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Group-based Acceptance and Commitment Therapy Interventions for Improving General Distress and Work-related Distress in Healthcare Professionals: A Systematic Review and Meta-Analysis

Background: A large proportion of the healthcare workforce reports significant distress and burnout, which can lead to poor patient care. Several psychological interventions, such as Acceptance and Commitment Therapy (ACT), have been applied to improve general distress and work-related distress in healthcare professionals (HCPs). However, the overall efficacy of ACT in this context is unknown. This review and meta-analysis aimed to: 1) test the pooled efficacy of ACT trials for improving general distress and reducing work-related distress in HCPs; 2) evaluate the overall study quality and risk of bias; and 3) investigate potential moderators of intervention effectiveness.

Method: Four databases (Ovid MEDLINE, EMBASE, PsycINFO, CINHAL) were searched, with 22 pre-post design and randomised controlled trial (RCTs) studies meeting the inclusion criteria. 10 RCTs studies were included in the meta-analysis.

Results: Two random effects meta-analyses on general distress and work-related distress found that ACT outperformed pooled control conditions with a small effect size for general distress at post-intervention (g=.394, CIs [.040; .748]) and for work-related distress (g=.301, CIs [.122; .480]) at follow-up. However, ACT was not more effective than active controls. The number of treatment sessions was a moderator of intervention efficacy for general distress. ACT process measures (psychological flexibility) did not show significantly greater improvement in those who received the intervention.

Limitations: The methodological quality of studies was poor and needs to be improved.

Conclusions: Overall, ACT interventions are effective in improving general distress and work-related distress in HCPs. These findings have implications for policymakers, healthcare organisations and clinicians.

Keywords: Acceptance and Commitment Therapy, systematic review, meta-analysis, healthcare professionals, general distress, burnout.

Introduction

The current trends and rates of work-related stress in the healthcare workforce are a matter of concern at an international level (Johnson et al., 2018). It is widely acknowledged that healthcare professionals (HCPs) are under particular strain because of changes in the organisation and the management of healthcare provision (Gibson et al., 2015). These changes in external pressures increase the likelihood of HCPs experiencing general distress and burnout (Hall et al., 2016; O'Connor, Hall & Johnson, 2021). It is notable that HCPs worldwide report psychological distress and burnout and meet the criteria for a psychiatric disorder (Hardy et al., 2003; Stride et al., 2008; Wall et al., 1997).

Distress, burnout and work-related distress not only represent distressing problems in the lives of HCPs, these factors also lead to absenteeism and presenteeism at the organisational level (Hardy et al., 2003; Kessler and Frank, 1997; Kessler et al., 2008) and increased instances of clinical error within patient care (Hall et al., 2016; O'Connor, Hall & Johnson, 2021). Given the clear clinical need and growing evidence that only a small proportion of HCPs receive treatments (Hilton et al., 2008), it is unsurprising that psychological interventions are being adopted to support the mental health and well-being of healthcare staff.

Acceptance and Commitment Therapy (ACT) has been advanced as a psychological model that is particularly suitable to this context (Flaxman et al., 2013), with evidence that this intervention is now being applied in clinical practice (A-Tjak et al., 2018; Waters et al., 2018). However, without a systematic examination of the evidence supporting the use of ACT for improving the well-being and burnout of HCPs, it is unknown to what extent ACT is efficacious or empirically supported for use in such contexts.

Acceptance and Commitment Therapy

ACT (Hayes et al., 2011; McHugh, 2011) is a third generation cognitive behavioural therapy from within the broad school of cognitive behaviour therapy (CBT). It uses a range of therapeutic

methods to help individuals to improve their "psychological flexibility" as a means to improve their well-being and efficacy at work and in other contexts. Psychological Flexibility can be defined as: "the ability to persist or to change behaviour in a setting of competing psychological influences, guided by values and goals dependent on what the situation at hand affords" (McCracken, 2013, p.828). From this definition you can see that psychological flexibility includes several overlapping sub-components: 1) Openness, which involves showing willingness to have unwanted thoughts and feelings, 2) Awareness, the ability to mindfully notice one's experiences as they occur in the here-and-now, and 3) Engagement, consistently choosing actions that enable progress on one's overarching goals and values (Hayes et al., 1996).

ACT can be delivered in individual, group or self-help formats, and involves a range of methods, such as metaphors, mindfulness practices, perspective-taking exercises, and goal-setting. Specific conversations, metaphors and exercises can be used to target different aspects of psychological flexibility (see Table 1). For example, when working to improve Engagement, ACT practitioners may help an individual connect with their own personal values (e.g. kindness, creativity, intimacy) by encouraging reflection on the qualities of people they do and do not admire. Mindfulness practice might then be used to build skills in noticing one's thoughts, feelings and urges (Awareness). While, 'defusion tasks', which involve learning how to step back from unhelpful entanglement with thoughts, could be used to help individuals disengage with patterns of thinking that get in the way of meaningful activity (Openness).

INSERT TABLE 1 ABOUT HERE

Rationale for current meta-analysis

ACT has a growing evidence-base for improving outcomes (e.g. quality of life and distress) across a diverse range of contexts, such as in mental health (A-tjak et al., 2015; Brown et al., 2016; Cavanagh et al., 2014; Hacker et al., 2016; O'Connor et al., 2018), chronic pain (Veehof et al., 2016), and chronic disease (Graham et al., 2016). These previous reviews have shown that ACT

outperformed control conditions with an average effect size from small to large on important outcomes such as distress, quality of life and well-being (Ducasse and Fond, 2015; Gaudiano, 2011; Hayes et al., 2006; Öst, 2008, 2014; Powers et al., 2009; Ruiz, 2010; Smout et al., 2012). However, to date, evidence does not suggest that ACT is more effective than any other established treatment.

Given the theoretical applicability of ACT on improving distress in workplace settings, it is unsurprising that several trials of ACT in the workplace have emerged (Bond and Bunce, 2000; Flaxman and Bond, 2010a, b). Prior to undertaking this review, the trials of which we were aware tended to suggest that ACT leads to promising improvements in mental health outcomes. However, the overall efficacy of ACT in the context of HCPs is not yet known, with knowledge limited to a systematic review of ACT for a very small subsection of HCPs: support workers working with intellectual disability alone (Reeve et al., 2018).

Alongside evaluating the pooled efficacy of ACT, it may also be useful to establish whether study characteristics affect findings. In previous systematic reviews it has been observed that the methodological quality of ACT trials is frequently low (Graham et al., 2016; Öst, 2008). This is important because a negative correlation between study quality and outcomes has been observed in a previous meta-analysis of ACT interventions (Öst, 2014). In addition to this, the configuration of the intervention under evaluation may also be important for explaining outcomes. For example, Kopta (2003) observed that better outcomes were associated with receiving more treatment sessions (a dose-effect relationship) (Levy et al., 2020).

With regards to the mechanisms of action or treatment processes, there is little and weak evidence to suggest whether ACT interventions lead to hypothesised changes in ACT processes in HCPs. It is important to understand the mechanisms of action by which psychological interventions affect outcomes because we should be able to use this information to optimise the efficiency or efficacy of the intervention. For example by adding treatment methods to target the most influential mechanisms or by removing treatment methods that target treatment processes that do not influence outcomes (e.g., Michie et al., 2018).

The present research aims to assess and describe the empirical support for the use of ACT interventions in healthcare settings, by investigating the effectiveness of ACT interventions in: 1) reducing general distress and work-related distress (primary outcomes) across HCPs (e.g. social workers, mental and physical health professionals) and; 2) improving psychological flexibility (secondary outcomes) in those who received the intervention in comparison to controls. The scope and contribution of this meta-analysis is not only to question the efficacy of an intervention on the outcomes (general distress and work-related distress), but also to understand the key treatment mechanism(s) of action, or processes (psychological flexibility in ACT). Further, to our knowledge, little is known about the relationship between either intervention configurations or trial quality and treatment efficacy in trials of ACT in the workplace. Therefore, we will assess whether factors such as study quality, risk of bias and the number of treatment sessions moderate the emergent effect sizes.

Materials and method

The protocol for this systematic review and meta-analysis was registered a priori on PROSPERO and in line with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guideline. Meta-analysis data is available on the Open Science Framework (DOI 10.17605/OSF.IO/2JK5H). Ethical statement: This study involved people but uses secondary, aggregate data.

Eligibility criteria

All papers retrieved from databases and peer-reviewed journals were examined using the following criteria.

Types of studies

The inclusion criteria were: 1) randomized controlled trials (RCTs; included in both systematic review and meta-analysis) and pre-post designs (only in the systematic review); 2) published in

English and in peer-reviewed journals; 3) studies reporting measures of general distress AND or OR work-related distress (including burnout) in HCPs; 4) studies including an ACT intervention AND including inactive controls (i.e. control conditions that did not involve any new treatment delivery, for instance, wait-list controls (WLC), treatment as usual (TAU), no treatment at all), or active controls (i.e. control conditions that controlled for potential confounds but are not considered to have active therapeutic ingredients, for instance, seminars, workshops, attention control, placebo or comparison interventions such as other validated and standardised psychological therapies that include active therapeutic ingredients, such as Cognitive Behavioural Therapies) or no control comparison (e.g. only ACT intervention). Note that RCT studies and pre-post design studies were both included in the systematic review to combine all studies published in this field. In the meta-analysis, only RCTs studies were included.

Types of participants

Participants included were: 1) HCPs who deal with the care of patients of any age; 2) HCPs in clinical training that hold care responsibilities (e.g. trainees in medicine or clinical psychology). Studies where the majority of participants (>50%) were not HCPs (e.g., family member caregivers, adolescents, teachers) were excluded.

