M. E., García-Toro, M., Alonso-Coello, P., Pastor-Moreno, G., Ruiz-Pérez, I., Sitges, C., García-Campayo, J., Llobera-Cánaves, J., & Ricci-Cabello, I. (2021). A mobile phone-based intervention to reduce mental health problems in health care workers during the COVID-19 pandemic (PsyCovidApp): Randomized controlled trial. *JMIR mHealth and uHealth*, *9*(5), e27039. https://doi.org/10.2196/27039

Gollwitzer, P. M., Mayer, D., Frick, C., & Oettingen, G. (2018). Promoting the self-regulation of stress in health care providers: An internet-based intervention. *Frontiers in Psychology*, *9*(Jun), 1–11. https://doi.org/10.3389/fpsyg.2018.00838

Greenberg, N., Docherty, M., Gnanapragasam, S., & Wessely, S. (2020). Managing mental health challenges faced by healthcare workers during covid-19 pandemic. *The BMJ*, *368*. https://doi.org/10.1136/bmj.m1211

Gruber, J., Prinstein, M. J., Clark, L. A., Rottenberg, J., Abramowitz, J. S., Albano, A. M., Aldao, A., Borelli, J. L., Chung, T., Davila, J., Forbes, E. E., Gee, D. G., Hall, G. C. N., Hallion, L. S., Hinshaw, S. P., Hofmann, S. G., Hollon, S. D., Joormann, J., Kazdin, A. E., & Weinstock, L. M. (2021). Mental health and clinical psychological science in the time of COVID-19: Challenges, opportunities, and a call to action. *American Psychologist*, *76*(3), 409–426. https://doi.org/10.1037/amp0000707

Hersch, R. K., Cook, R. F., Deitz, D. K., Kaplan, S., Hughes, D., Friesen, M. A., & Vezina, M. (2016). Reducing nurses' stress: A randomized controlled trial of a web-based stress management program for nurses. *Applied Nursing Research*, *32*, 18–25. https://doi.org/10.1016/j.apnr.2016.04.003

Hosseinzadeh Asl, N. R. (2021). A randomized controlled trial of a mindfulness-based intervention in social workers working during the COVID-19 crisis. *Current Psychology*, *41*, 8192–8199. https://doi.org/10.1007/s12144-021-02150-3

Jakel, P., Kenney, J., Ludan, N., Miller, P. S., McNair, N., & Matesic, E. (2016). Effects of the use of the provider resilience mobile application in reducing compassion fatigue in oncology nursing. *Clinical Journal of Oncology Nursing*, *20*(6), 611–616. https://doi.org/10.1188/16.CJON.611-616

Jung, Y. H., Ha, T. M., Oh, C. Y., Lee, U. S., Jang, J. H., Kim, J., Park, J. O., & Kang, D. H. (2016). The effects of an online mind-body training program on stress, coping strategies, emotional intelligence, resilience and psychological state. *PLoS One*, *11*(8), 1–20. https://doi.org/10.1371/journal.pone.0159841

Karasu, F., Öztürk Çopur, E., & Ayar, D. (2021). The impact of COVID-19 on healthcare workers' anxiety levels. *Journal of Public Health (Germany)*, *1–11*, 1399–1409. https://doi.org/10.1007/s10389-020-01466-x

Kemper, K. J., & Khirallah, M. (2015). Acute effects of online mind–body skills training on resilience, mindfulness, and empathy. *Journal of Evidence-Based Complementary & Alternative Medicine*, *20*(4), 247–253. https://doi.org/10.1177/2156587215575816

Kemper, K. J., Lynn, J., & Mahan, J. D. (2015). What is the impact of online training in mind–body skills? *Journal of Evidence-Based Complementary and Alternative Medicine*, *20*(4), 275–282. https://doi.org/10.1177/2156587215580882

Kemper, K. J., & Rao, N. (2017). Brief online focused attention meditation training: Immediate impact. *Journal of Evidence-Based Complementary and Alternative Medicine*, *22*(3), 395–400. https://doi.org/10.1177/2156587216663565

Ketelaar, S. M., Nieuwenhuijsen, K., Gärtner, F. R., Bolier, L., Smeets, O., & Sluiter, J. K. (2014). Mental vitality @ work: The effectiveness of a mental module for workers' health surveillance for nurses and allied health professionals, comparing two approaches in a cluster-randomised controlled trial. *International Archives of Occupational and Environmental Health*, *87*(5), 527–538. https://doi.org/10.1007/s00420-013-0893-6

