DOCTOR OF PHILOSOPHY

Evaluation of a Mindfulness-based programme in public sector workplaces for stress management: A cost consequence business case analysis

Hadley, Sharon

Award date:
2024

Awarding institution:
Bangor University

PRIFYSGOL
BANGOR
UNIVERSITY

Evaluation of a Mindfulness-based programme in public sector workplaces for stress management: A cost consequence business case analysis

Sharon Grace Hadley

Centre for Health Economics and Medicines Evaluation

Bangor University

October 2023

‘Yr wyf drwy hyn yn datgan mai canlyniad fy ymchwil fy hun yw’r thesis hwn, ac eithrio lle nodir yn wahanol. Caiff ffynonellau eraill eu cydnabod gan droednodiadau yn rhoi cyfeiriadau eglur. Nid yw sylwedd y gwaith hwn wedi cael ei dderbyn o’r blaen ar gyfer unrhyw radd, ac nid yw’n cael ei gyflwyno ar yr un pryd mewn ymgeisiaeth am unrhyw radd oni bai ei fod, fel y cytunwyd gan y Brifysgol, am gymwysterau deuol cymeradwy.’

Rwy’n cadarnhau fy mod yn cyflwyno’r gwaith gyda chytundeb fy Ngrichwyliwr (Goruchwylwyr)’

‘I hereby declare that this thesis is the results of my own investigations, except where otherwise stated. All other sources are acknowledged by bibliographic references. This work has not previously been accepted in substance for any degree and is not being concurrently submitted in candidature for any degree unless, as agreed by the University, for approved dual awards.’

I confirm that I am submitting the work with the agreement of my Supervisor(s)’

Acknowledgements

This research project and thesis has been possible thanks to the support and generosity of so many, it's not feasible to name every person who has supported me over the last nine years, but to each and every one of you - I'm truly grateful.

Various teams at Bangor University have supported me, Professor Rhiannon Tudor Edwards at the Centre for Health Economics and Medicines Evaluation and Dr Zoe Hoare at the North Wales Organisation for Randomised Trials in Health (& Social Care) who between them offered guidance and supervision. Dr Sion Williams from the School of Medical and Health Sciences who has been my PhD Chair and Dr Catherine Lawrence who provided excellent and thoughtful feedback as I prepared for submission. Professor Rebecca Crane and Eluned Gold who were based at the Centre for Mindfulness Research and Practice supported the RCT curriculum and delivery – thank you all. Appreciation also to Gary Smith for his support with all the online data collection and to Catalina Suarez-Rivera for SPSS mentoring. Many teachers from the Mindfulness field have offered their time freely to this trial, plus the teaching locations offered their space without charge, such generosity really has made this research possible.

On a personal level, nine years is a long time to commit to a PhD, I'm grateful to those in Bangor University who permitted an extension as I navigated through some personal challenges whilst working on the PhD and in full-time employment. My personal support network has been crucial together with the professional support. Too many people have been routing for me to mention them all, and in both the professional and personal context, I send sincere apologies to those whom I have not been able to mention by name. However, I can't conclude my acknowledgements without thanking my family, my sister (Dawn) and her husband (Steve) and mother (Barbara) and her husband (Chris) who looked after me, my children, my home and pets on many occasions so I could take time out to write. Writing time was supported by my employer (the Oxford Mindfulness Foundation) and enabled by Peter and Alison Yiangou who gifted me the sanctuary of their home to write in peace whilst also offering me moral support which proved invaluable, immensely nourishing and supportive.

And finally, to Pete, Cerys and Morgan, for all the times I've not been available, and you have simply been understanding, patient and supportive – thank you, I love you all.

TABLE OF CONTENTS

CHAPTER 3
EFFECTIVENESS OF A MINDFULNESS-BASED PROGRAMME IN THE WORKPLACE

CHAPTER 5
MINDFULNESS IN THE WORKPLACE – BUSINESS CASE ANALYSIS

CHAPTER 6
DISCUSSION, CONCLUSIONS AND RECOMMENDATIONS

LIST OF FIGURES

CHAPTER 1

CHAPTER 2

CHAPTER 3

CHAPTER 4

CHAPTER 5

LIST OF TABLES

CHAPTER 1

CHAPTER 2

CHAPTER 3

CHAPTER 4

CHAPTER 5

CHAPTER 6

Evaluation of a Mindfulness-based programme in public sector workplaces for stress management: A cost consequence business case analysis

From a novel employer perspective, is Mindfulness in the workplace effective and what are the costs and consequences of its implementation at scale?