Types of intervention

Acceptance and Commitment group interventions (Hayes et al., 2006; Hayes et al., 2011) that aimed to improve included outcomes by engendering psychological flexibility. Group interventions were selected because the majority of the interventions delivered in workplace settings are designed to be delivered in a group format.

Types of outcome measures

Primary outcome measures included reliable measures of general distress, and work-related distress and ACT measures for HCPs. Examples of these measures are the General Health Questionnaire-12

(Goldberg, 1992) for general distress and the Maslach Burnout Inventory (Maslach et al., 1996) for work-related distress. ACT process measures included reliable measures of psychological flexibility comprising mindfulness, values, cognitive fusion, and experiential avoidance (e.g. the Acceptance Action Questionnaire-II, Bond et al., 2011).

Information sources

An extensive search strategy was applied to OVID Medline (R) ALL (1946 to April week 25, 2020), PsychINFO (1806 to November week 3, 2020), Embase (1946 to April week 47, 2020), CINHAL (1937 to November week 3, 2020) and through cross-referencing, Google Scholar and the ACBS (Association for Contextual Behaviour Science) websites. Authors were contacted where information reported within a published study was not sufficient to meet the aims of this review.

Search strategy

First, four electronic databases were searched (Medline, PsychINFO, Embase, CINHAL). An extensive search was conducted to identify papers containing at least one term from each of the following blocks: “healthcare professionals” AND “acceptance and commitment therapy” AND “distress” OR “burnout” OR “stress”. Further eligible studies were identified through examining the reference lists of included studies, and the ACBS website. Finally, Google Scholar was used to search through all studies citing the included studies. See Supplementary Figure 1 and 2 for search strategies.

Study selection

Two independent reviewers independently screened 20% of titles screening, abstract and full-text articles (AP; FC) for eligibility. Duplicates were detected and removed prior to screening titles and abstract. A high level of inter-rater agreement (K=.81; p=<.001) on study selection was calculated. Data screening for the remaining articles was carried out by the first author.

Data collection process

A data extraction table was used to examine the studies. Two independent reviewers extracted the data independently and, subsequently, disagreements discussed.

Data items

The following information was extracted from each study: the number of participants at baseline and last measurement point, the number of experimental and control participants, the mean age, the percentage of females, the study design, the time-points of measurements, the included control conditions (active: seminars, workshops or any other valid and alternative therapy; inactive: delayed experimental condition or no intervention), measures of general distress, work-related distress, wellbeing, and ACT process measures, other validated measures, number of day sessions in the ACT condition and in the control conditions, and study quality.

Study quality and risk of bias

A study quality tool was utilised to assess intervention characteristics. The Psychotherapy Outcome Methodology Rating Form (POMRF; Öst (2008) was adapted for evaluating the methodological reporting of the included studies. Five items (items 2, 3, 4, 8 and 21), from the initial 22, were removed because they related to description of clinical assessment and diagnosis. Item 22 was applicable only to studies with active and comparison intervention controls. Two independent reviewers assessed the quality of all studies. The intra-class correlation for the total score was .90 (95%, CI, $p<.001$), indicating excellent inter-rater reliability. Kappa coefficients were calculated for each individual item, and when combined, a moderate level of agreement was reached ($K = 0.68$, $p<.001$).

To assess the quality of the study a risk of bias tool was employed. The Cochrane Collaboration's tool (Higgins et al., 2011) for assessing risk of bias in randomised controlled trials and pre-post designs was included using a scale adapted specifically for studies that included HCP samples (Hall et al., 2016). Two reviewers (AP; DH) independently reviewed 50% of the studies.

Kappa coefficients were calculated for each individual domain indicating moderate to high level of agreement and when combined moderate to high level of agreement (K=0.83, p<.001). The remaining studies were assessed by the first author (AP). Disagreements were resolved by discussion.

Summary measures

Outcomes were all continuous and analysed by using differences in means (M) and standard deviations (SD) at each time-point. Standardised effect sizes were estimated using Hedges' *g* (Cohen, 1988). According to Cohen (1988), Hedges'*g* was interpreted as follows: 0.2 represents a small effect, 0.5 a medium effect and 0.8 a large effect.

Planned method of analyses

All analyses were undertaken via Comprehensive Meta-Analysis (3.0) software. The effect size of the ACT intervention was compared to control conditions on primary (general distress, and work-related distress) and on ACT process-measures, at post-intervention and follow-up separately.

Random-effects models (Borenstein et al., 2009), by using the standard DerSimonian-Laird method, were adopted assuming the variability of the study population and the interventions included across studies. The heterogeneity across measures was assessed by conducting Q tests (25% low degree, 50% moderate, and 75% high degree of heterogeneity). The burnout total score was calculated by combining the two subscales of emotional exhaustion and depersonalisation. The subscales were combined in studies missing a combined score. Two studies (Noone and Hastings, 2009, 2010) sharing the same cohort of participants and missing data from the control condition were not included. One RCT study missing descriptive statistics of outcomes and process measures was not included in the meta-analysis (O'Brien et al., 2012). Dependence from multiple outcomes (general distress, work-related distress or ACT process measures) was calculated by computing an average effect size combining primary and ACT process measures separately at multiple time points

as indicated by Higgins and Thompson (2002) for complex meta-analyses. A study reported two control-comparisons (Hayes et al., 2004). As we were exploring efficacy of the intervention, the active control with the greatest control was chosen for inclusion in the meta-analysis including pooled controls conditions. This approach was also adopted by (Michie et al., 2009) in a large meta-analysis. Another study included two follow-up comparisons (Luoma et al., 2007). The first follow-up was chosen for similarity of follow-ups length with the studies included in the meta-analysis.

Risk of bias across studies

Funnel plots were visually inspected. Egger's regression coefficient (Egger et al., 1997) and Duval and Tweedie's trim and fill analyses (Duval and Tweedie, 2000) were conducted for identification of publication bias and the number of missing studies to the left or right side of the mean.

Additional analyses

Sensitivity analyses were performed by removing each study from the analyses, one at a time. Further subgroup analyses investigated the effectiveness of the ACT intervention relative to control conditions (pooled controls, inactive, and active controls). Meta-regressions (Restricted Maximum Likelihood, RML) were conducted to identify moderating variables (e.g. study quality, risk of bias, number of treatment sessions) and testing their effect on general distress, work-related distress and ACT process measures. In particular, three different meta-regressions were conducted to test whether the effects of the intervention on primary and secondary outcomes were associated with study quality, risk of bias, number of treatment sessions.

Results

A total of 1890 studies were retrieved through Ovid Medline (R) ALL (*n*=135), PsycINFO (*n*=218), EMBASE (*n*=273), CINHAL (*n*=574) and additional 694 records identified through the ACBS website (n=607), cross-referencing, and Google Scholar (*n*=417). After removing duplicates (*n*=254), titles and abstracts were screened, 104 abstracts were assessed for inclusion and 45 records

excluded for type of article included (e.g. case study or qualitative), including patients, family members or caregivers. 58 articles were obtained for full-text screening. However, upon closer inspection, 36 studies did not meet all the inclusion criteria (type of outcome, population, design and educational interventions) and, thus, were removed. Of the five authors' contacted, four provided a response and sufficient information to enable us to determine study eligibility. One author did not provide a response therefore one study not reporting descriptive statistics was not possible to include in the meta-analysis. Thus, 22 studies were finally included in the systematic review, and 10 RCTs in the meta-analysis. (see Figure 1).

[INSERT FIGURE 1 ABOUT HERE]

Study characteristics

Of these 22 studies, eleven were RCTs and eleven were pre-post designs. Studies were most frequently undertaken in the UK (n=7) and USA (n=5). All the studies included a baseline measurement, 19 provided a post-intervention assessment and 15 a final follow-up.

Participants

The total number of the participants who completed the first baseline assessment was 1353 and sample size ranged from 13 to 140. Here, 590 participants were allocated to the experimental group and 519 allocated to the control group in studies with control groups (n=16). The mean age was 36.69 years in the 17 studies that reported average age and the proportion of included females, average 76.48%. The studies using RCT and pre-post designs involved interventions delivered to samples of nurses (Farsi, 2018; Frögéli et al., 2016; Habibian et al., 2018), support staff caring for individuals with intellectual disability (Bethay et al., 2013; McConachie et al., 2014; Noone & Hastings, 2009, 2010), staff caring for clients diagnosed with personality disorder (Clarke, Taylor, Bolderston, et al., 2015; Clarke, Taylor, Lancaster, et al., 2015), substance abuse counsellors (Hayes et al., 2004), mental health professionals working in addiction treatment services (Luoma et al., 2007), palliative care providers (Gerhart et al., 2016), clinical psychology trainees (Pakenham,

2015; Stafford‐Brown and Pakenham, 2012; Dereix-Calogne et al., 2019), health workers (Waters et al., 2018), social workers (Brinkborg et al., 2011), psychiatric staff (Heydari, 2018), medical providers (O'Mahony et al., 2017), mental health workers (O'Brien et al., 2012), staff working with challenging behaviour (Smith and Gore, 2012), and a mixed group of HCPs (Stewart et al., 2016). (See Supplementary Table 1).

The percentage of participants who did not complete a post-intervention assessment ranged from 0 to 37.26 (*M*=15.25; *SD*=15.12, *n*=19 studies) and from 0 to 76.50 (*M*=25.56; *SD*= 24.08, *n*=15 studies) of the follow-up assessment indicating a low to medium level of drop-out at post-intervention and follow-up.