Kowalik, J., Weller, J., Venter, J., & Drachman, D. (2011). Cognitive behavioral therapy for the treatment of pediatric posttraumatic stress disorder: A review and meta-analysis. *Journal of Behavior Therapy and Experimental Psychiatry*, *42*(3), 405–413. https://doi.org/10.1016/j.jbtep.2011.02.002

Kriakous, S. A., Elliott, K. A., Lamers, C., & Owen, R. (2021). The effectiveness of mindfulness-based stress reduction on the

psychological functioning of healthcare professionals: A systematic review. *Mindfulness*, *12*(1), 1–28. https://doi.org/10.1007/s12671-020-01500-9

Kruk, J., Aboul-Enein, B. H., Bernstein, J., & Gronostaj, M. (2019). Psychological stress and cellular aging in cancer: A meta-analysis. *Oxidative Medicine and Cellular Longevity*, *2019*, 1–23. https://doi.org/10.1155/2019/1270397

Lavoie-Tremblay, M., Gélinas, C., Aubé, T., Tchouaket, E., Tremblay, D., Gagnon, M. P., & Côté, J. (2022). Influence of caring for COVID-19 patients on nurse's turnover, work satisfaction and quality of care. *Journal of Nursing Management*, *30*(1), 33–43. https://doi.org/10.1111/jonm.13462

Lee, D., Kang, D. H., Ha, N. H., Oh, C. Y., Lee, U., & Kang, S. W. (2018). Effects of an online mind-body training program on the default mode network: An EEG functional connectivity study. *Scientific Reports*, *8*(1), 1–8. https://doi.org/10.1038/s41598-018-34947-x

Lee, D., Lee, W. J., Choi, S. H., Jang, J. H., & Kang, D. H. (2020). Long-term beneficial effects of an online mind-body training program on stress and psychological outcomes in female healthcare providers: A non-randomized controlled study. *Medicine*, *99*(32), e21027. https://doi.org/10.1097/MD.0000000000021027

Lewis, C., Roberts, N. P., Andrew, M., Starling, E., & Bisson, J. I. (2020). Psychological therapies for post-traumatic stress disorder in adults: Systematic review and meta-analysis. *European Journal of Psychotraumatology*, *11*(1), 1729633. https://doi.org/10.1080/20008198.2020.1729633

Lippke, S., Gao, L., Keller, F. M., Becker, P., & Dahmen, A. (2021). Adherence with online therapy vs face-to-face therapy and with online therapy vs care as usual: Secondary analysis of two randomized controlled trials. *Journal of Medical Internet Research*, *23*(11), e31274. https://doi.org/10.2196/31274

Liu, C., Zhu, Q., Holroyd, K. A., & Seng, E. K. (2011). Status and trends of mobile-health applications for iOS devices: A developer's perspective. *Journal of Systems and Software*, *84*(11), 2022–2033. https://doi.org/10.1016/j.jss.2011.06.049

Lovibond, S., & Lovibond, P. (1995). *Manual for the depression anxiety stress scales*. Psychology Foundation of Australia.

Magnavita, N., Chirico, F., & Sacco, A. (2021). COVID-19: From hospitals to courts. *The Lancet*, *397*(10284), 1542. https://doi.org/10.1016/S0140-6736(21)00472-4

Mistretta, E. G., Davis, M. C., Temkit, M., Lorenz, C., Darby, B., & Stonnington, C. M. (2018). Resilience training for work-related stress among health care workers. *Journal of Occupational and Environmental Medicine*, *60*(6), 559–568. https://doi.org/10.1097/JOM.0000000000001285

Osman, I., Hamid, S., & Singaram, V. S. (2021). Efficacy of a brief online mindfulness-based intervention on the psychological well-being of health care professionals and trainees during the covid-19 pandemic: A mixed method design. *Health SA Gesondheid*, *26*, 1–9. https://doi.org/10.4102/hsag.v26i0.1682

Page, M. J., McKenzie, J. E., Bossuyt, P. M., Boutron, I., Hoffmann, T. C., Mulrow, C. D., Shamseer, L., Tetzlaff, J. M., Akl, E. A., Brennan, S. E., Chou, R., Glanville, J., Grimshaw, J. M., Hróbjartsson, A., Lalu, M. M., Li, T., Loder, E. W., Mayo-Wilson, E., McDonald, S., & Moher, D. (2021). The PRISMA 2020 statement: An updated guideline for reporting systematic reviews. *BMJ*, *372*. https://doi.org/10.1136/bmj.n71

Pfefferbaum, B., & North, C. S. (2020). Mental health and the Covid-19 pandemic. *New England Journal of Medicine*, *383*(6), 510–512. https://doi.org/10.1056/nejmp2008017

Popay, J., Baldwin, S., Arai, L., Britten, N., Petticrew, M., Rodgers, M., & Sowden, A. (2007). Guidance on the Conduct of Narrative Synthesis in Systematic Reviews. *ESRC Methods Programme*, *January*.

