Mental Health and Burnout in Healthcare Professionals: Exploring the Role of Psychological Flexibility

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The candidate confirms that the work submitted is her own, except where work which has formed part of jointly-authored publications has been included. The contribution of the candidate and the other authors to this work has been explicitly indicated below. The candidate confirms that appropriate credit has been given within the thesis where reference has been made to the work of others.

The meta-analysis and cross-sectional studies reported in Chapter 2 and Chapter 4 of this thesis have been published.

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AP, CGD and DOC designed the study and wrote the protocol of the systematic review and meta-analysis. AP conducted the literature searches and provided summaries of previous research studies. AP and FC conducted title, abstract and full-text screening and POMRF study quality assessment. AP and DH conducted Cochrane Risk of Bias study quality assessment. AP and RO conducted the meta-analyses. AP wrote the first draft of the thesis manuscript and all the authors provided comments and have approved the final version.

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Abstract

It is widely acknowledged that healthcare professionals (HCPs) report high levels of psychological distress and burnout. These issues, especially in the long-term, can lead to poor patient care. In recent years, interventions that aim to increase psychological flexibility (composed of acceptance, mindfulness, and values), such as Acceptance and Commitment Therapy (ACT), have been found beneficial for improving mental health in challenging working environments (e.g., banks, organisations). However, the research to date has been primarily unable to test: a) whether ACT interventions are effective for improving distress, burnout and patient safety in HCPs; b) the aspects of psychological flexibility most strongly related to mental health in HCPs and in the general population during the COVID-19 pandemic; c) whether ACT interventions can be improved by the inclusion of self-compassion.

A quantitative approach was taken to address these gaps. During Study 1, a systematic review and meta-analysis found that ACT was beneficial for reducing psychological distress and burnout in HCPs. In Study 2, a randomised-controlled trial study found that this intervention, via psychological flexibility and self-compassion, was effective for decreasing psychological distress in NHS staff. Study 3, using a cross-sectional design, suggested that mindfulness-based interventions for HCPs may benefit from the inclusion of values-based action training components, and the integration of self-compassion principles and practices. Lastly, Study 4, using a longitudinal design, found that psychological flexibility and self-compassion variables were associated with higher wellbeing and life satisfaction and lower burnout during the COVID-19 pandemic.

In combination, these findings found that psychological flexibility, and ACT interventions, are beneficial to improve mental health in HCPs and in the general population. Mindfulness, values and self-compassion were found the most effective processes. These results are useful for researchers, healthcare managers, clinicians, and stakeholders wanting to use this intervention in a healthcare context and during the COVID-19 pandemic.

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Abbreviations

ACT: Acceptance and Commitment Therapy

CBT: Cognitive Behaviour Therapy

CFT: Compassion-Focused Therapy

CMT: Compassionate Mind Training

FC: Functional Contextualism

GP: General Practitioner(s)

HCPs: Healthcare professionals

NHS: National Health Service

PF: Psychological Flexibility

RCT: Randomised controlled trial

RFT: Relational Frame Theory

TAU: Treatment as usual

WLC: Waitlist control

Chapter 1 Introduction

This chapter will outline the psychological literature on poor wellbeing and burnout in healthcare professionals (HCPs) and their association with perceived safety practices. Acceptance and Commitment Training will be presented as a promising workplace psychological intervention for improving healthcare staff's mental health. Gaps in the literature of ACT-workplace based interventions will be identified and based upon these, the aims of this thesis will be described.

1.1 The scope of the problem

Compared to other workers in the United Kingdom (UK), HCPs are at a greater risk of developing poor mental health and burnout (Health and Safety Executive, 2020). The latest data from the NHS staff survey (2019) - including 1.1 million staff across 300 NHS Trusts - suggests that 40.3% of staff reported feeling unwell due to work-related stress with the percentage representing the worst increase in the past four years.

Among HCPs, UK doctors remain the most stressed since 1998 (O'Connor et al., 2000; Wall, Bolden, & Borrill, 1997; McManus, Winder, & Gordon, 1999). A recent systematic review, including 14 studies on UK doctors shows that between 17% and 52% doctors present with common psychiatric disorders, and 31-54.3% present with emotional exhaustion (Imo, 2017). A more recent survey with over 43.000 doctors and medical students noted that over 80% reported a high or very high risk of psychiatric morbidity; with 40% experiencing psychological difficulties or to have been diagnosed with a medical condition at some point in their life (British Medical Association, 2019).

Similarly, nursing professionals are under increasing strain and are showing high rates of depression, stress and anxiety (Letvak et al., 2012; Ohler et al., 2010). Service personnel, emergency staff (ambulance staff) and all HCPs exposed to traumatic events at work (e.g., emergency departments, doctors, gynaecologists, obstetrics) also experience poor mental health and show signs of post-traumatic stress. For example, in a systematic review including 27 studies on paramedics, it was found that one in ten frontline ambulance staff may present with symptoms of post-traumatic stress disorder (Petrie et al., 2018). High levels of stress are also prevalent in mental health social workers

(Coyle et al. 2005), social workers (Lloyd, King, & Chenoweth, 2002) and managers (Mosadeghrad, 2013).

Changes in the organisation of the health care provision in the UK (e.g., working patterns, medical care), coupled with increased stress, burnout and poor psychological wellbeing have been shown to contribute to staff errors (e.g., medication errors, prescribing faults) and poor patient safety (O'Connor et al., 2000; Hall et al., 2016; O'Connor, Johnson & Hall, 2021). For example, the 2019 NHS Staff Survey showed that the number of errors, near misses, or incidents that could hurt patients had been steadily increasing from 25% to 27% in the past four years. Conversely, the satisfaction with the quality of care has decreased from 82.2% to 80.7% (NHS Staff Survey, 2019). These numbers are consistent with NHS litigation costs. The cost for clinical negligence amounted to £2.4bn in 2017/2018, up £137m on the previous year (NHS Resolution, 2018).

Despite wellbeing and burnout being top of the agenda for leading healthcare organisations, these issues have worsened in recent times. Indeed, the coronavirus pandemic has increased healthcare staff's stress significantly (da Silva & Neto, 2020; Muller et al., 2020; Shreffler et al., 2020; Spoorthy, Pratapa & Mahant, 2020, for reviews). Recent data shows that half of the UK HCPs are suffering mental health problems due to the pandemic; however, during the first wave of the pandemic, only one in five doctors could get access to psychological support (British Medical Association, 2020a). Another survey on UK general practitioners (GPs) suggests that only about 36% did receive partial or full access to NHS wellbeing support services (British Medical Association, 2020b).

As a result of this, there is a real concern that staff with minor psychiatric disorders or significant mental health conditions cannot get access to appropriate support and treatment (Greenberg et al., 2020). These issues are estimated to cost £ 26 billion a year to the NHS due to NHS sickness absence rates (£15.1 billion) and reduced work productivity (£8.4 billion) (Sainsbury Centre for Mental Health, 2007), and these numbers are expected to rise due to the pandemic.

Given the high levels of stress and psychological morbidity among HCPs, and the impact these factors have on patient care in the form of medical errors, it is vital that solutions are found to maintain staff wellbeing.

1.2 Mental health and burnout in healthcare professionals

1.2.1 Mental health

The literature widely acknowledges that HCPs frequently report depression, anxiety, post-traumatic stress, and psychological distress. When the symptoms are not treated and become severe, these can lead to increased risk of suicidal ideation.

For example, a systematic review including 19 studies found that doctors' depression rate varied from 14% to 60% and anxiety from 18% to 55% (Elliot, Tan & Norris, 2010). Another review on doctors including 29 studies showed that the prevalence of psychiatric morbidity was 6.0–66.5% for depression, 7.7–65.5% for anxiety and 12.2–96.7% for psychological distress (Hope & Henderson, 2014). A recent study on 1095 obstetricians and gynaecologists found that two-thirds were experiencing trauma symptoms related to work, and 18% of these reported clinically significant symptoms of post-traumatic stress disorder (Slade et al., 2020). Mental illness in doctors and access to drugs, being female doctors and victims of disciplinary investigations may lead to increased risk of suicide (Gerada et al., 2020). Even though current rates of suicide amongst doctors are decreasing (Duarte et al., 2020, for a review), a recent meta-analysis showed that doctors are 50% more at risk of suicide than the general population (Dutheil et al., 2019).

Studies on doctors have found that severe depression, anxiety and post-traumatic stress, may vary based on the level of experience and work demands required by the job (Imo, 2017). Junior doctors may be more at risk of developing symptoms (Firth-Cozens, 1987), and this may depend on their satisfaction with the job (Berman et al., 2007), inadequate supervision or lack of autonomy (Kapur, Borrill, & Stride, 1998). Conversely, consultants may also experience significant psychological distress, but this can be attributed to higher job demands (Deary et al., 1996). Indeed, the concept of emotional labour – "the labour involved in dealing with other peoples' feelings" (James, 1989, p. 84) - is intrinsic to the job position and may lead to mental health distress (Riley & Weiss, 2016).

Across medical specialities, a review of the literature across UK medical specialisation suggests that GPs and consultants experience the highest psychiatric morbidity levels given their high workload and pressures (Imo, 2017). Psychiatrists and paediatricians suffer exceptionally high mental illness levels, given their work's emotional nature (Fothergill, Edwards & Burnard, 2004). Surgeons are a complex and hidden group (Gerada, 2020); in comparison to other HCPs they are more reluctant to seek help but experience exceptionally high levels of burnout, report high levels of alcohol consumption along with the highest rates of personality disorders (Vijendren et al., 2018;

Sharma et al., 2008). Anaesthetists present a high risk of addiction given the easy access to drugs (e.g., Warner et al., 2013). Obstetricians, gynaecologists and paramedics report the highest rates of post-traumatic stress disorder (Slade et al., 2020; Hegg-Deloye et al., 2014).

In non-medical professionals, nurses experience high workload and emotional demands, as they are asked to assist many patients and their families (Balducci et al., 2014). Healthcare managers' stress is derived from high workload, making complex decisions, taking on responsibilities, lack of resources, work expectations, and competing priorities (Udod & Care, 2011; Udod & Care, 2013).

Whilst there has been much research on depression and anxiety in UK HCPs, in this thesis we focused on a broader concept than anxiety and depression separately, which is psychological distress. Psychological distress can be defined as "the unique discomforting, emotional state experienced by an individual in response to a specific stressor or demand that results in harm, either temporary or permanent, to the person" (Ridner, 2004, p. 539). Psychological distress can manifest with unique features such as: a perceived inability to cope with the stressors, a change in emotional status (including anxiety and depression), a sense of discomfort, the inability to communicate discomfort, and harm (Ridner, 2004). The most widely adopted measure of psychological distress is the General Health Questionnaire (GHQ-12; Goldberg, 1992). This measure aims to capture various aspects of one's mental health (e. g. sleep, worries). It was also developed to assess clinical symptoms of psychological distress and for detecting non-specific psychiatric morbidity.

More broadly, this conceptualisation is in line with contemporary definitions of wellbeing where it is considered as a "spectrum from psychological wellbeing (e.g., life satisfaction, excellent quality of life) at one end and psychological illness at the other (e.g., psychological distress, anxiety and depression)" (Wood & Johnson, 2016, p. 342). Because wellbeing is a complex construct covering both positive and negative aspects and hedonic and eudemonic concepts, we adopted this latter outlook in this thesis and used wellbeing (short Warwick–Edinburgh Mental Wellbeing scale; Tennant et al., 2007) and life satisfaction (Life Satisfaction scale, Hegarty et al., 2019) measures to capture these concepts.

1.2.2 Burnout

The phenomenon of psychological deterioration and the work commitment in HCPs was first studied by Cherniss (1980), Maslach (1982), Brill (1984), and Freudenberger (1989). According to these authors burnout manifests within a

set of: affective (dysphoria, exhaustion, irritability) and somatic symptoms (headaches, insomnia, back pain, gastrointestinal disorders), behavioural changes in work commitment (absenteeism, presenteeism, job dissatisfaction) and the relationship with colleagues and family members (cynicism, depersonalisation, emotional detachment).

Amongst all the relevant definitions, the most influential comes from Maslach and colleagues that have defined burnout as a “syndrome of emotional exhaustion, depersonalisation, and reduced personal accomplishment that can occur among individuals who work with people in some capacity” (Maslach et al., 1986, p. 4). These authors developed the most widely used measure of burnout: the Maslach Burnout Inventory (Maslach et al.,1986). This measure consists of three different scales: emotional exhaustion, depersonalisation and reduced personal accomplishment.

An alternative approach to burnout was more recently presented by Melamed and colleagues (2006), who conceptualised it as derived from the Conservation of Resources theory (Hobfoll, 1989). This theory posits that individuals' wellbeing depends on acquiring, maintaining, and preserving resources (e.g., internal or external resources). Burnout manifests in the context of a threat and/or a loss of resources. The Shirom-Melamed Burnout Measure (Shirom, 2003) is a relatively new measure of job burnout that captures three aspects of burnout: emotional exhaustion, physical fatigue and cognitive weariness. The emotional exhaustion component of burnout measures the perception of the "drying up" of one's emotional resources and the feeling that one has nothing to give on the psychological level (e.g., "I feel I am unable to be sensitive to the needs of colleagues and patients"). The physical component of burnout measures the physical exhaustion derived from the chronic stress (e.g., “I have no energy for going to work in the morning”). The cognitive weariness of burnout is concerned with difficulties in concentration, rigid cognitive style, dysfunctional thoughts (e.g., worries and ruminations, negative thoughts, e.g., “I have difficulty concentrating”). This measure seeks to capture a construct that is distinct from depression and anxiety. Unlike the Maslach Burnout Inventory, responses to the Shirom-Melamed Burnout Measure are temporally anchored to the past 30 workdays. The second measure of burnout adopted in this thesis was the Burnout Measure Short version (Malach-Pines, 2005). This measure was chosen because it has been found to be a valid and an easy-to-use instrument for population samples (Malach-Pines, 2005). Lastly, in this thesis, we also assessed a well-established burnout-related concept that is lack of recovery from work demands during non-work time (e.g., post-work, evenings, weekends, or non-shift days; Bennett et al., 2018). To capture this well-

established risk factor for burnout we employed two scales that measure work-related worry and rumination, and recovery from work (Cropley et al., 2012; Flaxman et al., 2012).

With several studies, the most relevant model that explains *how* burnout occurs is perhaps the Karasek's Job Demand-Control Model (Karasek, 1979). This model suggests that burnout occurs due to high job demands (e.g., workload) combined with low job control - "the ability to exert control over the work environment in order to make it more rewarding and less threatening" (Bond, Flaxman & Bunce, 2008, p. 645). A later development of this theory, the Job Demands Control-Support Model (Johnson & Hall, 1988), was developed to include social support as an essential aspect in the development of burnout. In more recent years, a new model, the Job Demands-Resources Model (Demerouti et al., 2001), integrates all the aspects previously mentioned. The Job Demands-Resources Model (Demerouti et al., 2001) suggests that burnout originates from the perception of a gap between the work demands related to work commitments (e.g., additional extra-workloads) and the resources available to the person (ability, motivation, effort, supports).

1.3 Contributory factors to poor mental health in healthcare professionals

Cumulative evidence suggests that organisational, occupational and individual-level risk factors contribute to poor mental health in UK HCPs (see Figure 1.1.; Fiabane et al., 2013; Bridgeman, Bridgeman, & Barone, 2018). The literature on these factors is wide ranging. While an in-depth investigation of these factors is not within the scope of this thesis, we will describe some of the salient factors that have been demonstrated to contribute to wellbeing and burnout in HCPs.

A systematic review of the literature, including 4335 studies on European HCPs, found that occupational and organisational factors were the primary proxy of burnout (Bria, Baban, & Dumitrascu, 2012). The healthcare organisation is a complex system, and several components contribute to its functioning. Since 1997 the NHS organisation, its organisational structure and the work climate have undergone complex managerial level transformations. These changes have resulted in improvements in patient waiting times, modernisation of clinical practices and increases in funding (Department of Health, 2000). However, these changes have also given rise to increased workloads and less patient contact, which inevitably has led to a change in the way clinicians perform their day to day duties (Department of Health, 2000).

The concept of “change fatigue” defined as “getting tired of new initiatives and the way they are implemented” reflects a broad stream of changes within the NHS's organisational development (Garside, 2004, p. 89). These changes in the NHS's organisational structure are risk factors for burnout and psychiatric co-morbidities (Bernerth, Walker, & Harris, 2011), and they have also led to increased workloads, excessive shift-work, and inadequate staffing levels (Larbie, Kemp, & Whitehead, 2017). Amongst the stressors identified in the organisational structure, perceived workload (Aziz, 2004) and perceived working conditions (Visser et al., 2003) have been identified as strongly related to poorer mental health.

To reduce HCPs workload, in 2004, policies such as the European Working Time Directive, or Working Time Regulation, restricted the number of HCPs working hours to 58 and included the allowance to include recovery time. Revising this policy gradually reduced the number of working hours to 56, with an extended reduction to 48 hours in 2009. The latter was introduced in parallel with the New Deal, an additional policy to protect junior doctors’ health. Despite these advancements, a study on junior doctors reported that flexibility in accessing meals and sleep mattered more to them than working hours (Firth-Cozens & Cording, 2004). Another study suggested difficulties with work colleagues and managers and fear of making patient safety hazards were more impactful stressors than the number of hours worked in a week (Firth-Cozens, 1998). Within the NHS, this may be related to a culture of fear to take days off from work when needed and the phenomenon of presenteeism – going to work despite experiencing psychological distress symptoms (General Medical Council, 2011).

As well as these stressors, the work climate is also a significant predictor of mental health (Saungweme & Gwandure, 2011). High incidences of bullying and harassment may also substantially impact the mental health of HCPs (British Medical Association, 2017). Lack of support from colleagues (Tattersall, Bennett, & Pugh, 1999) and lack of supportive working relationships (Kinman & Leggetter, 2016) may indeed be drivers of poorer mental health.

The studies that have investigated HCPs’ risk factors have also identified a range of occupational factors that may increase the risk of developing psychological distress and burnout symptoms. HCPs’ speciality is a critical occupational level risk factor, especially in primary care (see Imo, 2017, for a review).

Along with organisational and occupational level factors, individual-level factors may also contribute to HCPs’ health. Given the selective and competitive nature of the medical profession, when doctors are under stress, their attitudinal

characteristics (e.g., determination, ambition, precision, highly ethical) may become exaggerated and lead to an increased likelihood of being self-critical, perfectionistic behaviours, and obsessive-compulsive symptoms (Brewin & Firth-Cozens, 1997; McManus et al., 2004). These issues are prevalent for HCPs that do not have adequate coping or resilience skills (Tattersall et al., 1999) or have personality-related issues (Ozutku & Altindis, 2011) - Type D personality (Ogińska-Bulik, 2006), low consciousness (Gosseries et al., 2012), and neuroticism (Azeem, 2013). A recent systematic review shows that medical students' poor mental health may also be linked to a higher prevalence of childhood trauma (King et al., 2017). This evidence deserves attention given the high correlation between childhood trauma and suicide risk (O'Connor et al., 2018).

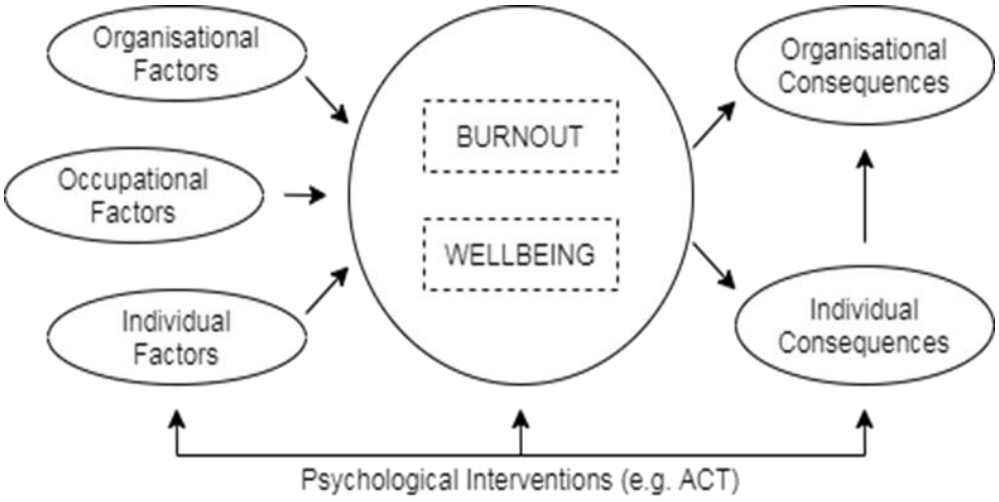

Figure 1-1 Contributory factors of poor mental health in HCPs

1.4 Consequences to poor mental health in healthcare professionals

Unsurprisingly, wellbeing and burnout concepts generally are considered to be inter-dependent, with the relationship between wellbeing and burnout conceptualised as a "causal cycle" (McManus, Winder, & Gordon, 2002), where distress or poor wellbeing have been found to increase exhaustion, which, in turn, increases poor wellbeing. Several observational studies confirm this pattern of association between psychiatric morbidity and burnout in UK doctors (McManus et al., 2002; McManus et al., 2011; Sharma et al., 2008).

Psychiatric illness and burnout have detrimental implications at an individual and organisational level. On an individual level, unfavourable work-life balance can cause burnout (Shanafelt et al., 2012). This may affect health, with burnout positively correlated with the incidence of physical illnesses, such as

musculoskeletal disorders in women and cardiovascular diseases in men (Honkonen et al., 2006). Burnout is also linked to various behavioural problems such as sleep disturbance, higher levels of alcohol consumption, and lower levels of physical exercise (Goldberg et al., 1996), alongside an increase in suicidal ideation (Dyrbye et al., 2008). At an organisational level, poor wellbeing and burnout have a significant impact, being linked to increased risk of medically certified sickness absenteeism, (Ahola et al., 2008), job turnover, (Firth & Britton, 1989) and reduced productivity (Dewa et al., 2014). In the worst-case scenario, poor wellbeing and burnout lead to staff suicide (Wilson & Langan-Martin, 2020), especially in vulnerable categories, such as male paramedics (Hird et al., 2019), and female nurses (Payne, 2001).

1.5 The problem of patient safety

Patient safety is considered to be one of the preventable causes of death, and can be defined as the prevention of errors and adverse events related to the quality of care provided to patients (Donaldson, Corrigan, & Kohn, 2000). In the UK, in 2000, one in ten hospital admissions were associated with at least an adverse event suggesting that this issue deserved the attention of healthcare organisations (Department of Health, 2000). In 2000 the publication of the report “To Err is Human” (Donaldson, Corrigan, & Kohn, 2000) launched “a call to action” to help healthcare organisations and professionals reduce the numbers of errors and adverse events that are reported every year. Although several initiatives have been launched (e.g., National Patient Safety Agency), 134 million adverse events still seem to occur in hospitals every year (National Academies of Sciences, 2019).

Among the risk factors that may increase the likelihood of a patient safety incident are poor wellbeing and burnout. A recent systematic review including 46 studies identified that 70% of the studies that examined both wellbeing and burnout in HCPs reported a significant association with patient safety (Hall et al., 2016). In a recent study on 232 GPs, psychological distress and burnout mediated the relationship between occupational demands and safer practices (Hall et al., 2019). Another study on 3232 UK nurses found that both burnout and depression have a link with patient safety and it is the portion of depression that overlaps with burnout that is the most important proxy of safety (Johnson et al., 2017).

In a meta-analysis, including 21 studies on HCPs, the probability of experiencing high burnout levels and being involved in poor patient practices was estimated to be 66.4% (Garcia et al., 2019). A meta-analysis, including 20

studies indicated that burnt-out staff were twice as likely to be involved in patient safety incidents (Panagioti et al., 2017). Neuropsychological factors could help explain the link between burnout and patient safety. The exhaustion component of burnout and associated depression may lead to impaired cognitive functioning (Johnson et al., 2017; Sandström et al., 2005), which might be expressed in reduced concentration and poor decision-making. In a demanding workplace, these cognitive vulnerabilities may increase the likelihood of errors. Stressed HCPs often experience a lack of cognitive functioning (e.g., attention, focus) that increases the likelihood of being involved in a patient hazard.

When HCPs are responsible for an error, near miss or incident and experience distressing symptoms, they do not often ask for help (McGuire, 2018). Consequently, depression, anxiety, shame and guilt (Sirriyeh et al., 2010; Seys et al., 2013) are reported consistently.

1.6 The challenge of the COVID-19 pandemic on NHS staff

In January 2020, a novel coronavirus outbreak spread from China to 213 other countries, including the UK. On the 24th March 2020, the UK implemented a nationwide lockdown as a preventative measure. The novel coronavirus is named severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), while the disease-associated with it is now referred to as COVID-19.

COVID-19 has brought significant changes and serious challenges (e.g., COVID fatigue, stigma and blame related to getting the infection) to HCPs worldwide (Majeed, Maile, & Bindman, 2020), especially to the NHS. Recent UK reports suggest that one in three NHS staff suffered mental health issues related to the pandemic (Lusher, Collins & Chapman-Jones, 2020). Together with the increased stress and workload experienced by clinical staff, perhaps one of the biggest challenges of the COVID-19 pandemic has been the increased demands on the whole workforce, including non-medical staff (Tan et al., 2020).

Recent UK reports suggest that many of the non-medical staff, such as mental health staff (e.g., psychologists), occupational health staff (e.g., managers, administrative roles) and care assistants (e.g., carers, support workers) have started experiencing symptoms of burnout as a result of the pandemic (Wang et al., 2020).

With the pandemic, doctors, nurses, mental health HCPs, all those whose work is on the front-line and healthcare managers have faced accelerated and

undoubtedly pressing workloads. COVID-19 stressors (e.g., lack of testing and personal protective equipment (PPE), changes to job roles, hours and redeployment, uncertainty amidst changing clinical guidelines) have exacerbated previous issues. COVID-19 also led HCPs to deal with new challenging scenarios (e.g., increased exposure to critical ill health, death and suffering) under extreme pressure.

Symptoms of burnout may be related to insufficient training (Lusher, Collins & Chapman-Jones, 2020). Indeed, some non-clinical staff who work in private practices have not yet undertaken sufficient training to deal with the issues the pandemic has raised. Also, many of the problems non-medical staff are facing date back to pre-existing issues. In 2017 a Care Quality Commission inspection assessed the quality of care delivered in more than 1200 care homes, and it was rated as “inadequate” (Care Quality Commission, 2017). This suggests that the pandemic has only aggravated pre-existing issues.

During the COVID-19 pandemic, several initiatives have been undertaken to support the NHS workforce's mental health. For example, Samaritans UK has launched a phone line that aims to support the NHS staff's mental health. The NHS Practitioner Health has potentiated the number of workshops and support sessions given to staff. However, as we have seen with the emerging new COVID-19 strains, the COVID-19 pandemic is unpredictable, and it may be that the impact on mental health is long-lasting. Although these support programmes have been (and still are) of help to many healthcare staff, it is likely, that, in the long term, symptoms of stress increase the likelihood of experiencing more severe issues such as staff burnout and post-traumatic stress disorder (Rudman et al., 2020). Perhaps one of the pandemic's biggest risks relates to a significant increase of burnout over time throughout the whole workforce. Because burnout is a serious issue that requires appropriate psychological support, evaluating the treatment components that may help promote better mental health and a treatment programme that may be effective for both medical and non-medical staff is imperative, now more than ever.

1.7 Workplace-based psychological interventions

Given the evident extent and impact of poor wellbeing and distress in HCPs, it is concerning that only a small fraction of distressed employees receive evidence-based interventions in or out of the workplace (Hilton et al., 2008; White et al., 2000). Interventions to alleviate psychological distress, burnout and work-related stress can be classified as: 1) primary interventions that are usually preventative - aiming to redesign aspects of workforce management

(e.g., team working, work duties, employees' schedules); 2) secondary interventions – for example, cognitive behavioural techniques (e.g., cognitive restructuring, exposure), stress inoculation training, time management training, muscular relaxation training – that aim to help employees develop a set of skills to cope with stress, and; 3) tertiary interventions that aim to minimise and reduce the adverse effects of stress (e.g., return-to-work and work compensation programmes) (LaMontagne et al., 2007). Although primary interventions might be more effective, it has been argued that they are not always possible, they may be complex and expensive, and focus more on the organisation without taking into account that some employees might lack coping or resilience resources (Flaxman et al., 2013). With regards to secondary and tertiary interventions, defined also as "stress management " interventions, the evidence suggests that they may also be effective (Dreison et al., 2018; Panagioti et al., 2017; West et al., 2016; Richardson & Rothstein, 2008).

Acceptance and Commitment Therapy (ACT) is a newer approach that has been proven effective in workplace organisations and is theoretically well suited to the context of HCPs; therefore, it may be of additional value in the literature of stress-management interventions (Flaxman et al., 2013). In this thesis, ACT will be tested as a feasible stress-management intervention for improving the mental health of HCPs. This approach is also in line with health policies, which view staff health and wellbeing as more than absence due to sickness, embraces the idea that health problems do not need to be always visibly symptomatic, and encourages employees to take time off from work when under the pressure of presenteeism.

1.8 Waves of behavioural therapy

In recent years, several types of psychological interventions have been developed to improve wellbeing and burnout of HCPs (Kunzler et al., 2020, for a review). Examples of these therapies adopted with HCPs are traditional cognitive behavioural therapies (CBT), schema therapy, individual psychotherapy but also "third-wave" cognitive behavioural therapies (e.g., mindfulness-based stress reduction, mindfulness-based cognitive therapy, dialectical behavioural therapies). The recent "third wave" psychological interventions are philosophically and theoretically distinct from many existing stress-management Interventions.

Third-wave cognitive behavioural therapies, such as ACT, differ from the first "behavioural" wave (Skinner & Watson), and second "cognitive" wave (Chomsky

& Beck) in the formulation of the philosophical roots, assumptions, and models of practice.

Third-wave behavioural approaches currently available developed from the radical behaviourism (Chiesa, 1994): an approach that initiated the “first wave” of behavioural therapy. Behaviourists were the first that aimed to study how people become competent and skilled at learning something (e.g., singing). In line with this approach, people learn (e.g., singing) as a response to a stimulus they receive from the environment in which the trigger occurs (e.g., music). When the relationship between the stimulus and the response is positively rewarded (reinforcement), individuals likely start enhancing a response without the stimuli needing to be elicited. This approach, born primarily as a reaction to Freud’s psychoanalysis, was dominant in the 60s until psychologists (Chomsky, 1959) started criticising that it could not explain generativity and the explosion of language in children. This approach could not contemplate untrained or derived responses – responses that cannot be learned but are automatic.

In response to radical behaviourists, psychologists like Beck (Beck, 1976; Clak & Beck, 1999) attributed greater importance to cognitive information processing (e.g., emotions and thoughts) as an essential aspect of the stimulus-response pattern. These psychologists initiated a set of cognitive techniques to help people deal with the harmful content of their experiences (CBT). This approach was very influential and successful for a wide range of psychological problems (Hofmann et al., 2012).

However, the evidence on CBT has shown that not everyone responds well to this intervention. For example, people who are unwilling to experience certain negative emotions or people who are particularly depressed or distressed may find it difficult to find concentration and follow very structured sessions (Gaudiano, 2008). Also, people with complex mental health difficulties (that often affect cognitive abilities) and learning difficulties may not benefit from this approach (Brown & Marshall, 2006).

The third wave generation of CBT was developed primarily to include the positive aspects of previous approaches with new features as an essential aspect of behaviour change. In particular, a possible explanation that led psychologists (Hayes, Strosahl, et al., 2004) to take a step forward from previous generations of CBT was the importance of focusing on *language* in the psychotherapeutic approach, and on the *context* in which behaviours manifest.

ACT is a third-wave behavioural therapy and is rooted in the philosophical approach of functional contextualism (FC; Biglan & Hayes, 1996); a philosophy of science that aims to explain how people relate to their behaviours (*function of*

behaviour), rather than to focus on the behaviour itself (*content of behaviour*). To do so, FC seeks to explain behaviours by considering the learning history and the context that maintains certain behaviours. In line with this approach, and the foundation of ACT, is Relational Frame Theory (RFT; Barnes-Holmes & Roche, 2001); a theory of language that aims to understand and predict how people behave under specific circumstances, and how this can influence the impact their thoughts might have on their behaviours.

1.9 Acceptance and Commitment Therapy

ACT is an intervention grounded in FC and based on RFT (Hayes et al., 2006). According to the model, many problematic behaviours are functionally similar: they are unhealthy efforts to avoid or control aversive internal experiences (Hayes et al., 2006). Rather than attempting to change the content or form of this experience, ACT promotes behaviour change by altering clients' relationship with their experience. This is achieved through the processes of acceptance, defusion, mindfulness, values clarification, and committed action. ACT fosters these processes through daily exercises, tips, and tools. The core process of ACT is psychological flexibility, which can be defined as "the ability to persist or 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). In the workplace, the ACT processes can be conceptualised as:

1) Being in the present moment and, thus, to be focussed and attentive on one task (mindfulness);

2) Being willing to experience challenging thoughts and emotions when doing so helps you reach your goals (acceptance);

3) Being able to step back from negative thoughts and worries (e.g., "I am not good enough for my boss") (cognitive defusion);

4) Being able to step back from judgments and self-concepts about oneself ("I have enough experience to do training") (self-as-concept);

5) Being connected with one's overarching goals and values (e.g., safety checks) on meaningful and uniquely chosen values (ethics at work) (values);

6) Consistently making choices that are in line with your values and satisfaction at work, even in the face of daily stressful events (committed action).

ACT's tripartite model, which organises overall psychological flexibility into open, aware, and active processes was adopted in this thesis (Hayes et al.,

2011). The *open* process refers particularly to experiential acceptance (or reduced experiential avoidance), which manifests in an increased willingness to experience challenging, discomforting, or unhelpful thoughts and feelings. The *aware* process captures the critical role of mindfulness and self-awareness skills in psychological flexibility, particularly present moment awareness. The *active* process represents ACT's behavioural activation skills, specifically clarifying personal values and propensity to use values as a guide for daily behaviour (Hayes et al., 2011).

1.9.1 Why ACT and not traditional CBT?

According to Flaxman, Blackledge and Bond (2010), in addition to the theoretical assumptions mentioned above, ACT differs and yet has similarities with other CBT interventions. Similarly to other CBT interventions, an ACT intervention aims to help employees develop a set of skills (e.g., problem solving, communication) that, if practised appropriately, should facilitate acceptance-based behaviours and develop more self-awareness of personal behaviour repertoires. However, the way these interventions aim to help people deal with thoughts has different purposes in ACT and/or it is presumed to work via differing mechanisms.