Abstract

Rising costs to the economy from absenteeism and a greater public awareness of stress, anxiety and depression have raised the profile and desire to tackle mental health issues in the workplace.

This thesis considers the advancement and transferability of Mindfulness from its original setting in healthcare into the workplace sector. A multidisciplinary perspective brings together health economics, psychology and leadership theory perspectives. Various intervention types and outcomes of Mindfulness trials are reviewed, with the principal exploration of programme transferability across sectors. The novel element of this thesis reviews both health and business outcomes of Mindfulness in the workplace and importantly considers an economic evaluation from the employer's perspective.

Process and methods

This thesis is structured in the following way: the rationale for a workplace mental health intervention and consideration of the evidence-base of Mindfulness in various settings is discussed **in Chapter one.** In **Chapter two**, a systematic review of the impact on job performance and the cost-effectiveness of Mindfulness interventions in the workplace is presented. **Chapter three** reports on the randomised control trial (RCT) which was conducted for this PhD project (registration number: CRD42021279822). The chapter reports on the process and results for effectiveness, with the main outcome of stress measured using the "*The Perceived Stress Scale*". Secondary measures included *Five Facet Mindfulness Questionnaire*, *The World Health Organization Quality of Life-BREIF*, *Cognitive Failures Questionnaire, Multifactor Leadership Questionnaire*, bespoke *Service Use Measure*, *ICECAP-A* and *EQ-5D-3L*. **Chapter four** presents the results from the RCT and considers cost-effectiveness via a cost-consequence analysis. This method was chosen as the trial did not find effects when evaluating the

primary outcome. **Chapter five** reports on the employer perspective considering outcomes relevant to the workplace. **Chapter six** brings together the findings in a discussion and makes future recommendations.

Results

In terms of the **primary outcome measure**, Perceived Stress Scale (PSS), the intervention was not found to be effective. Reasons for this are presented in Chapter three and discussed in detail in Chapter six. From an employer perspective, the cost consequence analysis provides the full range of costs and outcomes for the employer to consider. The outcomes and possible reasons for the results are explored with theories offered and recommendations made for further research. The **secondary outcome measures**: the Five Factor Mindfulness Questionnaire found statistically significant changes with higher Mindfulness traits in the intervention group. There were no statistically significant changes observed in either of the World Health Organization measures or the leadership measure. The three economic evaluation measures, ICECAP-A, EQ5D-3L including the VAS reported no statistically significant changes. The Cognitive Failures Questionnaire reported no statistically significant changes immediately following the intervention, however at the 12-month follow-up there were statistically significant changes in favour of the intervention group.

Conclusions

The Mindfulness intervention used in this trial was not found to be effective nor cost-effective when delivered in a public sector workplace in the United Kingdom (UK). It is important that results of trials and studies are published even if they are not found to be effective or cost-effective, in such cases a cost consequence analysis allows analysts to unpack wider findings and link them to process evaluation considerations. The trial provided valuable insights and learning when considering Mindfulness in the workplace. This thesis reviews various outcomes and considers **healthcare**, the **cost-effectiveness** and the **business case** of Mindfulness from an employer perspective.

Chapter One
Introduction and Background

1.0 Chapter preface and novel research

The research documented in this thesis commenced in 2014 when there was limited reporting on the economic impact of Mindfulness from a business perspective (Baxter et al., 2016). During the write-up in 2023, the original rationale for research is considered, alongside the current position nine years later. This consideration over a period of time is particularly pertinent due to the Covid-19 pandemic and the impact of Covid on population-wide mental health. The literature review included in this thesis (Chapter two) concentrates on UK mental health, defined as a *"state of wellbeing in which the individual realizes his or her own abilities, can cope with the normal stresses of life, can work productively and fruitfully, and is able to make a contribution to his or her community"* (World Health Organization, 2018).

This thesis is novel as typically research into the impact of Mindfulness-based interventions has focused on health outcomes, with 47% of publications from 1966 to 2021 originating from the psychology field and 20.8% from psychiatry (Baminiwatta & Solangaarachchi, 2021). More recent trends show a growing interest in reviewing the impact of Mindfulness outside of the healthcare context, looking into the mechanisms of Mindfulness, context and alternative delivery methods (Baminiwatta & Solangaarachchi, 2021).