Interventions

Treatment length spanned across one day-session up to 12 sessions (*M* =4.64, *SD* = 3.22). Overall, treatment length average was slightly higher for pre-post design studies (*M*=5.54; *SD*=3.90, *n*=11) than RCTs studies (*M*=3.73; *SD*=2.15, *n*=11). All of the interventions were delivered in a group format with one to three therapists. Given the flexibility and heterogeneity of experiential exercises included in the ACT training programmes, it was not possible to systematically summarise the content of the interventions. However, all of the studies included a training protocol or references to validated intervention protocols from which the intervention was developed or adapted, or a description of the intervention was included. Variability across studies in the intervention components reported was recorded when assessing the quality of the interventions. Overall, the interventions included a combination of didactic teaching, mindfulness practice, metaphors, group discussions and homework exercises. The majority of the interventions included were adapted versions of the Bond and Hayes (2002), Bond and Bunce (2000) and Noone and Hastings (2009) protocols.

Comparators

Ten studies involved inactive control group comparisons (Brinkborg et al., 2011; Dereix-Calogne et al., 2019; Heydari, 2018; McConachie et al., 2014; Noone and Hastings, 2009; O'Brien et a., 2012; Stafford‐Brown and Pakenham, 2012; Waters et al., 2018), of which three used a TAU control group (Bethay et al., 2013; Frögéli et al., 2016; Luoma et al., 2007). One study adopted an active control group as comparator, involving the delivery of communication skills seminars (Habibian et al., 2018). One study (Hayes et al., 2004) compared ACT to an active control (education training) and a comparison intervention (multicultural training). Two studies employed a comparison intervention: dialectical behavioural therapy (Clarke, Taylor, Bolderston, et al., 2015), and psycho-educational training (Clarke, Taylor, Lancaster, et al., 2015). Six studies did not utilise a control group (Gerhart et al., 2016; Noone and Hastings, 2010; O'Mahony et al., 2017; Pakenham, 2015; Smith & Gore, 2012; Stewart et al., 2016).

General distress

Eleven studies investigated general distress, using the short form of the General Health Questionnaire (GHQ-12) (Bethay et al., 2013; Brinkborg et al., 2011; McConachie et al., 2014; Noone & Hastings, 2009, 2010; Smith & Gore, 2012; Waters et al., 2018; O'Brien et al., 2012), or the longer versions - the GHQ-22 (Clarke, Taylor, Lancaster, et al., 2015) and the GHQ-28 (Clarke, Taylor, Bolderston, et al., 2015; Pakenham, 2015; Stafford‐Brown and Pakenham, 2012). Two studies measured perceived stress by adopting the Perceived Stress Scale (PSS) (Brinkborg et al., 2011; Frögéli et al., 2016). Four studies assessed depression with the Beck Depression Inventory‐II (BDI-II) (Gerhart et al., 2016; Heydari, 2018; O'Mahony et al., 2017; Smith & Gore, 2012), anxiety with the Beck Anxiety Inventory (BAI-II) (Farsi, 2018; Heydari et al., 2018), posttraumatic stress with the PTSD Symptom Checklist-Civilian Version (PCL-C) (Gerhart et al., 2016; O'Mahony et al., 2017). A study investigated stress, anxiety and depression with the subscale of the Depression, Anxiety and Stress Scale (DASS-21) (Dereix-Calonge et al., 2019).

General distress outcome was used in the meta-analysis given the majority of the RCTs studies including measures assessing this outcome (see Supplementary Table 1).

Work-related distress

Twelve studies measured burnout using the Maslach Burnout Inventory (MBI) (Bethay et al., 2013; Brinkborg et al., 2011; Clarke, Taylor, Lancaster, et al., 2015; Clarke, Taylor, Bolderston, et al., 2015; Gerhart et al., 2016; Hayes et al., 2004; Heydari, 2018; Luoma et al., 2007; O'Mahony et al., 2017; Smith and Gore, 2012). One study (Frögéli et al., 2016) employed the Burnout subscale (BO) from the Scale of Work Engagement and Burnout and another study by using the Maslach and Jackson Job Burnout Inventory (MJJBI) (Habibian et al., 2018).

Additional studies measured work-related stress employing the Staff Stressor Questionnaire (SSQ; McConachie et al., 2014; Noone and Hastings, 2009, 2010; Smith and Gore, 2012), the Mental Health Perceptions Staff Stressors (Pakenham, 2015; Stafford‐Brown and Pakenham, 2012), the Osipow Occupational Stress Inventory (OOSI) staff perceptions at work (Habibian et al., 2018), and a performance-based self-esteem scale (Brinkborg et al., 2011).

Of the work-related measures included in the systematic review, burnout measures, the SSQ (Hatton et al., 1999) and the OOSI (Osipow, 1998) were reported in RCTs studies and were deemed eligible for inclusion in the meta-analysis. The SSQ and the OOSI were combined with burnout because they assessed perceived levels of work stressors and they are, therefore, likely to assess a similar construct to burnout. See Supplementary Table 1.

Wellbeing

In terms of wellbeing, two studies included investigated wellbeing via Satisfaction with Life Scale (SWLS) (Stafford‐Brown and Pakenham, 2012; Stewart et al., 2016) and psychological wellbeing with the Warwick-Edinburgh Mental Well-Being Scale (WEMWBS) (McConachie et al., 2014) measures. Another study investigated physical health with the Short Form-12 Health Survey (SF-

12) (O'Brien et al., 2012). Note that it was not possible to undertake a meta-analysis with well-being measures given the small number of RCTs studies including this outcome.

ACT process measures

ACT processes were measured with: 1) mindfulness, using the Five Facets Mindfulness Questionnaire (FFMQ) (Pakenham, 2015; Stafford‐Brown and Pakenham, 2012; Waters et al., 2018), the Mindfulness Attention Awareness Scale (MAAS) (Frögéli et al., 2016), and the Mindfulness Practice Log (Gerhart et al., 2016); 2) cognitive defusion adopting the Cognitive Fusion Questionnaire (CFQ) (Gerhart et al., 2016) and entanglement with thoughts with the Automatic Thoughts Questionnaire (ATQ) (Waters et al., 2018), the Stigmatizing Attitudes – Believability (SAB) (Hayes et al., 2004), and the Burnout Believability Scale (BBS) (Bethay et al., 2013); 3) experiential avoidance with the White Bear Suppression Inventory (WBSI) (McConachie et al., 2014; Pakenham, 2015; Stafford‐Brown and Pakenham, 2012); 3) values using the Valued Living Questionnaire (VLQ) (Clarke et al., 2015b; Pakenham, 2015; Stafford‐Brown and Pakenham, 2012; Stewart et al., 2016), and the Support Staff Values Questionnaire (SSVQ) (Smith and Gore, 2012), and the Valuing Questionnaire (Dereix-Calonge et al., 2019); 4) overall psychological flexibility with the Acceptance and Action Questionnaire (AAQ) (Brinkborg et al., 2011; Pakenham, 2015; Smith and Gore, 2012; Stafford‐Brown and Pakenham, 2012), the Acceptance Action Questionnaire-II (AAQ-II) (Clarke et al., 2015a; Gerhart et al., 2016; McConachie et al., 2014; O'Mahony et al., 2017; Stewart et al., 2016; Waters et al., 2018), and the Avoidance and Fusion Questionnaire for Youth (AFQ-Y) (Frögéli et al., 2016). See Supplementary Table 1.

ACT process measures were used in the meta-analysis given the majority of the RCTs studies including psychological flexibility measures.

Study quality

Study quality was generally poor to fair across studies (M = 14.14, SD = 4.90; range 8 - 25) for all the studies, out of the maximum score available of 34. The mean was 16.18 (SD =4.60) for randomised-controlled studies (k=11) and 12.09 (SD=4.82) for pre-post studies (k=12 studies). The strengths of the included studies were specificity, reliability and validity of the measures and analyses. Studies were on average rated as fair in the description of the sample, treatment programs, therapist experience, and attrition. Assignment to treatment, study design, power analyses, blinding of assessor, time-points measurements, number of hours in the active and comparison condition, number of therapists and description of their competence, checks for treatment adherence and for therapists, control of concomitant treatments were often poorly described.

Risk of bias within studies

Sequence generation (50%) was judged at high risk of bias in the majority of the studies. Representativeness of the sample was judged as low risk of bias in 27.3 % of the studies. Blinding of participants was not possible in all the studies, as expected. Only 13.6 % of the studies reported blinding of researchers. Almost all studies were judged at low risk of bias in the outcome measures: in the psychological distress and wellbeing measures (100%), burnout (82.4% %) and psychological flexibility measures (72.2%). Six studies reported an available protocol and where it was not included, all the pre-specified outcomes were included in the methods. 68.2 % of the studies reported low risk of bias in incomplete data. Consequently, other sources of bias were generally low (13.6 %). Overall, 50% of the studies were judged as low risk of bias (k=11), 13.6 % as high risk of bias (k=3), and 36.4 % as medium risk of bias (k=8). The results of the risk of bias tool are presented in Figure 2.

[INSERT FIGURE 2 ABOUT HERE]

General distress

Heterogeneity of study measures was detected at post-intervention (Q =27.817, df=6, p<.001, 95% CI [0.040; 0.748], I^2= 78.430) and at follow-up (Q=10.500, df=4, p=.033, 95% CI [-0.241; 0.473],

I^2= 61.905). An overall random-effects meta-analysis, which included 7 RCT studies, initially tested the effect of ACT interventions on general distress at post-intervention and at follow-up. There was a small significant effect of ACT on general distress at post-intervention (*Hedges' g*=.394, *SE*=.182, 95% *CI* [.040; .748], *p*=.029, *k*=7) (see Figure 3), where ACT improved general distress outcomes more than control conditions. Further analyses indicated that the effects of ACT on general distress was not statistically significant at follow-up (*Hedges' g*=.116, *SE*=.182, *95% CI* [-.241; .473], *p*=.525, *k*=5), see Table 2.