Pospos, S., Young, I. T., Downs, N., Iglewicz, A., Depp, C., Chen, J. Y., Newton, I., Lee, K., Light, G. A., & Zisook, S. (2018). Web-based tools and Mobile applications to mitigate burnout, depression, and suicidality among healthcare students and professionals: A systematic review. *Academic Psychiatry*, *42*(1), 109–120. https://doi.org/10.1007/S40596-017-0868-0

Rao, N., & Kemper, K. J. (2017). The feasibility and effectiveness of online guided imagery training for health professionals. *Journal of Evidence-Based Complementary and Alternative Medicine*, *22*(1), 54–58. https://doi.org/10.1177/2156587216631903

Rudaz, M., Twohig, M. P., Ong, C. W., & Levin, M. E. (2017). Mindfulness and acceptance-based trainings for fostering self-care and reducing stress in mental health professionals: A systematic review. *Journal of Contextual Behavioral Science*, *6*(4), 380–390. https://doi.org/10.1016/j.jcbs.2017.10.001

Smoktunowicz, E., Lesnierowska, M., Carlbring, P., Andersson, G., & Cieslak, R. (2021). Resource-based internet intervention (med-stress) to improve well-being among medical professionals: Randomized controlled trial. *Journal of Medical Internet Research*, *23*(1), e21445. https://doi.org/10.2196/21445

Stoll, J., Müller, J. A., & Trachsel, M. (2020). Ethical issues in online psychotherapy: A narrative review. *Frontiers in Psychiatry*, *10*, 993. https://doi.org/10.3389/FPSYT.2019.00993/BIBTEX

Suntai, Z., Laha-Walsh, K., & Albright, D. L. (2021). Effectiveness of remote interventions in improving caregiver stress outcomes for caregivers of people with traumatic brain injury. *Rehabilitation Psychology*, *66*(4), 415–422. https://doi.org/10.1037/rep0000402

Wang, J., Song, B., Shao, Y., & Zhu, J. (2021). Effect of online psychological intervention on burnout in medical residents from different majors: An exploratory study. *Frontiers in Psychology*, *12*(May), 632134. https://doi.org/10.3389/fpsyg.2021.632134

Williamson, V., Stevelink, S. A. M., & Greenberg, N. (2018). Occupational moral injury and mental health: Systematic review and meta-analysis. *British Journal of Psychiatry*, *212*(6), 339–346. https://doi.org/10.1192/bjp.2018.55

World Health Organization (WHO). (2020). *Mental health considerations during COVID-19 outbreak*.

Wright, E. M. (2018). Evaluation of a web-based holistic stress reduction pilot program among nurse-midwives. *Journal of Holistic Nursing*, *36*(2), 159–169. https://doi.org/10.1177/0898010117704325

Yamagishi, M., Kobayashi, T., Kobayashi, T., Nagami, M., Shimazu, A., & Kageyama, T. (2007). Effect of web-based assertion training for stress management of Japanese nurses. *Journal of Nursing Management*, *15*(6), 603–607. https://doi.org/10.1111/j.1365-2834.2007.00739.x

Yamagishi, M., Kobayashi, T., & Nakamura, Y. (2008). Effects of web-based career identity training for stress management among Japanese nurses: A randomized control trial. *Journal of Occupational Health*, *50*(2), 191–193. https://doi.org/10.1539/joh.L7086

Yogeswaran, V., & El Morr, C. (2021). Effectiveness of online mindfulness interventions on medical students' mental health: A systematic review. *BMC Public Health*, *21*(1), 2293. https://doi.org/10.1186/s12889-021-12341-z

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How to cite this article: López-Del-Hoyo, Y., Fernández-Martínez, S., Pérez-Aranda, A., Barceló-Soler, A., Bani, M., Russo, S., Urcola-Pardo, F., Strepparava, M. G., & García-Campayo, J. (2023). Effects of eHealth interventions on stress reduction and mental health promotion in healthcare professionals: A systematic review. *Journal of Clinical Nursing*, *00*, 1–20. https://doi.org/10.1111/jocn.16634