Due to the multi-disciplinary nature of the thesis, the trial findings are written in separate chapters with differing perspectives. **Chapter two** presents a literature review conducted to establish existing literature and field knowledge of Mindfulness programmes in the workplace. The review updated an earlier similar review with the added inclusion criteria of an economic evaluation in trials which researched both the effectiveness of a Mindfulness intervention in the workplace and the impact on job performance. **Chapter three** presents the trial methodology and results. This chapter includes a review of the Mindfulness programme offered in this trial, each of the measures used are detailed with primary and secondary outcomes explained. This chapter focuses on the results and effectiveness and includes a consideration of the challenges in measuring preventative interventions in the workplace. **Chapter four** reports on the findings from a cost consequence analysis from an employer perspective. **Chapter five** develops this employer perspective in more detail, reviewing the outcomes more commonly associated with the workplace. In **Chapter six**, the main themes and research questions are

revisited, updated scientific and academic opinions are presented, concluding with recommendations for the Mindfulness field, government bodies and the workplace.

This chapter focuses on a brief introduction to healthcare, considering the universal rights to healthcare and the challenges a universal level of access to service can bring. Mental health is then explored along with the concept of proactive interventions to support the increasing demand on healthcare services, looking broadly on a global level then focusing on the UK position (which is the context for the subsequent research trial). The workplace is considered as a possible location for mental health interventions, reviewing employment statistics and sickness reporting in the workplace. Mindfulness is then introduced and the exploration of the workplace as a possible location to introduce Mindfulness to alleviate the pressures on public mental health services. The chapter reviews Mindfulness as a possible intervention to support the whole population by impacting on more than oneself but the wider decisions we make when engaging with our communities. The chapter concludes with an outline of key themes for exploration and key research questions.

1.1 Healthcare introduction

In 1946 the World Health Organization (WHO) described health as *"a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity"* (Grad, 2002). To support societal health, the National Health Service (NHS) was established in the UK after the Second World War and became operational on the 5th July 1948 (Grosios et al., 2010). Despite its current challenges, the UK NHS is still considered one of the best healthcare systems in the world, with the core principle of providing free healthcare at the point of use (O'Dowd, 2023; World Population Review, 2022).

The WHO have been advocating since 1946 that "*the enjoyment of the highest attainable standard of health is one of the fundamental rights of every human being without distinction of race, religion, political belief, economic or social condition*" (WHO, 2017). In 2002, a United Nations (UN) Human Rights Council Resolution made a pledge that *"every person should have the right to the enjoyment of the highest attainable standard of physical and mental health"* (United Nations, 2019*).* However, access to universal healthcare is challenging to achieve as healthcare is difficult to define, for example, does this include cosmetic surgery, infertility treatment or mental health therapies? If so, how can that be universally achievable and who is responsible for the duty to provide? The

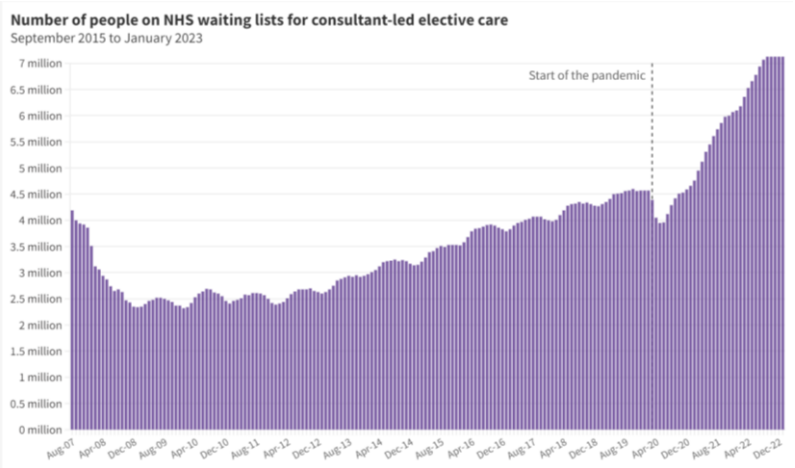
challenge of classifying healthcare as a human right could impose an intolerable burden on those deemed responsible (Barlow, 1999). Despite challenges in articulating what should, or should not, be included in universal healthcare, the UK government declared healthcare as a basic right with a societal duty to ensure its provision. The NHS Constitution for England details plans on how the NHS will deliver healthcare services to achieve universal access, free of charge, excluding certain limited exceptions sanctioned by Parliament (NHS, 2013; Department for Health and Social Care, 2021).