[INSERT FIGURE 3 ABOUT HERE]

Work-related distress

Heterogeneity of study measures was detected at post-intervention (*Q* =30.217, *df*=8, *p*<.001, 95% *CI's* [-.154; .455], I^2= 73.525) but not at follow-up (*Q*=6.183, *df*=7, *p*=.519, 95% *CI* [.122; 0.480], I^2= 0.000). A significant effect of ACT on work-related distress was not found at post-intervention (*Hedges' g*=.150, *SE*=.155, *95% CI* [-.154; .455], *p*=.333, *k*=9), where ACT did not improve work-related outcomes more than control conditions (see Figure 4). However, the effects of ACT on work-related distress was significant with a small effect size at follow-up (*Hedges' g*=.301, *SE*=.091, 95% *CI* [.122; .480], p=.001, *k*=8).

[INSERT FIGURE 4 ABOUT HERE]

Control comparisons on primary outcomes

The effect of ACT on general distress was superior to inactive controls with a medium effect size at post-intervention (*Hedges' g*= .615, *SE*= .121, 95% *CI* [.377; .853], *p*<.001, *k*=5) but was not at follow-up (*Hedges' g*= .357, *SE*=.194, 95% *CI* [-.023; .738], *p*=.066, *k*=3). The effect of ACT was not superior to active controls (*Hedges' g*= -.210, *SE*= .142, 95% *CI* [-.488; .068], *p*=.139, *k*=2) at post-intervention and follow-up (*Hedges' g*= -.284, *SE*= .186, 95% *CI* [-.650; .081], *p*=.127, *k*=2).

The effect of ACT on work-related distress was not superior to inactive controls at post-intervention (*Hedges' g*= .189, *SE*= .128, *95% CI's* [-.061; .439], *p*=.138, *k*=5), but was significant with a small to moderate effect size at follow-up (*Hedges' g*= .252, *SE*=.126, 95% *CI* [.005; .499], *p*=.046, *k*=4). The effect of ACT on work-related distress was not superior in comparison to active controls post-intervention (*Hedges' g*= .123, *SE*= .320, *95% CI* [-.505; .751], *p*=.700, *k*=4) but at follow-up (*Hedges' g*= .355, *SE*= .139, *95% CI* [.081; .628], *p*=.011, *k*=4).

[INSERT TABLE 2 ABOUT HERE]

Publication bias and sensitivity analyses

General Distress

Egger's regression coefficient did not indicate the presence of publication bias (see Figure 4) for general distress (intercept=6.510; *df*=5; *p*=.175) at post-intervention and at follow-up (intercept=1.072; *df*=3; *p*=0.809). Duval and Tweedie's trim and fill analyses revealed the presence of one study missing at post-intervention to the left of the mean. Sensitivity analyses did not detect any studies to have an impact on lowering the effect size at post-intervention or follow-up.

Work-related Distress

Egger's regression coefficient did not indicate the presence of publication bias (see Figure 5) for work-related distress (intercept=3.388; *df*=7; *p*=.283) at post-intervention and at follow-up (intercept=2.443; *df*=6; *p*=0.131). Duval and Tweedie's trim and fill analyses did not reveal the presence of studies missing at post-intervention and follow-up. Sensitivity analyses did not detect any studies to have an impact on lowering the effect size at post-intervention or follow-up.

[INSERT FIGURE 4 ABOUT HERE]

Meta-analyses on ACT process measures

A significant heterogeneity of study measures was detected (Q=25.510, df=7, p=.001, I^2=72.560) for ACT process measures at post-intervention but not at follow-up (Q=4.651, df=5, p=.001, I^2=0.000). The effects of ACT on ACT process measures (psychological flexibility, mindfulness, values, cognitive fusion, and experiential avoidance) were explored at post-intervention and follow-up.

Results found that psychological flexibility outcome measures, as measured by the various measures of psychological flexibility, did not improve in the studies were these were included at post-intervention (*Hedges'g*=.18, *SE*=.15, *95% CI* [-.12; .48], p=.23, k=8) and at follow-up (*Hedges'g*= .16, *SE*=.10, *95% CI* [-.40; .36], p=.12, k=6).

ACT Process Measures: publication bias and sensitivity analyses

Egger's regression coefficient did not indicate the presence of publication bias at post-intervention (intercept=2.181; df=6; p=0.64), and follow-up (intercept=1.684; df=4; p=0.43). Duval and Tweedie's trim and fill analyses detected a missing study to the left of the mean at post-intervention and follow-up. Sensitivity analyses did not detect any studies that had a significant independent impact on increasing the overall effect size at post-intervention and follow-up.

Moderator analyses

Study quality, risk of bias, and the number of treatment sessions were explored to determine whether low study quality, high risk of bias, studies with more treatment sessions were associated with higher effect sizes.

Study quality

Meta-regressions for general distress showed that a significant relationship between study quality and the effect sizes was not found at post-intervention (Q=1.00, df=1, p=.316), and at follow-up (Q=3.77, df=1, p=.0522) indicating that higher study quality was not associated with lower effect sizes at post-intervention. The same pattern of results was found for work-related distress at post-

intervention (Q=1.98, *df*=1, p=.160), and at follow-up (Q=0.96, *df*=1, p=.327) and ACT process measures at post-intervention (Q=0.12, *df*=1, p=.727) and follow-up (Q=0.00, *df*=1, p=.949).

Risk of bias

Given the small number of studies included, the moderation analysis for risk of bias was not possible for general distress and ACT process measures at post-intervention and follow-up. A significant relationship between risk of bias and effect sizes was not found for work-related distress at post-intervention (Q=1.53, *df*=1, p=.217), and at follow-up (Q=1.06, *df*=1, p=.301) indicating that higher effect sizes were not associated with greater risk of bias.

Number of treatment sessions

A significant relationship between the number of treatment sessions and the effect sizes was found for general distress at post-intervention (Q=5.59; *df*=1; p=0.018) and at follow-up (Q=5.53; *df*=1; p=0.018) indicating that studies with higher number of treatment sessions were associated with larger effect sizes. The relationship between the number of treatment sessions and the effect sizes was not significant for work-related distress at post-intervention (*Q*=1.28, *df*=1, *p*=.258) and at follow-up (*Q*=1.05, *df*=1, *p*=.306) and for the ACT process measures at post-intervention (*Q*=1.45, *df*=1, *p*=.229) and follow-up (*Q*=0.17, *df*=1, *p*=.678).

Discussion

This systematic review and meta-analysis assessed the effectiveness of ACT interventions for reducing general distress and work-related distress in HCPs and examined moderators of intervention effectiveness. Twenty-two studies met the inclusion criteria. 10 RCTs studies were included in the meta-analysis. Together, these studies provided evidence that, compared to control conditions, ACT interventions were effective for improving general distress at post-intervention and work-related distress at follow-up, with a small effect size at post-intervention and follow-up.

The current results on general distress are in line with a recent review of ACT meta-analyses (Gloster et al., 2020) that explored mental health by investigating depression, anxiety, life satisfaction and quality of life in mental health populations or across clinical contexts (mental health, physical health etc.) and previous meta-analyses of ACT trials that investigated combined psychological outcomes in multiple contexts (Hayes et al., 2006; Powers et al., 2009; Ruiz, 2010). These studies have found that ACT is more effective in improving a range of outcomes, compared to control conditions. Effect sizes for these outcomes are comparable with the results reported in this meta-analysis. Similarly, these studies also observed little evidence to suggest that ACT is more effective than other established treatments in improving outcomes.

This meta-analysis shows for the first time that there was a significant improvement of work-related distress at follow-up (g=.301), with a small to moderate effect size. This result is important and suggests that improvement in work-related distress may necessitate more time to improve than what needed to reduce general distress. This result may also suggest that burnout is linked to psychological distress. If the interventions primarily reduced distress, burnout may have improved as a consequence. If the link between distress and burnout exists, this finding is consistent with a longitudinal study which investigated stress and burnout in UK doctors over three years (McManus, Winder, & Gordon, 2002). It may also be that different aspects of burnout (e.g. emotional exhaustion, depersonalisation) changed at different times after receiving the ACT intervention but this was not possible to examine given the lack of sufficient data to conduct these subgroup analyses.

Two quality assessment tools were used (POMRF and Cochrane Collaboration's Tool). The POMFR scale was included because it provides a psychological intervention specific measure of study quality. However, recently, clinical researchers have questioned its validity for assessing the quality of trials of ACT (Atkins et al., 2017). Therefore, we decided also to add Cochrane Collaboration's Tool, which is a tool that assesses bias across all types of clinical intervention, in order to avoid bias and ensure maximum rigour. The general low study quality observed in this

review is in line with previous studies (Graham et al., 2016; Öst, 2008, 2014). However, study quality did not significantly moderate outcomes in the present meta-analysis. Therefore, although the current findings are promising, higher quality studies of ACT for improving outcomes in HCPs are now required before the precise effect size for ACT interventions in this context can be confirmed. Instead, the number of treatment sessions was a significant moderator of intervention effectiveness for general distress at post-intervention and this result is in line with the dose-effect relationship described by Kopta (2003).

Contrary to our expectations psychological flexibility processes did not change to a greater extent following ACT. This result is consistent with a small meta-analysis that included four RCTs studies and investigated psychological flexibility in direct-care support staff (Reeve et al., 2018). Perhaps change in process variables may be small in magnitude, which would require larger sample sizes to detect. These findings could also be explained by the analyses we used. Given the number of studies, we combined measures of all aspects of psychological flexibility in the analysis. However, the majority of the interventions included in this meta-analysis were an adapted version of the Bond and Bunce (2000), Bond and Hayes (2002) and Noone and Hastings (2009) protocols which primarily targeted mindfulness and values. It may be that these targeted aspects of psychological flexibility change following these interventions, yet others (defusion, thought suppression etc) do not, and future studies should investigate this possibility with larger and more diverse samples.