Traditional CBT interventions utilise exposure techniques to aversive stimuli as a way of helping employees to reduce the levels of stress, fear and anxiety by changing their beliefs about the self and the world. For example, common CBT approaches use behavioural activation to reduce the impact of depressive thoughts by employing "pleasant events" as a way to help the client change the form of their private events. Another distinctive characteristic of traditional CBT interventions is cognitive restructuring that is a cognitive technique to help people identify and change automatic thoughts.

Instead, an ACT intervention aims to help employees reconnect with what is most important to them using exposure techniques to help employees to *willingly experience* adverse events and fearful emotions. For example, an ACT intervention would use behavioural activation to help employees engage in value-consistent behaviours, in the presence of uncomfortable thoughts. Differently from cognitive restructuring, cognitive defusion aims to change the function of thoughts rather than their content. Recent studies support the use of cognitive defusion to reduce believability, discomfort and frequency of negative thoughts (Larsson et al., 2015; Prudenzi et al., 2019).

1.10 Self-Compassion

In recent years, there has been a growing interest in psychological interventions promoting self-compassion (Gilbert, 2000). The Webster's dictionary defines compassion as "a feeling of deep sympathy and sorrow for another who is stricken by suffering or misfortune, accompanied by a strong desire to alleviate the pain or remove its cause" (1996, p. 416). This approach is primarily rooted in the Buddhist tradition (Harrington, Bstan, & Gyatsho, 2002; Lama & Thupten, 1995) aiming at helping people develop common humanity – the idea that we have evolved in a way that leads us to avoid suffering – but further links to more recent western approaches, and it operates based on psychoeducation (Gilbert, 2005).

Compassionate care might help improve the quality of care delivered in a healthcare setting. Recent reports from the NHS Foundation Trust show that compassionate care and committed caring services are now encouraged from within the organisation in response to patient care deficits (Beaumont, Durkin, Martin, & Carson, 2016a, 2016b; Roberts, 2013). For example, the NHS provides HCPs with e-learning programmes (e.g., Compassion in Practice, NHS Health Education, 2016) to improve compassionate care. However, compassionate care and caring for others does not necessarily lead to wellbeing and less stress (Egan, Mantzios, & Jackson, 2017). Indeed, being compassionate towards others may reinforce the need for HCPs to decentre themselves and develop compassion fatigue - "the formal caregiver's reduced capacity or interest in being empathic or bearing the suffering of clients" (Figley, 1995, p. 7). Compassion fatigue may lead to burnout (e.g., Potter et al., 2010; Craig & Sprang, 2010).

Instead, self-compassion can be defined as a new integrative approach that aims to alleviate human suffering by teaching people how to develop self-care to become less self-critical or ashamed of oneself. Self-compassion has been suggested as a powerful tool that can help employees improve their wellbeing, and reduce burnout whilst caring for others (Gilbert, 2005). Self-compassion - with a clear focus on assisting HCPs with reducing the amount of harshly comparative and self-critical thoughts being experienced (self-kindness), by teaching willingness to be self-reflecting (mindfulness), and caring toward patients and colleagues (common humanity) (Neff, 2003a) – encourages employees to embrace daily stressors, difficulties, adverse events and near misses, without avoiding or disconnecting themselves from challenging private experiences. Self-compassion encourages HCPs to care for themselves before caring for others (Lama & Chan, 2015).

Training to boost self-compassion was initially developed to help individuals deal with internal (e.g., judgement regarding their thoughts and feelings) and

external (e.g., abusive, stressful environments) threats. It has recently been adopted within healthcare settings to help employees deal with difficulties in coping with self-criticism, shame, or, more generally, providing them with a set of skills such as self-kindness, forgiveness, or acceptance (Beaumont et al., 2016a). These individuals often have difficulties coping with self-criticism, shame, and are, more generally, not provided with a set of skills such as self-kindness, forgiveness, or the acceptance of negative experiences. Compassionate-based therapies - Compassion Focused Therapy (CFT; Gilbert, 2000, 2005) or Compassionate Mind Training (CMT) - are the most recent psychological approaches that aim to help people feel safe and develop soothing feelings. These therapies suggest utilising various techniques that involve working on both cognition (e.g., dysfunctional thoughts) and affective behaviours (e.g., thoughts, emotions, feelings). These approaches are rooted in the Social Mentality theory (Gilbert, 2009) and invite people to develop skills (e.g., non-judgment, empathy, distress tolerant, sympathy) to change their behaviours. These training programmes have shown effectiveness in coping with personal difficulties (Schanche et al., 2011), harbouring social connectedness (Hutcherson, Seppala, & Gross, 2008), improving responses to stress therefore increasing immune functionality (Pace et al., 2009), promoting compassionate thinking and reducing the impact of negative emotions (Arimitsu & Hoffman, 2015).

1.11 Thesis rationale and aims

The literature highlighted in this chapter has identified a number of gaps in the current research and suggests that the theoretical underpinnings of ACT may be particularly suitable to be applied to understanding and improving wellbeing and burnout in HCPs. Within this context, the thesis had five main aims which are outlined below.

Aim 1. To test whether ACT interventions are effective for reducing general distress and work-related distress (including burnout) in HCPs.

Rationale. In the past twenty years, a bulk of studies demonstrated that ACT-based interventions were found to be effective when delivered to a wide range of workplace contexts, such as banks and organisations (e.g., Bond & Bunce, 2000; Bond & Bunce, 2003; Burton et al., 2010; Finnes et al., 2019; Flaxman & Bond, 2010a; Flaxman & Bond, 2010b; Gloster et al., 2018; Harvey et al., 2017; Lloyd et al., 2013; Puolakanaho et al., 2020; Skagseth et al., 2020). To date, the

role and usefulness of ACT-focussed research in HCPs are not known. Therefore, aim 1 of this thesis will aim to address this gap in the literature.

Aim 2. To investigate which aspects of psychological flexibility are most strongly related to psychological distress and burnout in HCPs.

Rationale. Most evaluations of ACT programmes in workplace and healthcare settings have focused on rather broad process variables, particularly psychological flexibility or total mindfulness score (e.g., Brinkborg et al., 2011; Flaxman & Bond, 2010a; McConachie et al., 2014). One contribution of this thesis is to examine a set of ACT processes such as acceptance, mindfulness, self-compassion, and behavioural (values) processes of change, and to examine which are the most influential in workplace ACT for improving general mental health, burnout, and safety. There is a theoretical and practical utility in bringing a more focused empirical lens to the skills being cultivated in workplace ACT programmes.

At a theoretical level, clarifying specific variables that mediate ACT effects may significantly contribute to psychological flexibility among working populations. The need for such research is indicated by the inconsistent effects of workplace ACT programmes on overall measures of psychological flexibility (Reeve et al., 2018; Waters et al., 2018). Because there is an ongoing debate about whether ACT is a “mindfulness-based” approach; by examining the change in specific mindfulness skills, this thesis aims to explore the degree to which ACT is improving HCPs’ psychological outcomes via these processes, and also the degree to which the mindful processes of change are distinct from the influence of the behavioural (i.e., values) processes.

At a more practical level, understanding the specific skills that are being developed may provide valuable information for those seeking to enhance workplace ACT interventions' efficiency and effectiveness. By identifying the specific skills that influence mental health, burnout, and performance outcomes, we may further enhance ACT programmes by ensuring that effective skills are being effectively and efficiently targeted. Therefore, aim 2 of this thesis will aim to address this gap in the literature.

Aim 3. To explore whether ACT interventions can improve perceptions of patient safety in HCPs.

Rationale. Reviews of workplace mindfulness/acceptance-based interventions have highlighted a need for researchers to look beyond mental health variables

to focus on performance-oriented indicators such as patient safety. ACT workplace interventions were tested to see improvements in a number of performance-related outcomes (e.g., propensity to innovate, absenteeism, job performance) (Bond & Bunce, 2000; Varra et al., 2008; Hayes et al., 2004; Pakenham et al., 2015). In the occupational health literature, investigations of links between healthcare workers' mental health and patient safety outcomes (e.g., Halbesleben et al., 2008) exist. However, an evaluation that aims to investigate whether an ACT training programme has a *direct* or an *indirect influence* (via distress or burnout) on patient safety is missing. Because previous research in this area has not focused on the link between ACT processes and patient safety, we felt unable to offer predictions about psychological flexibility in explaining the influence on employees' patient safety. For this reason, we consider the exploratory investigation of an ACT training programme to improve perceived patient safety directly or via a reduction of psychological distress and burnout, and the prediction of psychological flexibility processes in explaining patient safety to be important contributions of the current thesis. Therefore, aim 3 will aim to address this gap in the literature.

Aim 4. To explore whether adding self-compassion exercises to a psychological flexibility-based programme can lead to improved mental health in healthcare professionals.

Rationale. There has been an interest in self-compassion as an ACT process (Tirch, 2010; Gilbert & Choden, 2013). Indeed, self-compassion might overlap with psychological flexibility and fits within its conceptualisation, but differently from ACT, it does not share the same theoretical underpinnings. Given the emphasis of self-compassion for common humanity, self-kindness, and mindfulness in the explanation of wellbeing and psychopathology (Gilbert, 2009), it could be argued that it shares a common variance with the ACT processes (Gilbert & Choden, 2013). Self-compassion, as opposed to mindfulness, aims primarily to cultivate self-kindness, which is defined as being kind and caring towards oneself. Busy and stressed HCPs or HCPs who have reported patient incidents or adverse events, or are under pressure because of their workload, are unlikely to be kind to themselves. Self-compassion, as opposed to self-criticism, might help HCPs to recognise that difficulties and challenges at work are part of the human experience. Practising self-compassion might enable HCPs to open up to complex thoughts and emotions with no judgment and teach them how to step back from impulsive behaviours when difficulties arise.

Therefore, in this thesis the aim was to explore whether adding self-compassion helps to explain additional variability over and above ACT processes in explaining psychological outcomes. If, as hypothesised, an intervention that includes both processes is effective, it can influence all staff, including those experiencing self-criticism, bullying, unwillingness or inability to engage in other forms of treatment. In addition to psychological flexibility, self-compassion would equip HCPs with a range of resilience skills that may facilitate personal self-care and care for others. Therefore, aim 4 of this thesis will aim to address this gap in the literature.

Aim 5. To explore whether psychological flexibility processes are associated with better mental health in the general population during the first wave of the COVID-19 pandemic.

Rationale. ACT processes have widely been shown to be effective promoters of health in crisis or emergency circumstances (e.g., Brockman et al., 2016; Gold & Marx 2007; Kumpula et al., 2011). Indeed, ACT processes have been consistently found to be associated with better mental health (e.g., trauma, post-traumatic stress, anxiety, depression) and reduced stress in challenging contexts (e.g., chronic pain, cancer, psychosis, addictions) (e.g., Graham et al., 2016; Shari et al., 2020; Serfaty et al., 2019; Gul & Aqeel, 2020). Given the current COVID-19 pandemic, challenges, and restrictions faced globally, we aimed to investigate whether ACT processes worked as resilience skills that may be associated with improved mental health in the general population. The results will inform stakeholders and policymakers on the beneficial effects of mindfulness, values and self-compassion as potential intervention targets. Therefore, aim 5 of this thesis will aim to address this gap in the literature.

1.12 Thesis overview

Four studies were conducted to address the aims outlined above. The next four chapters will elucidate the aims and methods employed in each study.

Chapter 2 relates to aims 1 and 2. A systematic review and meta-analysis of the literature was conducted to synthesise existing research that has tested ACT-workplace interventions to improve general distress and work-related distress in HCPs. A second meta-analysis was conducted to test whether ACT interventions are effective for improving psychological flexibility of HCPs.

Chapter 3 relates to aims 1-4. A randomised controlled study was employed to test the effectiveness of an ACT intervention to reduce psychological distress

and burnout and improve patient safety in NHS staff, in comparison to a waitlist control group (aim 3). It was also investigated whether the ACT processes and self-compassion mediated the effects of the intervention on those who received the intervention (aim 2-3).

Chapter 4 relates to aims 3-4. A quantitative cross-sectional study was employed to explore the relationship between mindfulness, values and self-compassion on psychological distress, burnout and patient safety.

Chapter 5 relates to aim 5. A longitudinal study was conducted to investigate the association between psychological health (wellbeing, life satisfaction and burnout) and psychological factors (dispositional and state mindfulness, values and self-compassion) at three time-points during the COVID-19 pandemic starting in early 2020.

Chapter 6 summarises and discusses the findings from the four studies, considers the implications of the findings for future research and offers recommendations for relevant stakeholders.

Chapter 2
Group-based Acceptance and Commitment Therapy Interventions for Improving General Distress and Work-related Distress in Healthcare Professionals: A Systematic Review and Meta-Analysis

A large proportion of the healthcare workforce reports significant distress and burnout, which can lead to poor patient care (Chapter 1). Several psychological interventions, such as ACT, have been applied to improve general distress and work-related distress in 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. These findings have implications for policymakers, healthcare organisations and clinicians. Overall, this chapter aims to address aim 1 of this thesis.

2.1 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 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 & 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 wellbeing of healthcare staff.

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 wellbeing and burnout of HCPs, it is unknown to what extent ACT is efficacious or empirically supported for use in such contexts.

2.1.1 Acceptance and Commitment Therapy

ACT (Hayes et al., 2011; McHugh, 2011) is a newer therapy from within the broad school of CBT. It uses a range of therapeutic methods to help individuals to improve their "psychological flexibility" as a means to improve their wellbeing 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 2.1). 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).

Table 2-1 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 a point that is important to you, you say you feel nervy, embarrassed… it's 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, 2019) 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 to attend to the present moment with flexibility	Sky & Weather "Do you notice that over a day our thoughts and feelings can change… it's 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, 2019) 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, 2019) 1. Define your values. 2. Set meaningful goals based on those values. 3. Identify the obstacles preventing you 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.

2.1.2 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), 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 wellbeing (Ducasse & Fond, 2015; Gaudiano, 2011; Hayes et al., 2006; Öst, 2008, 2014; Power, Vörding, & Emmelkamp, 2009; Ruiz, 2010; Smout et al., 2012). However, to date, the 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 (e.g., Bond & Bunce, 2000; Flaxman & Bond, 2010a, 2010b). 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.

2.2 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, Moher et al., 2009) guideline (see Appendix A.1). 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.

2.2.1 Eligibility criteria

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

2.2.1.1 Types of studies

The inclusion criteria were: 1) randomised 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 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 CBT) 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.

2.2.1.2 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.

2.2.1.3 Types of interventions

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.

2.2.1.4 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. For example, the Acceptance Action Questionnaire-II (Bond et al., 2011).

2.2.1.5 Information sources

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

2.2.1.6 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 Appendix A.2 and A.3 for search strategies.

2.2.1.7 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.

2.2.1.8 Data collection process

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

2.2.1.9 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, number of day sessions in the ACT condition, and study quality.

2.2.2 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 (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.

2.2.3 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 Hedge's *g* (Cohen, 1988). According to Cohen (1988), Hedge's *g* was interpreted as follows: 0.2 represents a small effect, 0.5 a medium effect and 0.8 a large effect.

2.2.4 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 & 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, Bissett 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.

2.2.5 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 & Tweedie, 2000) were conducted for identification of publication bias and the number of missing studies to the left or right side of the mean.

2.2.6 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, and number of treatment sessions.

2.3 Results

A total of 1890 studies were retrieved through Ovid Medline (R) ALL (*n* = 135), PsycINFO (*n* = 218), EMBASE (*n* = 273), CINHAL (*n* = 576) 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 46 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 2.1.).

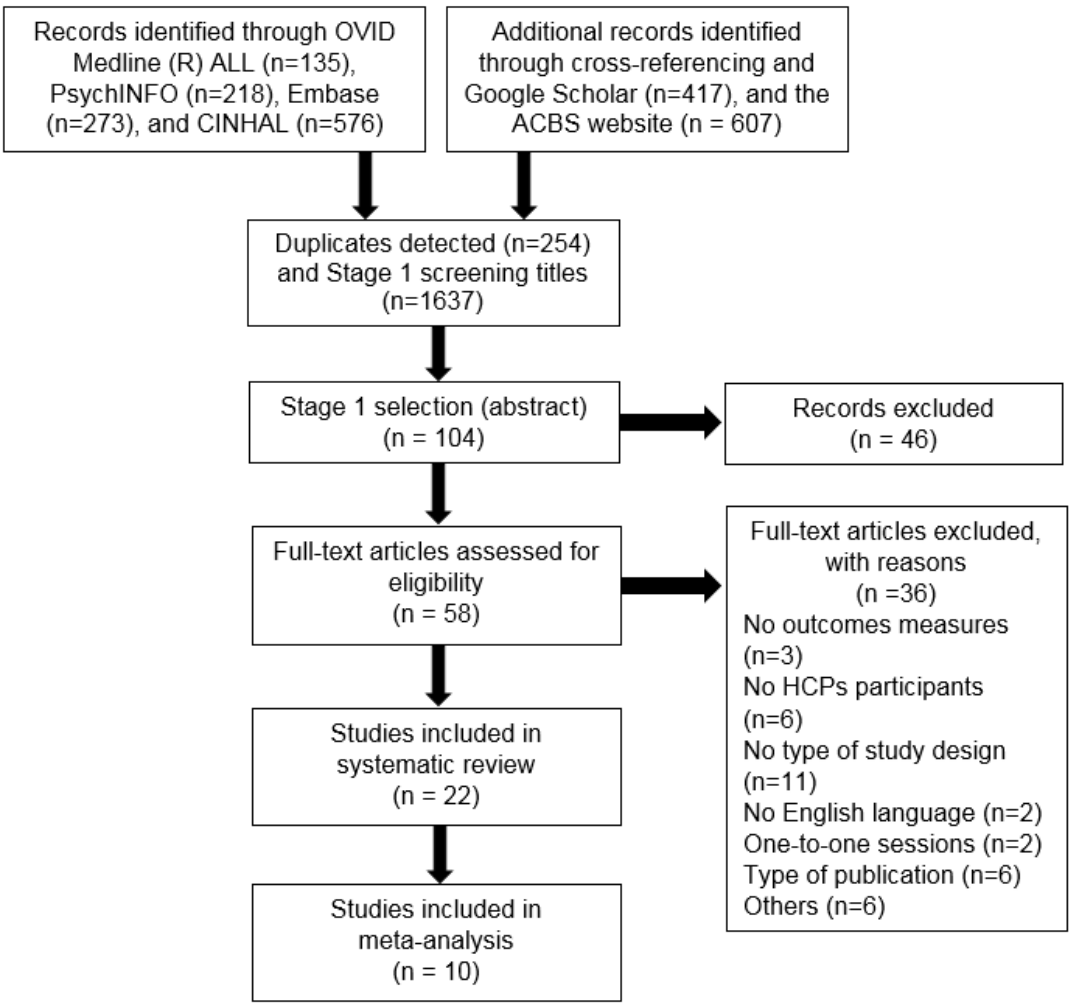

Figure 2-1 PRISMA study flow diagram of studies retained in the review. Reasons for exclusion included

2.3.1 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.

2.3.2 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, Bissett 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 (Dereix-Calogne et al., 2019; Pakenham, 2015; Stafford-Brown & Pakenham, 2012), 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 & Gore, 2012), and a mixed group of HCPs (Stewart et al., 2016). (See Appendix A.4).

The percentage of participants who did not complete a post-intervention assessment was 15.25% (SD = 15.12, *n* = 19 studies) at post-intervention and 25.56% (SD = 24.08, *n* = 15 studies) at follow-up, indicating a low to medium level of drop-out at post-intervention and follow-up.

2.3.3 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.

2.3.4 Comparators

Ten studies involved inactive control group comparisons (Brinkborg et al., 2011; Dereix-Calogne et al., 2019; Heydari, 2018; McConachie et al., 2014; Noone & Hastings, 2009; O'Brien et a., 2012; Stafford-Brown & 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). Four studies involved active control groups. One study adopted an active control group as comparator, involving the delivery of communication skills seminars (Habibian et al., 2018). One study (Hayes, Bissett et al., 2004) compared ACT to two active controls (education training and multicultural training). One study employed a dialectical behavioural therapy (Clarke, Taylor, Bolderston, et al., 2015), and another study a psycho-educational training (Clarke, Taylor, Lancaster, et al., 2015). Six studies did not utilise a control group (Gerhart et al., 2016; Noone & Hastings, 2010; O'Mahony et al., 2017; Pakenham, 2015; Smith & Gore, 2012; Stewart et al., 2016).

2.3.5 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; O'Brien et al., 2012; Smith & Gore, 2012; Waters et al., 2018), 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 & 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 Appendix A.4).

2.3.6 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, Bissett et al., 2004; Heydari, 2018; Luoma et al., 2007; O'Mahony et al., 2017; Smith & 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 & Hastings, 2009, 2010; Smith & Gore, 2012), the Mental Health Perceptions Staff Stressors (Pakenham, 2015; Stafford-Brown & 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 Appendix A.4.

2.3.7 Wellbeing

In terms of wellbeing, two studies included investigated wellbeing via Satisfaction with Life Scale (SWLS) (Stafford-Brown & Pakenham, 2012; Stewart et al., 2016) and psychological wellbeing with the Warwick-Edinburgh Mental Wellbeing 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 wellbeing measures given the small number of RCTs studies including this outcome.

2.3.8 ACT process measures

ACT processes were measured with: 1) mindfulness, using the Five Facets Mindfulness Questionnaire (FFMQ) (Pakenham, 2015; Stafford-Brown & 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, Bissett 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 & Pakenham, 2012); 3) values using the Valued Living Questionnaire (VLQ) (Clarke, Taylor, Lancaster et al., 2015; Pakenham, 2015; Stafford-Brown & Pakenham, 2012; Stewart et al., 2016), and the Support Staff Values Questionnaire (SSVQ) (Smith & 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 & Gore, 2012; Stafford-Brown & Pakenham, 2012), the Acceptance Action Questionnaire-II (AAQ-II) (Clarke, Taylor, Bolderston et al., 2015; 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 Appendix A.4.

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

2.3.9 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* = 11 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 programmes, therapist experience, and attrition. Assignment to treatment, study design, power analyses, blinding of assessor, time-points measurements, number of hours in the active control conditions, number of therapists and description of their competence, checks for treatment adherence and for therapists, control of concomitant treatments were often poorly described. See Appendix A.4.

2.3.10 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 2.2.

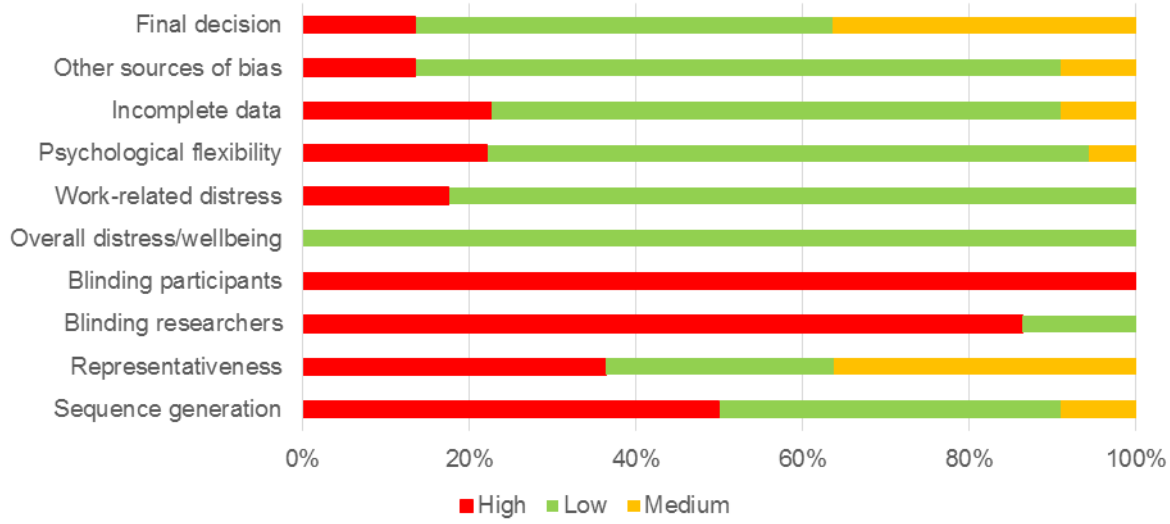

Figure 2-2 Risk of bias assessment for studies retained in the review adapted from Hall et al. 2016

2.3.11 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. There was a small significant effect of ACT on general distress at post-intervention (*Hedge's g* = .394, *SE* = .182, 95% *CI* [.040; .748], *p* = .029, *k* = 7), where ACT improved general distress outcomes more than overall control conditions (inactive and active controls together). Further analyses indicated that the effects of ACT on general distress was not statistically significant at follow-up (*Hedge's g* = .116, *SE* = .182, *95% CI* [-.241; .473], *p* = .525, *k* = 5), see Figure 2.3.

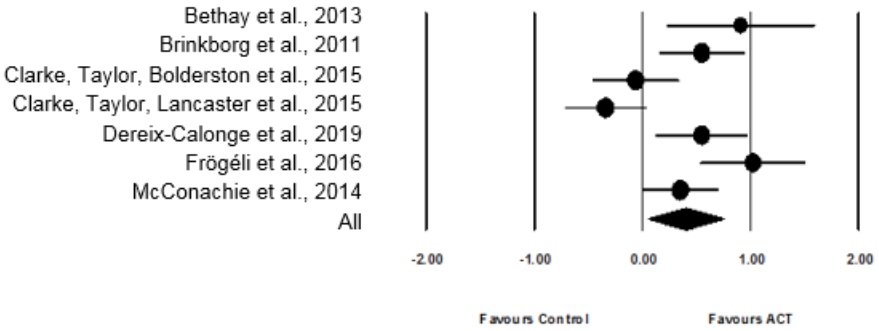

Figure 2-3 High resolution plot of effect sizes (Hedge's g) and 95% CI's on general distress at post-intervention

2.3.12 Work-related distress

Heterogeneity of study measures was detected at post-intervention (*Q* = 30.217, *df* = 8, *p* = <.001, 95% *CI* [-.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 (*Hedge's g* = .150, *SE* = .155, *95% CI* [-.154; .455], *p* = .333, *k* = 9), where ACT did not improve work-related outcomes more than overall control conditions (inactive and active controls together). However, the effects of ACT on work-related distress was significant with a small effect size at follow-up (*Hedge's g* = .301, *SE* = .091, 95% *CI* [.122; .480], *p* = .001, *k* = 8), see Figure 2.4.

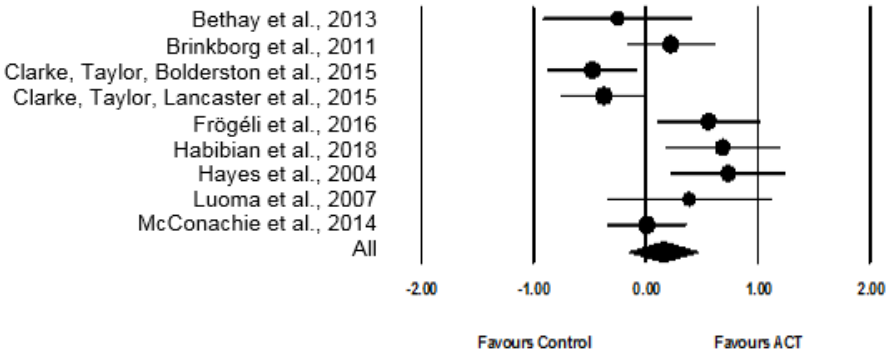

Figure 2-4 High resolution plot of effect sizes (Hedge's g) and 95% CI's on work-related distress at post-intervention

2.3.13 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 (*Hedge's g* = .615, *SE* = .121, 95% *CI* [.377; .853], *p* = <.001, *k* = 5) but was not at follow-up (*Hedge's g* = .357, *SE* = .194, 95% *CI* [-.023; .738], *p* = .066, *k* = 3). The effect of ACT was not superior to active controls (*Hedge's g* = -.210, *SE* = .142, 95% *CI* [-.488; .068], *p* = .139, *k* = 2) at post-intervention and follow-up (*Hedge's 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 (*Hedge's g* = .189, *SE* = .128, *95% CI* [-.061; .439], *p* = .138, *k* = 5), but was significant with a small effect size at follow-up (*Hedge's g* = .252, *SE* = .126, 95% *CI* [.005; .499], *p* = .046, *k* = 4). The effect of ACT on work-related distress was not superior to active controls at post-intervention (*Hedge's g* = .123, *SE* = .320, *95% CI* [-.505; .751], *p* = .700, *k* = 4) but at follow-up (*Hedge's g* = .355, *SE* = .139, *95% CI* [.081; .628], *p* = .011, *k* = 4).

Table 2-2 Summary of effect sizes and heterogeneity across all 10 RCT studies for general distress, work-related distress and psychological flexibility.

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 general distress, work-related stress and psychological flexibility at 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).

2.3.14 Publication bias and sensitivity analyses

2.3.14.1 General distress

Egger's regression coefficient did not indicate the presence of publication bias (see Figure 2.5) 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.

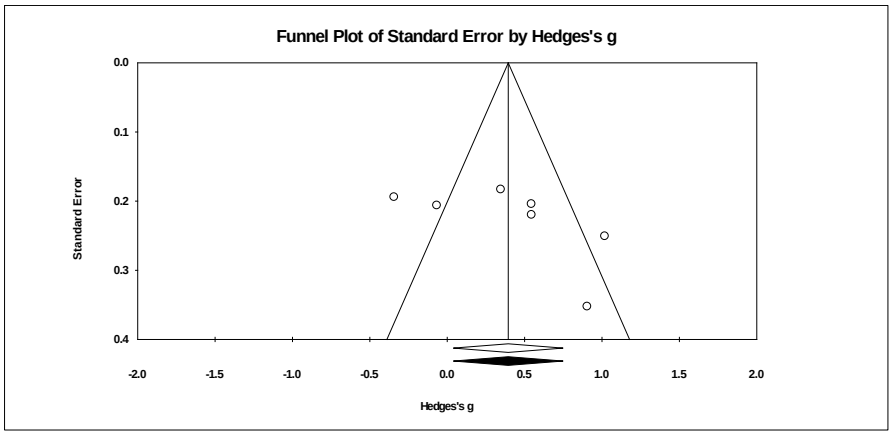

Figure 2-5 Funnel plot based on Hedge's g 95% CI's for general distress

2.3.14.2 Work-related distress

Egger's regression coefficient did not indicate the presence of publication bias (see Figure 2.6) 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.

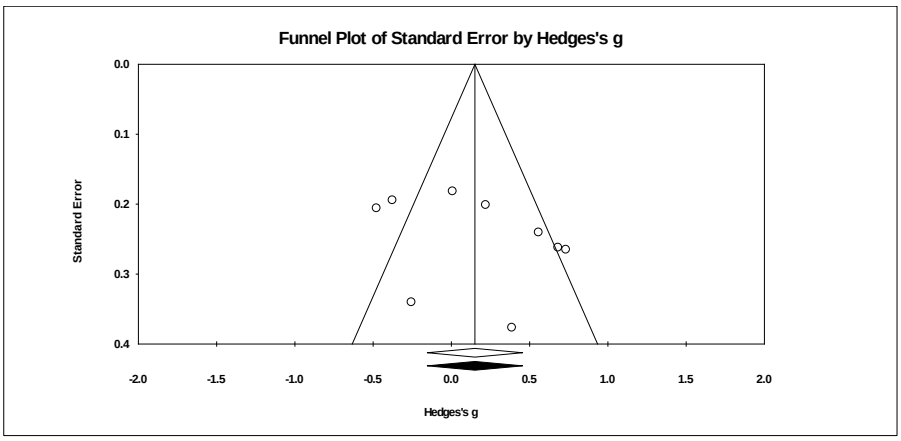

Figure 2-6 Funnel plot based on Hedge's g 95% CI's for work-related distress

2.3.15 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 where these were included at post-intervention (*Hedge's g* = .18, *SE* = .15, *95% CI* [-.12; .48], p = .23, k = 8) and at follow-up (*Hedge's g* = .16, *SE* = .10, *95% CI* [-.40; .36], p = .12, k = 6).

2.3.15.1 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.

2.3.16 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.

2.3.16.1 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).

2.3.16.2 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.

2.3.16.3 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).

2.4 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, Vörding, & Emmelkamp, 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 (*Hedge's g* = .301), with a small to moderate effect size. This result is important and suggests that changes in work-related distress may necessitate more time to improve than what was 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 POMRF 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 interventions, 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 & Emmelkamp, 2009; Levin & Hayes, 2009; Powers & 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., 2014) 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 & O'Connor, 2019). Second, changes in the healthcare organisation in the UK coupled with stress, burnout and psychological distress have been shown to contribute to staff errors (e.g., medication 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.

2.5 Conclusion

Results from this meta-analysis suggest that ACT is a promising psychological intervention for improving a range of psychological outcomes (general distress, stress, and 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.

Chapter 3

A Workplace Acceptance and Commitment Therapy (ACT) Intervention for Improving Healthcare Staff Psychological Distress: A Randomised Controlled Trial

To prevent and reduce distress among employees, researchers have begun implementing and evaluating mindfulness-based worksite training interventions. One of these interventions is based on Acceptance and Commitment Therapy (ACT; Hayes et al., 1999). ACT interventions appear to affect improvements in various other indicators of employee wellbeing, such as being innovative at work (Bond & Bunce, 2000; Dahl et al., 2004; Flaxman & Bond, 2006; 2010a; 2010b; Varra et al., 2008). Moreover, higher levels of psychological flexibility have been associated with improved mental health, job performance and absenteeism in UK workers (Bond & Bunce, 2003; Bond, Flaxman, & Bunce, 2008). Based upon the current evidence and the need to further test whether ACT interventions are helpful and effective for improving mental health in healthcare professionals, the research team and the Leeds Clinical Commissioning Groups Partnership investigated whether a shorter version of the validated and standardised intervention was effective for improving psychological distress and burnout in NHS staff. Unlike the traditional version of the intervention with three sessions carried out across three months, the current intervention was delivered in four sessions across one month. Also, for the first time, the current study aimed to assess whether the intervention could have a direct or indirect impact on perceived patient safety.