1.2 Healthcare in England

In January 2014 (when this research began), it was estimated that 56.4 million (87.4%) of the population were registered patients with a medical general practitioner (GP) in England (NHS Digital, 2014). These figures increased to 62.4 million (92.7%) in April 2023 (NHS Digital, 2023a). The increase in registered GP patients is evidence of the growing demand on the NHS, with a large portion of the UK population accessing free healthcare services.

A population-wide, free healthcare principle poses resourcing challenges. The NHS is regularly cited as being overstretched, which is evidenced by NHS consultant-led referral to treatment waiting times being at an all-time high (British Medical Association, 2023) (Figure 1.1).

Figure 1.1
NHS England Consultant-led Referral to Treatment Waiting Times statistics (British Medical Association, 2023)



The number of referral to treatment patients waiting to start treatment more than doubled between 2014 and 2023:

- 3 million – The number of Referral to Treatment patients waiting to start treatment at the end of April 2014 (NHS, 2014)
- 7.2 million – The number of Referral to Treatment patients waiting to start treatment at the end of January 2023 (British Medical Association, 2023)

The Covid-19 pandemic has further impacted on the demand for services with waiting times to begin treatment at the highest number since records began in 2007 (O'Dowd, 2021). To tackle this backlog and generally improve services, government funding allocated for the period 2022/23 to 2024/25 is £18 billion higher than previously planned (The Health Foundation, 2021).

To address the need and meet the increasing demands on health care services, governments rely on health economists to evaluate what is cost-effective, or seen as good value for money. This is particularly important when operating within limited tax-funded budgets. To enable the UK government to meet demands, the NHS must move from reactive approaches and place increased emphasis on proactive services. A proactive approach to tackle healthcare is not a new concept and was highlighted in the 'NHS Five Year Forward View' report published in October 2014 which outlined the need for a *"radical upgrade in prevention and public health"* (NHS, 2014). A '*Predictive, Preventive, Personalized and Participatory'* approach, referred to as a 'P4 Health Spectrum' (Sagner et al., 2017) supports this theory and outlines a shift in paradigm that could greatly improve societal health and wellbeing (Table 1.1). Such proactive approaches could assist in the prevention of illnesses, subsequent demands on services, and the associated healthcare costs.

Table 1.1

Paradigm shifts from reactive to proactive medicine. Sagner et al. 2017

Paradigm shifts from reactive to proactive medicine.

Reactive Medicine	Proactive P4 Medicine
Reactive symptoms based response	Proactive and preventive
	Pre-symptomatic biomarker response
Cross-sectional disease management	Lifespan Health Management
Few measurements, limited diagnostic and prognostic value	Many measurements, high resolution diagnostic and prognostic value
Organ-centric	Systems-biology
Disease-centric	Person-centric
	Based on needs, personal requirements and biological variability
Symptom focused therapy	Disease mechanism focused therapy/interventions
Top-down	Individual and health professional as a team

The 2014 NHS Five Year Forward View report and a subsequent 2019 'NHS Long Term Plan' (NHS England, 2019) utilises the P4 Health System approach and details commitments to tackle and remove the historic divide between primary and community health services. The 2019 NHS plan promised to fund new evidence-based prevention programmes and increase proactive population health initiatives. These approaches move selected services away from reactive care and towards proactive care as a measure to reduce the long-term growing healthcare burden.

Members of the public tend to give more importance to diagnostic and laboratory tests than to lifestyle measures in relation to preventative care (Sá et al., 2016); therefore, to achieve a societal shift in perceived value, and increase acceptance of proactive interventions, public engagement in preventative healthcare is a priority. Research from health economists to inform and educate in this area can provide credibility to the approach, support communication, acceptability and increase the potential of success of preventative interventions. This thesis aims to explore if Mindfulness could assist in this area by further informing guidance and recommendations.