We acknowledge the existing review and meta-analysis has a number of limitations. First, we only included ACT interventions delivered primarily to HCPs and we selected primary outcomes based on a pragmatic approach selected by the researchers. Second, classification of interventions into inactive, and active controls has been a subject of debate in the ACT literature (see Powers, Vörding and Emmelkamp's, 2009; Levin and Hayes, 2009; Powers and Emmelkamp, 2009). We too found this classification process challenging, and accept that others may classify interventions differently. For example, in the current review we decided to classify TAU conditions

into the inactive group. Third, all of the studies reported the AAQ or AAQ-II scales to measure experiential avoidance or, more generically, psychological flexibility. However, the AAQ-II has been described as overly saturated with personality traits or distress (Wolgast et al., 2011) rather than specifically measuring experiential avoidance or psychological flexibility (Rochefort et al., 2018). Therefore, these measurements and psychometric issues may have influenced our findings relating to the ACT process measures.

This review suggests a number of directions for future research. First, higher quality trials are needed to understand the efficacy of ACT. We suggest that quality checklists are considered when designing future trials (Borek et al., 2015), Also, in line with Open Science initiatives, research best practice suggests that randomised controlled trials should be registered before data collection begins (Norris and O'Connor, 2019). Second, changes in the organisation of health care providers in the UK coupled with stress, burnout and psychological distress have been shown to contribute to staff errors (e.g. medications errors, prescribing faults) and poor patient safety (Hall et al., 2016; Evans, 2010). However, surprisingly, no intervention studies have included measures of patient safety as an outcome variable. Future research ought to address this important gap. Third, treatment fidelity to ACT was rarely assessed in a robust way in the included trials. Trials can use measures such as the ACT Fidelity Measure (ACT-FM: O'Neill et al.., 2019), to assess the extent to which treatment delivery is consistent with ACT principles.

Conclusion

Results from this meta-analysis suggest that ACT is a promising psychological intervention for improving a range of psychological outcomes (general distress, stress, burnout) in HCPs with small effect sizes at post-intervention and follow-up. However, ACT interventions did not lead to improvements in ACT process measures. The general methodological quality of included studies was poor and needs to be improved.

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Table 1. Example of ACT intervention exercises which may be used with healthcare professionals.

	Example Metaphor	Some example exercises
Openness (Acceptance and Defusion) Embracing our thoughts and feelings (when doing so helps us to make progress in life)	Ticket metaphor "When you consider speaking up in a meeting to make an point that is important to you, you say you feel nervy, embarrassed… its almost like those tricky feelings are a part of doing something important. Almost like a ticket, on the one side you have the things that you really care about in life, on the other you have the price… would you throw away the ticket, if it meant you didn't have to feel anxious?"	Television screen/Silly voices (Harris, 2009) 1. Identifying a significant distressful emotion, event or image. 2. Imagine that being displayed on a television screen or being announced or described by a well-known funny voice. 3. Recognise that these thoughts are nothing more than sounds or images and they cannot cause any harm. 4. Identify the influence that these distressing thoughts or images may have on your body, thinking, and decision-making.
Awareness (Mindfulness and Self-as-context) Being able flexibly to attend to the present moment	Sky & Weather "Do you notice that over a day our thoughts and feelings can change… its almost like the weather… and if our thoughts and feelings are the weather, then I suppose that we are the sky… we contain those thoughts and feelings but we are like the sky. "	Noticing exercise (Harris, 2009) 1. Pause for a moment. 2. Observe and notice the sounds, smells, images of the environment. 3. Observe and notice body sensations (including breathing). 4. Once you have observed, connect with your daily activities.
Engagement (Values and Committed Action) Connecting with and doing what's personally important	Compass metaphor "Connecting with your values is a bit like having a compass in your pocket. When you feel lost or are struggling, you can take out your compass and see where you want to go, and maybe begin to make a few small steps in that direction "	Smallest possible step (Harris, 2008) 1. Define your values. 2. Set meaningful goals based on those values. 3. Identify the obstacles preventing from achieving value-based goals. 4. Define a plan to achieve value-based goals, including the possible obstacles and break it down into smallest possible steps.

Table 2. Summary of effect sizes and heterogeneity across all 10 studies for general distress, work-related distress and psychological flexibility at post-intervention and follow-up in comparison to overall control conditions, inactive controls and active controls.

Outcome	Comparator	Time-Points	K	ES (p) [1]	CI's [1]	I^2 [2]	Q (p) [3] within studies
Psychological distress	**Overall**	**Post-intervention**	**7**	**.394 (.029)**	**[.040; .748]**	**78.430**	**27.817 (<.001)**
		Follow-up	5	.116 (.525)	[-.241; .473]	61.905	10.500 (.033)
	Inactive	**Post-intervention**	**5**	**.615 (<.001)**	**[.377; .853]**	**27.877**	**5.546 (.236)**
		Follow-up	3	.357 (.066)	[-.023;.738]	46.469	3.736 (.154)
	Active	Post-intervention	2	-.210 (.139)	[-.488; .068]	0.000	0.946 (.331)
		Follow-up	2	-.284 (.127)	[-.650; .081]	0.000	0.173 (.677)
Work-related distress	Overall	Post-intervention	9	.150 (.333)	[-.154; .455]	73.525	30.217 (<.001)
		Follow-up	**8**	**.301 (.001)**	**[.122; .480]**	**0.000**	**6.183 (.519)**
	Inactive	Post-intervention	5	.189 (.138)	[-.061; .439]	24.700	5.312 (.257)
		Follow-up	**4**	**.252 (.046)**	**[.005; .499]**	**0.000**	**2.567 (.463)**
	Active	Post-intervention	4	.123 (.700)	[-.505;.751]	87.179	23.400 (<.001)
		Follow-up	**4**	**.355 (.139)**	**[.081; .628]**	**9.131**	**3.301 (.347)**
Psychological flexibility	Overall	Post-intervention	9	.182 (.229)	[-.115; .480]	72.560	25.510 (.001)
		Follow-up	6	.162 (.117)	[-.040; .364]	0.000	4.651 (.460)

[1] Effect sizes and confident intervals arranged by Hedge's g value of combined (primary outcomes) and individual outcomes (wellbeing or work-related stress) at overall time-points combined, post-intervention and follow-up.
[2] The I^2 value reflects the percentage of variance due to heterogeneity across the studies included within each subgroup (Higgins & Thompson, 2002).
[3] Test of hetereogeneity within studies (Higgins & Thompson, 2002).

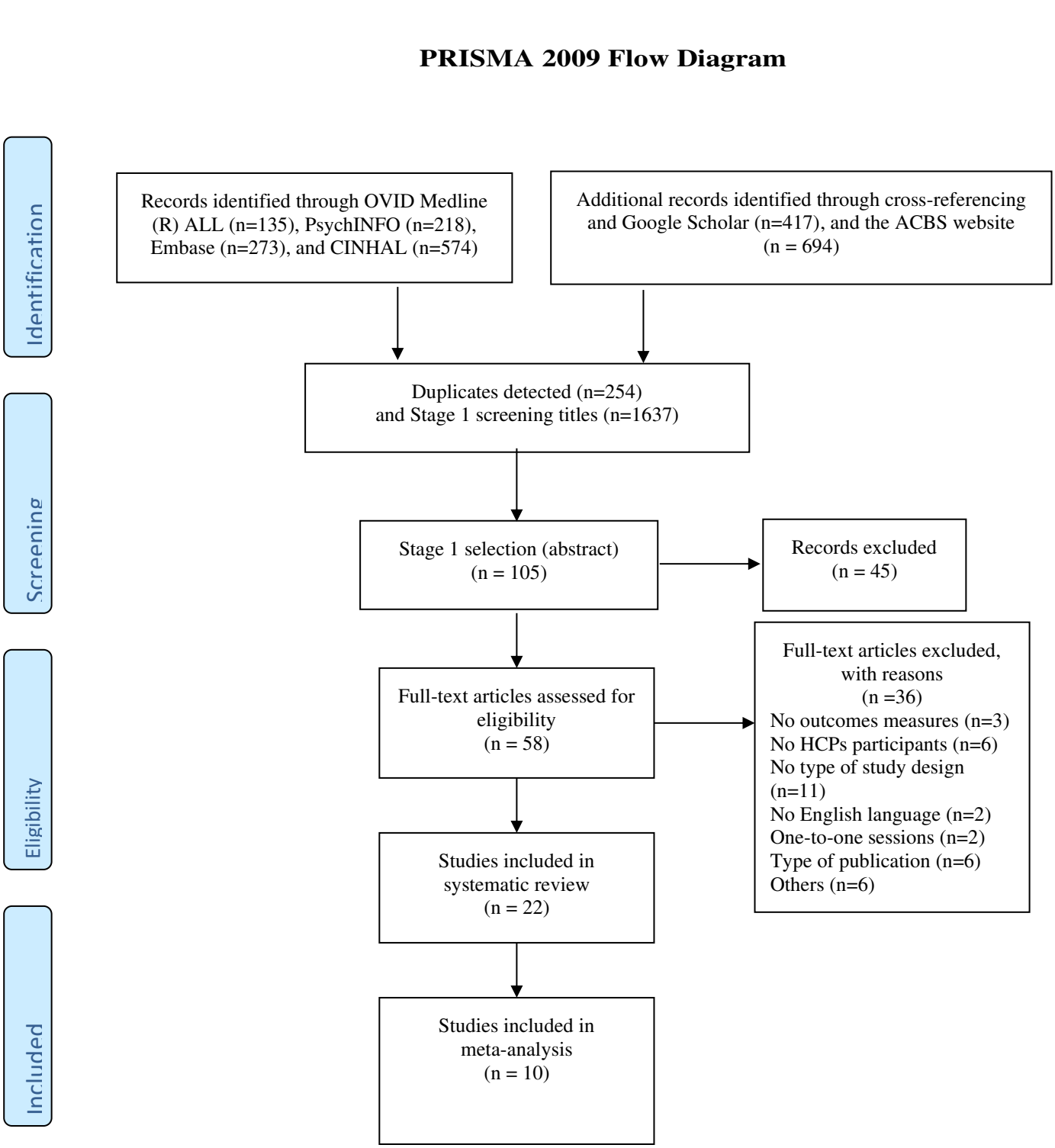


Figure 1. PRISMA study flow diagram of studies retained in the review. Reasons for exclusion included.