Based on the findings obtained in the systematic review and meta-analysis of ACT-interventions in HCPs (Chapter 2), the aim of the randomised controlled trial presented in this chapter was to investigate the outcomes and putative processes of change in a four-session ACT training programme designed to reduce psychological distress among healthcare staff. Ninety-eight NHS staff employees were randomly allocated to the ACT intervention or to a waiting list control group. Study measures were administered on four occasions (pre-, mid-, post-intervention and follow-up) spread over a three-month evaluation period. The results from this trial should advance our understanding of ACT as an effective stress management intervention for healthcare staff. This chapter aims to address aims 1-4 of this thesis.

3.1 Introduction

High levels of burnout and distress are a long-standing concern in the healthcare workforce (Imo, 2017, for a review). For example, in the NHS, the estimated proportion of HCPs reporting work-related stress has risen from 28% to 37% since 2008, with more than 25% of staff in this sector experiencing symptomatic levels of psychological distress (Johnson et al., 2018). Moreover, high levels of burnout and distress may have implications for the quality of patient care, potentially leading to reduced perceptions of patient safety and heightened risk of medical error (Hall et al., 2016; O'Connor, Hall, & Johnson, 2021; O'Connor et al., 2000).

Evidence suggests that worksite stress management interventions, particularly those based on CBT, can be effective for improving the psychological health of staff working in healthcare and other organisational settings (e.g., Dreison et al., 2018; Panagioti et al., 2017; Richardson & Rothstein, 2008; West et al., 2016). Stress management interventions can be broadly classified into primary, secondary, or tertiary prevention initiatives (LaMontagne et al., 2007). Primary interventions aim to modify sources of work-related stress (e.g., lack of workplace support, feedback, or job control), while secondary interventions, such as CBT and mindfulness-based interventions, equip employees with psychological skills and resources that increase resilience to stress (Robertson et al., 2015). Tertiary interventions are considered more therapeutic in nature and are designed to mitigate clinically relevant levels of psychological distress.

Among the modern CBT approaches, ACT is increasingly being adapted for delivery to groups of employees in healthcare and other workplace settings (Flaxman & Bond, 2010a; Reeve et al., 2018; Rudaz et al., 2017). Whether delivered in clinical or nonclinical contexts, ACT interventions are designed to help people develop a broad capacity labelled psychological flexibility. Psychological flexibility is 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. 9). In workplace settings, this ability may involve: 1) greater willingness to experience unpleasant thoughts and emotions that arise while performing at work; 2) an ability to bring present moment awareness to current tasks, inner experiences, and external interactions and situations; and 3) consistent engagement in work-related behaviours that are congruent with one's overarching goals and values (Bond et al., 2011; Flaxman et al., 2010a; Reeve et al., 2018).

Psychological flexibility is developed through a combination of techniques, such as mindfulness, cognitive defusion, the use of metaphor, personal values clarification, and values-based behavioural activation (Hayes et al., 2011).

When applied in the workplace, ACT most commonly involves group skills training sessions, or (less commonly) remote bibliotherapy (e.g., giving participants self-help books) or online programmes. To date, ACT interventions have been empirically evaluated in a wide range of organisational contexts, including a media organisation (Bond & Bunce, 2000), government agencies (Flaxman & Bond, 2010a, 2010b; Lloyd et al., 2013), and in educational, social care, and healthcare settings (Brinkborg et al., 2011; Frögéli et al., 2016; Gillard et al., 2018; Hayes et al., 2004; Jeffcoat & Hayes, 2012; Reeve et al., 2018; Rudaz et al., 2017; Waters et al., 2018). A few studies have demonstrated the efficacy of self-help or web-based ACT programmes delivered to mixed occupational samples (Hofer et al., 2018; Puolakanaho et al., 2020). Collectively, the results of this body of intervention research suggest that increasing psychological flexibility via relatively brief workplace ACT programmes leads to improvements in employees' general mental health (e.g., Bond & Bunce, 2000; Frögéli et al., 2016), while the impact of ACT on burnout has been less consistent (Reeve et al., 2018). In only a small proportion of workplace studies, ACT was found to improve performance-related outcomes (e.g., Bond & Bunce, 2000; Varra et al., 2008).

Despite the burgeoning popularity of ACT in workplace settings, and the accumulating evidence supporting ACT's utility for improving employees' general mental health, a number of issues remain contentious or underexplored. First, workplace evaluations of ACT have focused predominantly on broad process of change variables, particularly overall levels of psychological flexibility and/or mindfulness (e.g., Flaxman & Bond, 2010b; Frögéli et al., 2016; Reeve et al., 2018). Generally, this research does not determine the more discrete psychological and/or behavioural skills being developed by employees who attend ACT programmes; nor does it establish whether a subset of the targeted skills are especially influential in transmitting ACT's positive effects on employees' mental health.

With these potential theoretical and practical benefits in mind, the first contribution of the current trial is to ascertain the degree to which an ACT programme delivered to staff in a healthcare setting elicits change on a set psychological flexibility's sub-processes; and whether change on some or all of these processes mediates ACT's effect on healthcare employees' mental health.

Our second contribution is to address the inconsistent findings surrounding the putative impact of ACT on key aspects of work-related functioning, beginning with job burnout (Reeve et al., 2018). Burnout may stem largely from chronic work environment conditions, such as excessive job demands (e.g.,

unmanageable workload and time pressure) coupled with a lack of job resources (e.g., support, autonomy, or feedback; Demerouti et al., 2001). Research evaluating ACT for burnout has mostly utilised the Maslach Burnout Inventory (Reeve et al., 2018; Rudaz et al., 2017). Although the Maslach Burnout Inventory is widely used in the burnout literature, it is noteworthy that the original scale instructions ask employees to report burnout symptoms experienced over the past year. In contrast, worksite ACT evaluations tend to be conducted over comparatively shorter periods (e.g., 3 months). This incongruence between measurement and study design may reduce the likelihood of detecting changes in burnout elicited by ACT programmes.

Consistent with these principles, the Conservation of Resources theory (Shirom, 2010; Westman et al., 2004) conceptualises burnout as an over-depletion of energy resources resulting from prolonged exposure to job stress without adequate periods of recovery. On the basis of these observations, we propose that the Conservation of Resources theory conceptualisation and assessment is well-suited to the task of exploring shorter-term changes in healthcare workers' burnout symptoms elicited by a workplace ACT intervention. An additional advantage of drawing from this theory is that it supports assessment of change on other variables that are theoretical and empirically associated with burnout. A well-established risk factor for burnout is lack of recovery from work demands during non-work time (e.g., post work evenings, weekends, or non-shift days; Bennett et al., 2018). To our knowledge, no previous research has explored whether attending an ACT programme strengthens employees' ability to cognitively detach from work problems during non-work time.

Third, we extend the Conservation of Resources theory to examine ACT's influence on a primary indicator of work-related functioning in healthcare settings: perceptions of patient safety (Hall et al., 2016). Given the critical importance of safe practice in healthcare contexts (Hall et al., 2016), we examine whether any salutary effect of ACT on healthcare employees' exhaustion is associated with an improvement in their perceptions of patient safety. In this way, we respond to calls for worksite ACT research to incorporate performance-related outcomes (Reeve et al., 2018), and assess whether the growing uptake of ACT for improving healthcare staff wellbeing might translate into improvements in the quality of patient care.

Lastly, because these programmes are typically offered and delivered in practice to all employees, regardless of current levels of psychological strain, we aim to evaluate this programme in the same way it would likely be delivered in other NHS organisations. Because ACT has increasingly being found to be useful for employees with above average levels of psychological strain (e.g.,

Hofer et al., 2018; Flaxman & Bond, 2010b; Waters et al., 2018), we also aim to test whether initial level of strain moderates the effects. If initial level of psychological strain moderates the intervention effects, this study would provide useful information to organisations who may consider whether to offer ACT widely, or specifically seek to attract employees with high levels of strain (i.e., it has implications for how the programmes are delivered within the NHS).

Based on the rationale outlined above, we test the following five hypotheses: healthcare employees' who attend a workplace ACT intervention are expected to experience a significant improvement in mental health, specifically a reduction in symptoms of psychological distress (primary outcome) along with reductions in burnout, work-related worry and rumination and perceived patient safety (secondary outcomes) (hypothesis 1). In addition, we predicted that the positive influence of ACT on these outcome variables will be mediated through improvements in psychological flexibility (hypothesis 2). Because most previous research in this area has focused on overall markers of psychological flexibility, we felt unable to offer predictions about different influences among these skills in explaining ACT's influence on employees' wellbeing. For this reason, we consider our exploratory investigation of the mediating role of each of these skills to be an important contribution of the current study. Additionally, we aimed to test whether intervention effects were moderated by initial levels of psychological distress (hypothesis 3); and whether participants reported reliable and clinically significant changes in psychological distress at post-intervention and follow-up (hypothesis 4). Finally, drawing from the assumptions of the body of evidence demonstrating links between burnout and healthcare practice, we hypothesised that any reduction in healthcare employees' exhaustion gained from an ACT intervention would be associated with an improvement in perceived patient safety (hypothesis 5).

3.2 Method

The study received ethical approval by the Health Research Authority R&D approval (IRAS ref#18/HRA/0200 accepted on 21/09/2017) and the Institute of Psychological Sciences Research Ethics Committee (ref#17-0212 accepted on 22/07/2017). The study protocol was registered in the ISRCTN registry (ISRCTN29599982 accepted on 20/07/2018). Note that hypotheses 1 and 2 were pre-registered as part of the study protocol and hypotheses 3-5 were not and therefore, are considered to be exploratory.

The reporting of this psychological trial is in line with the Consolidated Standards of Reporting Trials (CONSORT) guidelines (Grant et al., 2018).

3.2.1 Design

The study employed a randomised controlled design.

3.2.2 Participants

Eligible participants were currently employed NHS staff working within NHS primary care settings in Yorkshire and Humberside. Participants were excluded if not present at work. Based on previous RCT studies of ACT interventions in HCPs (e.g., Brinkborg et al., 2011, Waters et al., 2018), we estimated a small to medium effect size (*f* = 0.22). The estimated sample size necessary to detect a small to medium effect size at an alpha error rate of 0.05 (two-tailed) using the G* Power 3 programme (Faul et al., 2007), was 104 participants. However, based on the average drop-out rate reported in the meta-analysis of ACT interventions for HCPs (Chapter 2 of this thesis), we aimed to receive consent from up to 140 participants, anticipating approximately a 26% attrition rate.

A total of 146 NHS staff returned the consent form. 98 NHS staff (52 experimental, 46 controls) were finally included in the study, see CONSORT flowchart in Figure 3.1. 81 participants completed measures at mid-intervention (17.3 % attrition rates), 70 participants responding at post-intervention (28.6% attrition rates) and 63 at follow-up (35.8% drop-outs). The mean age of participants was 42.97 (SD = 10.18). 92.7 % of the participants were female. Participants worked 34.14 hours per week on average (SD = 7.59), and 46.3% worked full-time. Participants were from a range of NHS roles: GPs (28%), nurses (23.2%), mental health professionals (17.1%), managers (13.4%), administration staff (7.3%), consultants (2.4%), dietitians (2.4%), other HCPs (1.2%), technicians (2.4%), other staff (2.4%). 87.8% of the sample was English, Welsh, Scottish or Northern Irish, 2.4% was European, and the remainder (1.2 %) was Brazilian, Caribbean, Indian, Latin American, Pakistani, or White Chinese. Based on 83.7% of the sample reporting demographics, 14.3 % of the sample reported practicing mindfulness at baseline, 6.1% by using an app, 4% reported doing meditation, 2% yoga and a final 2% practicing stress-management exercises. 56.1 % of the sample did not report practicing mindfulness. The frequency of mindfulness practice at baseline was weekly (12.2%), daily (7.1%), monthly (5.1%), two-three times (4.1%), ad hoc (1%).

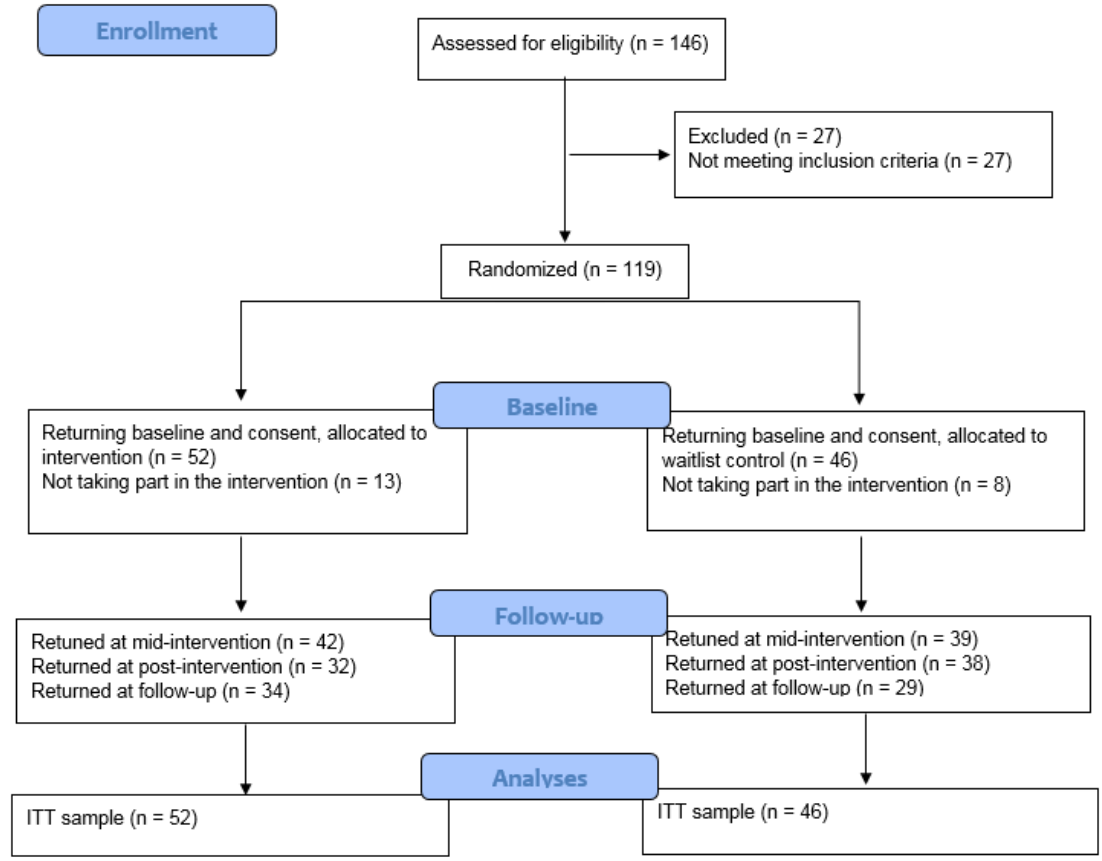

Figure 3-1 Participants flow

3.2.3 Procedure

Potential participants were contacted via posters, emails and local awareness via primary care settings. The ACT training was open to NHS staff with no exclusion criteria applied. Participants were given information about the study and contacts of primary care managers if interested in opting-in to the study. The participant information sheet, with a briefing about the study and training, was sent via e-mail to potentially interested participants. After providing consent, participants were randomly assigned to an experimental group (receiving the ACT intervention) or a waitlist control group. A computer-generated randomisation procedure was employed. Participants allocated to the waitlist control were informed that they would receive the intervention in fourteen weeks. The training was delivered by three mindfulness trainers (see therapists section below) to NHS employees on four different occasions (7-9 pm), during non-working hours, in North and South Leeds in venues outside the organisation. Participants received a total of 8-hour intervention time spanning across four consecutive weeks. Participants completed questionnaires at baseline (i.e. up to four weeks before the start of the intervention), at mid-intervention (after session 2, and between week 1 and 3 from the start of the intervention), at four-week intervention (at the end of the four-week intervention), and at fourteen weeks follow-up (ten weeks after the end of the intervention).

3.2.4 ACT Intervention

To prevent and reduce distress among employees, researchers have begun implementing and evaluating mindfulness-based worksite training interventions. One of these interventions is based on Acceptance and Commitment Therapy (ACT; Hayes et al., 1999). ACT interventions appear to affect improvements in various other indicators of employee wellbeing, such as being innovative at work (Bond & Bunce, 2000; Dahl et al., 2004; Flaxman & Bond, 2006; 2010a; 2010b; Varra et al., 2008). Moreover, higher levels of psychological flexibility have been associated with improved mental health, job performance and absenteeism in UK workers (Bond & Bunce, 2003; Bond, Flaxman, & Bunce, 2008).

Based upon the current evidence and the need to further test whether ACT interventions are helpful and effective for improving mental health in healthcare professionals, the research team and the Leeds Clinical Commissioning Groups Partnership investigated whether a shorter version of the validated and standardised intervention was effective for improving psychological distress and burnout in NHS staff. Unlike the traditional version of the intervention with three

sessions carried out across three months, the current intervention was delivered in four sessions across one month. Also, for the first time, the current study aimed to assess whether the intervention could have a direct or indirect impact on perceived patient safety

The ACT intervention was based on an existing standardised and validated ACT three-week intervention designed for workplace settings (Flaxman, Bond, & Livheim, 2013). The current intervention was an updated version of the three half-day sessions previously utilised in workplace contexts. The intervention was extended to a total of four two-hour group sessions delivered on four consecutive weeks. Sessions comprised of between 10 and 15 people. Each session consisted of a structured combination of mindfulness and value-based work, see Table 3.1.

The first session served the purpose of introducing participants to mindfulness and value-based activities. In this session, participants were introduced to both mindfulness and values psychoeducation to help them become familiar with psychological flexibility processes. Two main mindfulness-based exercises were given: the raisin exercise (adapted from Segal, Williams, & Teasdale, 2018) and the body and breath meditation (Williams & Penman, 2011). In terms of values, the participants were invited to a “values-sort case” exercise (Harris, 2019). During this session, participants were also invited to reflect on barriers, thoughts and feelings that may be problems. The “passengers on the bus” metaphor (Hayes et al., 2012) was proposed to help participants understand their psychological barriers. In every session, the trainers would invite participants to practice the exercises learned (e.g., mindfulness and value-based exercises) in their home practice. The same structure of the first session was then repeated in the following sessions.

In session 2, participants were invited for the first time to the psychological flexibility component of cognitive defusion. After a repetition of the body and breath meditation given in session 1 (Williams & Penman, 2011), participants were introduced to the distinction between thinking and sensing modes of mind (Teasdale, Williams & Segal, 2014). Next, trainers presented a retrospective noticing exercise based on a simplified version of the ACT matrix (see Polk et al., 2016). During this exercise participants were invited to notice the barriers that block them from the qualities they wanted to express most. Participants were then invited to repeat the ACT matrix by focusing on values. To conclude session 2, the participants were invited to an adapted version of the “passengers on the bus metaphor” presented in session 1 but with the aim of cultivating cognitive defusion.

In session 3, participants were invited for the first time to the psychological flexibility component of acceptance. First, the trainer would start with a mindfulness exercise with the aim of helping participants bring attention to body sensations. This exercise aimed to reconnect HCPs with the body and to develop curiosity. Following the home practice review, the trainer re-proposed the retrospective noticing exercise linking it with the physicalising exercise. This exercise offered a possibility to practice acceptance. During this session the trainer read the Rumi guest house poem (Morrison et al., 2014), and invited participants to repeat the ACT matrix exercise in different life areas. This session ended with a three-step mindfulness exercise.

The final session followed the structure of the previous sessions with the overall aim to bring together and refresh all psychological skills learned in the previous sessions. After the opening mindfulness exercise, the participants were invited to the home practice review, and to repeat the retrospective noticing exercise. A different version of the value-based construction exercise was repeated. The main focus of this last session was to invite the participants to participate in a role-play by acting out the “passengers on the bus” metaphor. The main purpose of this metaphor was to help participants relate to different thoughts and emotions.

Table 3-1 Content of the ACT intervention programme

SESSION 1	SESSION 2	SESSION 3	SESSION 4
Welcome	**Welcome back**	**Welcome back**	**Welcome back**
Aim of the training (three column theoretical framework)	Aim of the training (three column theoretical framework)	Aim of the training (three column theoretical framework)	Aim of the training (three column theoretical framework)
Introduction to mindfulness	**Mindfulness practice**	**Mindfulness practice**	**Mindfulness practice**
Raisin exercise	Body and breath exercise (difference between "sensing" and "thinking" modes of Mind)	Body and breath exercise (focus on reconnecting with body)	Body and breath exercise (waking up from the autopilot, difference between "sensing" and "thinking" modes of Mind, focus on reconnecting with body)
Mindfulness psychoeducation	**Homework review**	**Homework revision**	**Homework review**
How to practice mindfulness	Review of mindfulness practice and value-based action practice	Review of mindfulness practice and value-based action practice	Review of mindfulness practice and value-based action practice
Body and breath exercise (waking up from the autopilot)	**Cultivating psychological flexibility**	Reflection on the ACT matrix exercise	Reflection on the ACT matrix exercise
Introduction to value-based actions	ACT matrix	**Cultivating acceptance**	**Cultivating values**
Values psychoeducation	**Cultivating values**	The physicalizing exercise	Different version of the ACT matrix (personally chosen values)
Values card sort exercise	Different version of the values card sort exercise	Rumi's guest house poem	**Cultivating psychological flexibility**
How to overcome issues with practice	Identification of value-based actions	**Cultivating values**	Passengers on the bus exercise in group
Normalisation	**Cultivating cognitive defusion**	Different version of the ACT matrix (health, relationships, work and career, leisure time)	**Training programme review**
Passengers on the bus exercise	Defusion psychoeducation	**Homework**	Aim of the training

			(three column theoretical framework) ACT Matrix What to take away How to keep practicing
Homework	Normalisation	Encouragement to practice mindfulness 5 times a week	**Conclusion**
Daily mindful activity	Three-step exercise	Encouragement to reflect on personal values	Poem (The Coconut by Paul Hostovsky)
Encouragement to practice mindfulness 5 times a week	**Homework**	Noticing “towards” and “away” moves in daily life	
Start noticing “towards” moves	Daily mindful activity	**Conclusion**	
Conclusion	Encouragement to practice mindfulness 5 times a week	Three step mindfulness exercise	
Two sheets of paper exercise (importance on values)	Start noticing a “towards” and an “away” move		
	Conclusion		
	Two sheets of paper exercise (importance on coexistence of values and unhelpful thoughts)		

3.2.5 Measures

3.2.5.1 Outcome measures

General Health Questionnaire (GHQ-12; Goldberg et al., 1992). The GHQ-12 is a well-known measure of psychological distress and assesses a number of different aspects related to one's wellbeing (e.g., feeling unhappy, depressed and constantly under strain). The GHQ-12 was scored in two ways. The Likert method was used to assess primary outcomes. Higher scores indicate higher levels of psychological distress. The scoring method was instead employed to assess reliable and clinically significant changes. By using the scoring method, participants were classified as: asymptomatic, sub-clinically symptomatic, symptomatic, and highly symptomatic. In the present sample Cronbach's alphas were .86 at baseline, .88 at mid-intervention, .90 at post-intervention and .90 at follow-up.

Shirom-Melamed Burnout Measure (SMBM; Shirom & Melamed, 2006). The SMBM is a measure of job burnout, composed of 14 items and three subscales that capture three core components of burnout (physical fatigue, emotional exhaustion, and cognitive weariness). Higher scores indicate higher levels of burnout. Unlike other widely used measures of burnout, this scale assesses the cognitive component of burnout and is anchored to the past 30 workdays. In the present sample Cronbach's alphas were .91 at baseline, .91 at mid-intervention, .94 at post-intervention and .94 at follow-up.

Work-related worry and rumination questionnaires (Cropley et al., 2012; Flaxman et al., 2012) was investigated to assess lack of recovery from work demands during non-work time. This burnout-related aspect was assessed by combining the affective rumination scale and the perseverative cognition scale. The first scale (Cropley et al., 2012) measures worry and rumination during non-work time, and has demonstrated good psychometric properties among various samples of UK workers (Cropley et al., 2012; Querstret & Cropley, 2012). The second scale was developed and validated by Flaxman and colleagues (Flaxman et al., 2012). It assesses the amount of work and rumination thoughts experienced during non-work time (e.g., evenings and weekends) over the past week. Higher scores indicate higher levels of worry and rumination. In the present sample Cronbach's alphas were .90 at baseline, .91 at mid-intervention, .93 at post-intervention and .90 at follow-up.

Safe Practitioner measure (Louch et al., 2017). This measure captures perceptions of organisational and personal patient safety and was measured

using the following two items “In the past four weeks, my practice is not as safe as it could be because of work related factors/conditions” (individual perceptions of organisational safety practices) and “My practice is safe” from 1 (strongly disagree) to 5 (strongly agree) (individual perceptions of personal safety practices). This measure has been shown to be reliable and valid in HCPs (Louch et al., 2016; Louch et al., 2017).

3.2.5.2 Process measures

In order to investigate the mechanisms of action that the ACT intervention may change, we included the following assessments of ACT process measures.

Multidimensional Experiential Avoidance Questionnaire – Distress Endurance subscale (MEAQ-DE; Gamez et al., 2011). This 11-item MEAQ-DE subscale measures an important aspect of psychological flexibility: one’s ability to endure difficult thoughts and feelings in order to complete important activities. Higher scores indicate higher distress endurance. In the present sample Cronbach’s alphas were .89 at baseline, .89 at mid-intervention, .90 at post-intervention and .87 at follow-up.

Short-Form Five Facet Mindfulness Questionnaire (FFMQ-15; Baer et al., 2008). This is the short scale of the well-known multidimensional Five Facet Mindfulness Questionnaire Scale (Baer et al., 2008). This scale assesses 5 subcomponents of mindfulness: observing, describing, acting with awareness, non-judging of experience, and non-reactivity to difficult inner experience. In this study the total score was employed. Higher scores indicate higher levels of mindfulness. In the present sample Cronbach’s alphas were .81 at baseline, .83 at mid-intervention, .86 at post-intervention and .85 at follow-up.

Valuing Questionnaire (VQ; Smout et al. 2014). This 10-item questionnaire assesses people’s ability to engage in valuing actions. The scale has previously demonstrated good psychometric properties in both clinical and nonclinical adult populations (Smout et al., 2014). Higher scores indicate higher scores in value-based living. In the present sample Cronbach’s alphas for values progression were .74 at baseline, .84 at mid-intervention, .85 at post-intervention and .81 at follow-up. In the present sample Cronbach’s alphas for values obstruction were .80 at baseline, .80 at mid-intervention, .80 at post-intervention and .78 at follow-up.

Self-Compassion Scale – short-form (SCS-SF; Raes et al., 2011). The measure captures the propensity to treat oneself with care and kindness, to accept one’s imperfections, and tendency to take a balanced perspective on one’s experiences. This 12-item self-compassion scale has 6 subscales: self-

kindness; self-judgement; common humanity; isolation; mindfulness; and over-identification. Higher scores indicate higher levels of self-compassion. The total score was employed in this study. The scale has previously demonstrated good psychometric properties in HCPs. In the present sample Cronbach's alphas were .83 at baseline, .87 at mid-intervention, .88 at post-intervention and .88 at follow-up.

3.2.6 Therapists and adherence

Training sessions were delivered by mindfulness teachers, who were also experienced clinicians, either on the national register or who comply with the Good Practice Guidelines. Trainers were given a minimum of two training days with one of the authors (PF), who has extensive experience training professionals to deliver workplace interventions based on ACT. Trainers were supervised by regular group supervisions sessions with one of the authors (CDG), who is an experienced clinician with more than six years of experience.

3.2.7 Main ethical considerations

Confidentiality

The participants were employees of the Leeds West NHS primary care organisation. They rated questionnaires capturing information about their psychological distress and burnout in relation to their working lives. Consequently, it was of paramount importance that the information they gave within the questionnaires was confidential. Thus, upon entry to the study - after giving consent - participants generated an unique identification code for themselves (first two letters of their mother's maiden name and last four digits of their mobile phone number). This allowed the research team to separate data given within questionnaires from participant's contact details and demographics. Once they had given consent, their contact details and demographics were kept on one database, alongside their unique identification code. A separate database contained the questionnaire data linked to their identification code alone. This code was used on all data captured in the online surveys. They did not enter any personally identifiable information alongside questionnaire data (name, address etc.). In addition, online survey data were collected via an encrypted website (Bristol Online Surveys).

Only the research team had access to personally identifiable data. This was safely stored on a University-issued password protected computer. In addition, to maintain confidentiality amongst participants, the requirement of

confidentiality during the training sessions was emphasized at the beginning of each session. Participants were also informed that they did not have to share personal information during the training sessions. There was flexibility in allocating participants to alternative training sessions if they requested not to attend with a close colleague or manager.

Managing Risk

Based on previous experience of similar intervention research in the workplace (e.g., Flaxman & Bond, 2010), the risk of harm to participants was minimal. No problems have been reported during comparable intervention studies conducted by Dr Paul Flaxman over the past 10 years (including recent studies conducted in other NHS trusts). As stated, past experience, and the focus of the training on occupational functioning as opposed to childhood traumas and wider mental health problems suggests that the disclosure of significant risks (e.g. immediate plans for suicide) or safeguarding issues (e.g., risk of harm to vulnerable others) was unlikely. Nonetheless, we could not rule-out the occurrence of such an event; therefore, we had an agreed escalation protocol. This escalation protocol was approved by local Medical and Nursing Directors in line with ethical guidance for health practitioners relating to risks to their own health and that of other people. Participants and trainers were asked to agree to the escalation protocol prior to the intervention.

Potential adverse effects and serious adverse effects were monitored by the research team. No adverse events or serious adverse events were reported.

3.2.8 Statistical analyses

3.2.8.1 Preliminary analyses

Data analysis was carried out with the statistical package SPSS (version 24). Outliers were investigated by using boxplots and histograms. The data was missing completely at random (X^2 = 932.037, *df* = 921, *p* =.39), intention-to-treat (ITT) analyses with imputation of missing data by last value carried forward approach was adopted. To ascertain whether data met the assumptions for statistical tests for univariate tests, exploratory analyses to assess independence of observations, homogeneity of variance, normality and sphericity were carried out. Multivariate normality, homogeneity of covariance

matrices and independence of residuals were tested to perform multivariate tests. To examine the association between the variables under investigation, correlations were carried out using Pearson's r coefficient. The correlation coefficients were interpreted as following: r = .10 as a weak effect, r = .25 as a moderate effect and r = .40 as a strong effect size (Cohen, 1988).

3.2.8.2 Analyses on primary and secondary outcomes

Several steps were taken to analyse the effect of the intervention on primary and secondary outcomes. Baseline between-group differences were tested by conducting independent sample t-tests between the intervention group and the waitlist control on outcomes and process measures. A 2 x 4 ANOVA - with Time as the within-subject variable (baseline, mid-intervention, post-intervention, follow-up) and Condition (ACT condition and waitlist control) as the between-subject variable - was conducted to test whether psychological distress levels decreased in the ACT condition relative to the waitlist control at post-intervention time-points. A set of multivariate analyses of variances (MANOVAs) with burnout (physical exhaustion, emotional exhaustion and cognitive weariness), worry and rumination (affective rumination and perseverative cognition) and patient safety (perceptions of organisational patient safety and perceptions of personal patient safety) being the dependent variables, were assessed. Pillai's Trace value was selected given that experimental and control sample sizes were almost equal. When an interaction was significant, univariate tests were reported. Significant interactions were followed-up with tests of simple effects by comparing the means at each time-point with the mean of baseline levels or by comparing the mean of each level to the mean of following levels (baseline vs mid-intervention, mid-intervention vs post-intervention, post-intervention vs follow-up). Follow-up tests of simple effects were chosen over one-way ANOVAs or paired-sample t tests to avoid increasing the probability of Type I errors. When interaction effects were not significant, follow-up tests of the main effects (post hoc tests and pairwise comparisons) were reported. Effect sizes were reported with partial eta squared ($\eta 2$), that were interpreted as $\eta 2 = 0.01$ small, $\eta 2 = 0.09$ medium, and $\eta 2 = 0.25$ large effect sizes.

3.2.8.3 Mediation analyses

To test the hypothesis that changes in psychological distress at post-intervention were mediated by changes in the ACT processes throughout the intervention, eight bootstrapped mediator models were tested. A bootstrapping approach (Hayes, 2013) was preferred given the size of the sample (MacKinnon et al., 2002), and to test indirect effects (MacKinnon & Fairchild, 2009). Similarly

to Lloyd, Bond, and Flaxman (2013), in these models, we tested for the effect of the ACT intervention (predictor vs waitlist control) on changes of psychological distress (baseline to post-intervention) through changes in the ACT processes of mindfulness, values obstruction, values progression, self-compassion (from mid-intervention to post-intervention). A final model was assessed to test whether the ACT intervention had an indirect effect on patient safety perceptions related to work conditions (individual perceptions of organisational patient safety) and to one's self (individual perceptions of personal patient safety) (baseline to post-intervention) via reductions in psychological distress and burnout (mid-intervention to post-intervention).

3.2.8.4 Moderation analyses

We performed moderated regression analyses to assess whether baseline levels of psychological distress (GHQ-12 at baseline) had an impact on the main intervention effect at mid-intervention and at post-intervention on psychological distress. Following the procedure adapted by Flaxman et al. (2010b), to examine this effect, a paired sample t-test was performed to test whether there was a significant difference between participants classified as likely cases of psychiatric disorder – "cases" - and those not likely to experience a psychiatric problem – "noncases". First, baseline distress was included in step 1, group was included in step 2 and the interaction effect was assessed. To do this, we classified participants with GHQ-12 scoring four or higher on the GHQ-12 as psychiatric "cases" (Goldberg et al., 1997; Hardy et al., 1997).

3.2.8.5 Reliable and statistically significant changes

Reliable and statistically significant changes were calculated using the Leeds Reliable Change Indicator (Morley & Dowzer, 2014) group version. These methods are based on the Jacobson and Truax (1991) statistical principles and aim to: 1) determine whether the change is reliable and not explained by errors of measurement; 2) calculate whether the extent of change suggests a remission of the problem. To calculate the reliable change for the psychological distress measure, we used the baseline, four-week post-intervention and follow-up scores of the GHQ-12 (scoring method). For the mean of the comparison norms we used the mean published in Oskrochi, Bani-Mustafa, and Oskrochi (2018) representative of 213, 365 data points (Mean = 1.938; SD = 0.463). Instead, for the mean of the clinical norms we used the mean reported in the validation of the GHQ-12 (Goldberg et al., 1997) for detecting depression in the general population (major depression, Mean = 5.3 SD = 4.2). We used Cronbach's alpha published in the validation (Goldberg, et al., 1997) regarding

information about the reliability of the measure. For calculating clinically significant changes, based on the original Jacobson and Truax (1991) interpretation of scores, we selected criterion c given the availability of the comparison group. Criterion c was selected over criterion b, given the scores from the two groups being different and not overlapping.