Risk of bias assessment

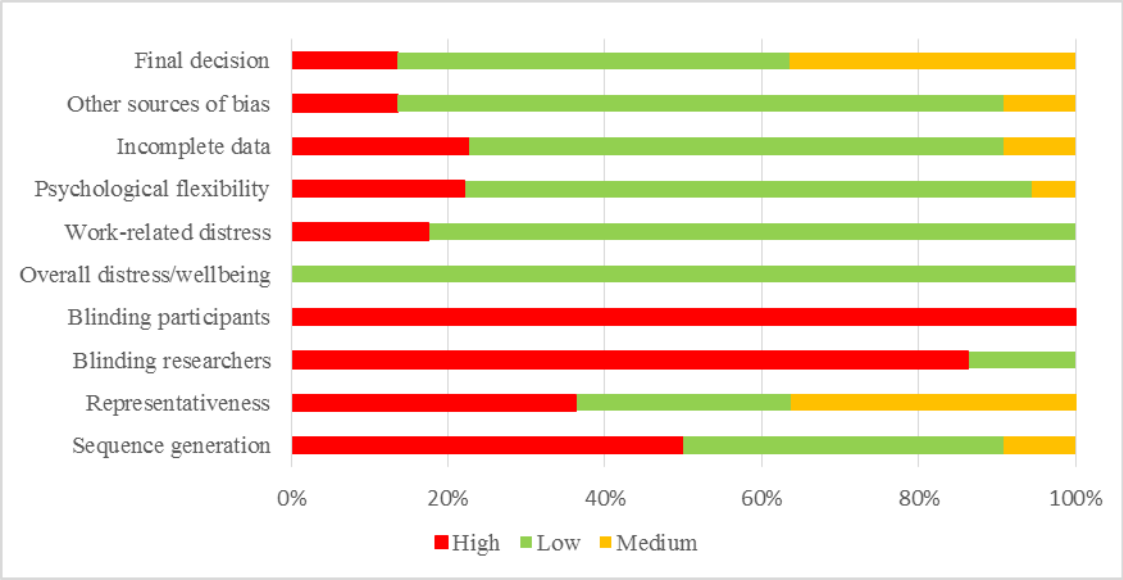


Figure 2. Risk of bias assessment for studies retained in the review adapted from Hall et al., 2016.

Meta-analysis results on primary outcomes

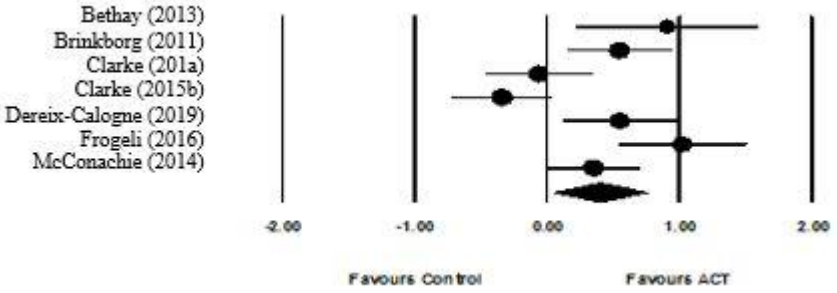


Figure 3. High resolution plot of effect sizes (Hedge's g) and 95% CI's on general distress at post-intervention.

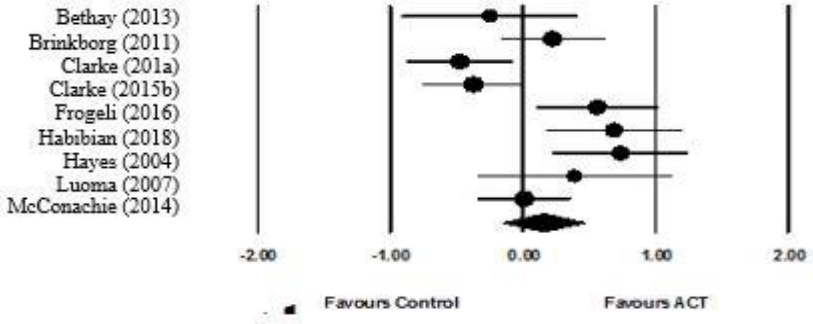


Figure 4. High resolution plot of effect sizes (Hedge's g) and 95% CI's on work-related distress at post-intervention.

Publication bias on Primary Outcomes

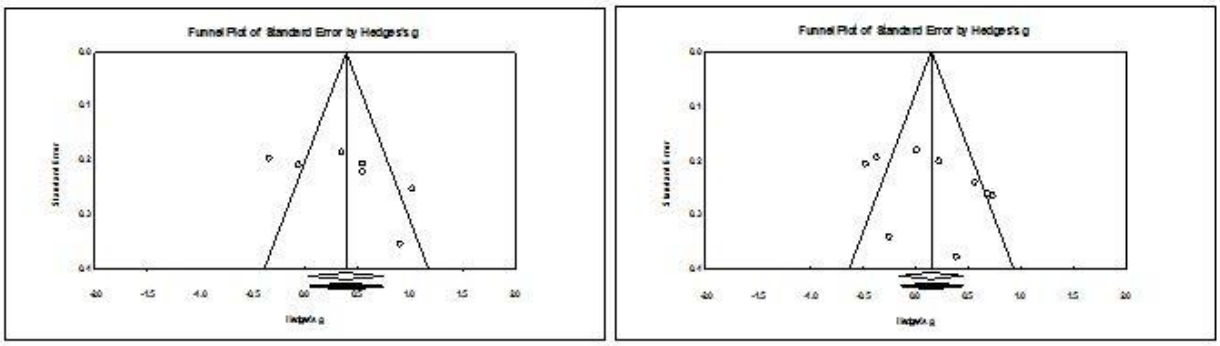
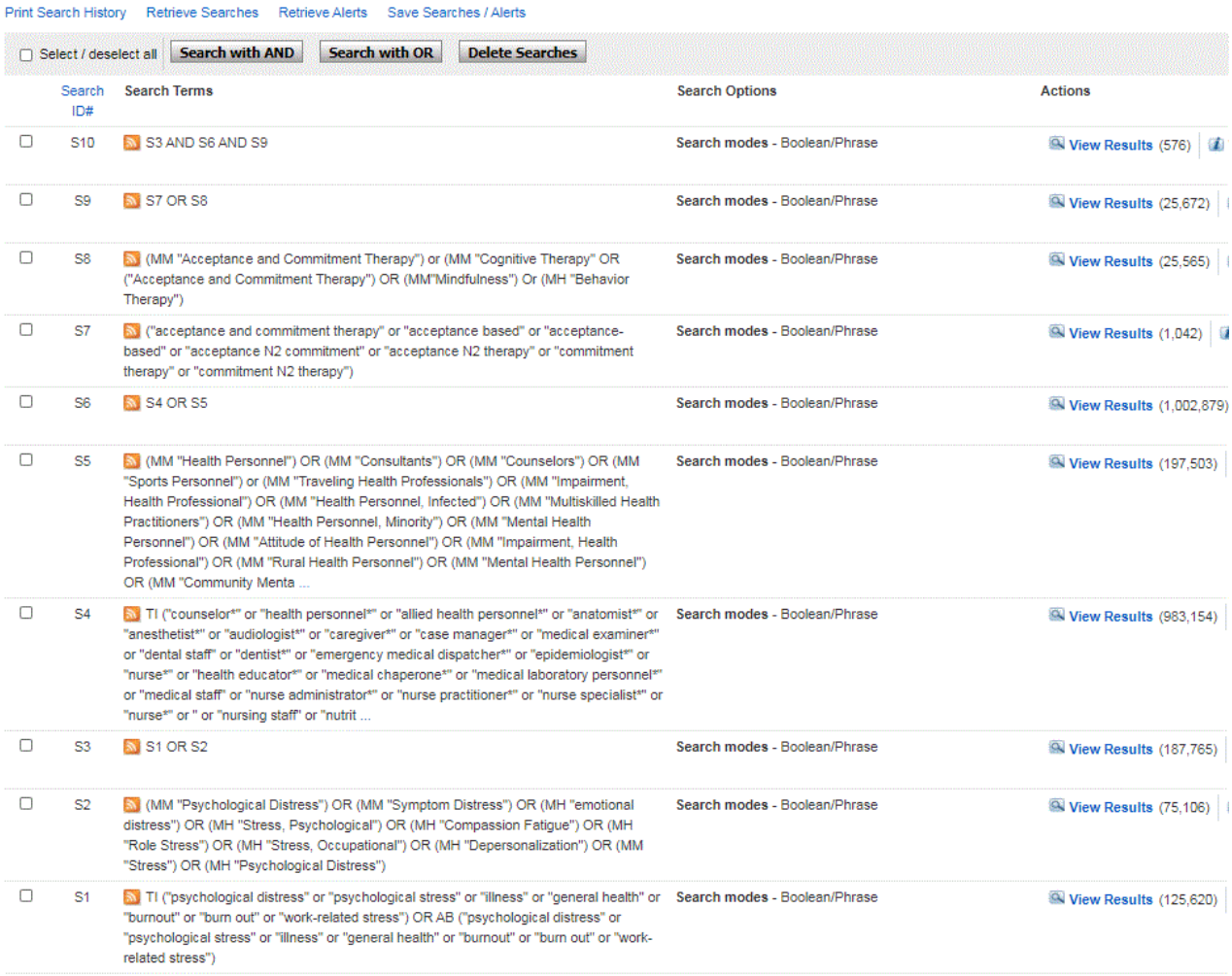


Figure 5. Funnel plot of observed (white circles) and imputed (black circles) standard errors based on Hedge's g, 95% CI's for general distress (left) and work-related distress (right).

Supplementary Figure 1. Ovid MEDLINE, EMBASE, and PsycINFO search strategy.

# ▲	Searches	Results
1	(acceptance and commitment).ti,ab,kw.	6596
2	acceptance-based.ti,ab,kw.	1492
3	acceptance based.ti,ab,kw.	1492
4	"Acceptance and Commitment Therapy"/	3847
5	PSYCHOLOGICAL STRESS/ or CHRONIC STRESS/ or STRESS/ or OCCUPATIONAL STRESS/ or STRESS REACTIONS/	504973
6	stress.ti,ab,kw.	1888312
7	Stress, Psychological/ or occupational health/	248002
8	occupational health.ti,ab,kw.	33978
9	mental health/ or *anxiety disorders/ or *depressive disorder, major/ or wellbeing/	370672
10	illness.ti,ab,kw.	635028
11	general health.ti,ab,kw.	73063
12	burnout, professional/	13440
13	burn out.ti,ab,kw.	2500
14	burnout.ti,ab,kw.	40354
15	work-related stress.ti,ab,kw.	4536
16	(Occupational hazard* or occupational burnout or occupational burn out or workplace stress or staffing level* or work* hour*).ti,ab,kw.	35483
17	counselors/ or health personnel/ or allied health personnel/ or anatomists/ or anesthetists/ or audiologists/ or caregivers/ or case managers/ or "coroners and medical examiners"/ or dental staff/ or dentists/ or doulas/ or emergency medical dispatcher/ or epidemiologists/ or faculty, dental/ or faculty, medical/ or faculty, nursing/ or health educators/ or health facility administrators/ or infection control practitioners/ or medical chaperones/ or medical laboratory personnel/ or medical staff/ or nurses/ or nurse administrators/ or nurse practitioners/ or nurse specialists/ or nurses, community health/ or nurses, international/ or nurses, male/ or nurses, public health/ or nursing staff/ or nutritionists/ or occupational therapists/ or optometrists/ or personnel, hospital/ or pharmacists/ or physical therapists/ or physician executives/ or physicians/ or veterinarians/ or educational personnel/ or social workers/	1344379
18	General Practitioners/	99807
19	(physician* or doctor* or clinician* or therapist* or dentist* or psychiatrist* or surgeon* or psychologist* or nurse* or carer* or care giver* or caregiver* or professional* or provider* or gp*).ti,ab,kw.	4634988
20	1 or 2 or 3 or 4	8432
21	5 or 6 or 7 or 8 or 9 or 10 or 11 or 12 or 13 or 14 or 15 or 16	3100767
22	17 or 18 or 19	5248168
23	20 and 21 and 22	626

Supplementary Figure 2. CINHAL search strategy.



Print Search History | Retrieve Searches | Retrieve Alerts | Save Searches / Alerts

Select / deselect all | Search with AND | Search with OR | Delete Searches

	Search ID#	Search Terms	Search Options	Actions
☐	S10	S3 AND S6 AND S9	**Search modes** - Boolean/Phrase	View Results (576)
☐	S9	S7 OR S8	**Search modes** - Boolean/Phrase	View Results (25,672)
☐	S8	(MM "Acceptance and Commitment Therapy") or (MM "Cognitive Therapy" OR ("Acceptance and Commitment Therapy") OR (MM"Mindfulness") Or (MH "Behavior Therapy")	**Search modes** - Boolean/Phrase	View Results (25,565)
☐	S7	("acceptance and commitment therapy" or "acceptance based" or "acceptance-based" or "acceptance N2 commitment" or "acceptance N2 therapy" or "commitment therapy" or "commitment N2 therapy")	**Search modes** - Boolean/Phrase	View Results (1,042)
☐	S6	S4 OR S5	**Search modes** - Boolean/Phrase	View Results (1,002,879)
☐	S5	(MM "Health Personnel") OR (MM "Consultants") OR (MM "Counselors") OR (MM "Sports Personnel") or (MM "Traveling Health Professionals") OR (MM "Impairment, Health Professional") OR (MM "Health Personnel, Infected") OR (MM "Multiskilled Health Practitioners") OR (MM "Health Personnel, Minority") OR (MM "Mental Health Personnel") OR (MM "Attitude of Health Personnel") OR (MM "Impairment, Health Professional") OR (MM "Rural Health Personnel") OR (MM "Mental Health Personnel") OR (MM "Community Menta ...	**Search modes** - Boolean/Phrase	View Results (197,503)
☐	S4	TI ("counselor*" or "health personnel*" or "allied health personnel*" or "anatomist*" or "anesthetist*" or "audiologist*" or "caregiver*" or "case manager*" or "medical examiner*" or "dental staff" or "dentist*" or "emergency medical dispatcher*" or "epidemiologist*" or "nurse*" or "health educator*" or "medical chaperone*" or "medical laboratory personnel*" or "medical staff" or "nurse administrator*" or "nurse practitioner*" or "nurse specialist*" or "nurse*" or " or "nursing staff" or "nutrit ...	**Search modes** - Boolean/Phrase	View Results (983,154)
☐	S3	S1 OR S2	**Search modes** - Boolean/Phrase	View Results (187,765)
☐	S2	(MM "Psychological Distress") OR (MM "Symptom Distress") OR (MH "emotional distress") OR (MH "Stress, Psychological") OR (MH "Compassion Fatigue") OR (MH "Role Stress") OR (MH "Stress, Occupational") OR (MH "Depersonalization") OR (MM "Stress") OR (MH "Psychological Distress")	**Search modes** - Boolean/Phrase	View Results (75,106)
☐	S1	TI ("psychological distress" or "psychological stress" or "illness" or "general health" or "burnout" or "burn out" or "work-related stress") OR AB ("psychological distress" or "psychological stress" or "illness" or "general health" or "burnout" or "burn out" or "work-related stress")	**Search modes** - Boolean/Phrase	View Results (125,620)

Supplementary Table 1. Summary of outcomes, interventions, and comparison groups of studies retrieved in the review.

Authors, date, country	N baseline (n completers last end-point)	N Intervention baseline (N Control)	Age mean (% females)	Study Design	Measurements points	Comparison	Work-related Distress	Overall Distress	Wellbeing	Acceptance and Commitment Therapy	Other Measures	Number of sessions (control)	Study quality
Bethay, Wilson, Schnetzer, Nassar & Bordieri (2013). USA	38 Intellectual disability staff (34)	20 (18)	38 (76.5%)	RCT pilot	Baseline (pre-treatment), post-treatment (TL[a] =3 sessions), & 3-month follow-up	Inactive control (TAU)	Burnout (MBI)	Psychological Distress (GHQ-12)		Burnout Believability Scale (BBS)	Social validity Survey	ACT: 6h + 3h of ABA (3 x 3h sessions) ABA: 9h (3 x 3h sessions)	15
* Brinkborg, Michanek, Hesser & Berglund (2011). Sweden.	106 Social workers (94)	68 (38)	44 (89%)	RCT after stratification	Two weeks pre-treatment (TL = 4 sessions) and 2 weeks post-treatment	Inactive Control	Burnout (MBI) PBSE	Psychological Distress (GHQ-12) Perceived Stress (PSS)		Psychological Flexibility (AAQ, swedish)	DCSQ	4 x 3 hour sessions (0)	25
*Clarke, S., Taylor, G., Bolderston, H., Lancaster, J., & Remington, B. (2015A). UK	100 Staff caring for clients with a personality disorder (57)	53 (47)	41.6 (78%)	RCT	Baseline (pre-treatment), post-treatment (TL= 2 sessions), 6-month follow-up	Comparison intervention (dialectical behavioural therapy)	Burnout (MBI)	Psychological Distress (GHQ-28)		Psychological Flexibility (AAQ-II)	CEQ, APDQ, HAQ-II, SDS	2 x one day session (=)	20
Clarke, S., Taylor, G., Lancaster, J., & Remington, B. (2015B). UK	140 Staff caring for clients with a personality disorder (61)	77 (63)	39.9 (75%)	RCT	Baseline, post-intervention (TL=2 sessions, 6-month follow-up	Comparison intervention (psych education training)	Burnout (MBI)	Psychological Distress (GHQ-22)		Values (VLQ)	APDQ, HAQ-II, MCQ, CEQ, SDS	2 x one day session (=)	20
Dereix-Calonge, Ruiz, Sierra, Peña-Vargas, Ramírez (2019), Colombia.	85 clinical psychology trainees (85)	43, (42)	23.38 (79%)	RCT	Baseline (TL=six sessions), post-intervention	Inactive Control (WLC)		Depression Anxiety and Stress Scales (DASS-21)		Values (VQ)		Six sessions (=)	18
Farsi, (2018). Iran	30 nurses (30)	15 (15)	NA	Pre-post design	Pre-intervention (TL=8 sessions), post intervention	Inactive Control (WLC)		Anxiety (BAI)				90 min x 8 sessions	9
*Frögéli, Djordjevic, Rudman, Livheim & Gustavsson (2016). Sweden.	113 Nursing students (63)	69 (44)	NA	RCT pilot	Baseline (pre-treatment), post-treatment (TL= 6 weeks) and at 3-month follow-up	Inactive control (TAU)	Burnout (BO)	Perceived Stress Scale (PSS)		Psychological Flexibility (AFQ-Y); Mindfulness (MAAS)		6 x 2 hour sessions (2 x 3 hour sessions)	13