3.3 Results

3.3.1 Preliminary analyses

Descriptive statistics are presented in Table 3.2. At baseline, the mean score for psychological distress (GHQ-12) was 16.04 (SD = 4.85) which is near that of highly stressed HCPs groups (McConachie et al., 2014). Before the start of the intervention 16.3% of the sample was classified as asymptomatic, 23.5% was sub-clinically symptomatic, 29.6% symptomatic and 30.6% was highly asymptomatic.

The data was screened, and no significant outliers were detected. Levene's test showed that the homogeneity of variances was satisfied. Variables of interest were normally distributed - skewness and kurtosis levels did not exceed the cut-off values (asymmetry < 2 and kurtosis < 7) provided by Curran, West and Finch (1996). Mauchly's test indicated that the sphericity assumption for the analysis was not satisfied, $\chi 2\ (5) = .55$, $p = <.001$, $\varepsilon = .71$ (Greenhouse-Geisser), therefore, we used adjusted univariate significance tests (Greenhouse-Geisser). Table 3.2 reports the means and standard deviations for each variable. One-way ANOVAs revealed no significant differences between groups on the baseline measurements confirming baseline equivalence. Table 3.3. reports the correlations between study measures.

Table 3-2 Intention to treat (ITT) means (standard deviations) for outcome and process measures for all participants in the ACT (n=52) and waitlist control (n=46) groups

	Baseline		Mid-intervention		Post-intervention		Follow-up	
	ACT	Waitlist	ACT	Waitlist	ACT	Waitlist	ACT	Waitlist
Psychological distress	16.04 (4.85)	15.48 5.59	11.65 (5.13)	14.63 (5.44)	9.89 (4.90)	13.46 (5.96)	11.15 (7.53)	13.54 (8.97)
Physical fatigue	4.20 (1.25)	4.34 (1.00)	3.53 (1.00)	3.96 (1.03)	3.60 (1.15)	4.10 (1.30)	3.42 (1.17)	3.93 (1.29)
Emotional exhaustion	2.87 (1.22)	2.83 (1.43)	2.87 (1.22)	2.83 (1.44)	2.48 (1.20)	2.73 (1.46)	2.43 (1.36)	2.65 (1.33)
Cognitive weariness	4.05 (1.37)	3.84 (1.28)	3.46 (1.30)	3.92 (1.29)	3.28 (1.18)	3.60 (1.20)	3.22 (1.30)	3.70 (1.15)
Worry and rumination	3.09 (.98)	2.96 (.89)	2.87 (.95)	2.89 (1.00)	2.67 (.92)	2.76 (1.10)	2.64 (0.96)	2.74 (0.97)
Patient safety (organisational)	1.94 (1.21)	2.04 (1.11)	1.89 (1.09)	2.02 (1.22)	1.67 (1.04)	1.87 (1.07)	1.79 (1.07)	1.87 (1.07)
Patient safety (personal)	4.23 (.96)	4.09 (.96)	4.08 (1.23)	4.00 (1.26)	4.15 (1.19)	4.26 (1.04)	4.28 (.95)	4.37 (.88)
Mindfulness	43.52 (7.57)	44.39 (9.69)	44.40 (8.13)	44.11 (9.34)	47.14 (8.70)	44.09 (9.63)	48.65 (7.76)	46.20 (9.90)
Self-compassion	34.40 (4.83)	35.24 (6.33)	33.64 (6.30)	35.04 (7.79)	35.17 (8.39)	33.96 (8.57)	36.52 (7.98)	35.74 (8.61)
Values (obstruction)	19.21 (5.24)	18.78 (6.25)	18.19 (5.72)	19.08 (6.41)	16.23 (5.54)	18.65 (5.97)	16.94 (5.44)	17.30 (5.11)
Values (progress)	20.93 (5.82)	21.17 (6.03)	22.94 (6.00)	21.44 (5.94)	23.23 (5.96)	22.59 (6.05)	23.02 (5.56)	23.86 (5.07)
Distress endurance	41.08 (7.92)	41.24 (7.07)	40.21 (7.81)	40.41 (6.40)	39.90 (8.81)	40.94 (5.67)	41.00 (7.49)	41.05 (6.38)

Table 3-3 Pearson's Product Moment correlations between study measures

	1	2	3	4	5	6	7	8	9	10	11	12
1. Psychological distress	1	**.516****	**.204***	**.450****	**.525****	**.208***	-0.055	**-.457****	**-.306****	**.497****	**-.281****	-0.067
2. Physical fatigue	**.550****	1	**.321****	**.556****	**.515****	**.202***	-0.078	**-.331****	-0.167	**.383****	**-.219***	-0.046
3. Emotional exhaustion	**.409****	**.521****	1	**.321****	**.331****	0.134	-0.019	**-.319****	0.039	**.203***	-0.030	-0.008
4. Cognitive weariness	**.492****	**.701****	**.462****	1	**.381****	**.281****	**-.256***	**-.348****	-0.179	**.371****	**-.231***	**-.268****
5. Worry and rumination	**.469****	**.508****	**.416****	**.522****	1	**.238***	-0.176	**-.518****	**-.222***	**.372****	-0.046	-0.079
6. Patient safety (org)	**.247***	**.339****	**.442****	**.416****	**.456****	1	**-.599****	-0.118	0.027	0.176	-0.137	-0.187
7. Patient safety (pers)	**-.208***	**-.330****	**-.378****	**-.325****	-0.188	**-.518****	1	0.051	0.029	-0.093	0.053	0.158
8. Mindfulness	**-.533****	**-.557****	**-.420****	**-.579****	**-.389****	**-.349****	**.205***	1	**.505****	**-.547****	**.457****	**.236***
9. Self-Compassion	**-.415****	**-.504****	**-.358****	**-.521****	**-.390****	**-.349****	**.206***	**.748****	1	-0.190	0.195	0.059
10. Values obstruction	**.558****	**.577****	**.485****	**.619****	**.401****	**.353****	**-.290****	**-.685****	**-.598****	1	**-.324****	**-.272****
11. Values progression	**-.520****	**-.452****	**-.237***	**-.437****	**-.301****	**-.340****	0.184	**.612****	**.539****	**-.587****	1	**.337****
12. Distress endurance	-0.139	-0.099	-0.093	**-.217***	-0.086	-0.034	0.080	0.176	**.254***	**-.237***	0.128	1

Note. N=98. Coefficients below the diagonal represent inter-correlations at Time 1, those above at Time 3. Patient safety (org) = perceptions of organisational patient safety, Patient safety (pers) = perceptions of individual patient safety.

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

3.3.2 Primary outcomes: psychological distress

We performed a mixed repeated measures ANOVA, with Time (baseline, mid-intervention, post intervention and follow-up) as the within-subjects variable and Condition (ACT condition and waitlist control) as the between-subjects, to assess whether the level of psychological distress decreased in the ACT condition relative to the waitlist control at post-intervention time-points.

The 4 x 2 mixed ANOVA indicated a significant interaction between Time and Condition, F (2.12, 203) = 3.49, *p* = .03, the magnitude of which was consistent with a small effect size, partial η2 = .04. There was also a main effect of Time, F (2.12, 203) = 13.27, *p* = <.001, partial η2 = .12, and a significant main effect of the Condition, F (1, 96) = 5.26, *p* = .02, partial η2 = .05. This indicates that the ACT training had a beneficial effect on people's psychological distress in comparison to controls. To decompose this interaction, tests of simple effects revealed this interaction to be significant from baseline to mid-intervention, F (1, 96) = 8.94, *p* = .004, η2 = 0.9 and from baseline to post-intervention F (1, 96) = 8.96, p = .004, partial η2 = 0.9, but was not effective from baseline to follow-up F (1, 96) = 1.50, *p* = .22, partial η2 = 0.2.

In the ACT group, repeated within-subjects contrasts revealed a change from baseline to mid-intervention, F (1, 51) = 27.38, *p* = <.001, partial η2 = .35, post-intervention, F (1, 51) = 39.59, *p* = .01, partial η2 = .44, and follow-up, F (1, 51) = 350.65, *p* = <.001, partial η2 = .87, indicating that the level of psychological distress decreased across time during the intervention. In the waitlist control, repeated within-subjects contrasts did not reveal a change from baseline to mid-intervention, F (1, 45) = 1.05, *p* = .31, partial η2 = .02, but from baseline to post-intervention, F (1, 45) = 4.39, *p* = .04, partial η2 = .09, and follow-up, F (1, 45) = 225.13, *p* = <.001, partial η2 = .83, indicating that the level of psychological distress decreased across time during the intervention. For a visual representation of the primary outcomes findings see Figure 3.2.

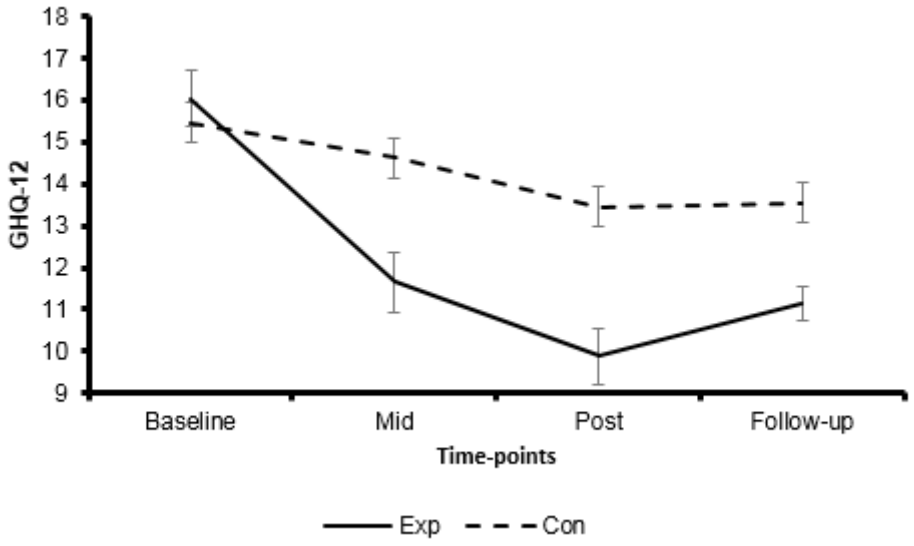

Figure 3-2 Psychological distress (GHQ-12) scores (and standard errors)

Note: Exp = experimental group, Con = control group.

3.3.3 Secondary outcomes: burnout

A repeated-measures MANOVA on the burnout sub-components of physical exhaustion, emotional exhaustion, and cognitive weariness found a significant Time x Condition interaction using Greenhouse-Geisser, F (2.32, 223.21) = 3.82, *p* = .02, partial η2=.04. Univariate analyses showed that cognitive weariness significantly declined from baseline to mid-intervention, F (1, 96) = 8.48, *p* = .004, partial η2 = .08, post-intervention, F (1, 96) = 4.52, *p* = .04, partial η2 = .05, and follow-up, F (1, 96) = 5.49, *p* = .02, partial η2 =.05.

There was also a significant effect of Time, F (2.28; 218.40) = 11.64, *p* = <.001, partial η2= .11 and Condition, F (1, 96) = 4.31, *p* = .04, partial η2 = .04 for physical exhaustion. For physical exhaustion, the effect of Time was found to be significant from baseline to mid-intervention F (1, 96) = 27.95, *p* = <.001, partial η2 = .23, post-intervention, F (1, 96) = 11.17, *p* = .001, partial η2 = .10, and follow-up, F (1, 96) = 18.35, *p* = <.001, partial η2 = .16. A significant interaction between Time x Condition was not found, F (2.27, 218.40) = 1.23, *p* = .30.

A significant effect for Time was also found for emotional exhaustion F (1.56, 150.02) = 3.91, *p* = .03, partial η2 = .04. This effect was significant from baseline to mid-intervention, F (1, 96) = 27.95, *p* = <.001, partial η2 = .23, and significant from baseline to post-intervention, F (1, 96) = 27.95, *p* = <.001, partial η2 = .23, and follow-up, F (1, 96) = 27.95, *p* = <.001, partial η2 = .23. No significant effect was found for Condition, F (1, 96) = .93, *p* = .34 or Time x Condition, F (1.87, 187.03) = .96, *p* = .37.

3.3.4 Secondary outcomes: work-related worry and rumination

Repeated-measures MANOVA on worry and rumination (affective rumination, perseverative cognition) showed a significant main effect of Time, F (3, 288) = 5.26, *p* = .004, partial η2 = .05. However, no significant main effect was found for either Condition, F (1, 96) = .00, *p* = 1.00, or Time x Condition interaction, F (3, 288) = .980, *p* = .420. The analyses indicated that a significant effect of Time was found on worry and rumination from baseline to post-intervention F (1, 96) = 7.85, *p* = .006, partial η2 = .08 and from baseline to follow-up, F (1, 96) = 8.67, *p* = .004, partial η2 = .08 indicating that worry and rumination decreased over time. No effect of Time was found from baseline to mid-intervention, F (1, 96) = 3.12, *p* = .08, partial η2 = .03.

3.3.5 Secondary outcomes: perceived patient safety

Repeated-measures MANOVA on patient safety (individual perceptions of organisational and personal patient safety) did not show a significant main effect of Time, F (6, 91) = 2.219, *p* = .099, or Condition, F (1, 96) = .477, *p* = .492 or Time x Condition, F (6, 91) = 1.33, *p* = .910 indicating that there was no difference in the perceptions of patient safety at an organisational or individual level.

3.3.6 Mediation analyses

Results from the mediation analyses indicated that two of the eight models tested, were statistically significant. First, as you can see in Table 3.4, there was an effect of the ACT intervention on psychological distress via changes in the ACT processes of values obstruction (estimate = .17, BCa 95% CI [.02; .33]), mindfulness (estimate = .20, BCa 95% CI [.04; .37]) and self-compassion (estimate = .13, BCa 95% CI [.01; .31]) from mid-intervention to post-intervention. Secondly, there was an effect of the intervention on cognitive weariness via changes in the ACT processes of mindfulness (estimate = .22, BCa 95% CI [.04; .40]), values obstruction (estimate = .14, BCa 95% CI [.01; .30]) and self-compassion (estimate = .17, BCa 95% CI [.01; .37]) from mid-intervention to post-intervention. Lastly, an indirect effect of the intervention was found on patient safety perceptions (baseline to post-intervention) (estimate = -.09, BCa 95% CI [.01;.22]) through a decrease in psychological distress (mid-intervention to post-intervention).

Table 3-4 Bootstrapped simple mediation models testing the indirect effect of the intervention on mental health outcomes (psychological distress and burnout) and patient safety

Outcome variable	Mediator variable	Bootstrap estimate		BCa 95% CI	
		Estimate	SE	Lower	Upper
Psychological distress	**Mindfulness**				
T1-T3	T2-T3	**.20**	**.08**	**.04**	**.37**
Psychological distress	Values progression				
T1-T3	T2-T3	-.03	.08	-.21	.12
Psychological distress	**Values obstruction**				
T1-T3	T2-T3	**.17**	**.07**	**.02**	**.33**
Psychological distress	**Self-Compassion**				
T1-T3	**T2-T3**	**.13**	**.08**	**.01**	**.31**
Psychological distress	Experiential avoidance				
T1-T3	T2-T3	-.01	.04	-.09	.10
Cognitive weariness	**Mindfulness**				
T1-T3	T2-T3	**.22**	**.09**	**.04**	**.40**
Cognitive weariness	Values progression				
T1-T3	T2-T3	-.03	.06	-.16	.08
Cognitive weariness	**Values obstruction**				
T1-T3	T2-T3	**.14**	**.07**	**.01**	**.30**
Cognitive weariness	**Self-Compassion**				
T1-T3	**T2-T3**	**.17**	**.09**	**.01**	**.37**
Cognitive weariness	Experiential avoidance				
T1-T3	T2-T3	-.00	.03	-.06	.08
Patient Safety (organis)	**Psychological distress**				
T1-T3	T2-T3	**.09**	**.05**	**.01**	**.22**
Patient Safety (personal)	Psychological distress				
T1-T3	T2-T3	-.06	.05	-.19	.00
Patient Safety (organisat)	Cognitive weariness				
T1-T3	T2-T3	.00	.05	-.09	.14
Patient Safety (personal)	Cognitive weariness				
T1-T3	T2-T3	-.00	.05	-.12	.09

Note. BCa = biased corrected confidence intervals. Partially standardised estimates are presented.

3.3.7 Moderation analyses

Results of these analyses are presented in Table 3.5. Baseline levels of distress significantly moderated the impact of the intervention on psychological distress at post-intervention, but not at mid-intervention. Following Flaxman and colleagues (2010b), to examine this effect we also tested whether the initial level of distress resulted in larger distress reduction in those classified as "cases" (GHQ ≥ 4) at baseline in the intervention group. Of those who received the intervention, paired sample t-tests showed significant differences between cases and noncases. In the cases, there was a significant reduction in the levels of distress from baseline to mid-intervention (t (32) = 6.40, p = <.001) and from baseline to post-intervention (t (32) = 9.27, p = <.001). In the noncases, no significant differences were found in the level of distress from baseline to mid-intervention (t (18) = .90, p = .35), and from baseline to post-intervention (t (18) = .73, p = .51). Baseline levels of distress did not significantly moderate the impact of the intervention on burnout, or patient safety practices (data not shown).

Table 3-5 Moderated regression analyses for testing whether intervention effects were moderated by initial levels of psychological distress

Outcome Variable	Predictor	β	p	R^2
Psychological Distress (T2)				
	Psychological Distress (T1)	.090	.764	
	Group (ACT vs Waitlist)	.293	.002	
	Group X Psychological Distress Time 1	.**290**	.332	.**19****
Psychological Distress (T3)				
	Psychological Distress (T1)	-.437	.157	
	Group (ACT vs Waitlist)	.324	.001	
	Group X Psychological Distress Time 1	.**637**	.040	**.14****
Psychological Distress (T4)				
	Psychological Distress (T1)	-.270	.411	
	Group (ACT vs Waitlist)	.151	.136	
	Group X Psychological Distress Time 1	.413	.209	.02

Note: β are standardised coefficients.

3.3.8 Reliable and clinically significant changes

The reliable and clinically significant change was calculated by improvement on the GHQ-12 (Jacobson & Truax, 1991), see Figure 3.3. At four-week post-intervention, 48% (25 of 52) participants who received the ACT intervention met the criteria for "reliable change" with the vast majority of these changes reaching the threshold for clinical significance 24/52 (46.15%); while, 42% (22 of 52) did not change, and 10% (5 of 52) reliably deteriorated. Spontaneous improvements were also found in the control group: 21.74% (10 of 46) showed reliable improvement, with 19.57% (9 out of 46) reaching the threshold for clinical significance. 10.87% deteriorated (5 of 46).

At follow-up, 52% (27 of 52) of the participants who received the ACT intervention met the criteria for "reliable change" with the vast majority of these changes reaching the threshold for clinical significance 26/52 (50%), while, 40% (21 of 52) did not change, and 7% (4 of 52) reliably deteriorated. Spontaneous improvements were also found in the control group at follow-up: 34.78% (16 of 46) showed reliable improvement, with 30.43% (14 out of 46) reaching the threshold for clinical significance. 8.70% deteriorated (4 of 46). For a visual representation of group changes see Figure 3.3.

59.62% (31 of 52) of the participants who took part in the intervention, were initially distressed at baseline (GHQ-12 baseline score ≥ 4). Of the participants with high levels of distress, 77.4% (24 of 31) of the participants improved significantly (GHQ-12 < 4) at post-intervention and 83.87% at follow-up (26 of 31). For a visual representation of changes of participants with high levels of distress at baseline see Figure 3.4.

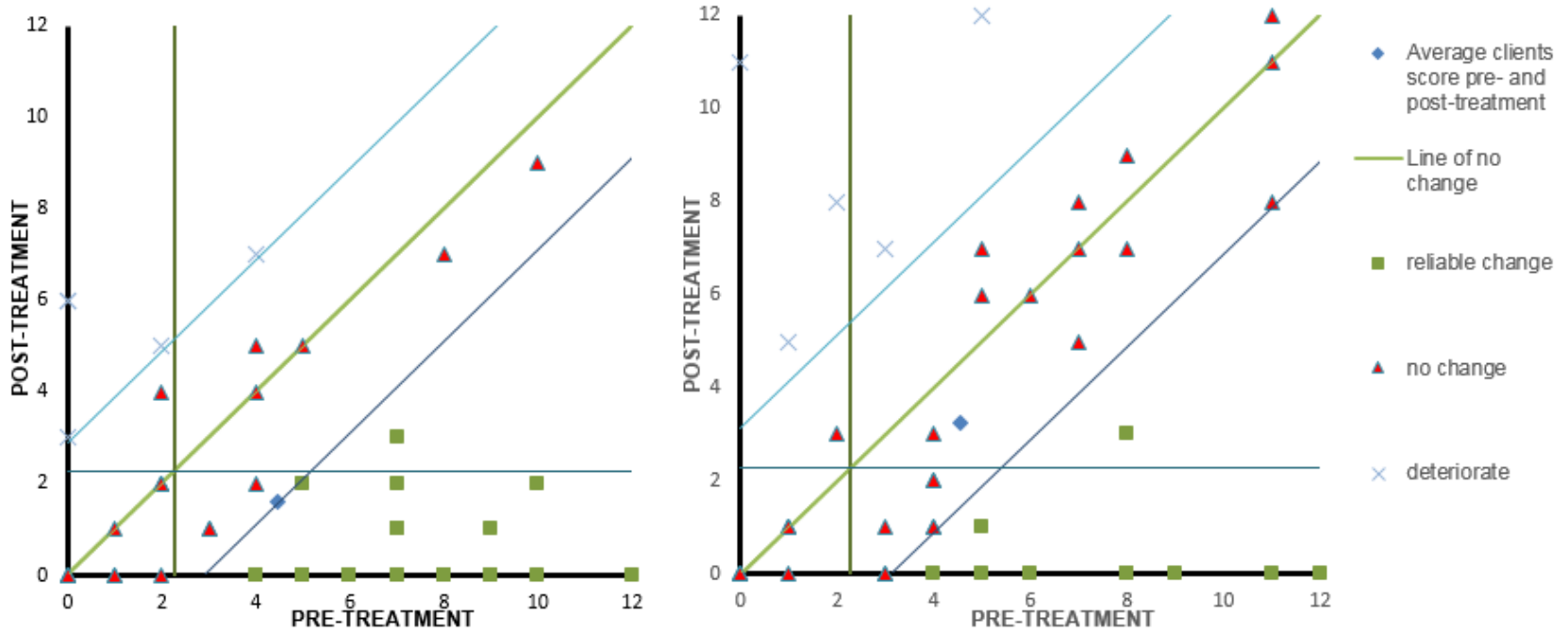

Figure 3-3 Reliable and clinically significant change from baseline to post-intervention in psychological distress (GHQ-12) in the ACT group (left) and in the control group (right)

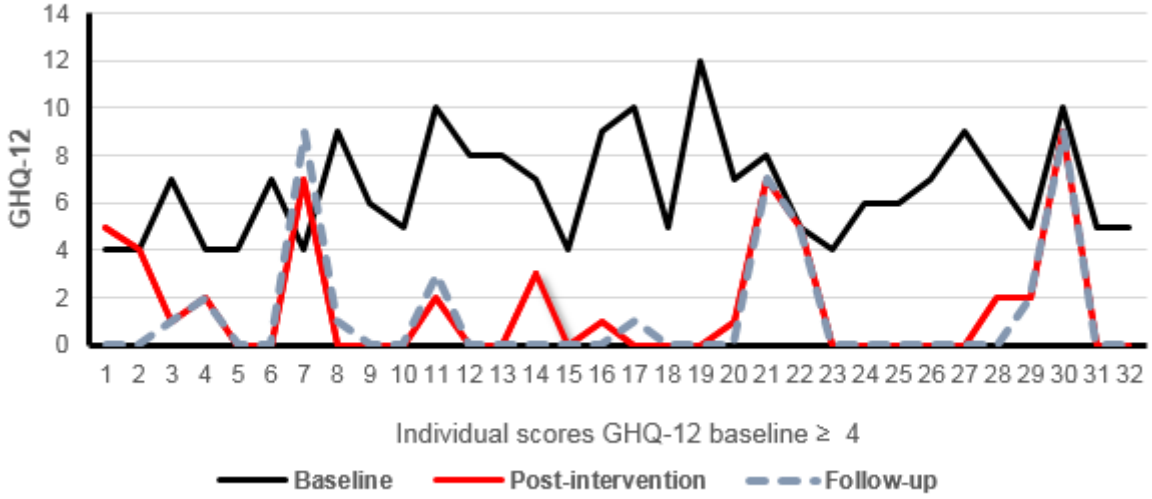

Figure 3-4 Individual change for highly distressed participants at baseline (GHQ-12 ≥ 4) and who received the intervention (N=32), from pre-treatment to follow-up

3.4 Discussion

This study aimed to test the effectiveness of an ACT-based workplace intervention for improving psychological distress (primary outcome) and burnout, work-related worry and rumination and perceived patient safety in NHS staff (secondary outcomes). The results showed that the primary outcome, psychological distress, showed a significant improvement in the ACT treatment arm compared to a waitlist control. However, for the secondary outcomes, the ACT intervention only led to significant improvements in the cognitive weariness aspect of burnout. No statistically significant main effects of the ACT intervention were found for work-related worry and rumination, perceived safety practices or for the physical or emotional exhaustion components of burnout. In support of hypothesis 2, mindfulness, values and self-compassion mediated improvements in psychological distress and the cognitive weariness aspect of burnout. The impact of the ACT intervention was found to be moderated by initial levels of distress with those with high levels of psychological distress tending to respond better to the intervention. Lastly, reliable and clinically significant changes in psychological distress were apparent in larger proportions of those in the ACT arm, with twice as many showing reliable change in the intervention group compared to controls and very few deteriorations, and with clear improvements for those who were particularly distressed at baseline.

Overall, our expectations for the first hypothesis were partially met. As predicted, we found a significant condition by time interaction for the primary outcome, psychological distress. This finding is consistent with the positive findings of ACT interventions for distress observed in a number of RCT studies in workplace contexts (e.g., Bond & Bunce, 2000; Brinkborg et al., 2011; Flaxman & Bond, 2010a; McConachie et al., 2014; Waters et al., 2018; Smith & Gore, 2012). Our finding is important because the intervention was conducted with NHS staff, who are at particular risk of experiencing poor wellbeing and burnout (O'Connor, Johnson & Hall, 2021). For the secondary outcomes, there was evidence of a small effect for burnout. This finding is consistent with a few ACT studies in the workplace (e.g., Hayes et al., 2004; Lloyd et al., 2013; Smith & Gore, 2012). However, our study is the first that aimed to investigate burnout by employing the Shirom Melamed Burnout Measure – which assessed a key component of burnout, cognitive weariness. Our finding suggests that burnout is likely to be related to psychological cognitive functioning, and therefore, is more amendable to change following an ACT intervention. In contrast, for the emotional exhaustion component of burnout, the lack of between-group differences may be because the ACT intervention does not target organisational

factors that are likely to contribute to the development of emotional exhaustion. This is consistent with the Conservation of Resources theory that conceptualises emotional exhaustion as related to work, with a focus on the context and organisational settings. Indeed, emotional exhaustion is the result of chronic exposure to a stressful and demanding work environment, and therefore, will be more difficult to change at an individual level (see Maslach, Schaufeli, & Leiter, 2001, for a review on burnout).

Given the positive change in the primary outcome, it was surprising that the ACT intervention did not yield benefits for the burnout-related component of work-related worry and rumination. The lack of significance of work-related worry and rumination may depend on the nature of the intervention delivered which specifically aimed to improve psychological flexibility, and not worry and rumination. Although a bulk of research has shown that the ACT training has a potential to decrease worry and rumination (e.g., Dereix-Calonge et al., 2019), the interventions delivered in these studies aimed to specifically improve repetitive negative thinking. In contrast, the intervention delivered in this trial aimed to specifically improve mindfulness, values and cognitive defusion skills. Cognitive defusion is specifically designed to help people disentangle from the content of troubling or currently unhelpful thoughts and cultivate the capacity to notice such thoughts from a decentred perspective as passing events in the mind (Hayes et al., 2011). Although it was not assessed, it may be that cognitive defusion skills, or the believability of negative thoughts, may have improved, as shown in several ACT interventions in the workplace (e.g. Hayes et al., 2004; Bethay et al., 2013; McConachie et al., 2014; Gerhart et al., 2016; Varra et al., 2008; Pakenham et al. 2015).

This study did not show a direct effect of the ACT intervention on patient safety. However, for the first time, this study showed that the ACT intervention led to a significant reduction in perceived patient safety via reduction of psychological distress. This finding is in line with the patient safety literature (e.g., Johnson et al., 2018; O'Connor et al., 2021; Panagioti et al., 2017) that suggests that psychological distress is a strong proxy of perceived safety practices. Although this finding needs to be replicated in a larger trial, this result is important and suggests that ACT training programmes may have an indirect influence on patients. It may be indeed that skills HCPs learn during the training programmes are transferrable and utilised in clinical practice.

'Patient safety' is a broad construct that is quite challenging to assess in healthcare settings. Although an objective measure of patient safety (e.g. incident reports or chart audits) might have been best to assess such a complex

construct, the number of people realistically making errors or mistakes at work is low. Therefore healthcare researchers may encounter problems with analysing this type of data (e.g. data skewness). An alternative is asking participants whether they have made a mistake or not (e.g. self-reported measures). Although using these measures is much more time-efficient and practical, these measures are subject to memory recall and social desirability biases (Hall et al., 2016).

In the current study, the safe practitioner measure was employed. In the validation paper (Louch et al., 2014), the measure correlated with self-reported patient incidents meaning that safer practitioners reported being less involved in patient safety incidents. Although there is some evidence from this data of an association between perceptions of safety behaviours and actual safety behaviours, the question remains. If the two measures correlate, then the results from the current study (and measures) suggest that this is a valid alternative and more straightforward method to assess patient safety in primary care.

The significant mediation effects of mindfulness and values are consistent with the ACT underlying theory (Hayes et al., 2012) suggesting that the intervention works through improvements in mindful awareness and valued living. These results are also consistent with previous ACT interventions in the workplace (Bond & Flaxman, 2006; Flaxman & Bond, 2010a; Waters et al., 2018). Also, this result has direct implications for third-wave behavioural therapies more generally (e.g., mindfulness based cognitive therapy or mindfulness-based stress reduction) providing evidence that interventions that include mindfulness-based exercises in their protocol may be effective for NHS staff. It is worth noting how our study differs from previous ACT interventions in the workplace. Although previous studies have found an indirect effect of mindfulness (e.g. Waters et al., 2018) or psychological flexibility (e.g., Bond & Flaxman, 2006; Flaxman & Bond, 2010a), to our knowledge, this is the first study to show a significant improvement in psychological distress of NHS staff through an improvement of values. This finding suggests that ACT programmes for NHS staff would benefit from integrating mindfulness and values components. This study also found that an ACT-based intervention improved psychological distress and burnout via self-compassion. This finding suggests that ACT-workplace interventions with the inclusion of self-compassion techniques may be beneficial for targeting these outcomes.

Reliable and clinically significant change data from this RCT confirms preliminary findings from previous studies in workplace contexts. Changes

appear to be significant for many participants (46%) with twice as many participants showing reliable change in psychological distress following the intervention than spontaneous improvements in the waitlist control. For example, Flaxman and Bond (2010b) found that 69% of those who received the ACT programme improved with a clinically significant change. Similarly, Brinkborg et al. (2011) found that 42% of social workers who received the ACT training improved with a clinically significant change at post-intervention. This finding is important and confirms that ACT training programmes may be particularly helpful for employees who are experiencing psychological distress. The results from our trial suggests that future research should investigate whether this intervention may be particularly helpful for those groups with mental health conditions (e.g., bipolar affective disorder or paranoid psychoses). Also, few deteriorations and the same number of participants in the control group suggests that the ACT intervention is unlikely to be harmful.

Results from the moderation analyses are in line with previous ACT RCTs in the workplace (e.g., Bethay et al 2013; Brinkborg et al., 2011; Flaxman & Bond, 2010b) suggesting that employees enrolled in ACT workplace-based interventions may respond differently to the ACT training according to their initial levels of distress. Specifically, results from these analyses showed that the intervention effects may be greater for participants with higher levels of psychological distress at baseline. The current results suggest that the intervention may be more effective for reducing psychological distress in those clinically distressed and help them to improve with a clinically significant change. Flaxman and Bond (2010b) suggest that a better classification of ACT stress-management intervention would be to classify these based on both their impact and the group of employees targeted. This was previously illustrated by De Vente et al. (2008). Although implications of this finding may lead one to think that this intervention should be targeted to NHS staff with symptomatic levels of stress, screening participants within the NHS may raise issues related to staff equality and stigmatisation. These issues may need attentive consideration before proceeding with the screening of participants' initial distress.

We recognise there are a number of shortcomings of this current study. First, the level of attrition of participants was relatively high. Of the 98 participants who completed the baseline survey, 63 completed four time-points. Although it is possible to hypothesise that NHS staff who did not find the intervention beneficial were less disposed to continue, there were no significant differences between participants who only completed baseline and those who completed

baseline and at least another survey. Also, to limit the impact of the drop-outs, in the current study we employed intention-to-treat analyses with last observation carried forward. Missing data in a RCT may be a threat, therefore, future research ought to explore further the barriers that NHS staff may encounter when undertaking ACT training (e.g., workload, high turnover, job sickness, schedule, and reminders for questionnaire completion). With regards to patient safety practices, it is possible that the heterogeneous nature of the sample with 20.7% participants working in a managerial or administration roles and without direct contact with patients may have diluted or impacted this outcome. Also, we are aware of the limitations of including a perceived measure of patient safety. Future research should consider the inclusion of a larger sample size and aim to incorporate objective measures of patient safety outcomes.

3.5 Conclusion

This study showed that the ACT intervention is a useful intervention for improving psychological distress in HCPs working within the NHS, including GPs, nurses, clinical psychologists and managers. Mindfulness, values and self-compassion were found to be the most effective mediators of intervention effectiveness. The intervention was particularly effective for those with high levels of distress at baseline. Reliable and clinically significant changes were found in 46% of the participants receiving the intervention. The findings should be confirmed in a large scale randomised controlled trial.

Chapter 4

Psychological Distress, Burnout, and Safe Practice among Healthcare Professionals: Predictive Influences of Mindfulness, Values, and Self-Compassion

This chapter aims to: provide the first investigation of the combined and unique influences of mindfulness, values, and self-compassion as established psychological factors in predicting safe practice; confirm the role played by mindfulness in relation to psychological distress, burnout and safe practice in healthcare staff working in West Yorkshire, England; and investigate whether values and self-compassion predict additional variability in psychological distress, burnout, and safe practice above and beyond mindfulness skills. The results from this chapter hold implications for the design of psychological interventions to improve patient safety, psychological distress and burnout in HCPs. This chapter aims to address aims 2-4 of this thesis.

4.1 Introduction

Poor wellbeing and high levels of work-related stress are well-documented in HCPs (Johnson et al., 2018; O'Connor et al., 2020). Prolonged symptoms of work-related stress can have serious consequences at an individual level (poor work-life balance, reduced quality of life, substance abuse and suicidality) and at an organisational level (high staff turnover, sickness absence, poor quality of care), both of which contribute to poor patient care (Hall et al., 2016; Johnson et al., 2018). When HCPs experience symptoms of distress following an error or near miss, they may be reluctant to seek help. As a consequence, depression, anxiety, shame and guilt are reported consistently (see Sirriyeh et al., 2010; Seys et al., 2013, for reviews). These effects may affect the health and wellbeing of “second victims” – clinicians who encounter a medical error or witness adverse events (Stewart, Lawton, & Harrison, 2015).

Given these challenges, we designed the current study to examine the potential influences of various psychological processes on both stress-related and patient safety outcomes among HCPs. Specifically, we explored the role played by a number of variables proposed by the theories underlying “third wave” cognitive behavioural therapies, such as ACT, mindfulness-based interventions, and compassion-based therapies (e.g., CFT, CMT) as important determinants of psychological wellbeing, alongside more established factors such as work-

related worry and rumination. Specifically, we investigated the integration of values and self-compassion alongside mindfulness in explaining psychological distress, burnout and perceived safety of practice among healthcare staff. It is hoped that the findings will hold practical implications for the design of ACT and mindfulness-based programmes being delivered to staff in healthcare settings. In particular, we intend to examine the congruency of this study's findings with recent discussions around integrating values-based behavioural processes within mindfulness interventions (Puolakanaho et al., 2020), and the potential benefits of integrating self-compassion strategies within workplace ACT programmes.

4.1.1 Mindfulness, values and self-compassion in healthcare professionals

The first variable of interest in the current study is mindfulness. Mindfulness is commonly defined as "paying attention in a particular way: on purpose, in the present moment, and non-judgmentally" (Zinn, 1994, p.4). Growing evidence suggests that mindfulness-based programmes are effective for improving wellbeing in HCPs (see Bartlett et al., 2019, for a review). These programmes also teach acceptance-based ways to interact with unwanted emotions as alternatives to unhelpful attempts to control or avoid these experiences (experiential avoidance) (Lindsay & Creswell, 2017).

Secondly, we are interested in investigating the role of values, which is explicitly included as the motivational and behavioural activation process within ACT's intervention model. Values are defined as one individual's freely chosen orientations (e.g., caring for others) that influence daily behaviours, goals and activities (e.g., caring for a severely ill patient) (Wilson, 2009).

The close integration of mindfulness and values-based processes has long been a feature in newer types of workplace cognitive behavioural programmes, such as ACT (e.g., Bond & Bunce, 2000; Flaxman et al., 2013). However, little is known about the more specific role of values-based processes above and beyond mindfulness and, specifically, the degree to which both values progress (e.g., engaging in action that is consistent with personal values) and values obstruction (e.g., experiences of obstacles to pursuing such actions) uniquely influence psychological distress, burnout, and practice outcomes among healthcare staff.

The third variable of interest is self-compassion, the primary treatment target of compassion-based therapies (e.g., CFT, CMT, Gilbert, 2009). Compassion-based therapies aim to engender self-compassion by helping participants

reduce the amount of harshly comparative and self-critical thoughts being experienced (self-kindness), by teaching self-reflection and self-awareness skills (mindfulness), and purposefully adopting a caring approach toward oneself, patients and colleagues (common humanity) (Neff, 2003a). Several studies have shown that self-compassion correlated positively with wellbeing in HCPs (Beaumont et al., 2016a, 2016b; Linley & Joseph, 2007).

In recent years, there has been growing interest in integrating self-compassion processes in cognitive behavioural interventions with the overarching aim of helping clients to engage more fully in value-consistent behaviours with self-kindness and self-validation (e.g., Neff & Tirch, 2013; Polk et al., 2016). In healthcare contexts, self-compassion techniques can support employees to deal with negative emotions such as shame and guilt, especially in the face of errors and patient incidents. Self-compassion can help foster particular qualities such as self-kindness, self-awareness or recognizing one's own humanity. However, in the current literature little is known about the combined and unique influences of mindfulness, values, and self-compassion on the psychological health and practice of HCPs.

Finally, we were interested in testing whether these variables together explain unique variance in addition to more established drivers of poor wellbeing and burnout in working populations, such as worry and rumination (Brosschot et al., 2006; Flaxman et al., 2012; O'Connor et al., 2013; O'Connor, Hall & Johnson, 2021). In this study, we were interested in investigating work-related worry and rumination (work-related WR), defined as perseverative “thought or thoughts directed to issues relating to work” (Cropley & Zijlstra, 2011, p. 6).

While previously separate strands of evidence suggest that each of the focal variables contribute to wellbeing in HCPs, it is unknown the extent to which they are associated with perceived safety of practice. Also, in terms of informing practice, it seems timely to investigate whether values and self-compassion processes can account for unique variance in HCPs’ psychological distress, burnout and perceived safety of practice beyond mindfulness alone. Understanding the unique effects for one or more of these variables allow us to understand which processes should be optimally targeted within existing mindfulness programmes that are being delivered in the workplace, and particularly to staff in healthcare organisations.

Primary aims

1. To investigate the association between mindfulness, values, self-compassion, work-related worry and rumination and perceived safety of practice in a sample of NHS staff;

2. To confirm the role played by mindfulness in explaining psychological distress, burnout and perceived safety of practice in HCPs;

3. To explore whether values contribute unique variance in explaining psychological distress, burnout and perceived safety of practice after accounting for mindfulness;

4. To explore whether self-compassion contributes unique variance in explaining psychological distress, burnout and perceived safety of practice after accounting for mindfulness and values.

Secondary aim:

1. To explore whether mindfulness, values and SC explain unique variability in psychological distress, burnout and safety of practice beyond work-related WR.

4.2 Method

4.2.1 Design

A cross-sectional questionnaire-based study. The ethical approval was granted by the Institute of Psychological Sciences Research Ethics Committee (ref#17-0212 accepted on 22/07/2017).

4.2.2 Participants

98 staff (90.8 % female) within the NHS took part in this study. The mean age was 42.97 years (SD = 10.18). On average, staff reported working 34.14 (SD=8.5) hours per week and a mean of 8.06 (SD = 7.59) years in the current role. 48% of staff reported working full-time with the remainder working part-time.

4.2.3 Measures

Participants completed the survey via Bristol Online Survey (BOS).

4.2.4 Procedure

The NHS employees were contacted via the NHS Leeds primary care managers who sent out posters and advertisements for taking part in this research. If participants were interested in the research, primary care managers would send a link with the participant information sheet and a consent form to take part.

4.2.5 Measures

4.2.5.1 Psychological flexibility measures

Mindfulness was measured by following the compartmentalisation of attention monitoring and acceptance mechanisms suggested by Lindsay and Creswell (2017). The mechanism of attention monitoring was assessed with the Observing subscale of the Five Facet Mindfulness Questionnaire (FFMQ-15; Baer et al., 2008). The acceptance component of mindfulness was assessed with the Distress Endurance subscale of the Multidimensional Experiential Avoidance Questionnaire (MEAQ) (Gámez et al., 2011) and the FFMQ facets of Non-judgment and Non-reactivity. Higher scores in the subscales indicate higher acceptance, non-judgment and non-reactivity. The Cronbach's α for the MEAQ was .90, for the FFMQ-Observing was .70, for the FFMQ- Non-judgment was .78, and the FFMQ-Non-reactivity was .80.

Values. Values-based behaviour was assessed with the Valuing Questionnaire (VQ; Smout et al., 2014). This 10-item scale is designed to assess people's ability to engage in actions that are consistent with their personal values (values progression), and also their experiences of internal obstacles to pursuing such actions (values obstruction). Higher scores indicate value-based living *towards* personal values (values progression). For the values obstruction subscale, higher scores indicate value-based living *away* from personal values. The Cronbach's α in the current study was .79 for the progress component and .74 for the obstruction subscale.

Self-Compassion was measured with the short-form 12-item Self-Compassion Scale (SCS-SF; Raes et al., 2011). This scale assesses self-kindness, mindfulness and non-reactivity. In this study the total score was employed. Higher scores indicate higher self-compassion. The Cronbach's α in the current study was .83 for the total scale.

Work-related worry and rumination (Cropley et al., 2012; Flaxman et al., 2012) was investigated by combining the affective rumination scale and the perseverative cognition scale. The first scale (Cropley et al., 2012) measures worry and rumination during non-work time, and has demonstrated good

psychometric properties among various samples of UK workers (Cropley et al., 2012; Querstret & Cropley, 2012). The second scale was developed and validated by Flaxman and colleagues (Flaxman et al., 2012). It assesses the amount of work and rumination thoughts experienced during non-work time (e.g., evenings and weekends) over the past week. Higher scores indicate higher levels of worry and rumination. In the present sample Cronbach's alphas were .90 at baseline, .91 at mid-intervention, .93 at post-intervention and .90 at follow-up. The Cronbach's α for the combined worry and rumination scale was .93.

4.2.5.2 Psychological health outcomes and perceptions of safe practice

Perceived safety of practice. Perception of safe practice was measured using the Safe Practitioner measure via the following two items: "In the past four weeks, my practice was not as safe as it could be because of work related factors/conditions" (individual perceptions of organisational safety practices); and, "My practice is safe" (individual perceptions of personal safety practices). These measures were validated in previous studies (Louch et al., 2016; Louch, 2014).

Psychological distress. We used the 12-item General Health Questionnaire 12 (GHQ-12; Goldberg & Williams, 1992) to assess recent symptoms of distress. The Likert scoring method was used to assess the outcomes. Higher scores indicate higher psychological distress. The Cronbach's α in the current study was .84 for the total scale.

Burnout. The 14-item Shirom-Melamed Burnout Measure (SMBM; Shirom & Melamed, 2006) was employed to measure work-related burnout. Higher scores indicate higher burnout. The Cronbach's α in the current study was .90 for the total scale (α = .86 physical fatigue; α = .94 emotional exhaustion; α = .94 cognitive weariness).

4.2.6 Main ethical issues

Informed consent

Participants were made aware of the purpose of the project and how the findings were used. Participants were given the option to take part in the study or not. Participation was voluntary.

Confidentiality

Contact details like names were carefully managed with confidentiality. Only the researcher had access to the name of the participants and every name was associated with an unique identification code. All participants were instructed not to provide their names on the questionnaires at the beginning of the study. Participants were given instructions on how to create a unique and anonymous participant identifier code that they entered when they completed the survey. This ensured anonymity and confidentiality of the participant's responses.

Participants were not asked to provide any potentially personally identifiable information. Data were stored on a password-protected computer. Every effort was made to protect the identity of the participant involved in the study.

4.2.7 Statistical analyses

For the main analyses we employed the GHQ Likert method. Caseness of psychological distress was also calculated by using a GHQ-scoring method, with scores greater than 4 points indicating symptomatic levels of distress (Russ et al., 2012). Missing data was carried out using the Little's test (1988). The missing data was handled by using single imputation using the column mean of the relevant healthcare profession. The pattern of missing data was classified as missing completely at random (X^2 = 181.682, df=180, p=.45). Visual inspection of boxplots and computation of Cook's and Mahalanobis distance scores did not indicate any concerning outliers or influential cases.

Statistical analyses were conducted in SPSS (version 24). Pearson's correlations between variables of interest were examined, and effect sizes were interpreted as r = .10 weak, r = .25 moderate, and r = .40 strong effects (Cohen, 1988). Hierarchical regression analyses were conducted, after having controlled for age, length of time in the current role, number of hours typically worked in a week and mindfulness practice. Four hierarchical regressions were tested to explore whether: 1) mindfulness explained psychological distress, burnout (physical fatigue, emotional exhaustion, cognitive weariness) and perceived safety of practice; 2) values would add a unique contribution to mindfulness in explaining psychological distress, burnout, and perceived safety of practice; 3) self-compassion would add a unique contribution, after mindfulness and values, in explaining psychological distress, burnout, and perceived safety of practice; 4) psychological distress, burnout, and perceived safety of practice could be explained by the addition of mindfulness, values and self-compassion mechanisms together (step 2) to work-related worry and rumination (step 1).

4.3 Results

4.3.1 Descriptive statistics

Means, standard deviations and correlations for the outcomes and process measures are reported in Table 4.1. The mean GHQ-12 score was just above the cut-off indicating a symptomatic level of distress (M = 15.75, SD = 4.90) with participants reporting scores across the whole range of the scale: highly symptomatic (26.5), symptomatic (34.7), subclinical (22.4%), and asymptomatic (15.3%).

Table 4-1 Pearson's correlations between main study variables (N = 98)

	M	SD	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
PD (1)	15.75	4.91	1	**.50****	0.11	**.43****	0.18	-0.11	-0.04	-0.13	**-.42****	**-.40****	**.52****	**-.29****	**-.38****	**.46****
PF (2)	3.81	.97		1	**.26***	**.56****	**.20***	-0.0	0.03	-0.05	**-.25***	**-.24***	**.37****	**-.256***	**-.27****	**.48****
EE (3)	2.78	1.29			1	**.29****	0.13	-0.12	0.07	-0.12	**-.30****	**-.21***	0.17	-0.062	0.001	**.34****
CW (4)	3.85	1.33				1	**.21***	**-.20***	**-.26****	-0.10	**-.30****	-0.15	**.32****	**-.256***	-0.194	**.37****
PS (org) (5)	1.91	1.07					1	**-.54****	-0.16	0.05	**-.32****	-0.07	0.15	-0.085	-0.108	**.27***
PS (pers) (6)	1.83	0.89						1	**.22***	-0.05	**.25***	-0.01	-0.09	0.094	0.03	-0.10
DE (7)	41.63	7.63							1	0.03	**.22***	0.05	**-.22***	**.30****	0.12	-.049
OBS (8)	8.76	2.71								1	0.18	**.35****	-0.16	**.38****	**.44****	-0.16
NJ (9)	9.64	3.08									1	**.43****	**-.42****	**.36****	**.46****	**-.36****
NR (10)	8.06	2.54										1	**-.42****	**.47****	**.41****	**-.42****
VO (11)	19.02	5.72											1	**-.34****	**-.31****	**.29***
VP (12)	21.50	5.80												1	**.40****	-0.13
SC (13)	31.98	7.67													1	**-.24***
WR (14)	14.95	4.83														1

**Correlation is significant at the 0.01 level (2-tailed).
*Correlation is significant at the 0.05 level (2-tailed).
Note: CW = cognitive weariness;
EE = emotional exhaustion; DE = mindfulness (distress endurance); NJ = mindfulness (non-judgment); NR = mindfulness (non-reactivity); OBS = mindfulness (observing); PD = psychological distress; PF = physical fatigue; PS (org) = perceptions of organisational patient safety; PS (pers) = perceptions of personal patient safety; SC = self-compassion; VO (values-obstruction); WR = worry and rumination.

4.3.2 Associations between mindfulness, values, self-compassion, work-related worry and rumination, and perceived safety of practice

The participants who reported that their practice was safe were also more willing to accept unpleasant thoughts and emotions (mindfulness distress endurance) (r = .22, *p* = .03), and were making fewer judgments about their inner experience (mindfulness non-judgment) (r = .25; *p* = .01). Participants who reported that their practice was unsafe because of work-related related conditions, reported that they were less able to pay attention without judgment (mindfulness non-judgment) (r = -.32, *p* = .002), and had higher levels of work-related worry and rumination about work (r = .27, *p* = .008).

4.3.3 Role of mindfulness and values in explaining psychological distress, burnout and safe practice perceptions

Regarding mindfulness, for psychological distress, at step 1, mindfulness non-judgment together with mindfulness non-reactivity were found to be significant predictors, F (4, 93) = 7.176, *p* = <.001, accounting for 20% variance (see step 1 for each regression model in Table 4.2). For physical fatigue, mindfulness at step 1 was not found to be a significant predictor, F (4, 93) = 2.281, *p* = .066. For emotional exhaustion, mindfulness non-judgment at step 1, F (4, 93) = 3.157, *p* = .02, was found to be significant explaining 8% of the variance. For cognitive weariness, distress endurance (β = -.21, *p* = .04) and mindfulness-non-judgment (β = -.23, *p* =.04), at step 1 explained 10% of the variance. For both perceived safety of practice related to one's self (β = .27, *p* = .003) and perceived safety of practice related to work (β = -.33, *p* =.02), mindfulness non-judgment alone explained respectively 7% and 8% of the variance.

4.3.4 Testing the unique influence of values in explaining psychological distress, burnout and perceived safety of practice

Introducing values obstruction after mindfulness, did significantly enter the regression equation (see step 2 for each regression model in Table 2) for psychological distress (β = .39, *p* = <.001), contributing 12% of unique variance, and for physical fatigue (β = .31, *p* =.007), contributing 10% of unique variance. Values did not enter the regression equation for cognitive weariness, emotional exhaustion, or perceptions of patient safety.

4.3.5 Testing the unique influence of self-compassion in explaining psychological distress, burnout and perceived safety of practice

After controlling for both mindfulness and values, self-compassion was found to be a significant predictor of the emotional exhaustion component of burnout, explaining an additional 4% of variance (see step 3 for each regression model in Table). However, self-compassion was not a unique predictor of psychological distress, physical fatigue, cognitive weariness, or safe practice.

The results of the regression analyses are presented in Table 4.2.

4.3.6 Secondary aim

Combined measures of mindfulness, values and self-compassion added 23% of unique variance after work-related worry and rumination were included in the models in explaining psychological distress, 14% to physical fatigue and 12% to the cognitive weariness component of burnout (see Table 4.3).

Table 4-2 Hierarchical linear regression models testing the relationship between mindfulness, values, self-compassion and psychological health

		Predictors	β step 1	β step 2	β step 3	R2 change for step	Total ΔR2
		Psychological distress					
Step 1	Mindfulness	Distress endurance (EA)	.05	.13	.13		**.20****
		Mindfulness-Observing	.03	.05	.11		
		Mindfulness-Non-judgment	**-.31****	**-.20***	-.14		
		Mindfulness-Non-reactivity	**-.28***	-.14	-.12		
Step 2	Values	Values-Progression		-.08	-.06	**.12****	**.31****
		Values-Obstruction		**.39****	**.38****		
Step 3	Self-Compassion	Self-Compassion			**-.20**	.02	.33
		Physical fatigue					
Step 1	Mindfulness	Distress endurance (EA)	.09	.18	.18		.05
		Mindfulness-Observing	.05	.09	.15		
		Mindfulness-Non-judgment	-.20	-.09	-.04		
		Mindfulness-Non-reactivity	-.17	-.02	.00		
Step 2	Values	Values-Progression		-.20	-.18	**.10****	**.14****
		Values-Obstruction		**.31****	**.30****		
Step 3	Self-Compassion	Self-Compassion			-.17	.02	.15
		Emotional exhaustion					
Step 1	Mindfulness	Distress endurance (EA)	.14	.13	.13		**.08***
		Mindfulness-Observing	-.05	-.07	-.15		
		Mindfulness-Non-judgment	**-.29****	**-.29****	**-.37****		
		Mindfulness-Non-reactivity	-.08	-.09	-.11		
Step 2	Values	Values-Progression		.09	.06	.00	.07
		Values-Obstruction		.06	.07		
Step 3	Self-Compassion	Self-Compassion			**.26***	**.04***	**.11***
		Cognitive weariness					
Step 1	Mindfulness	Distress endurance (EA)	**-.21***	-.15	-.15		**.10***
		Mindfulness-Observing	-.05	-.02	-.01		
		Mindfulness-Non-judgment	**-.23***	-.17	-.16		
		Mindfulness-Non-reactivity	-.03	.07	.07		
Step 2	Values	Values-Progression		-.11	-.11	.04	.12
		Values-Obstruction		.20	.20		
Step 3	Self-Compassion	Self-Compassion			-.02	.00	.11
		Patient safety (personal)					
Step 1	Mindfulness	Distress endurance (EA)	.17	.16	.16		**.07***
		Mindfulness-Observing	-.06	-.07	-.05		
		Mindfulness-Non-judgment	**.27****	**.27****	**.29****		
		Mindfulness-Non-reactivity	-.12	-.13	-.12		
Step 2	Values	Values-Progression		.04	.05	.00	.05
		Values-Obstruction		.00	.00		
Step 3	Self-Compassion	Self-Compassion			-.07	.00	.04
		Patient safety (organisational)					
Step 1	Mindfulness	Distress endurance (EA)	-.09	-.09	-.09		**.08***
		Mindfulness-Observing	.09	.10	.10		

		Mindfulness-Non-judgment	**-.33****	**-.32****	**-.32****		
		Mindfulness-Non-reactivity	.04	.05	.05		
Step 2	Values	Values-Progression		.01	.01	.00	.06
		Values-Obstruction		.03	.03		
Step 3	Self-Compassion	Self-Compassion			-.01	.00	.05

EA: Experiential avoidance scale

Note:
** p<.005
* p<.05

Table 4-3 Hierarchical linear regression models with work-related worry and rumination (step 1), mindfulness, values and self-compassion (step 2)

Model			R2 change for step	Total ΔR2
1		**Psychological distress**		
	Step 1	Work-related worry and rumination		**.20****
	Step 2	Mindfulness		
		Values	**.23****	**.39****
		Self-Compassion		
2		**Physical fatigue – burnout**		
	Step 1	Work-related worry and rumination		**.23****
	Step 2	Mindfulness		
		Values	**.14****	**.32****
		Self-Compassion		
3		**Emotional exhaustion - burnout**		
	Step 1	Work-related worry and rumination		**.11****
	Step 2	Mindfulness		
		Values	.10	.15
		Self-Compassion		
4		**Cognitive weariness - burnout**		
	Step 1	Work-related worry and rumination		**.13****
	Step 2	Mindfulness		
		Values	**.12***	**.19***
		Self-Compassion		
		Patient safety – individual		
	Step 1	Work-related worry and rumination		-.00
	Step 2	Mindfulness		
		Values	.11	.04
		Self-Compassion		
5		**Patient safety - organisational**		
	Step 1	Work-related worry and rumination		**.06****
	Step 2	Mindfulness		
		Values	.09	.09
		Self-Compassion		

**p<.005
* p<.05

4.4 Discussion

Three main findings emerged from this study. First, it was found that those who reported that their practice was safe presented higher scores in distress endurance (acceptance) and in the non-judgment component of mindfulness. Second, values explained unique variance in psychological distress and physical fatigue, above and beyond the influence of attentional and attitudinal facets of mindfulness. Third, self-compassion explained unique variance in emotional exhaustion after both mindfulness and values were included in the models. These findings lend support to the view that mindfulness-based programmes delivered in the workplace could be enhanced by the inclusion of value-based behavioural activation components (e.g., Puolakanaho et al., 2020).

To the best of our knowledge, this is the first study to investigate relationships between variables such as specific components of mindfulness, values, and self-compassion in relation to perceived safety of healthcare practice. These findings are important because they suggest that mindfulness processes could affect the perceived safety of practice in several ways. Considered prospectively, experiential avoidance (the opposite of acceptance) could lead to avoidance of difficult emotions that might arise with the need to change behaviour in the service of implementing safe practice. Or perhaps the relationship between these variables is explained by participants who have made mistakes at work, trying to avoid having the emotions and thoughts that come along with reflecting on one's mistakes.

The findings may also have practical implications for mindfulness-based interventions in the workplace. For example, staff who perceive themselves to have made a mistake may benefit from a mindfulness-based approach with an acceptance focus –on developing their ability to open-up to associated aversive emotions, like fear and anxiety. Similarly, it may be that training HCPs to notice their experiential avoidance could lead to better patient safety of practice. Disentangling the direction of the relationships between experiential avoidance and safety practices will allow us to know which intervention strategies are likely to be most effective. To this end, prospective study designs, such as daily diary studies, are recommended.

Commensurate with several previous studies (McCracken & Yang, 2008; Vilardaga et al., 2011; Noone & Hastings, 2011), findings from this study also confirm the role played by mindfulness and values in explaining significant proportions of variance in psychological distress (31 %), and several aspects of

burnout: physical fatigue (14 %), emotional exhaustion (8%), and cognitive weariness (10 %).

With regards to our second aim, self-compassion explained a small yet statistically significant portion of additional variance (4%) in emotional exhaustion once mindfulness facets and values-based behaviour had been accounted for. These results are compatible with previous reviews of research involving HCPs showing the potential role of self-compassion in helping HCPs reduce stress and increase clinical effectiveness (Raab, 2014). Based on the Conservation of Resources conceptualisation of job burnout, the emotional exhaustion measure used in this study was specifically capturing HCPs' emotional resources for offering interpersonal support at work (an example item was "I feel I am not capable of investing emotionally in co-workers and patients"). Accordingly, the predictive role of self-compassion in relation to this aspect of burnout implies that an increase in self-compassion could provide HCPs with adequate resources for helping co-workers and patients without becoming personally over-depleted (Shirom, 2003). In terms of the intervention implications, this unique relationship observed between self-compassion and emotional exhaustion (above and beyond both mindfulness and values) suggests that workplace programmes targeting staff burnout would benefit from the deliberate cultivation of self-compassion around existing strategies (see Polk et al., 2016; Tirch, 2010).

Results from this exploratory study should be interpreted cautiously given a number of limitations. First, while the findings regarding relationships between experiential avoidance and perceived safe practice are novel, causality cannot be assumed due to the cross-sectional design employed. Second, self-report and not behavioural measures were used. Third, a relatively small convenient sample of NHS staff in England were recruited, potentially reducing the generalisability of results. Fourth, one of the limitations of this study is the reliance on self-reported measures of patient safety. In health psychology research, various studies have documented that perceptions and actual behaviours are not the same (Armitage & Conner, 2001). Therefore, findings from this study need to be interpreted cautiously. It is recommended that future researchers also investigate the inclusion of objective measures of patient safety in their work, preferably over a longer time window, to assess the variability of these events over a more extended amount of time.

In conclusion, this study has shown that the attitudinal facets of mindfulness (i.e., experiential avoidance and non-judgment) are associated with perceptions of safe practice among HCPs. The findings suggest that practitioners who adapt

mindfulness-based interventions for workplace settings could consider the potential of integrating techniques designed to promote mindful awareness of values-oriented behaviour. Similarly, our results suggest that mindfulness programmes delivered to reduce burnout among healthcare staff could be enhanced by integrating processes that target self-compassion.

Chapter 5

Mental Health during the COVID-19 Pandemic: Exploring the Role of Psychological Flexibility and Stress-related Variables

Understanding the impact of the COVID-19 pandemic on the mental health of the UK population, and the psychological factors associated with this can help inform subsequent interventions to protect psychological health. The current study aimed to investigate changes in psychological health (wellbeing, life satisfaction and burnout), protective factors (state mindfulness, values and self-compassion) and risk factors (COVID-19 stress, worry and rumination) for mental health during the COVID-19 pandemic starting in April 2020. The results inform stakeholders and policymakers of the beneficial effects of mindfulness, values and self-compassion as potential targets for intervention. This chapter aims to address aim 5 of this thesis.

5.1 Introduction

Public health emergencies are a substantial threat to healthcare systems and the health and wellbeing of both patients and the general public (Quinn, 2008). In January 2020, a novel coronavirus outbreak spread from China to more than 215 other countries, including the UK. The novel coronavirus is named severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), while the disease-associated with it is COVID-19.

The emerging psychological evidence on COVID-19 has mainly focussed on understanding the negative effects of the pandemic on psychological health (e.g., Fullana et al., 2020; Li et al., 2020; Wang et al., 2020). These studies confirmed data from previous infectious diseases (e.g., Brooks et al., 2020), showing that public health measures such as isolation, quarantine and community containment are effective in slowing down the spread of the disease (Wilder-Smith & Freedman, 2020). However, restrictive measures are also likely to give rise to poorer mental health (e.g., Cheng & Tang, 2004; García-Fernández et al., 2020; Holmes et al., 2020; Wang et al., 2020; Xiong et al., 2020; Yu et al., 2005) especially in HCPs (e.g., Cartwright & Thomson, 2020; de Pablo et al. 2020; Kadhum et al., 2020; Khalafallah et al., 2020; Kannampallil et al., 2020; Wu et al., 2020). Moreover, contextual factors such as stress, worry and rumination related to COVID-19 may also pose a psychological challenge

to the health and wellbeing of those affected by the restrictive measures (e.g., Baiano et al., 2020; Satici et al., 2020; Zysberg & Zisberg, 2020).

During the COVID-19 pandemic, behavioural scientists and psychologists have played an important role in advising governments on how to implement lockdown and social distancing measures. However, as argued by O'Connor et al. (2020) in their COVID-19 psychological research priorities position paper, there is an urgent need for further evidence that informs governments and policies not only about the effects of the COVID-19 pandemic on the health and wellbeing of the UK population but also on the psychological factors that may be associated with increased wellbeing and life satisfaction during the pandemic. Indeed, whilst a large amount of the emerging evidence has focussed on understanding the negative effects of the pandemic on psychological health, less has investigated which psychological factors may protect or confer resilience. One such factor is psychological flexibility.

Psychological flexibility can be broken down into three sub-processes and is defined as "the capacity to persist or to change behaviour in a way that includes conscious and open contact with thoughts and feelings (acceptance), appreciates what the situation affords (mindfulness), and is guided by one's goals and values (values)" (McCracken & Morley, 2014, p. 8). Recent studies have shown that at times of great difficulty, such as wars (Tol et al., 2020), school shootings, devastating storms, or violent crime (e.g., Brockman et al., 2016; Gold & Marx 2007; Kumpula et al., 2011), higher psychological flexibility can help people function effectively even when experiencing strong emotions such as fear and anxiety. Presti et al. (2020) have argued that psychological flexibility skills can help individuals cope with the rigid narrative of anxiety and fear that is likely to guide their behaviours during the pandemic. For example, if a person experiences fear of contracting the virus (e.g., "I have the virus, so I will die"), when anxiety levels rise, making space for upsetting thoughts (e.g., actively listening to a supporting friend) (mindfulness), with self-kindness (self-compassion) may help to orient people towards the things they most care about (values), despite the anxiety.

A small number of cross-sectional studies have investigated the relationship between psychological flexibility and the negative effects of mental health during the COVID-19 pandemic. For example, Landi and colleagues (2020) assessed psychological flexibility, trait health anxiety, COVID-19 distress, anxiety, and depression in Italian adults. Results from this study showed that overall psychological flexibility was associated with reduced negative effects of trait health anxiety during the nationwide lockdown. In another study in Italian

adults, four sub-processes of psychological flexibility (self-as context, defusion, values, committed action), were found to be positively associated with mental health (Pakenham et al., 2020). In a study of UK residents (Dawson & Golijani-Moghaddam, 2020), overall psychological flexibility was positively related to wellbeing and negatively associated with depression, anxiety, COVID-19 stress and worry.

To the best of our knowledge, no studies have longitudinally examined the specific psychological flexibility processes that may help mitigate the current COVID-19 mental health crisis and there has been an over-reliance on cross-sectional methodologies. A longitudinal assessment and investigation with alternative methods (e.g., multilevel modelling) may offer a deeper understanding of whether psychological flexibility can mitigate the detrimental effects of COVID-19 on psychological health. Also, understanding which of the specific psychological flexibility processes (e.g., mindfulness, values and self-compassion) are most important in this context will help inform the development of future psychological interventions to improve psychological health and aid recovery from the current pandemic. If psychological flexibility processes facilitate adaptation in times of crisis, the current study will advance the current evidence on how to design effective psychological treatments (e.g., digital interventions) during stressful events - such as future outbreaks of emerging infectious diseases or natural disasters.

With this study, by employing a multilevel modelling approach, with longitudinal data collected across three time-points during the first wave of the COVID-19 pandemic, we aim to investigate whether specific psychological flexibility processes (mindfulness, values and self-compassion) may enhance greater mental health during the pandemic. Moreover, if, as hypothesised, psychological factors (mindfulness, values, self-compassion) have a positive influence on facilitating better psychological health and mitigate the negative effects of lockdown, targeting these factors that are modifiable by an intervention can inform and determine what psychological support is available throughout the pandemic, especially for the most vulnerable (immediate action).

5.1.1 Aims

1. To explore changes of psychological health (wellbeing, life satisfaction, and burnout), psychological flexibility (mindfulness, values and self-compassion), and COVID-19 stress, worry and rumination during the early stages of the COVID-19 pandemic.

2. To examine whether psychological flexibility (mindfulness, values and self-compassion) is associated with better psychological health, and whether COVID-19 stress, worry and rumination are associated with poorer psychological health during the early stages of the COVID-19 pandemic.

5.2 Method

5.2.1 Ethics and registration

This study received ethical approval (reference number: PSYC-23) from the School of Psychology (University of Leeds) Ethics Committee. The hypotheses for this study were pre-registered at "As Predicted" (URL: https://aspredicted.org/blind.php?x=xh9es6) during the data collection phase, but before data analyses commenced.

5.2.2 Participants

Participants were recruited through advertisements on Prolific Academic, social media (e.g., Twitter, Facebook) and university participant pool lists. Eligible participants were identified if they satisfied the general inclusion criteria – UK residents, fluent in English language, and aged over 18 years old.

Four hundred and thirty-nine participants agreed to take part in this study, and returned questionnaires at three time-points. Participants were aged between 18 and 75 years-old (M = 35.05; SD = 13.65) and consisted of 346 females (78.8%) and 93 males (21.2%). 77 (17.54 %) participants were HCPs, and of these 62 (80.52 %) were NHS workers. 18% of the participants were employed in a professional occupation, 11.7% were technicians and 20.6% were students. 15.2% of the participants were retired or unemployed because of COVID-19 at the start of the pandemic. 10.9% of the sample declared to have lost their jobs at the start of the pandemic (two weeks after the start of the lockdown), 16.2% to have had a pay cut, and 0.7% declared to be still working but with a pay cut. The sample consisted predominantly of White British (91.3%).