Gerhart, O' Mahony, Abrams, Grosse, Greene & Levy (2016). USA.	17 palliative care providers (11)	only ACT	53 (81%)	Pre-post design	Pre-training, mid-training (4 weeks)(TL = 10 sessions) and post-intervention		Burnout (MBI)	Posttraumatic stress (PCL-C); Depression (BDI-II)		Psychological Flexibility (AAQ-II); Cognitive Fusion (CFQ); Mindfulness Practice Log		Two half-day x 2 hour training sessions (4 h) + 82 x 1.5/2 hrs	13
Habibian, Sadri, Nazmiyeh, 2018, Iran	60 pediatric oncology and special diseases nurses (60)	30 (30)	34.2 (94%)	RCT	Baseline, post-intervention (TL=4 sessions) and three-month follow-up	Active control (communication skills)	Burnout (MJJBI)	Occupational stress (OOSI)				4 x 1.5 h + 2 x 1.5 h sessions (=)	10
Hayes, Bissett, Roget, Padilla & Kohlenberg (2004). USA.	93 Substance Abuse Counsellors (85)	30, Comparison (34); Control (29)	53 (63%)	RCT	Pre-workshop, (TL=one session) at the end (post) and 3 month follow-up	Active control (Educational Control); Comparison intervention (Multicultural Training)	Burnout (MBI)		-	Stigmatizing Attitudes - Believability (SAB)	CASA	A day-long workshop (=)	16
Heydari, Masafi, Jafari, Saadat & Shahyad (2018). Iran.	30 psychiatric staff (30)	15, (15)	NA (NA)	Pre-post design	Baseline (pre-treatment), post-treatment (TL=8 weeks) and two-month follow-up	Inactive Control (no intervention)	Burnout (MBI)	Depression (BDI-II); Anxiety (BAI)				8 X 90 min sessions (0)	8
Luoma, Hayes, Twohig, Roget, Fisher, Padilla, Kohlenberg, (2007). USA	30 Therapists and trainees providing addiction treatment services (24)	16, (14)	53 (70%)	RCT	At beginning of workshop (pre), (TL=8 sessions) at the end (post), 2-and 4-month follow-ups	Inactive Control (TAU)	Burnout (MBI)				GDC Group Drug Counselling knowledge, Self-reported adoption, TARS	One-day (6 hrs + 8x1.5hrs workshop) + weekly consultation group. (One-day workshop)	10
McConachie, McKenzie, Morris, & Walley (2014). UK	120 Support staff caring for individuals with intellectual disability (87)	66, (54)	43 median (71.2%)	RCT	Baseline (pre-treatment), post-treatment (TL= 2 sessions) and six week follow-up	Inactive Control (WLC)	Staff Stressor (SSQ)	Psychological Distress (GHQ-12)	Psychological wellbeing (WEMWBS)	Psychological Flexibility (AAQ-II) Thought suppression (WBSI)		One day workshop + a half day refresher after six weeks (=)	13
Noone and Hastings, 2009, UK	28 ID support staff (14)	22, (6)	37.43 (78.3%)	Pre-post design	Baseline, (TL=2 sessions), and 6-week follow-up	Inactive control (WLC)	Staff Stressor (SSQ)	Psychological Distress (GHQ-12)				One day + half-day follow-up (=)	8
Noone and Hastings, 2010, UK	34 ID support staff (34)	PACT only	41.71 (70.5%)	Pre-post design	Baseline, (TL=2 sessions) & follow-up		Staff Stressor (SSQ)	Psychological Distress (GHQ-12)				one day + half-day follow-up	8
O'Brien, Bannon, McCarren, Delaney (2012), USA.	45 mental health workers (45)	21, (24)	43.64 (78%)	RCT	Baseline, post-intervention (Tl= three sessions)	Inactive Control (WLC)		Psychological Distress (GHQ-12)	Short Form-12 Health Survey (SF-12)	Psychological Flexibility (AAQ-II)	RSRS	Three two-hour sessions (=)	18

O' Mahony et al., 2017, USA	13 medical providers who care with end-of life children (10)	ACT only	44 (69.2%)	Pre-post design	Baseline (pre-treatment), mid-treatment (5 weeks), and post-intervention (TL=9 sessions)		Burnout (MBI)	Depression (BDI-II) Post-Traumatic symptoms (PCL-C)		Psychological Flexibility (AAQ-II); Cognitive Defusion (CFQ)	Perseverative thinking questionnaire (PTQ; PTQ_CPT)	2 half-day sessions + 7 x two-hour	10
Pakenahm, 2015, Australia	51 First year postgraduate clinical psychology trainees (32)	ACT only	27.66 (88%)	Pre-post design	Pre-training & post-training (TL=4 sessions)		Work-related Stress (MHPSS)	Psychological Distress (GHQ-28)		Psychological Flexibility (AAQ) Mindfulness (FFMQ) Thought suppression (WBSI) Values (VLQ), Self-compassion (SCS)	Client–therapist Alliance (CASES), Working Alliance Inventory-Short Form	12 x 2-hour workshops	8
Smith and Gore, 2012, UK	72 staff working in specialist challenging behaviour (26)	ACT only	Range 18-27 (66.6%)	Pre-post design	Baseline (one month prior the workshop), pre-intervention (at the beginning of the workshop), (TL=2 sessions), post-intervention (at the end of the second part of the workshop), three-month follow-up, six-month follow-up		Burnout (MBI); Staff Stressor (SSQ)	Psychological Distress (GHQ-12); Depression and anxiety (DAS)		Psychological Flexibility (AAQ); Support Staff Values Questionnaire (SSVQ)		A day + half-day	17
Stafford Brown and Pakenham, (2012) Australia	56 clinical psychology trainees (54)	28, (28)	28.45 (87.5%)	Pre-post design	Baseline, post-intervention (TL=4 sessions) & ten-week follow-up	Inactive control (WLC)	Work-related Stress (MHPSS)	Psychological Distress (GHQ-28)	Life Satisfaction (SWLS)	Values (VLQ); Thought suppression (WBSI); Mindfulness (FFMQ); Self-compassion (SCS); Psychological Flexibility (AAQ)	Social validation of the intervention; Therapeutic alliance; Self-efficacy (Self-Efficacy Scales-Helping Skills Scale)	4 x 3-hour sessions (=)	15
Stewart, White, Ebert, Mays, Nardozzi & Bockarie (2016)	57 workers and health professional (37)	ACT only	34 (54.39%)	Pre-post design	Pre-workshop, post-workshop (TL=three sessions) & 3-month follow-up				Satisfaction with Life (SWLS)	Psychological Flexibility (AAQ-II); Values (VQ)	Post-workshop evaluation form; follow-up feedback form	Workshop over three days (X2)	20
Waters, Frude, Flaxman & Boyd (2018). UK	35 Clinically distressed health care workers (30)	17, (18)	39.7 (84%)	Pre-post design	Pre-intervention (TL=one session) & 3-month follow-up	Inactive Control (WLC)		Psychological Distress (GHQ-12)		Psychological Flexibility (AAQ-II) Mindfulness (FFMQ) Automatic Thoughts (ATQ)		one day workshop (=)	17

MBI: Maslach Burnout Inventory; GHQ: General Health Questionnaire; BBS: Burnout Believability Scale; ACT: Acceptance and Commitment Therapy; ABA: Applied Behavioural Analysis; PSS: Perceived Stress Scale; AAQ: Acceptance and Action Questionnaire; DCSQ: Demand Control Support Questionnaire; EE: Emotional Exhaustion, DEP: Depersonalisation; PA: Personal Accomplishment; CEQ: Credibility and Expectancy Questionnaire; APDQ: Attitude to Personality Disorder Questionnaire; HAQ: Helping Alliance Questionnaire – Therapist Version; SDS: Social Distancing Scale; VLQ: Valued Living Questionnaire; MCQ: Marlowe-Crowne Questionnaire; BAI: Beck Anxiety Inventory; BO: Burnout Subscale from the Scale of Work Engagement and Burnout; AFQ-Y: Avoidance and Fusion Questionnaire for Youth; MAAS: Mindful Attention Awareness Scale; PCL-C: The PTSD Symptom Checklist – re-experiencing subscale; BDI: Beck Depression Inventory; CFQ: Cognitive Fusion Questionnaire; PTSD Re-experiencing: PTSD Symptom Checklist; MJJBI: Maslach and Jackson Job Burnout Inventory; OOSI: Osipow Occupational Stress Inventory; SAB: Stigmatizing Attitudes – Believability; CASA: Community Attitudes Toward Substance Abusers; GDC: Group Drug Counselling; TARS: Treatment Acceptability Rating Scale; SSQ: Staff Stressor Questionnaire; WEMWBS: White Bear Suppression Inventory; Mental Health Professional Stress Scale; SCS: Social Distancing Scale; FFMQ: Five Facet Mindfulness Questionnaire; SK: Five Facet Mindfulness Questionnaire – Self-Kindness subscale; GHQ: General Health Questionnaire; GHQ-SS: General Health Questionnaire – Somatic Symptoms Subscale ; DAS: Dysfunctional Attitude Scale; SSVQ: Support Staff Values Questionnaire; PBSE: Performance-based self-esteem scale; ATQ: Automatic Thoughts; RSRS: Revised session reaction scale; PTQ: Perseverative Thinking Questionnaire.

[a] Treatment Length.