5.2.3 Design

Longitudinal questionnaire study with measures taken at three time-point measurements during the 1st wave of COVID-19 pandemic: Time 1 (April 1st-5th 2020), Time 2 (April 15th-19th April) and Time 3 (May 13th-17th 2020). This study employed an intensive repeated-measures design during the early stages

of the UK lockdown in order to allow us to examine changes during this time window.

5.2.4 Procedure

Participants who were interested in the study were invited to complete a participant information sheet which outlined the nature of the study. Interested participants also received a consent form with a link to the baseline survey to complete. Participants who wished to complete the study were asked to complete an online pre-survey that asked to confirm if they were over 18 year-old and reside in the UK. Participants completed a total of three surveys. Participants who completed the three surveys were then debriefed and given a chance of winning £100 Amazon Voucher upon completion of the study.

5.2.5 Measures

5.2.5.1 Psychological health

Psychological health was measured with three questionnaires capturing wellbeing, life satisfaction and burnout.

Wellbeing. A brief seven-item self-report inventory scale, the Warwick-Edinburgh Mental Wellbeing scale (SWEMWBS; Tennant et al., 2007), was used to assess wellbeing in the general population (e.g., “Over the past two weeks have you been feeling optimistic about the future?”). Items were rated on a scale that extended from 1 (none of the time) to 5 (all of the time). Raw scores were then converted to metric scores, as published in Stewart-Brown et al. (2009), to allow for comparisons with previous studies. Cronbach’s alpha for the summed scale was .84 for the first survey, .86 for the second survey and .86 for the third survey.

Life Satisfaction. One item was used ‘How satisfied are you with your life today?’ ranging from 0 (not at all satisfied) to 10 (extremely satisfied) (Hegarty et al., 2019). This single item measure has been shown to be reliable and valid (Hegarty et al., 2019).

Burnout. A brief 10-item scale was employed to assess job burnout, the Burnout Measure Short version (BMS; Malach-Pines, 2005). Participants were asked to rate how often they felt tired or disappointed with others (e.g., “During the past two weeks, when thinking about your work overall, how often have you felt tired or disappointed with people?”) for example, and to rate how often they felt burnout from 1 (never) to 7 (always). Cronbach’s alpha for the summed

scale was .90 for the first survey, .93 for the second survey and .94 for the third survey.

5.2.5.2 Psychological processes

Trait measures of mindfulness, values and self-compassion were only assessed by participants in the first survey.

Trait mindfulness. A brief 15-item scale, the 15-item Five Facet Mindfulness Questionnaire (FFMQ-15; Gu et al., 2016), was employed to assess trait mindfulness (e.g., “I pay attention to sensations, such as the wind in my hair and the sun in on my face”). Items were rated on a scale that extended from 1 (never true) to 5 (always true). This scale is composed of 5 subscales that assess different aspects of mindfulness; observing, describing, acting with awareness, non-judging of experience and non-reactivity to difficult inner experience. In this study the total score was employed. Cronbach’s alpha for the scale was .77.

Trait values. Trait values were assessed with an adapted version of the Chronic Pain Values Inventory (CPVI; McCracken & Yang, 2006) published in Hegarty et al. (2019). Participants were asked to rate how important a series of values were for them such as health, family and friends, and work (e.g., “How important are family and friendship, work or health and self-care for you?”) on a scale from 0 (not at all) to 10 (extremely important)). Cronbach’s alpha for the scale was .68.

Trait self-compassion. Trait self-compassion was assessed with the 12-item Self-Compassion Scale (SCS-SF; Neff, 2003b). This measure captures the dispositional ability to treat oneself with kindness and compassion (e.g., “I try to be understanding and patient towards those aspects of my personality I don’t like”). Items were rated on a scale that extended from 1 (almost never) to 5 (almost always). In this study the total score was employed. Cronbach’s alpha for the scale was .89.

Participants responded to state measures of mindfulness, values and self-compassion at three time-points.

State mindfulness. Participants rated state mindfulness by completing an adapted version of the Mindful Attention Awareness Scale (MAAS; Brown & Ryan, 2003). In this study, this scale captured the present-to-present awareness experience over the past two weeks (e.g., “During the past two weeks, I found it difficult to stay focused on what was happening in the present”.

Items were rated on a scale that extended from 0 (extremely) to 6 (not at all)). Cronbach's alpha for the scale was .86 for the first survey, .91 for the second survey and .91 for the third survey.

State values. The engagement with personal values was rated on a three-item scale which was an adapted version of the Chronic Pain Values Inventory (CPVI; McCracken & Yang, 2006). Participants rated how engaged they were with their values (e.g., "During the past two weeks, how successful have you been living according to your values?") on a scale from 0 (not at all engaged) to 10 (extremely engaged)). Cronbach's alpha for the scale was .68 for the first survey, .67 for the second survey and .67 for the third survey.

State self-compassion. State self-compassion was assessed with an adapted version of the 12-item Self-Compassion Scale (Raes et al., 2011). This measure captured the ability to treat oneself with kindness and compassion (e.g., "During the past two weeks, I have tried to be kind and reassuring to myself"). Items were rated on a scale that extended from 1 (almost never) to 5 (almost always). Cronbach's alpha for the scale was .83 for the first survey, .80 for the second survey and .82 for the third survey.

COVID-19 stress, worry and rumination. COVID-19 related factors were assessed by investigating COVID-19 related stress, worry and rumination during the pandemic. Three items were utilised for this study. To assess COVID-19 stress, the participants were asked "In the past two weeks, to what extent has life become more stressful, difficult or upsetting because of the COVID-19 outbreak?" on a scale from 0 (not at all stressful, bothersome, upsetting) to 7 (very stressful, bothersome, upsetting). For COVID-19 worry participants were asked "Over the last two weeks, how often did you worry or focus on COVID-19-related things that may occur or happen in the future?" and invited to respond on a scale from 0 (never) to 7 (often). For COVID-19 rumination participants were asked: "Over the last two weeks, how often did you ruminate over COVID-19-related things that have happened to you, or upset you in the past?" on a scale from 0 (never) to 7 (often).

Other measures. A demographics questionnaire asked questions about participants' age, gender, occupation, job loss, keyworker status, healthcare professional or not.

5.3 Main ethical issues

Risk

There were no anticipated physical risks. Participants may have experienced some low level psychological upset or distress due to the sensitive nature of some of the questionnaires, however this was not anticipated to be long lasting and participants were adequately debriefed to ensure they did not suffer negative consequences. Participants were informed beforehand that questions were of a sensitive nature and reminded that if they felt upset or distressed at any time during the study they had the right to withdraw, and they did not have to answer any questions they did not wish to.

Steps to minimise risk

Risk to participants. Given the sensitive nature of the questions, contact details for mental health helplines were provided in the event that participants became distressed.

Data storage, confidentiality and disclosure

All data were stored on a University password encrypted computer, and were accessed only by the research team. Participants' data were recorded using anonymous codes. All participants were instructed not to provide their names on the questionnaires at the beginning of the study. Participants were given instructions on how to create a unique and anonymous participant identifier code that they entered when they completed the survey. This ensured anonymity and confidentiality of the participant's responses. Any personally identifiable information was kept secure and separate from participants' responses. The study aims, and the right to withdraw at any time, were stated in participants' information sheet that was sent before participants received the consent form to participate.

To ensure anonymisation was upheld, the following procedures were put in place.

1) Participants provided an email address. The email address was placed onto an Excel spreadsheet alongside their ID number. This spreadsheet existed purely to ensure if a participant wanted to withdraw their data they were able to (up until prize draw selection). This spreadsheet was not accessed other than to input new participants or to remove existing participants who wished to withdraw.

2) A second spreadsheet was set up with participants email addresses and 3 columns 'Survey 1 / Survey 2 / Survey 3'. This allowed the researcher to track the emails sent to the participants.

3) A third spreadsheet was set up which contained the participant IDs, this also included ID and 3 columns ‘Survey 1 / Survey 2 / Survey 3’. This allowed the researcher to track if participants were completing the questionnaires.

4) The rows from spreadsheet 2 to 3 did not match unless the researcher used spreadsheet 1, therefore, it was impossible to determine individual responses.

5.4 Data analysis

Preliminary analyses were conducted to explore data distributions and missingness. Outliers were visually assessed by computing boxplots. Little’s missing completely at random (MCAR) test was performed to explore whether data were missing completely at random. Simple imputation by using variable mean substitution was employed to replace missing data. Multilevel modelling analyses were employed using hierarchical linear modelling software (HLM) (Raudenbush et al., 2011). HLM allows for analyses of both within and between person processes. In this study, Level 1 variables (state measure of stress, worry, rumination, wellbeing, burnout, mindfulness, values, and self-compassion) were group mean centred. Level 2 variables (trait mindfulness, trait values, trait self-compassion) were grand mean centred. For the first aim, a series of one-way ANOVAs with Time as the within-subjects factor were conducted to investigate changes in wellbeing, life satisfaction and burnout during the 1st wave of the pandemic. Follow-up tests of simple effects were conducted, and effect sizes were reported with partial eta squared and were interpreted as 0.01 small, 0.09 medium, and 0.25 large effect sizes. For the second aim, using HLM and in the same model, we examined whether the level 1 slopes between state measures of mindfulness, values, self-compassion, COVID-19 stress, worry and rumination and the measures of psychological health (wellbeing, life satisfaction, and burnout) were statistically significant. Trait measures of mindfulness, values and self-compassion were included as covariates. The general form for the cross-level HLM model for each of the outcomes variables was:

Outcome variables (e.g., wellbeing, life satisfaction, burnout) = β00

+ β01*Trait Mindfulness + β02*Trait Values+ β03*Trait Self-Compassion

+ β10*State Values

+ β20* State Mindfulness

+ β30*State Self-Compassion

+ β40*COVID-19 Stress

+ β50* COVID-19 Worry

+ β60*COVID-19 Rumination

+ r0i+ ε

5.5 Results

5.5.1 Descriptive statistics

Descriptive statistics for the main study outcomes and psychological flexibility variables are presented in Table 5.1. Overall, at the start of the pandemic, the level of positive wellbeing reported by participants at Time 1 fell in the bottom 20% of responses meaning that wellbeing level at Time 1 was low by comparison with the UK population norm (M = 23.60; SD = .05). Life satisfaction (4.54/10) was lower compared to the mean average of the UK population in 2019 (6.8/10; Helliwell et al., 2019) and levels declined from Time 1 to Time 3. Overall burnout levels were low and were not markedly different by comparison with the mean average published in Malach-Pines (2005). Inspection of Table 5.1 also reveals that COVID-related stress, rumination and worry levels appeared to decrease throughout the six-week assessment period.

5.5.2 Aim 1. Changes in psychological health, COVID-19 stress, worry and rumination

Repeated measures ANOVAs with a Greenhouse-Geisser correction were performed to explore changes in psychological health (wellbeing, life satisfaction, and burnout), COVID-19 stress, worry and rumination (See Table 5.1 and Figure 5.1 and 5.2). From Time 1 to Time 3 there was a significant effect of Time on life satisfaction, F (1.913, 837.837) = 262.727, p = <.001, partial η2 = .38, COVID-19 worry F (1.975, 865.170) = 76.133, p = <.001, partial η2 = .15, and COVID-19 stress F (1.908, 839.195) = 58.145, p = <.001, partial η2=.12. From T1 to T3, participants reported a significant decrease in COVID-19 stress, COVID-19 worry and life satisfaction. Wellbeing, F (1.902, 833.140) = .698, p = .491, partial η2=.00, burnout, F (1.69, 630.57) = .71, p =.47, partial η2 = .00, and COVID-19 rumination, F (1.978, 866.532) = 2.349, p = .10 partial η2 = .01, did not change throughout the lockdown.

Pairwise comparisons using Bonferroni correction post hoc criterion for significance revealed that life satisfaction declined substantially from Time 1 (M = 4.54; SD = 2.20) to Time 3 (M = 2.76; SD = 2.09), and this difference was

statistically significant (p = <.001). COVID-19 stress (M = 4.85; SD = 1.28) and COVID-19 worry (M = 5.00 SD = 1.28) were higher at Time 1 than when these were measured at Time 3, for the former (M = 4.16; SD = 1.53) and the latter (M = 4.48; SD = 1.38), and these differences were statistically significant (p = <.001).

Table 5-1 Means, standard deviations of state measures of mindfulness, values, self-compassion and outcome measures

	Time-point 1		Time-point 2		Time-point 3		F (p-value)	Partial η2
	M	SD	M	SD	M	SD		
Wellbeing	20.02	3.54	20.13	3.68	20.17	3.60	.698 (*p* = .491)	.00
Burnout	2.38	1.29	2.45	1.54	2.39	1.58	.711 (*p* = .469)	.00
Life Satisfaction	4.54	2.20	2.69	2.02	2.76	2.09	262.727 (*p* = <.001)	.38
State mindfulness	3.29	1.32	3.43	1.43	2.49	1.45	7.665 (*p* = .001)	.02
State self-compassion	3.45	0.79	3.51	0.76	3.50	0.79	2.791 (*p* = .06)	.00
State values	5.57	2.13	4.78	1.97	4.86	1.99	50.411 (*p* = <.001)	.10
COVID-19 worry	5.00	1.28	4.65	1.39	4.48	1.38	76.133 (*p* = <.001)	.15
COVID-19 rumination	3.62	1.71	3.48	1.67	3.46	1.68	2.349 (*p* = .10)	.01
COVID-19 stress	4.85	1.28	4.40	1.45	4.16	1.53	58.145 (*p* = <.001)	.12

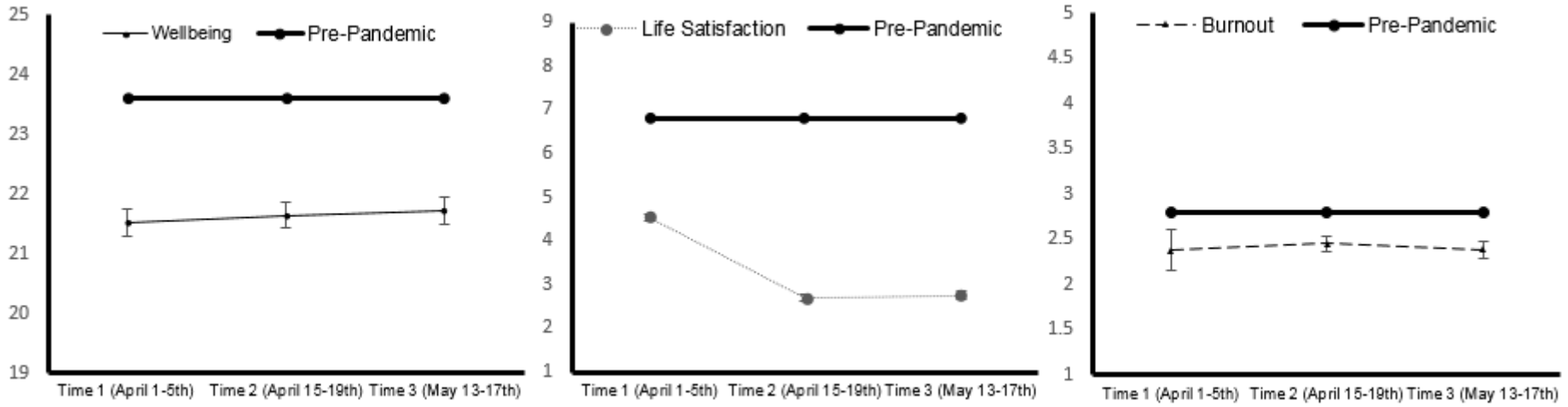

Figure 5-1 Changes in outcome measures at Time 1 (April 1-5th 2020), Time 2 (April 15-19th, 2020), and Time 3 (May 13-17th 2020)

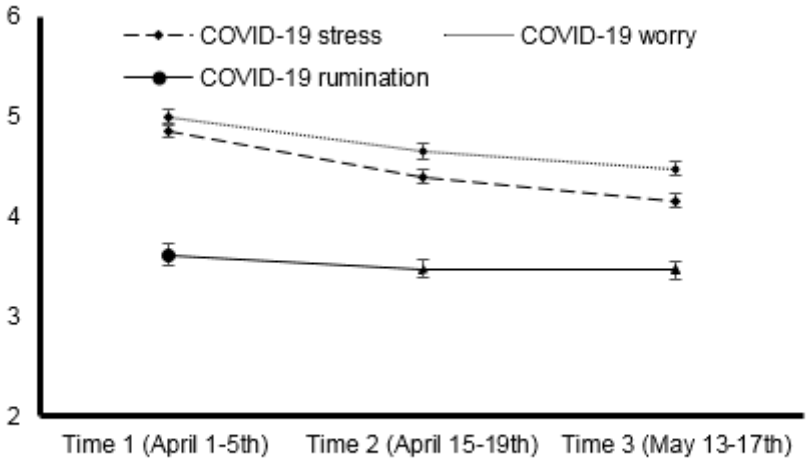

Figure 5-2 Changes in COVID-19 stress, worry and rumination at Time 1 1 (April 1-5th 2020), Time 2 (April 15-19th, 2020), and Time 3 (May 13-17th 2020). Error bars represent standard errors

5.5.3 Aim 2. Association between psychological flexibility, COVID-19 stress, worry and rumination, and psychological health

The results for these analyses are presented in Table 5.2 and they showed that state mindfulness (β = 0.341, *p* = <.001), state values (β = 0.211, *p* = <.001) and state self-compassion (β = 1.060, *p* = <.001) together with COVID-19 stress (β = -0.255, *p* = <.001) were all significantly associated with wellbeing during the early stages of UK lockdown. Higher scores in state values, state mindfulness and state self-compassion and lower scores in COVID-19 stress were associated with higher wellbeing. State self-compassion (β = .488, *p* = < .001) and state values (β = 0.221, *p* = < .001) together with COVID-19 stress (β = -0.154, *p* = .001) had a significant relationship with life satisfaction. Higher scores in state values and self-compassion and lower scores in COVID-19 stress were associated with higher scores in life satisfaction. State mindfulness (β = -0.131, *p* = .003), state values (β = -0.066, *p* = .009), and state self-compassion (β = -0.183, *p* = .025) together with COVID-19 stress (β = 0.171, *p* = <.001) and COVID-19 rumination (β = 0.082, *p* = .009) had a significant relationship with burnout. Lower scores in state mindfulness, and higher scores in state values, state self-compassion, COVID-19 stress and COVID-19 rumination were associated with higher scores in burnout.

Table 5-2 Association between psychological health (wellbeing, life satisfaction and burnout), psychological flexibility (mindfulness, values and self-compassion), and COVID-19 stress, worry and rumination

Wellbeing	β	Coefficient	SE	*d.f.*	p-value	**Life Satisfaction**	β	Coefficient	SE	*d.f.*	p-value	**Burnout***	β	Coefficient	SE	*d.f.*	p-value
Intercept	β_{00}	20.107	0.115	435	<0.001		β_{00}	4.595	0.081	435	<0.001		β_{00}	2.400	0.060	371	<0.001
Trait mindfulness	β_{01}	0.084	0.018	435	<0.001		β_{01}	0.025	0.014	435	0.066		β_{01}	-0.021	0.008	371	0.0017
Trait values	β_{02}	0.322	0.081	435	<0.001		β_{02}	0.150	0.054	435	0.005		β_{02}	-0.069	0.037	371	0.065
Trait self-compassion	β_{03}	0.171	0.020	435	<0.001		β_{03}	0.074	0.011	435	<0.001		β_{03}	-0.043	0.008	371	<0.001
State mindfulness	B_{10}	**0.341**	**0.083**	**872**	**<0.001**		B_{10}	-0.082	0.065	872	0.211		B_{10}	**-0.131**	**0.044**	**744**	**0.003**
State values	β_{20}	**0.211**	**0.054**	**872**	**<0.001**		B_{20}	**0.221**	**0.043**	**872**	**<0.001**		B_{20}	**-0.066**	**0.025**	**744**	**0.009**
State self-compassion	β_{30}	**1.060**	**0.173**	**872**	**<0.001**		B_{30}	**0.488**	**0.126**	**872**	**<0.001**		B_{30}	**-0.183**	**0.081**	**744**	**0.025**
COVID-19 stress	B_{40}	**-0.255**	**0.065**	**872**	**<0.001**		B_{40}	**-0.154**	**0.048**	**872**	**0.001**		B_{40}	**0.171**	**0.040**	**744**	**<0.001**
COVID-19 worry	B_{50}	0.050	0.067	872	0.458		B_{50}	0.079	0.046	872	0.090		B_{50}	0.031	0.031	744	0.319
COVID-19 rumination	B_{60}	-0.076	0.070	872	0.281		B_{60}	-0.053	0.040	872	0.187		B_{60}	**0.082**	**0.031**	**744**	**0.009**

5.6 Discussion

Two main findings emerged from the current study. First, lockdown had an impact on the mental health of the UK population by lowering life satisfaction during the early stages of the COVID-19 pandemic, while wellbeing and burnout levels did not significantly change throughout the six weeks of assessment. By comparison with pre-pandemic comparison data, wellbeing levels remained lower but burnout did not change. Moreover, from Time 1 to Time 3, COVID-19 stress and worry decreased. Second, higher levels of state mindfulness, values and self-compassion were associated with better psychological health during the pandemic. In contrast, COVID-19 stress and COVID-19 rumination were associated with higher levels of burnout and lower life satisfaction.

Our results for life satisfaction are in line with emerging (Satici et al., 2020) and previous studies (e.g., Cheng & Tang, 2004; Yu et al., 2005) showing that the pandemic may be a significant threat for different aspects of wellbeing. Results from this study show that, overall, the pandemic has caused a large decline in life satisfaction in the UK from 4.54/10 to 2.56/10 six weeks after the start of the pandemic. By comparison with UK data in 2019, life satisfaction went down from an average of 6.8 out of 10 (Helliwell et al., 2019). This outcome is to be expected given physical distancing measures in place during the first weeks of UK lockdown, the limited ability to stay connected to family and friends, and higher unemployment rates. Indeed, life satisfaction may depend on health (Strine et al., 2008), job satisfaction (Unanue et al., 2017), income (Stevenson & Wolfers, 2008) and relationship satisfaction (Rochlen et al., 2008).

Conversely, a different pattern of results has emerged for wellbeing and burnout. Wellbeing was rated as poor at Time 1 and remained stable throughout the early stages of the pandemic. Although it is not possible to make direct comparisons with the levels of wellbeing pre-pandemic, the reported levels of wellbeing across the three time points was poor by comparison with the UK general population norms (Fat et al., 2017). This outcome is unsurprising and it is in line with data from the UK Office of National Statistics (ONS; 2020) that suggests that anxiety levels and happiness decreased and remained fairly stable during the pandemic, and with emerging UK studies (e.g., Holmes et al., 2020) that assessed mental health during the first wave of the pandemic (see Brooks et al., 2020; Xiong et al., 2020, for early reviews). This finding is important and suggests that the experience of living in a global pandemic (threat of illness, ill health, effects on family friends, social distancing, and isolation) may lower people's wellbeing and have a significant impact on people's mental health.

In terms of burnout, levels at Time 1 reflected low burnout as indicated by the normative data reported by Malach-Pines (2005). By comparison with data pre-pandemic (M = 2.8; SD = 1.2) (Malach-Pines, 2005), burnout levels did not worsen in the current study. Although there was a slight increase in burnout between Time 1 and Time 2, this difference was not significant. It is possible that these findings may be influenced by the heterogeneity of the population. Although remote working was not assessed in this study, it is possible to hypothesise that remote working may be beneficial to reduce burnout (Felstead & Henseke, 2017). Indeed, working in a new environment may enhance higher flexibility, more motivation and more ability to focus on tasks rather than on working hours. If burnout levels were associated with remote working, these results are compatible with a large individual-level panel study on 12.095 workers suggesting that longer commute times were associated with symptoms of burnout (Jansen et al., 2003). It may also be that symptoms of burnout or pandemic fatigue occurred later in the pandemic (e.g., during the 2nd wave) as a consequence of decision fatigue (i.e. making constant challenging decisions whilst trying to focus on work) or parental stress (working at home whilst caring for young children) on top of concerns related to losing loved ones, becoming infected, job loss or anxiety associated with government strategies.

The results from the current study show that psychological flexibility processes may mitigate the negative psychosocial effects of the pandemic on mental health and help with better psychological adjustments throughout the first wave of the pandemic. This result is consistent with a number of previous studies (Brockman et al., 2016; Gold & Marx 2007; Kumpula et al., 2011) and adds to the cross-sectional evidence that is emerging during the pandemic (Dawson & Golijani-Moghaddam, 2020; Landi et al., 2020; Pakenham et al., 2020). Psychological flexibility may function as a resilience skill and help with the ability to shift perspectives and actions when unexpected events, such as the current COVID-19 pandemic, arise. Moreover, in the current study we were able to identify specific processes of psychological flexibility (mindfulness, values and self-compassion) that emerged as significant protective factors that may have helped to adapt more easily to stressful and difficult situations. These novel results suggest that those who have been better able to bring more present-to-present awareness into their daily lives have been kinder to themselves or have behaved according to their personal values, experienced better levels of wellbeing and life satisfaction, and decreased burnout. Therefore, these findings suggest that incorporating these processes into future psychological interventions may help to improve mental health in UK residents during and post COVID-19 pandemic. For example, promoting ACT-based training (Hayes et al., 2006) more widely in the NHS and in communities could help lessen the

negative effects of the pandemic on people's and mental health of healthcare staff.

The findings from this study also confirm that COVID-19 stress and rumination are important vulnerability factors for psychological health during the pandemic (e.g., Baiano et al., 2020; Satici et al., 2020; Zysberg & Zisberg, 2020). The latter findings are unsurprising given that the effects of stress and rumination on mental health, as well as physical health outcomes, are well established (e.g., Clancy et al., 2016; Lyubomirsky et al., 2015; McCarrick et al., in press). However, these outcomes are also concerning given that behaviours driven by stress and fear (e.g., stockpiling goods or not wearing a face covering) may accelerate the spread of the disease or exacerbate its impacts (Shultz et al., 2016). On the positive side, to our knowledge, this study showed that the COVID-19 stress, worry and rumination decreased over the six-week assessment during the early stages of the UK lockdown. This finding is noteworthy and suggests that our hypothesised psychological factors (such as state measures of mindfulness, values and self-compassion) may have played a role in facilitating posttraumatic growth after the initial phase of the UK pandemic and helped people adjust to their changing environment (Calhoun & Tedeschi, 1999). This is an important finding suggesting that, for example, instead of constantly thinking about not being able to see or spend time with family members, it may be that mindfulness, values and self-compassion may have helped to strengthen the relationship with others, especially the most vulnerable, and may have increased a self-perception of vulnerability "it's normal to feel vulnerable and wanting to spend time with family and friends in isolation", facilitating acceptance of negative emotions. These possibilities ought to be investigated in future research.

This current study had a number of strengths. First, the longitudinal observation window assessed in this study through a repeated assessment of the relationship between psychological health (wellbeing, burnout and life satisfaction) and psychological coping mechanisms or resilience skills (state mindfulness, values and self-compassion) over time may help build up an accurate and reliably ordered account of the participants' inner experiences during the pandemic. Second, the sample size of this study could be considered large by comparison with other psychological research studies in the area (see here: https://www.covidminds.org/). Third, this study adopted a within-participant design, using participants as their own controls. Fourth, all of the observed effects were maintained when controlling for trait measures of mindfulness, values and self-compassion. This is an important finding and adds additional weight to the robustness of the current results.

Some limitations should also be noted. First, given the unprecedented speed at which the disease spread, it was not possible for us to include appropriate baseline measurements prior to lockdown. Without an appropriate baseline, there is not sufficient information to attribute any findings to lockdown specifically because participants might have felt the same during a 'typical' six week period (although, this is unlikely). Second, this study aimed at assessing short-term psychological health during the pandemic. We believe that understanding and raising awareness of the impact of the COVID-19 pandemic on health and mental health of people during the pandemic, would help stakeholders, healthcare organisations and research body funders prioritise mental health as a key health priority throughout the pandemic (e.g., during other lockdowns) and post COVID-19 pandemic. A longer follow-up is missing and would help to understand whether the adverse effects of the pandemic on health and wellbeing are long-lasting or limited to the post-pandemic period. Third, we would have liked to have more detailed assessments of each of the main study outcomes. However, we were mindful of balancing the reliability and validity of the measures with participant burden.

5.7 Conclusion

This study set out to explore the changes in psychological health, psychological flexibility and COVID-19 stress, worry and rumination during the 1st wave of the pandemic. The relationship between psychological health, psychological flexibility and COVID-19 stress, worry and rumination was also investigated. Whilst wellbeing and burnout did not change, life satisfaction decreased. COVID-19 stress, worry and rumination improved. Mindfulness, values and self-compassion emerged as reliable predictors of psychological health. These findings have implications for informing the design of psychological interventions, during and post COVID-19 pandemic and are relevant to both practitioners and policy-makers.

Chapter 6

General discussion

The previous chapters have provided in-depth discussions on the specific research aims of the current thesis; this final chapter aims to synthesise the evidence provided and consider limitations, recommendations and directions for future research. Implications for HCPs, patients and healthcare organisations will also be discussed.

6.1 Thesis aims and summary

The figures from the NHS Staff Survey in 2019 showed that 40.3% of staff reported feeling unwell due to work-related stress with the percentage representing the worst increase in the past four years (NHS Staff Survey, 2019). The current COVID-19 pandemic is expected to have a substantial impact on the psychological health of HCPs and aggravate the already elevated work-related stress (e.g., da Silva & Neto, 2020; Spoorthy, Pratapa & Mahant, 2020). Recent studies show that at least a third of the workforce is experiencing poor mental health (Lusher et al., 2020).

Although there are several definitions of wellbeing, in this thesis we conceptualised wellbeing as a "spectrum from psychological wellbeing (e.g., high life satisfaction, good quality of life) at one end and psychological illness at the other (e.g., distress, anxiety and depression)" (Wood & Johnson, 2016, p. 342). In this thesis, the definition of burnout as composed of physical fatigue, emotional exhaustion and cognitive weariness by Melamed and colleagues (2006) was chosen to capture a construct distinct from anxiety and depression and to assess burnout over a relatively shorter amount of time compared to more generic burnout measures.

Burnout and poor wellbeing have negative implications at an individual and organisational level, and are linked to patient safety (O' Connor et al., 2000; Hall et al., 2016). Although several efforts have been made in the NHS, by changing policies and priorities, staff sickness remains high, and interventions that tackle staff burnout are needed (e.g., Jones, 2020). Evidence for this is shown by the low number of employees receiving psychological treatments (Hilton et al., 2008), the financial burden that this phenomenon is causing and the high levels of presenteeism that takes place when an employee is experiencing strain and symptoms of ill-health at work (Flaxman et al., 2012). In response to these problems, in recent years, stress-management interventions that aim to reduce

psychological distress and work-related stress of HCPs have been developed. A novel intervention that has been suggested to promote employees' mental and physical health is ACT (Bond & Bunce, 2003). ACT is an intervention that aims to promote mental health by helping employees to undertake and enjoy activities that are consistent with their overarching goals and values. This is achieved through the process of 'psychological flexibility'. Psychological flexibility is mainly promoted in workplace contexts by teaching employees mindfulness, values, and cognitive defusion techniques (see Flaxman, Bond, & Livheim, 2013). There have been a few trials of ACT in the workplace and these trials have shown that ACT leads to better health, job performance, less absenteeism (Bond et al., 2016), and reduced burnout (Lloyd, Bond, & Flaxman, 2013) in workplace settings. However, the research to date has been unable to examine: a) the effectiveness of ACT interventions to improve mental health in HCPs; b) identify which are the most effective processes of change (e.g., mindfulness and values) in workplace ACT for improving mental health; c) whether an ACT intervention can lead to an improvement in clinical practice, through an increased perception of patient safety; d) whether self-compassion is useful to improve mental health and should be integrated into ACT interventions; and e) whether mindfulness, values and self-compassion are protective factors of health and potential targets for intervention during and post COVID-19 pandemic.

This thesis aimed to fill these gaps in knowledge and improve understanding of the mechanisms through which psychological flexibility acts on psychological distress, burnout and perceived patient safety. The specific research aims within this thesis were as follows:

Aim 1. To test whether ACT interventions are effective for reducing general distress and work-related stress (including burnout) in HCPs.

Aim 2. To investigate which aspects of psychological flexibility are most strongly related to psychological distress and burnout in HCPs.

Aim 3. To explore whether ACT interventions can improve perceptions of patient safety in HCPs.

Aim 4. To explore whether an ACT intervention can be improved by the inclusion of self-compassion.

Aim 5. To explore whether psychological flexibility processes are associated with better mental health in the general population during the first wave of the COVID-19 pandemic.

Four studies were conducted to address these aims. The section below outlines an in-depth summary of the findings, strengths and limitations of this thesis. Lastly, an overarching model of the significant results is presented and discussed.

6.2 Summary of key findings, strengths and limitations

6.2.1 Study 1

6.2.1.1 Summary of method

- A systematic literature review and meta-analysis was undertaken to test the effectiveness of ACT-based interventions to improve general distress and work-related distress in HCPs

6.2.1.2 Main findings

- Twenty-two studies met the inclusion criteria in the systematic review. Ten studies were included in the meta-analysis, which aimed to investigate the effectiveness of ACT-based interventions to improve general distress and reduce work-related distress in HCPs.
- These studies provided evidence that, compared to control conditions, ACT interventions were effective for improving psychological distress at post-intervention, and work-related stress at follow-up.
- Subgroup analyses on primary outcomes revealed that: 1) the effect of ACT on general distress was superior to inactive controls at post-intervention but was not superior to active controls; 2) the effect of ACT on work-related distress was superior to both inactive and active controls at follow-up.
- Study quality, on average, was low, and the risk of bias was moderate. These variables did not have a moderating effect on outcomes meaning that studies with larger effect sizes were not more likely to be of poorer methodological quality or show a higher risk of bias.
- There was a positive relationship between the number of treatment sessions and the effect sizes for psychological distress, indicating that the effect sizes were larger with increased number of sessions.
- The results from the meta-analysis on the ACT process measures showed that psychological flexibility measures did not improve in those

receiving the intervention compared to controls, at both post-intervention and follow-up.

6.2.1.3 Strengths

- This was the first systematic review and meta-analysis investigating general distress and work-related distress in HCPs, including medical and non-medical professionals.
- This study included a second meta-analysis which provided information on specific psychological flexibility process variables.
- This study provided a first investigation into the differences in ACT effectiveness on general distress and work-related stress (including burnout) in HCPs.
- This study assessed both the quality of trial methodology (POMRF) and risk of bias (Cochrane Collaboration's Tool) of the existing studies.
- The analyses provided critical information on how to best design ACT-workplace interventions. The findings from this study will be useful for policymakers and clinicians.

6.2.1.4 Limitations

- The selection of the primary or secondary outcomes was based on a pragmatic approach selected by the researcher. A different classification could have led to different results.
- The study quality tool (POMRF) was used; five items were not included as there was limited applicability to assess study quality in non-clinical contexts.
- The classification of the control interventions into inactive and active was relatively arbitrary.
- The psychometric issues of the AAQ-II (construct validity), included in several studies, may have influenced the main findings.
- The overall quality of the studies included in the meta-analysis was rated as low.

6.2.1.5 Future research

- Higher-quality trials should be designed and conducted.
- Factorial trial designs could be used to establish whether the addition of organisational components (e.g., joint sessions with managers or liaison workers) lead to improvements in HCP's burnout.
- Future trials in the healthcare context should include patient safety as a performance-indicator measure.

- Future trials should include ACT fidelity measures to assess the extent to which treatment delivery is consistent with ACT principles.

6.2.2 Study 2

6.2.2.1 Summary of method

- A randomised-controlled study was conducted to test whether the ACT intervention improved psychological distress in HCPs (primary outcome), reduced burnout and led to improvements in patient safety (secondary outcomes) by comparison with a control group.

6.2.2.2 Main findings

- The ACT training delivered in 4 x 2-hour sessions was an effective intervention for improving psychological distress and burnout (cognitive weariness) in a range of HCPs, including GPs, nurses, clinical psychologists and managers.
- Mindfulness, values and self-compassion were found to be the most influential processes and mediated the improvements for psychological distress, and the cognitive weariness component of burnout.
- The intervention was found to be more effective at improving psychological distress than burnout.
- This was the first study that assessed the cognitive weariness component of burnout, and this was found to be improved compared to the waitlist control.
- No significant changes between groups were found for work-related worry and rumination and perceived safe practices. However, psychological distress was found to mediate improvements in perceived patient safety.
- Reliable and clinically significant changes were found for most NHS employees taking part in the intervention (46%), with clear improvements for those who were particularly distressed at baseline.
- Clinical levels of stress at baseline moderated the impact of the intervention.

6.2.2.3 Strengths

- This was the first evaluation that aimed to test a performance-indicator of staff, patient safety, in medical and non-medical NHS staff.
- This evaluation included assessing psychological flexibility processes as mediators of change, providing an insight into the most effective

treatment processes for improving psychological distress and perceived patient safety, and reducing burnout in HCPs.

6.2.2.4 Limitations

- The level of attrition was high.
- The sample size was relatively small.
- The inclusion of a *perceived* measure of patient safety may have impacted these outcomes.

6.2.2.5 Future Research

- Test the feasibility and acceptability of introducing ACT training as part of routine training for clinicians.
- Consider the inclusion of objective measures of patient safety.
- Compare the intervention to an active comparison intervention (e.g., ACT training that aims to improve organisational flexibility) in HCPs.

6.2.3 Study 3

6.2.3.1 Summary of method

- A cross-sectional study was conducted to explore the predictive influences of psychological flexibility (mindfulness and values) and self-compassion on psychological distress, burnout and perceived patient practices.

6.2.3.2 Main findings

- This is the first study that showed that the mindfulness sub-components of acceptance (distress endurance) and non-judgment could affect the perceived safety of practice in several ways.
- Values explained unique variance in psychological distress and burnout.
- Self-compassion explained unique variance in emotional exhaustion after both mindfulness and values were included in the models.

6.2.3.3 Strengths

- This the first study that cross-sectionally explores the association between patient safety and psychological flexibility processes.
- This study found that values go above and beyond the influence of attentional and acceptance facets of mindfulness.
- This study suggests that mindfulness-based programmes delivered in the workplace could be enhanced by including a values-based behavioural activation component.

- ACT programmes for healthcare staff could benefit from the explicit inclusion of strategies designed to cultivate self-compassion.

6.2.3.4 Limitations

- A cross-sectional design was employed.
- Self-reported measures were used.
- The sample size was relatively small (n=98).

6.2.3.5 Future research

- Larger samples and longitudinal designs should replicate these findings.
- Objective measures of patient safety should be included.

6.2.4 Study 4

6.2.4.1 Summary of method

- A longitudinal study was employed to explore the relationship between psychological flexibility, protective factors and risk factors of health during the COVID-19 pandemic.

6.2.4.2 Main findings

- This was the first longitudinal study which aimed to investigate the relationship between psychological health (wellbeing, life satisfaction and burnout), protective factors (state mindfulness, values and self-compassion) and risk factors (COVID stress, worry and rumination) of health in 439 UK residents during the COVID-19 pandemic.
- 439 UK participants reported low wellbeing and decreased life satisfaction but did not show burnout symptoms at three-time points during the early stages of the COVID-19 pandemic.
- COVID-19 stress, worry and rumination decreased throughout the six-week assessment.
- Mindfulness, values and self-compassion were associated with better psychological health.
- COVID-19 stress and rumination were associated with poorer psychological health.
- Interventions that target psychological flexibility may be promising in improving mental health during and post-COVID-19 pandemic.

6.2.4.3 Strengths

- The sample size of this study is relatively large given the repeated measures design.

- This study employed a multilevel modelling design which provides an assessment at a within-level subject, using participants as their controls.

6.2.4.4 Limitations

- The study does not include an appropriate baseline; therefore, there is insufficient information to attribute the findings obtained to characteristics associated with the lockdown.
- This study assessed short-term psychological health during the pandemic.
- The number of mental health measures included was limited.

6.2.4.5 Future research

- Future studies should assess the relationship between psychological, flexibility and mental health with a longer follow-up and post-pandemic to understand whether the negative effects of the pandemic are long-lasting.

6.3 Overall discussion

6.3.1 Aim 1

First, this thesis aimed to test whether ACT-based interventions can effectively improve mental health in HCPs. In particular, this thesis aimed to evaluate whether ACT interventions are efficacious for reducing psychological distress and/or staff burnout.

ACT-based interventions for HCPs were found to be effective for improving healthcare staff's mental health. Further analyses showed for the first time that, in the short-term (e.g., post-intervention), ACT interventions might be more useful for reducing psychological distress than burnout. Instead, these interventions may take more time to change burnout (e.g., follow-up) (Chapter 2). This result was confirmed by the RCT trial study (Chapter 3) where it was found that the ACT intervention significantly reduced psychological distress at post-intervention, but not at follow-up. Furthermore, although in the RCT study burnout declined at both post-intervention and follow-up, the intervention's effect was more pronounced at follow-up confirming the meta-analytic findings. Overall, the findings from this thesis confirm the results of previous RCT trials delivered in various workplace contexts (e.g., banks, call centres) showing that ACT interventions are effective at improving psychological distress (e.g., Bethay et al., 2013; Bond & Flaxman 2010a; Noone & Hastings, 2009; Waters et al., 2018) and burnout in healthcare staff (e.g., Hayes et al., 2004; Lloyd et al., 2013).

Differing from psychological distress, converging evidence suggests that burnout stems mainly from chronic work environment conditions, such as excessive job demands (e.g., unmanageable workload and time pressure) coupled with a lack of job resources (e.g., support, autonomy, or feedback; Demerouti et al., 2001). Hence, given that ACT is an individual-focused (rather than organisation-focused) intervention approach, worksite ACT programmes may ultimately prove less effective for reducing job burnout in the short term when compared to the more reliable effects on general psychological health (Ahola et al., 2017). This interpretation might also justify the lack of the intervention' s effect on work-related worry and rumination (Chapter 3). Nonetheless, inspection of the relevant studies suggests that ACT's inconsistent effect on burnout may be partly due to conceptual and methodological issues. For instance, research evaluating ACT for burnout has mostly utilised the Maslach Burnout Inventory (Chapter 2). Although the Maslach Burnout Inventory is widely used in the burnout literature, it is noteworthy that the original scale instructions ask employees to report burnout symptoms experienced over the past year. In contrast, worksite ACT evaluations tend to be conducted over comparatively shorter periods (e.g., three months). This mismatch between measurement and study design may reduce the likelihood of detecting job burnout changes elicited by ACT programmes. Therefore, our study is novel; the first to assess burnout by measuring the relationship between psychological flexibility and cognitive weariness in HCPs (Chapter 3 and 4).

Furthermore, results from the RCT trial supported the results from other RCT trials replicating the finding that ACT workplace-based interventions appear to be more effective for those who are particularly distressed at baseline (Bethay et al., 2013; Brinkborg et al., 2011; Flaxman & Bond, 2010a; Flaxman & Bond, 2010b; McConachie et al., 2014; Noone & Hastings, 2010; Waters et al., 2018). As a consequence of these findings, ACT may work better as a secondary or tertiary level intervention. Reliable and clinically significant changes supported the results of previous studies (Brinkborg et al., 2011; Flaxman & Bond, 2010b). These interventions are particularly useful for employees with clinical symptoms of psychological distress.

6.3.2 Aim 2

Second, with regards to ACT mechanisms of action, this thesis aimed to collate all the studies utilising ACT process measures and evaluate whether the effectiveness of the intervention is mediated through changes in ACT process measures. The results from the meta-analysis in this thesis (Chapter 1) suggested that, when combined, ACT process measures did not seem to lead

to significant improvements in psychological flexibility. However, several studies included the AAQ or AAQ-II questionnaires as an overall measure of psychological flexibility, which in recent years have been found to measure psychological distress (e.g., Wolgast, 2014). This finding is important and indicates that perhaps the current literature suffers from methodological limitations regarding measures and measurements of psychological flexibility. Nevertheless, when looking at the specific ACT process measures, mindfulness and values were shown to be effective. In the meta-analysis, given the small number of studies included, it was not possible to conduct subgroup analyses for the specific ACT process measures; however, results from individual studies seem to confirm what we observed in the RCT trial (Chapter 3). Mindfulness and values were found to mediate the effects of the intervention on the outcome measures (psychological distress and cognitive weariness) suggesting that these interventions may work by improving mindfulness skills and engagement with value-based living. Furthermore, the cross-sectional study results (Chapter 4) further elucidate the relationship between mindfulness and values, suggesting that both components play an essential role in explaining these outcomes, including patient safety.

6.3.3 Aim 3

Third, this thesis investigated whether ACT-based interventions may impact perceived patient safety and/or whether ACT processes may promote mental health and indirectly improve perceived safety practices. First, a preliminary search was conducted to assess whether ACT-workplace based interventions included patient safety as a performance-based outcome measure. No studies were detected (Chapter 2); therefore, the RCT trial (Chapter 3) was the first to investigate whether an ACT intervention was found to be effective to reduce perceived patient safety. The RCT trial results showed that ACT was effective in reducing perceived safety practices via psychological distress, but a direct effect of the intervention on perceived patient safety was not found. The indirect effect of the intervention on patient safety via psychological distress has been previously found reported in the literature (Garcia et al., 2019; Panagioti et al., 2017). Safer practitioners also reported higher levels of mindfulness, particularly an accepting (e.g., non-judgmental) attitude toward difficult thoughts and feelings suggesting that the acceptance component of mindfulness (rather than the attention monitoring) may deserve attention for the development of future mindfulness-based interventions that aim to improve patient safety (Chapter 5) specifically.

6.3.4 Aim 4

Fourth, overall the findings from the current thesis suggest that targeting self-compassion may be particularly promising for addressing staff burnout. In the RCT trial study (Chapter 3), self-compassion mediated the improvements in psychological distress and burnout. The cross-sectional study (Chapter 4) showed that self-compassion added a unique contribution in explaining burnout. The longitudinal study confirmed this finding and showed that self-compassion was negatively associated with staff burnout (Chapter 5). These findings are in line with the literature. For example, in a study conducted on student midwives, self-compassion and self-kindness were negatively correlated with burnout and self-judgement (Beaumont et al., 2016a). Higher levels of self-compassion were linked to less compassion fatigue and burnout on mental health practitioners (student counsellors and psychotherapists) (Beaumont et al., 2016b). In particular, the negative facets of self-compassion (self-judgment, isolation, and over-identification) were found to explain burnout in 440 primary care HCPs (Montero-Marin et al., 2016). Also, self-compassion was associated with less burnout in community nurses (Baer, Lykins, & Peters, 2012).

Although this suggestion would need to be tested in larger trials, in the future, the effectiveness of ACT may be enhanced if the intervention is expanded with self-compassion techniques and exercises.

6.3.5 Aim 5

Fifth, the final aim of this thesis was to assess whether ACT process measures were associated with mental health during the COVID-19 pandemic. In line with the findings of the RCT study (Chapter 3) and the cross-sectional study (Chapter 4), in the longitudinal study (Chapter 5), mindfulness, values and self-compassion were found to be “protective factors” in the general population.

Higher value-based actions, higher self-compassion, and lower COVID-19 stress were associated with better life satisfaction throughout the early stages of the pandemic. Together with mindfulness, these variables were also associated with higher wellbeing and lower burnout. COVID-19 rumination was also associated with burnout, but COVID-19 worry was not associated with any of the psychological outcomes. The results inform stakeholders and policymakers on the beneficial effects of mindfulness, values and self-compassion as potential intervention targets, especially during and post-COVID-19 pandemic in both the general population and with HCPs.

6.4 Thesis reflections, limitations and strengths

When this PhD was commenced in January 2018, it was not expected that a global pandemic was about to happen with the extraordinary effects on healthcare staff. Consequently, the current COVID-19 pandemic has impacted the final study of this PhD, which aimed to assess daily distress and burnout of healthcare staff. In March 2020, the ethics of the PhD's final study entitled "Exploring the Temporal Relationship between Daily Psychological Flexibility, Self-Compassion, Worry and Rumination and Wellbeing, Burnout Perceived Patient Safety in Healthcare Professionals: A Daily Diary Approach" was submitted, but with the pause in research activity on healthcare staff, the study could not go ahead. Therefore, Chapter 5 of the current thesis was the study's contingency plan.

Second, the current thesis suffers from methodological limitations relative to the measures adopted for the assessment of (perceived) patient safety. Whilst objective measures of patient safety (e.g., incident reports, chart audits) could be used, it may have been challenging to do so within the timeline and budget of a PhD research project. In this thesis, the safe practitioner measure was used because the scale validation of the measure showed that safer practitioners are less likely to be involved in patient safety incidents (Louch, 2016; 2017). However, it is worth noting, as suggested by the intention behaviour gap (Armitage & Conner 2001; Duncan et al., 2011), that perceptions of behaviours (perception of safety) and actual behaviours (safety practices) are not the same.

Third, all the studies included in the current thesis employed a quantitative methodology. An in-depth investigation of participants' experiences and insights may facilitate a better understanding of the practical usability of the intervention techniques and how these could be translated into clinical practice. A qualitative assessment may also offer an understanding of the aspects and techniques of the intervention that worked better and those that may need adjusting.

Despite limitations, the current thesis aimed to quantitatively address important gaps in the ACT literature by utilising robust research study designs (e.g., meta-analysis, RCT and longitudinal). Also, all of the studies but one (Chapter 4) were pre-registered in the appropriate register (e.g., PROSPERO, ISRCTN register and AsPredicted) to ensure open and rigorous research findings (Norris & O'Connor, 2020). Also, the analyses from the current studies were double-checked by independent assessors suggesting a large degree of confidence in reaching firm conclusions when interpreting the current thesis results.

6.4.1 Learning from the ethical considerations

Although there were several risks associated with confidentiality and potential adverse events as a result of the intervention delivered in Chapter 3, the participants taking part in the intervention did not report any adverse or serious adverse events. As hypothesised and consistent with previous studies delivered by Flaxman and colleagues in workplace organisations, the risk of harm to participants was minimal. Additionally, results from the clinical and significant changes analyses reported in study 2 (Chapter 3) of the current thesis suggested that only a few individuals reported a small level of deterioration in the outcome measures indicating that the ACT intervention is unlikely to be harmful.

6.5 Future research

First, future research should test the feasibility and acceptability of introducing ACT training as part of routine training for HCPs, including junior clinicians during the early stages of education. Promoting mindfulness, values and self-compassion skills into the curriculum from the early stages of the clinical career would mentally prepare the clinicians with practical techniques and skills for the emotional toll they may face throughout their careers. Also, the literature suggests that organisational-based factors such as improving support within the workplace may be important to help reduce burnout (Maslach & Leiter, 2017). Therefore, the introduction of formal mentoring and buddying systems, scheduling regular communal breaks, official team-building interventions, and individual-level skills promoted by the ACT intervention could be a viable route to promote and prevent burnout in early career HCPs.

Second, one of the next steps following the current research might be to explore how to improve the intervention utilised in this thesis (e.g., augmenting it with a self-compassion component). Further research should be conducted in a larger trial and focus on improving employees' mental health over time and exploring whether the effects of the current intervention are long-lasting or whether booster sessions are needed. For example, it would be good to explore if booster sessions will further reduce staff burnout. Second, future research wants to compare the current intervention with an active control condition or a comparison intervention that aims, for example, to enhance greater organisational flexibility (e.g., Bond et al., 2016; Bond, 2018).

Third, future interventions may consider the inclusion of physical exercises to target the physical exhaustion component of burnout. ACT training, indeed, tends to help people change their relationship with their thoughts (cognitive) and find ways to relate to emotions that enable individuals to act effectively, but they do not include exercises and techniques that specifically target physical

wellbeing. Although the mindfulness exercises included in this training may include the body (in some aspects), they are not conceptualised to improve physical but instead to promote mental relaxation.

Fourth, future research may consider testing these interventions in low, lower/upper, and middle-income countries. Although results from the meta-analysis (Chapter 2) showed that this might be feasible (Stewart et al., 2016; Heydari et al., 2018; Farsi et al., 2018) to the best of our knowledge, ACT interventions have not been tested in several countries (e.g., South America, Asia) where HCPs are continuously exposed to highly demanding work environments.

Fifth, results from this thesis showed that an ACT training programme might be indirectly effective in improving patient safety via burnout. This finding is important and suggests that future studies should replicate and confirm this finding in a larger and more representative sample of HCPs involved in adverse events or patient incidents.

Sixth, no studies have explored the link between psychological flexibility and health behaviour change in healthcare staff. Psychological flexibility has been shown to be associated with better health in various contexts (Kashdan & Rottenberg, 2010, see for a review). To our knowledge, only one study (Burton et al., 2010), has investigated the relationship between psychological flexibility and physical activity, body mass index, blood pressure and cholesterol levels in a sample of employees. Future research should address this gap in knowledge and examine the relationship between psychological flexibility and health behaviour changes such as, for example, diet, physical activity and consumption of alcohol.

Seventh, from our knowledge there has been only one study that primarily carried out a qualitative assessment of an ACT workplace based intervention for therapeutic practitioners (Wardley et al., 2016). Therefore, a qualitative assessment may provide greater insights and understanding of how the training programme can be further improved and enhance greater safety practices.

Although the suggestions above may be valid and feasible, it is imperative to acknowledge that they may not necessarily be easy to implement, especially given the current COVID-19 pandemic. Indeed, organisational-level factors such as HCPs workload, lack of support and supervision listed in Chapter 1 may remain preeminent demanding challenges to address and have also been made more difficult by the current COVID-19 pandemic.

6.6 Practical implications

6.6.1 Implications for healthcare staff

It is widely acknowledged that HCPs do not prioritise their mental wellbeing and often are unable to find time to attend training programmes to improve their mental health (cf., Gerada et al., 2020) and this is supported by the drop-out rates of the RCT study in Chapter 3. This is also confirmed by the literature that shows that HCPs are not very good at being patients (Kay et al., 2008, for a review).

Practical suggestions for HCP clinicians (e.g., junior doctors, nurses), especially during the early stages of HCPs' education, would be to take part in training programmes that include mindfulness, values and self-compassion (such as ACT). For example, taking part in the training programme included in this thesis (Chapter 3) would mentally prepare new clinicians for the stresses, strains and challenges of their jobs. For more experienced clinicians or those already distressed and/or often overworked doing 12-hour shifts, who might face the challenge of not having enough time to attend this type of programme, sharing the difficulties with managers may help foster a more open culture of talking about wellbeing and burnout. This may also facilitate the validation of this training in different formats, and thus promote higher up-take.

6.6.2 Implications for patients

The findings from this thesis have indirect effects on patients. The results of this thesis show that an ACT training programme delivered to staff may have an indirect effect on patient safety (Chapter 3). Also, the feedback from a GP receiving the ACT intervention (Chapter 3) suggests that the techniques learned and utilised during the training programme are transferrable and may be used in clinical practice with patients. Teaching HCPs psychological techniques that help to deal with patients' psychological problems may equip GPs with a range of additional skills to deal with challenging patients. Research shows that ACT skills may be equally learned whether these are delivered by clinicians or non-clinicians (Richards et al., 2011). ACT training programmes delivered more widely to all NHS staff, may also help reduce the generalised "pandemic fatigue".

The results from the cross-sectional study of this thesis (Chapter 4) suggest that HCPs whose practice is safe reported higher levels of acceptance, non-judgment and work-related worry and rumination. According to the theory of Attention and Monitor (Lindsay & Creswell, 2017), this finding is important. It suggests that perhaps mindfulness-based interventions that aim to target

patient safety specifically should include more acceptance-based techniques (e.g., ACT matrix) that focus more, for example, on reducing non-judgment and non-reactivity than attention monitoring.

6.6.3 Implications for healthcare managers and leaders

It is widely acknowledged that healthcare leaders and managers are facing complex issues given the evolving COVID-19 pandemic. Traditional training for leaders aims to solve complicated problems (e.g., identifying problems and solutions, developing a plan and implementing it, making decisions, and problem-solving). However, traditional training for dealing with problems may not necessarily be enough help when facing complex problems that arise, like the current COVID-19 pandemic (Berger & Johnston, 2015; Heifetz, Grashow, Linsky, 2009). The current pandemic is characterised by being unpredictable, evolving, emergent, and uncontrollable. Therefore, teaching leaders psychological flexibility - and, thus, to foster new thinking, explore multiple perspectives, face what is hard, and learn with curiosity and compassion - may help to face the burden of dealing with complex problems (Obolensky, 2014).

Additionally, based on the outcomes of this thesis, it may be that managers or liaison workers, may help to improve mental health of employees with burnout. Indeed, burnout seems to be more difficult to change perhaps because it is dependent on organisational-level factors (Panagioti et al., 2017). Therefore, introducing workshops or single-sessions for managers on: raising mental health awareness at work, how to provide help and support for mental health issues, and how to prevent poor mental health at work - by teaching them how to improve managerial skills alongside flexibility and work adjustments - may be helpful (e.g., Gayed et al., 2019).

6.6.4 Implications for policy makers

The high rates of burnout and poor wellbeing warrant a call to action within the NHS and research body funders, especially during and post COVID-19 pandemic (O'Connor et al., 2020). The research from this thesis shows that an acceptance-based approach like ACT may be useful for stressed HCPs, and the use of self-compassion should be integrated especially when targeting staff burnout.

Given the effectiveness of the ACT framework, primary care trusts should consider making the intervention available to all staff, and research body funders should prioritise HCPs wellbeing. Improving HCPs' health with ACT training programmes is likely to result in significant financial savings for the

NHS, through reduced absenteeism rates as previously shown by Finnes et al. (2019).

6.6.5 Suggestions for researchers

In combination, these studies suggested that ACT interventions for HCPs need to be improved. Future researchers want to consider the following suggestions (see 6.6.6 and 6.6.7) on how to improve the study design of ACT trials for HCPs.

Second, researchers want to consider the inclusion of self-compassion in the ACT intervention protocol and investigate, in a larger trial, what aspects of self-compassion (self-kindness, common humanity, mindfulness) change after the intervention.

Third, researchers want to consider designing an ACT trial that specifically aims to improve patient safety and possibly consider objective measures of patient safety.

6.6.6 Improving the quality of ACT interventions for staff

The quality assessment from this meta-analysis (Chapter 2) suggests several ways to improve the quality of forthcoming trials and control conditions of ACT for HCPs. Therefore, the design and description of future interventions should include:

1. Detailed information on the sample (single-multi centre study), demographics, and inclusion and exclusion criteria;

2. Blinded and trained assessors;

3. Active controls and comparator groups (e.g., other evidence-based psychological interventions) shall be selected rather than an inactive control group;

4. Power analysis based on an estimated effect size;

5. Longer follow-ups (>one year);

6. More than two experienced therapists (with long clinical experience) should deliver the intervention and checks on their competence ensured;

7. Checks shall be made to ensure the intervention was well delivered and consistent with the treatment protocol to ensure treatment adherence;

8. Dropout analysis with proportion of attrition at each time-point reported, and intention-to-treat analysis performed. Means, standard deviations and correlation co-efficient included in the appendices;

9. Concomitant treatments (e.g., medications, mindfulness-based workshops or other psychological treatment) shall be reported;

10. Active control(s) and comparator intervention(s) condition(s) shall provide same number of hours and sessions of the experimental group therapy.

Additional suggestions on the study reporting include: an exhaustive description of the randomisation method used including allocation concealment and, when possible (e.g., health behaviours outcomes), using direct and physiological measurements (e.g., pedometers, biochemical measurements) (Miller & Hays, 2000; Tudor-Locke & Myers, 2001).

6.6.6.1 Control conditions

An issue observed in the meta-analysis (Chapter 2) was the lower quality of the control conditions. Indeed, designing, implementing and evaluating optimal interventions requires good and well-controlled control conditions. Karlsson and Bengmark (Karlsson & Bergmark, 2015) offer guidelines for creating or reporting quality control conditions. For example, comparison conditions and rationale for these should be clearly stated, including the specific ingredients (e.g., number of sessions, therapist competence and experience). Also, possible confounding conditions should be matched in active or treatment conditions (e.g., mindfulness practice at baseline).

6.6.6.2 Practical issues for researchers

The main practical issues from this thesis derive from the RCT study (Chapter 3).

1. Marketing and recruitment. The steps taken to approach the healthcare organisation are very important. First, contacting human resources departments and primary care managers with a summary of the evidence gathered on psychological flexibility and its link with outcomes such as wellbeing and burnout may be a good first starting point. Second, showing the evidence on the effectiveness of RCT interventions on HCPs may set the ground for capturing the organisations' interest. Whilst many may think that recruiting participants may be problematic, data from our trial do not indicate that this may be the case with the NHS. This may be linked to the high percentage of staff already experiencing high psychological distress levels and seeking help. However, the format in which the intervention is delivered may require adaptation based on HCPs' work schedules. Indeed, in the RCT (Chapter 3), the level of drop-out rates was high.

2. Managing attrition. Based on our RCT study's informal feedback, one of the reasons that may facilitate attrition rates is the hierarchy of professions. For

example, at the start of the training course, GPs did not show interest in being in the same group of nurses. Organising multiple groups and giving the option to change groups may help with uptake. Also, to help prevent confounding of conditions in employees working within the same NHS trust (e.g., waitlist control participants getting to know insights and aspects of the intervention), it is essential to reiterate confidentiality at the beginning and the end of each session.

3. Organisational issues. When wanting to deliver an ACT intervention in an organisation, it is essential to inform managers or healthcare leaders that employees' burnout is deeply rooted in organisational stressors. To benefit from the intervention, employees need support from managers and perceive a climate of safety within the organisation.

Having an in-house project manager (e.g., a GP or a partner charity or organisation) as a critical point of internal contact with the head managers or human resources may help managers understand *why* and *for whom* the training is needed. Also, ensuring contact with primary care managers is kept up is crucial. Primary care managers are essential in the effective delivery of organisational-related activities of the projects. Particularly when the study is conceptualised to involve independent researchers or outcome assessors, primary care managers are involved in the project's effective delivery (e.g., randomisation, booking rooms, planning training schedule).

6.6.7 Suggestions for clinicians delivering ACT in the NHS

When using ACT in groups, it is imperative to be careful with the language used. Whilst inviting participants, the term "stress-management training" may sound dated and not the most appropriate. Instead, encouraging participants to "Work and Life Effectiveness Training", may facilitate engagement. It is also essential to set the ground rules in the first session and describe the course's intention to participants. For example: "This training aims to teach you how to deal with psychological barriers to effective and enjoyable living". Teaching what the training is about is important to give participants a chance to raise issues they may have around that. It is also good to further discuss what useful and enjoyable living mean and the psychological barriers around that. It is also imperative to develop a rapport with HCPs and instil a climate of safety and warmth.

Results from this thesis encourage clinicians to include mindfulness practices, value-based techniques and self-compassion exercises in intervention protocols for reducing psychological distress in HCPs.

When scheduling the sessions, it is recommended to take into consideration the working pattern of HCPs. For example, clinicians want to consider offering healthcare staff the opportunity to choose (before the start of the intervention) dates of availability to reduce attrition rates.

6.7 Reflections on psychological interventions in organisations

As previously described in Chapter 1 of the thesis, psychological interventions delivered in organisations might be individual-level or organisational-level interventions. The former are context-dependent interventions meaning that the overarching aim is to bring and maintain organisational-level changes. Examples of these interventions are changing shift patterns of employees, improving canteen facilities, interventions that involve managers or employers. Instead, individual-level interventions are interventions (delivered in groups or one-to-one) that aim to help employees struggling with their mental health at work. Examples of these interventions are stress-management workshops, one-to-one CBT or ACT interventions, and support phonelines.

Although organisational-level interventions might be more expensive and challenging to implement given the employer's involvement and/or the organisation, they are traditionally more effective for targeting organisational changes within the organisation. On the other hand, individual-level interventions such as the ACT intervention utilised in the RCT study of this thesis are easier to implement and might be particularly helpful for those employees who have initial symptoms of distress or are more severely distressed.

Given the percentage of NHS staff experiencing psychological distress symptoms in studies 2 and 3 of the current thesis, the selected individual-level approach adopted in the current thesis was perhaps the best approach for targeting psychological distress. Indeed, results from the RCT study confirms that the ACT intervention is a promising approach to improve psychological distress. On the other hand, results from the RCT study also showed that there is still little evidence to suggest that these interventions effectively improve burnout. This is consistent with other studies that failed to find significant reductions in burnout (e.g. Reeve et al., 2018, Bethay et al., 2013, Clarke et al., 2015, Habibian et al., 2018).

The smaller effect of the ACT intervention on burnout reported at follow-up in study 1 and 2 of the current thesis suggests that it is likely that organisational-

level factors such as the relationship with the manager, workload, staff turnover and lack of support might be significant challenges that need addressing within the organisational culture of the NHS. Other challenges in implementing these interventions in the NHS might be related to a number of practicalities:

1) Given the hierarchical organisational nature of the NHS and its staff, in study 2 of the current thesis, not all HCPs wanted to take part in the same intervention sessions with other groups of professionals. In study 2, GPs expressed that they would have preferred to participate in the intervention with other GPs and asked whether nurses could participate in different groups. This request highlighted possible organisational and cultural tension and problems within the organisation and working relationships between professionals. For researchers delivering this type of intervention in the future, we recommend scheduling the sessions in advance and asking HCPs themselves regarding their preferences. This might also help researchers lower drop-out rates.

2) Another issue that we encountered in delivering an individual-level intervention like ACT within the NHS was related to NHS staff's busy schedules and workload. Although the intervention was delivered in the evenings, it was scheduled across four sessions and always delivered on the same week day. Because of staff shifts, participants might have lost one or more sessions because they were working on shift patterns. We recommend asking HCPs for their availability beforehand, allowing them to be able to participate in all four sessions.

Based on the data reported in this thesis, it is possible to suggest that the ACT interventions would have also benefitted from the inclusion of information and content that could help staff deal with problems that arise from the organisation (e.g. problems staff might have with their managers, organisational culture, workload). To better understand how to integrate ACT interventions in organisations considering organisational-level factors that might be playing a role in influencing employees' wellbeing, researchers should integrate occupational health theoretical models, rationale and framework into their research.

Such theoretical models are designed to explain how work-related stress or burnout are associated with specific organisational characteristics. This thesis attempted to use a resource-based conceptualisation of burnout (COR theory) and adopted an alternative measure of burnout that aimed to capture a relevant but understudied aspect of the construct: cognitive weariness. Beyond the methodological utility, there was also a practical argument for testing the alignment between psychological flexibility and the COR theory: psychological flexibility is a skill that can be learned and taught to employees as a resource

they can use when struggling and/or in crisis. Integrating ACT with theories of occupational health psychology might be a good approach for researchers who aim to work in organisations and want to help employees learn new ways to handle work-related stressors and job demands.

6.8 Conclusion

Overall, this thesis aimed to test whether ACT-workplace interventions are useful for improving mental health in healthcare staff. Using a quantitative methodology, this thesis found that the ACT intervention was effective for reducing high levels of psychological distress and burnout but some improvements in the intervention still need to be made. The direct effect of the intervention on patient safety is still not clear, but a viable explanation emerging from this thesis is that the intervention might have impacted (perceived) patient safety by reducing psychological distress, but this needs to be confirmed in a larger trial. The most effective treatment processes found throughout the thesis were mindfulness and values. Self-compassion was also found to be promising and should be included in future interventions. The association between mindfulness, values and self-compassion and better mental health was confirmed in a relatively large study of this thesis in the general population. Implications of these findings are relevant for managers, clinicians, and HCPs working in healthcare organisations. However, the findings from this thesis are also useful for researchers aiming to develop or test interventions for improving mental health in healthcare staff or in the general population during or after the COVID-19 pandemic.

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Appendix A Chapter 2 (Systematic review and meta-analysis) Appendices

A.1 PRISMA checklist

Section/topic	#	Checklist item	Reported on page #
TITLE			
Title	1	Identify the report as a systematic review, meta-analysis, or both.	22
ABSTRACT			
Structured summary	2	Provide a structured summary including, as applicable: background; objectives; data sources; study eligibility criteria, participants, and interventions; study appraisal and synthesis methods; results; limitations; conclusions and implications of key findings; systematic review registration number.	n/a for thesis
INTRODUCTION			
Rationale	3	Describe the rationale for the review in the context of what is already known.	25-26
Objectives	4	Provide an explicit statement of questions being addressed with reference to participants, interventions, comparisons, outcomes, and study design (PICOS).	26
METHODS			
Protocol and registration	5	Indicate if a review protocol exists, if and where it can be accessed (e.g., Web address), and, if available, provide registration information including registration number.	26
Eligibility criteria	6	Specify study characteristics (e.g., PICOS, length of follow-up) and report characteristics (e.g., years considered, language, publication status) used as criteria for eligibility, giving rationale.	26-30

Information sources	7	Describe all information sources (e.g., databases with dates of coverage, contact with study authors to identify additional studies) in the search and date last searched.	27
Search	8	Present full electronic search strategy for at least one database, including any limits used, such that it could be repeated.	28, Appendix A2-A3
Study selection	9	State the process for selecting studies (i.e., screening, eligibility, included in systematic review, and, if applicable, included in the meta-analysis).	28
Data collection process	10	Describe method of data extraction from reports (e.g., piloted forms, independently, in duplicate) and any processes for obtaining and confirming data from investigators.	28
Data items	11	List and define all variables for which data were sought (e.g., PICOS, funding sources) and any assumptions and simplifications made.	28
Risk of bias in individual studies	12	Describe methods used for assessing risk of bias of individual studies (including specification of whether this was done at the study or outcome level), and how this information is to be used in any data synthesis.	28-29
Summary measures	13	State the principal summary measures (e.g., risk ratio, difference in means).	29
Synthesis of results	14	Describe the methods of handling data and combining results of studies, if done, including measures of consistency (e.g., I^2) for each meta-analysis.	29-30
Section/topic	**#**	**Checklist item**	**Reported on page #**
Risk of bias across studies	15	Specify any assessment of risk of bias that may affect the cumulative evidence (e.g., publication bias, selective reporting within studies).	30
Additional analyses	16	Describe methods of additional analyses (e.g., sensitivity or subgroup analyses, meta-regression), if done, indicating which were pre-specified.	30

RESULTS			
Study selection	17	Give numbers of studies screened, assessed for eligibility, and included in the review, with reasons for exclusions at each stage, ideally with a flow diagram.	30-32
Study characteristics	18	For each study, present characteristics for which data were extracted (e.g., study size, PICOS, follow-up period) and provide the citations.	33, Appendix A.4
Risk of bias within studies	19	Present data on risk of bias of each study and, if available, any outcome level assessment (see item 12).	36, Appendix A.4
Results of individual studies	20	For all outcomes considered (benefits or harms), present, for each study: (a) simple summary data for each intervention group (b) effect estimates and confidence intervals, ideally with a forest plot.	33-36
Synthesis of results	21	Present results of each meta-analysis done, including confidence intervals and measures of consistency.	38-39
Risk of bias across studies	22	Present results of any assessment of risk of bias across studies (see Item 15).	36-38, 41
Additional analysis	23	Give results of additional analyses, if done (e.g., sensitivity or subgroup analyses, meta-regression [see Item 16]).	43
DISCUSSION			
Summary of evidence	24	Summarize the main findings including the strength of evidence for each main outcome; consider their relevance to key groups (e.g., healthcare providers, users, and policy makers).	44-46

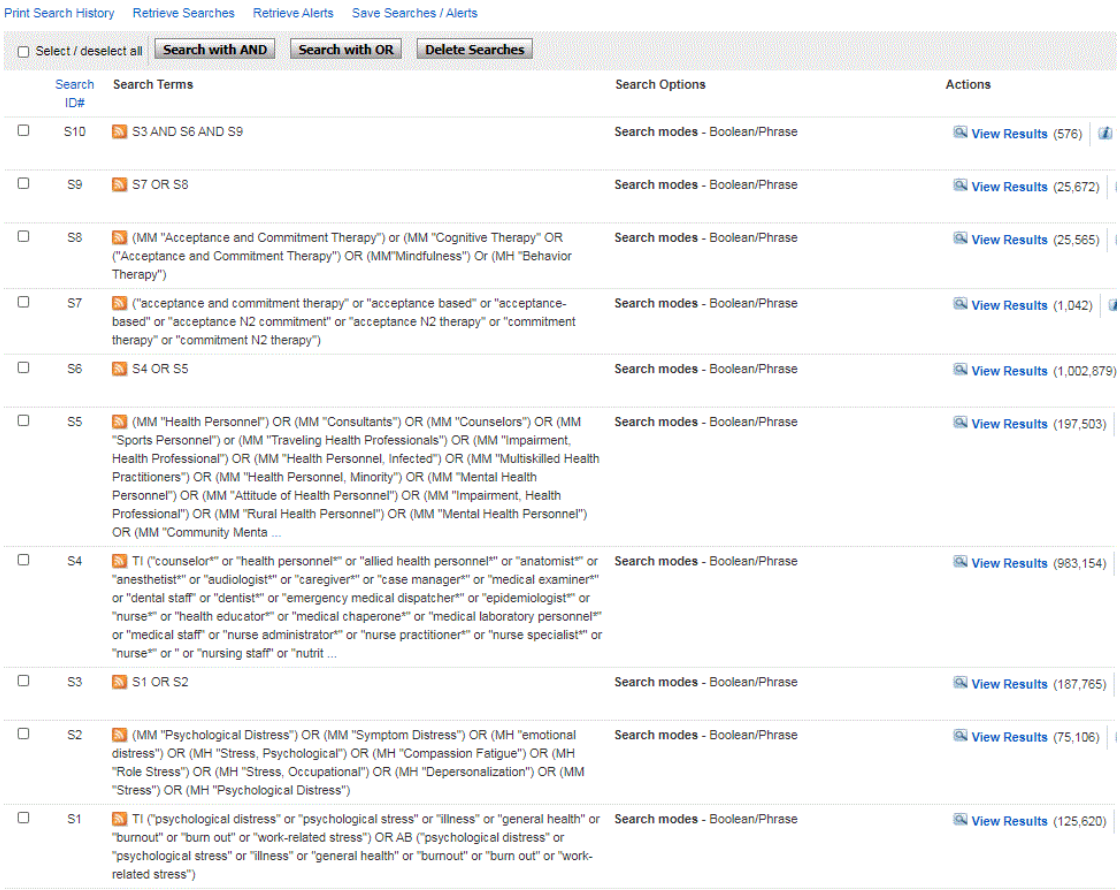
Limitations	25	Discuss limitations at study and outcome level (e.g., risk of bias), and at review-level (e.g., incomplete retrieval of identified research, reporting bias).	45-46
Conclusions	26	Provide a general interpretation of the results in the context of other evidence, and implications for future research.	46
FUNDING			
Funding	27	Describe sources of funding for the systematic review and other support (e.g., supply of data); role of funders for the systematic review.	n/a for thesis

From Moher, D., Liberati, A., Tetzlaff, J., Altman, D. G., & Prisma Group. (2009). Preferred reporting items for systematic reviews and meta-analyses: the PRISMA statement. *PLoS Medicine*, *6*(7), e1000097.

A.2 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

A.3 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)

A.4 Summary of outcomes, interventions, and comparison groups of studies retrieved in the review and meta-analysis

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	General Distress	Wellbeing	Psych flexibility or inflexibility	Treatment length	Follow-up length	Study quality
Bethay, Wilson, Schnetzer, Nassar & Bordieri (2013). USA	38 Intellectual disability staff (34)	20 (18)	38 (76.5%)	RCT	Baseline, post-intervention and follow-up	Inactive control	MBI	GHQ-12		BBS	3 sessions	3-month-follow-up	15
* Brinkborg, Michanek, Hesser & Berglund (2011). Sweden.	106 Social workers (94)	68 (38)	44 (89%)	RCT	Baseline and post-intervention	Inactive Control	MBI PBSE	GHQ-12 PSS		AAQ (swedish)	4 sessions	NA	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, post-intervention and follow-up	Active control	MBI	GHQ-28		AAQ-II	2 sessions	6 month-follow-up	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 and follow-up	Active control	MBI	GHQ-22		VLQ	2 sessions	6 month-follow-up	20
Dereix-Calonge, Ruiz, Sierra, Peña-Vargas, Ramírez (2019), Colombia.	85 clinical psychology trainees (85)	43, (42)	23.38 (79%)	RCT	Baseline and post-intervention	Inactive Control		DASS-21		VQ	6 sessions	NA	18
Farsi, (2018). Iran	30 nurses (30)	15 (15)	NA	Pre-post design	Baseline and post-intervention	Inactive Control		BAI			8 sessions	NA	9
*Frögéli, Djordjevic, Rudman, Livheim & Gustavsson (2016). Sweden.	113 Nursing students (63)	69 (44)	NA	RCT	Baseline, post-intervention and follow-up	Inactive control	BO	PSS		AFQ-Y MAAS	6 sessions	3 month-follow-up	13
Gerhart, O' Mahony, Abrams, Grosse, Greene & Levy (2016). USA.	17 palliative care providers (11)	only ACT	53 (81%)	Pre-post design	Baseline, mid-intervention and post-intervention		MBI	PCL-C BDI-II		AAQ-II CFQ Mindfulness Practice Log	10 sessions		13

Habibian, Sadri, Nazmiyeh, 2018, Iran	60 paediatric oncology and special diseases nurses (60)	30 (30)	34.2 (94%)	RCT	Baseline, post-intervention and follow-up	Active control	MJJBI	OOSI			4 sessions	3 month-follow-up	10
Hayes, Bissett, Roget, Padilla & Kohlenberg (2004). USA.	93 substance abuse counsellors (85)	30, Comparison (34); Control (29)	53 (63%)	RCT	Baseline, post-intervention and follow-up	Two active controls	MBI		-	SAB	1 session	3 month-follow-up	16
Heydari, Masafi, Jafari, Saadat & Shahyad (2018). Iran.	30 psychiatric staff (30)	15, (15)	NA (NA)	Pre-post design	Baseline, post-intervention and follow-up	Inactive Control	MBI	BDI-II BAI			8 sessions	2 month-follow-up	8
Luoma, Hayes, Twohig, Roget, Fisher, Padilla, Kohlenberg, (2007). USA	30 therapists and trainees (24)	16, (14)	53 (70%)	RCT	Baseline, post-intervention and follow-up	Inactive Control	MBI				8 sessions	2-and 4-month follow-ups	10
McConachie, McKenzie, Morris, & Walley (2014). UK	120 support staff (87)	66, (54)	43 median (71.2%)	RCT	Baseline, post-intervention and follow-up	Inactive Control	SSQ	GHQ-12	WEMWBS	AAQ-II WBSI	2 sessions	6-week follow-up	13

Noone and Hastings, 2009, UK	28 ID support staff (14)	22, (6)	37.43 (78.3%)	Pre-post design	Baseline and follow-up	Inactive control	SSQ	GHQ-12			2 sessions	6-week follow-up	8
Noone and Hastings, 2010, UK	34 ID support staff (34)	PACT only	41.71 (70.5%)	Pre-post design	Baseline and follow-up		SSQ	GHQ-12			2 sessions	6-week follow-up	8
O'Brien, Bannon, McCarren, Delaney (2012), USA.	45 mental health workers (45)	21, (24)	43.64 (78%)	RCT	Baseline and post-intervention	Inactive Control		GHQ-12	SF-12	AAQ-II	3 sessions		18
O' Mahony et al., 2017, USA	13 medical providers (10)	ACT only	44 (69.2%)	Pre-post design	Baseline, mid-intervention and post-intervention		MBI	BDI-II PCL-C		AAQ-II CFQ	9 sessions		10
Pakenahm, 2015, Australia	51 clinical psychology trainees (32)	ACT only	27.66 (88%)	Pre-post design	Baseline and post-intervention (TL = 4 sessions)		MHPSS	GHQ-28		AAQ FFMQ WBSI VLQ SCS	12 sessions		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, post-intervention and follow-up		MBI SSQ	GHQ-12 DASS		AAQ SSVQ	2 sessions	3 and 6-month follow-up	17
Stafford Brown and Pakenham, (2012) Australia	56 clinical psychology trainees (54)	28, (28)	28.45 (87.5%)	Pre-post design	Baseline, post-intervention and follow-up	Inactive control	MHPSS	GHQ-28	SWLS	VLQ WBSI FFMQ SCS AAQ	4 sessions	10-week follow-up	15
Stewart, White, Ebert, Mays, Nardozzi & Bockarie (2016)	57 workers and health professional (37)	ACT only	34 (54.39%)	Pre-post design	Baseline, post-intervention and follow-up				SWLS	AAQ-II VQ	3 sessions	3-month follow-up	20
Waters, Frude, Flaxman & Boyd (2018). UK	35 Clinically distressed health care workers (30)	17, (18)	39.7 (84%)	Pre-post design	Baseline and follow-up	Inactive Control		GHQ-12		AAQ-II FFMQ ATQ	1 session	3-month follow-up	17

AAQ: Acceptance and Action Questionnaire; AFQ-Y: Avoidance and Fusion Questionnaire for Youth; ATQ: Automatic Thoughts; BAI: Beck Anxiety Inventory; BBS: Burnout Believability Scale; BDI: Beck Depression Inventory; BO: Burnout Subscale from the Scale of Work Engagement and Burnout; CFQ: Cognitive Fusion Questionnaire; DAS: Dysfunctional Attitude Scale; FFMQ: Five Facet Mindfulness Questionnaire; GHQ-12: General Health Questionnaire; MAAS: Mindful Attention Awareness Scale; MBI: Maslach Burnout Inventory; MHPSS: Mental Health Professional Stress Scale; MJJBI: Maslach and Jackson Job Burnout Inventory; OOSI: Osipow Occupational Stress Inventory; PBSE: Performance-based self-esteem scale; PCL-C: The PTSD Symptom Checklist – re-experiencing subscale; PSS: Perceived Stress Scale; PTQ: Perseverative Thinking Questionnaire; PTSD Re-experiencing: PTSD Symptom Checklist; SAB: Stigmatizing Attitudes – Believability; SSQ: Staff Stressor Questionnaire; SSVQ: Support Staff Values Questionnaire; VLQ: Valued Living Questionnaire; WEMWBS: White Bear Suppression Inventory.

Appendix B

Chapter 3 (Randomised-controlled trial) Appendix

B.1 Questionnaire given to participants at four different time-points

Background Details

Please complete the sections below:

Your age: _____

Gender (please tick)

- Male
- Female
- Prefer not to answer

Please indicate your current role (e.g., GP, nurse) _____

How long have you been in your current job role? (to the nearest year)_____

Approximately how many hours do you work in a typical working week? (please include any overtime hours in your estimation)

_____

Do you work full-time or part-time?

- FT
- PT

How would you describe your ethnic background? Please indicate one from the following options

- English/Welsh/Scottish/Northern Irish/British
- Irish
- Gypsy or Irish Traveller

- European
- White and Black Caribbean
- White and Black African
- White and Asian
- Indian
- Pakistani
- Bangladeshi
- Chinese
- Japanese
- African
- Caribbean
- Other
- Prefer not to say

If you chose ‘Other’ please describe_____

Have you been practising mindfulness, acceptance and commitment therapy or another stress management technique within the last 3 months?

If yes, please indicate which one _____

How frequently have you been practising this technique (weekly, daily etc.) _____

How long have you been practising this technique? _____

Your General Wellbeing (psychological distress)

The questions below ask how your health has been in general **over the last few weeks.** Please answer ALL the questions simply by circling the answer which you think most nearly applies to you. Remember, this is about complaints you have experienced **in the last few weeks**, *not those you had in the past*.

Have you recently…

Been able to concentrate on whatever you're doing?	Better than usual	Same as usual	Less than usual	Much less than usual
Lost much sleep over worry?	Not at all	No more than usual	Rather more than usual	Much more than usual
Felt that you are playing a useful part in things?	More so than usual	Same as usual	Less useful than usual	Much less useful
Felt capable of making decisions about things?	More so than usual	Same as usual	Less so than usual	Much less capable
Felt constantly under strain?	Not at all	No more than usual	Rather more than usual	Much more than usual
Felt you couldn't overcome your difficulties?	Not at all	No more than usual	Rather more than usual	Much more than usual
Been able to enjoy your normal day-to-day activities?	More so than usual	Same as usual	Less so than usual	Much less than usual
Been able to face up to your problems?	More so than usual	Same as usual	Less so than usual	Much less able
Been feeling unhappy and depressed?	Not at all	No more than usual	Rather more than usual	Much more than usual
Been losing confidence in yourself?	Not at all	No more than usual	Rather more than usual	Much more than usual
Been thinking of yourself as a worthless person?	Not at all	No more than usual	Rather more than usual	Much more than usual
Been feeling reasonably happy, all things considered?	More so than usual	About same as usual	Less so than usual	Much less than usual

How Do You Feel at Work? Part I (burnout)

Below are a number of statements that describe different feelings that you may feel at work. Please indicate (using the scale from 1 (never) to 7 (Always or almost always) with a tick one box per row) how often, in the **past 30 workdays**, you have felt each of the following:

	1	2	3	4	5	6	7
I feel tired							
I have no energy for going to work in the morning							
I feel physically drained							
I feel fed up							
I feel like my “batteries” are “dead”							
I feel burned out							
My thinking process is slow							
I have difficulty concentrating							
I feel I'm not thinking clearly							
I feel I'm not focused in my thinking							
I have difficulty thinking about complex things							

I feel I am unable to be sensitive to the needs of co-workers and customers							
I feel I am not capable of investing emotionally in co-workers and customers							
I feel I am not capable of being sympathetic to co-workers and customers							

How do you feel about work? Part 2 (work-related worry and rumination)

How often have you felt this way at work?

Below are a number of statements that describe different feelings that you may feel at work. Please indicate how often, in the past 7 days, you have felt each of the following feelings. Where, 1= very seldom to never, 2= seldom, 3= sometimes, 4 = often, 5 = very often or always.

	1	2	3	4	5
Do you become tense when you think about work related issues during your free time?					
Are you annoyed by thinking about work-related issues when not at work?					
Are you irritated by work issues when not at work?					
Do you become fatigued by thinking about work related issues during your free time?					
Are you troubled by work-related issues when not at work?					

How do you feel outside work, about work? (work-related worry and rumination)

Below are a number of statements that describe different experiences of feelings relating to work. Please indicate how often, in the past 7 days, you have felt each of the following feelings from 1 (*not at all*) to 5 (*a great deal*). Please indicate how often, in the past 7 days, you have felt each of the following feelings from 1 (*not at all*) to 5 (*a great deal*):

	1	**2**	**3**	**4**	**5**
My thoughts kept returning to a stressful situation at work					
I worried about things to do with work					
I found myself dwelling on problems related to my work					
I repeatedly thought about a situation that had upset me at work					
I was concerned about mistakes I have made (or might make) at work?					

How do you feel about the work you do?(perceived safety practices)

Please indicate your answer from 1 (strongly disagree) to 5 (strongly agree) to the following statements, Please place a tick in the desired column, one tick per row.

	1	**2**	**3**	**4**	**5**
In the past four weeks, my practice is not as safe as it could be because of work related factors/conditions					
In the past four weeks, my practice is safe					

How do you behave in difficult times? (distress endurance subscale, experiential avoidance)

Please indicate the extent to which you agree or disagree with the following statements. Please write the corresponding number in the column, one number per row.

	1 = Strongly disagree	**2 = Moderately disagree**	**3 = Slightly disagree**	**4 = Slightly agree**	**5 = Moderately agree**	**6 = Strongly agree**
People should face their fears						
Even when I feel uncomfortable, I don't give up working toward things I value						
I am willing to put up with pain and discomfort to get what I want						
I am willing to suffer for the things that matter to me						
Fear or anxiety won't stop me from doing something important						
When I am hurting, I still do what needs to be done						
I don't let pain and discomfort stop me from						

getting what I want						
I am willing to put up with sadness to get what I want						
I continue working toward my goals even if I have doubts						
I don’t let gloomy thoughts stop me from doing what I want						
When working on something important, I won’t quit even if things get difficult						

How do you feel toward yourself in difficult times? (self-compassion)

Please place a tick in the box to indicate the how often you behave in the stated manner using a scale from 1 (*almost never*) to 5 (*almost always*).

	1	**2**	**3**	**4**	**5**
When I fail at something important to me I become consumed by feelings of inadequacy					
I try to be understanding and patient toward those aspects of my personality I don't like					
When something painful happens I try to take a balanced view of the situation					
When I am feeling down, I tend to feel like most other people happier than I am					
I try to see my failings as part of the human condition					
When I am going through a very hard time, I give myself the caring and tenderness I need					
When something upsets me I try to keep my emotions in balance					
When I fail at something that's important to me, I tend to feel alone in my failure					
When I'm feeling down I tend to obsess and fixate on everything that's wrong					
When I feel inadequate in some wat, I try to remind myself that feelings of inadequacy are shared by most people					

I'm disapproving and judgemental about my own flaws and inadequacies					
I'm intolerant and impatient toward those aspects of my personality I don't like					

Your experience of yourself (mindfulness)

Please indicate how true the following fifteen statements are for you. Please use the scale 1 (Never or very rarely true) to 5 (Very often or always true) to indicate how true each statements is for you. Circle one number per row.

	Never or very rarely true	**Rarely true**	**Sometimes true**	**Often true**	**Very often or always true**
1. When I take a shower or a bath, I stay alert to the sensations of water on my body.	1	2	3	4	5
2. I'm good at finding words to describe my feelings	1	2	3	4	5
3. I don't pay attention to what I'm doing because I'm daydreaming, worrying or otherwise distracted.	1	2	3	4	5
4. I believe some of my thoughts are abnormal or bad and I shouldn't think that way.	1	2	3	4	5
5. When I have distressing thoughts or images, I "step back" and am aware of the thought or image without getting taken over by it.	1	2	3	4	5
6. I notice how foods and drinks affect my thoughts bodily sensations and emotions	1	2	3	4	5

7. I have trouble thinking of the right words to express how I am feeling about things.	1	2	3	4	5
8. I do jobs or tasks automatically without being aware of what I'm doing.	1	2	3	4	5
9. I think some of my emotions are bad or inappropriate and I shouldn't feel them	1	2	3	4	5
10. When I have disturbing thoughts or images I am able to just notice them without reacting.	1	2	3	4	5
11. I pay attentions to sensations, such as the wind in my hair or the sun on my face.	1	2	3	4	5
12. Even when I am feeling terribly upset, I can find a way to put it into words.	1	2	3	4	5
13. I find myself doing things without paying attention.	1	2	3	4	5
14. I tell myself I shouldn't be feeling the way I am feeling.	1	2	3	4	5
15. When I have distressing thoughts or images, I just notice them and let them go.	1	2	3	4	5

Values

Please read each statement carefully and indicate a number from 1 (*not at all true*) to 6 (*completely true*), which best describes the extent to which the statement was true for you **during the past week,** including today.

Thank you for showing interest in taking part in this study.

	1 **= Not at all true**	**2**	**3**	**4**	**5**	**6** **= Completely true**
I spent a lot of time thinking about the past or future, rather than being engaged in activities that mattered to me						
I was basically on “auto-pilot” most of the time						
I worked toward my goals even if I didn’t feel motivated to						
I was proud about how I lived my life						
I made progress in the areas of my life I care most about						
Difficult thoughts, feelings or memories got in the way of what I really wanted to do						
I continued to get better at being the kind of person I want to be						
When things didn’t go according to plan, I gave up easily						
I felt like I had a purpose in life						
It seemed like I was just “going through the motions” rather than focusing on what was important to me						

Appendix C

Chapter 4 (Cross-sectional study) Appendix

The cross-sectional study of this thesis (Chapter 4) employed the same measures used in the randomised-controlled study (Chapter 3). A list of these measures is presented in Appendix B.

Appendix D

Chapter 5 (Longitudinal study) Appendix

D.1 Questionnaire sent to participants at different time-points

This project has been approved by the Research Ethics Committee of the School of Psychology at the University of Leeds – Reference number: PSYC-11, Date: 31.03.2020.

We would like to invite you to take part in a research study on stress, wellbeing, emotions and suicide during UK lockdown. Before you decide whether to participate it is important for you to understand why the research is being done and what it will involve. Please take time to read the following information carefully and discuss it with others if you wish. Please email the researcher (stressandwellbeingstudy@gmail.com) if there is anything that is not clear or if you require more information. Take time to decide whether or not you wish to take part. Please click continue to read the information sheet.

Are you fluent in English, aged 18 years of age or older and currently reside in the UK?

Yes

Your age

Gender (please tick)

Male

Female

Prefer not to say

Please indicate your current/pre-COVID-19 job:

What is your highest educational qualification?

Have you lost your job or taken a pay cut because of covid-19?

Yes, I have lost my job

Yes, I have taken a pay cut

I am still working

Are you currently working as a key worker as classified by the government?

Yes

No

If yes, do you work for the NHS?

Yes

No

COVID-19 (Stress)

In the past two weeks, to what extent has life become more stressful, difficult or upsetting because of the COVID-19 outbreak?

Not at all stressful, bothersome, upsetting						**Extremely stressful, upsetting, bothersome**
1	2	3	4	5	6	7

Burnout

During the past two weeks, when thinking about your work overall, how often have you felt the following?

	Never 1	2	3	4	5	6	7	I am retired	I am not working
Tired									
Disappointed with people									
Hopeless									
Trapped									
Helpless									
Depressed									
Physically weak/ Sickly									
Worthless/ Like a failure									
Difficulties sleeping									
“I have had it”									

COVID-19 worry

Worry is defined as “Negative, repetitive thoughts about future events which have the potential to be stressful or upsetting”. These worrisome thoughts are usually distressing, can be difficult to control and can lead to a spiral of different worries. Over the last two weeks: How often did you worry or focus on COVID-19-related things that may occur or happen in the future?

Never						**Very Often**
1	2	3	4	5	6	7

COVID-19 rumination

Rumination is defined as “Negative, repetitive thoughts about upsetting emotions or events which have happened in the past (including today)”. These ruminative thoughts are usually distressing, can be difficult to control and can lead to a spiral of different ruminations. Over the last two weeks: How often did you ruminate over COVID-19-related things that have happened to you, or upset you in the past?

Never						**Very Often**
1	2	3	4	5	6	7

Wellbeing

Below are some statements about feelings and thoughts. Please tick the box that best describes your experience of each over the last 2 weeks.

	None of the time	**Rarely**	**Some of the time**	**Often**	**All of the time**
1. I've been feeling optimistic about the future.					
2. I've been feeling useful.					
3. I've been feeling relaxed.					
4. I've been dealing with problems well.					
5. I've been thinking clearly.					
6. I've been feeling close to other people.					
7. I've been able to make up my own mind about things.					

Life Satisfaction

Please rate how satisfied you are with your life during the past two weeks.

Not at all satisfied									**Extremely satisfied**
1	2	3	4	5	6	7	8	9	10

Mindfulness (Trait)

Your experience of yourself. Please indicate how true the following fifteen statements are for you. Please use the scale 1 (Never or very rarely true) to 5 (Very often or always true) to indicate how true each statements is for you. Tick one box per row.

	Never or very rarely true	**Rarely true**	**Sometimes true**	**Often true**	**Very often or always true**
1. When I take a shower or a bath, I stay alert to the sensations of water on my body.	1	2	3	4	5
2. I'm good at finding words to describe my feelings	1	2	3	4	5
3. I don't pay attention to what I'm doing because I'm daydreaming, worrying or otherwise distracted.	1	2	3	4	5
4. I believe some of my thoughts are abnormal or bad and I shouldn't think that way.	1	2	3	4	5
5. When I have distressing thoughts or images, I "step back" and am aware of the thought or image without getting taken over by it.	1	2	3	4	5
6. I notice how foods and drinks affect my thoughts bodily sensations and emotions	1	2	3	4	5
7. I have trouble thinking of the right words to express how I am feeling about things.	1	2	3	4	5
8. I do jobs or tasks automatically without being aware of what I'm doing.	1	2	3	4	5

9. I think some of my emotions are bad or inappropriate and I shouldn't feel them	1	2	3	4	5
10. When I have disturbing thoughts or images I am able to just notice them without reacting.	1	2	3	4	5
11. I pay attentions to sensations, such as the wind in my hair or the sun on my face.	1	2	3	4	5
12. Even when I am feeling terribly upset, I can find a way to put it into words.	1	2	3	4	5
13. I find myself doing things without paying attention.	1	2	3	4	5
14. I tell myself I shouldn't be feeling the way I am feeling.	1	2	3	4	5
15. When I have distressing thoughts or images, I just notice them and let them go.	1	2	3	4	5

Mindfulness (State)

Your experience of yourself - Part 2. Please tick one box to show how often you experienced each of the following statements during the past two weeks:

During the past two weeks, I found it difficult to stay focused on what was happening in the present.

Not at all			Somewhat			Very much
0	1	2	3	4	5	6

During the past two weeks, I rushed through activities without being really attentive to them.

Not at all	Somewhat	Very much

0	1	2	3	4	5	6

During the past two weeks, I did jobs or tasks automatically, without being aware of what I was doing.

Not at all			Somewhat			Very much
0	1	2	3	4	5	6

During the past two weeks, I found myself preoccupied with the future or past.

Not at all			Somewhat			Very much
0	1	2	3	4	5	6

During the past two weeks, I found myself doing things without paying attention.

Not at all			Somewhat			Very much
0	1	2	3	4	5	6

Values (Trait)

Values are defined as 'the personal qualities a person wants to express most in his or her daily behaviour'. For each of the areas listed below consider how you most want to live your life. Then rate how IMPORTANT each domain is for you. This is NOT about how well you are doing in each area – it is about how important it is to you. Rate the importance you place in each domain using any number on the scale from 0 (not at all important) to 10 (extremely important). Each area need not be important to you – rate an area low if it is not important to you personally.

1. Family and friendship (e.g., participation in relationships with parents, children, other close relatives, people you live with, or whoever is your “family”).

Not all important										**Extremely important**
0	1	2	3	4	5	6	7	8	9	10

2. Work (e.g., engaging in whatever is your work, at home or in your workplace).

Not all important										**Extremely important**
0	1	2	3	4	5	6	7	8	9	10

3. Health and self-care (e.g., keeping yourself fit, physically able, and healthy just as you would most want to do).

Not all important										**Extremely important**
0	1	2	3	4	5	6	7	8	9	10

Values (State)

For each of the areas of life listed below consider again how you most want to live your life. Then rate how SUCCESSFUL you have been living according your values during the past two weeks. These questions are NOT asking how successful you want to be but how successful you have been. Rate your success using any number on the scale from 0 (not at all successful) to 10 (extremely successful) during the past two weeks. During the past two weeks, how SUCCESSFUL have you been at doing what matters to you in terms of your...?

1. Family and friendship (e.g. participation in relationships with parents, children, other close relatives, people you live with, or whoever is your “family”).

Not all important										**Extremely important**
0	1	2	3	4	5	6	7	8	9	10

2. Work (e.g., engaging in whatever is your work, at home or in your workplace).

Not all important										**Extremely important**
0	1	2	3	4	5	6	7	8	9	10

3. Health and self-care (e.g., keeping yourself fit, physically able, and healthy just as you would most want to do).

Not all important										**Extremely important**
0	1	2	3	4	5	6	7	8	9	10

Self-Compassion (Trait)

How do you feel toward yourself in difficult times?

Please place a tick in the box to indicate the how often you behave in the stated manner using a scale from 1 (*almost never*) to 5 (*almost always*).

	1	**2**	**3**	**4**	**5**
When I fail at something important to me I become consumed by feelings of inadequacy					
I try to be understanding and patient toward those aspects of my personality I don't like					
When something painful happens I try to take a balanced view of the situation					
When I am feeling down, I tend to feel like most other people happier than I am					
I try to see my failings as part of the human condition					
When I am going through a very hard time, I give myself the caring and tenderness I need					
When something upsets me I try to keep my emotions in balance					
When I fail at something that's important to me, I tend to feel alone in my failure					
When I'm feeling down I tend to obsess and fixate on everything that's wrong					
When I feel inadequate in some wat, I try to remind myself that feelings of inadequacy are shared by most people					

I'm disapproving and judgemental about my own flaws and inadequacies					
I'm intolerant and impatient toward those aspects of my personality I don't like					

Self-Compassion (State)

Please indicate how often over the past two weeks you have behaved in the stated manner using a scale from 1 (almost never) to 5 (almost always).

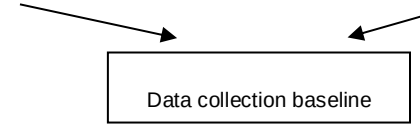
	Almost never 1	**2**	**3**	**4**	**Almost always 5**
1. I have tried to be kind and reassuring to myself.					
2. I have tried to take a supportive attitude towards myself.					
3. I have been hard on myself.					
4. I have been angry with myself.					
5. I feel like other people are having an easier time in this situation than me.					
6. Negative things seem to happen to me more than other people.					
7. I keep thinking about bad things					

that have happened.					
8. I guess that a lot of people have difficulty with situations like this.					

Appendix E

E.1 Thesis flowchart

PhD Timeline	PhD funding secured (NHS Clinical Commissioning Group, Patient Safety Translational Centre, and University of Leeds)			
Pre PhD	**Study 1**	**Study 2: RCT study**	**Study 3: cross-sectional study**	**Study 4**



Date	**Study 1**	**Study 2**	**Study 3**	**Study 4**
Oct 2017		**Data collection starts (Study 2)**	**Data collection starts (Study 3)**	
Nov 2017				
Dec 2017				
Jan 2018 (PhD start)	**Study 1: Meta-analysis**			
Feb 18	**Study design**			
March 18				

April 18	**Screening articles**			
May 18				
June 18		**Data collection ends** (N=98)		
July 18	**Meta-analyses**	**Data cleaning**		
August 18				
September 18		**Data analysis**		
October 18	**Revision of meta-analyses**		**Data collection ends** (N = 98, 81 participants the same as the cross-sectional study)	
November 18			**Data cleaning**	
December 18				
Jan 2019				
Feb 19				
March 19	**Writing up**	**Writing up**		
April 19			**Data analysis**	
May 19				

June 19				
July 19				
August 19				
September 19				**Conceptualisation study 4 on NHS staff and ethics approval**
October 19				
November 19			**Writing up**	
December 19				
Jan 2020				
Feb 20				**Changes to study 4 – COVID-19 study**
March 20				**Study design**
April 20				**Data collection**
May 20				
June 20				**Data analyses**
July 20				
August 20				**Writing up**
September 20				

October 20				
November 20				
December 20				
Jan 2021				
Feb 21				
March 21	**PhD thesis submission**			