1.3 Mental health focus

Stress is ever-present in modern life, with evidence that daily stress negatively impacts mental health and general wellbeing (Bolger et al., 1989; de Vibe et al., 2017) including impacting on depression (Bakunina et al., 2015), sleep problems (Wallace et al., 2017), eating disorders (Smith et al., 2021), substance misuse (Linsky et al., 1985), and heart problems (Fink, 2016). Stress and other mental health problems often overlap with broader wellbeing which forms part of everyday life, indicating that wellbeing and mental health challenges are a normal part of people's lives (Granlund et al., 2021, Figure 1.2). This concept increases the case for a population-wide approach to mental health

interventions which promote wellbeing across society and not simply targeting those identifying with poor mental health. Granlund's concept adds weight to the case that mental health is not merely the absence of a specific illness but the ability to function, indeed flourish, productively in everyday life. Using Granlund's characterisation, this research focused on the broad definition of mental health.

Figure 1.2

Image describing mental health problems overlapping with wellbeing - (Granlund et al. 2021)

At the start of this research in 2014, poor mental health (referred to as mental illness) was the largest single cause of disability, representing 28% of the national disease burden in the UK. There was a significant treatment gap in mental healthcare reported, with approximately 75% of people with mental illness receiving no treatment at all (Davies, 2014). This position worsened as the Covid-19 pandemic negatively impacted on population mental health and increased demands on services (Kumar & Nayar, 2020, Loiwal, 2020). We now see unprecedented pressures on the NHS mental health services:

- November 2013 – 936,603 people were in contact with mental health services (NHS Digital, 2013)
- July 2022 – 1.61 million people were in contact with mental health services (NHS Digital, 2023b)

Waiting lists for services are now reported to be at an all-time high (NHS Providers, 2021). Past pandemics have shown similar increases in poor mental health:

"When crises affect people's lives and communities, high levels of stress are expected. Adversity is a well-established risk factor for short - and long-term mental health problems. Research on past epidemics has highlighted the negative impact of outbreaks of infectious diseases on people's mental health."

United Nations Sustainable Development Group, Policy Brief: COVID-19 and the Need for Action on Mental Health. May 2020

Statistics in relation to mental health sickness instances in the UK vary due to differences in reporting mechanisms, although it is evident that the number of people reporting poor mental health is rising within the UK population. One source stated that prior to the Covid-19 pandemic, 18.9% of the UK population were reporting clinically significant levels of mental distress, following the pandemic these levels rose to 27.3% (Pierce et al., 2020, Table 1.2). Increases in poor mental health post Covid-19 has been attributed to a range of factors such as the UK government's lockdowns, financial stresses, and loss of loved ones.

Table 1.2

Proportion of participants with a clinically significant level of mental distress – The Lancet – Pierce et, al., 2020

	2014–15 (n=26 979)	2015–16 (n=44 024)	2016–17 (n=39 984)	2017–18 (n=33 540)	2018–19 (n=12 312)	April, 2020 (n=17 452)
Overall	16·7% (16·1–17·3)	16·9% (16·4–17·4)	18·2% (17·7–18·8)	19·0% (18·4–19·6)	18·9% (17·8–20·0)	27·3% (26·3–28·2)
Gender						
Women	19·4% (18·7–20·2)	19·8% (19·1–20·5)	21·0% (20·3–21·7)	22·4% (21·6–23·3)	23·0% (21·5–24·5)	33·3% (32·0–34·6)
Men	13·7% (12·9–14·5)	13·8% (13·1–14·4)	15·2% (14·5–15·9)	15·3% (14·5–16·1)	14·5% (13·0–16·0)	20·4% (19·1–21·7)
Age, years						
16–24	19·8% (18·0–21·6)	19·6% (18·2–21·0)	19·7% (18·2–21·3)	23·5% (21·7–25·3)	24·5% (21·3–27·8)	36·7% (32·9–40·5)
25–34	18·1% (16·4–19·8)	18·3% (16·8–19·7)	20·5% (18·9–22·2)	21·7% (19·7–23·6)	21·6% (18·1–25·1)	35·0% (31·9–38·2)
35–44	18·3% (16·8–19·8)	18·1% (16·9–19·4)	19·2% (17·9–20·5)	19·9% (18·3–21·5)	21·0% (18·4–23·7)	30·6% (28·2–33·0)
45–54	18·3% (17·0–19·6)	18·8% (17·7–19·9)	20·0% (18·8–21·2)	20·5% (19·1–21·9)	21·5% (18·9–24·0)	26·3% (24·3–28·2)
55–69	14·8% (13·8–15·8)	15·2% (14·3–16·1)	16·5% (15·6–17·5)	17·7% (16·6–18·8)	17·0% (15·1–18·8)	24·7% (23·2–26·3)
≥70	12·9% (11·7–14·1)	12·8% (11·8–13·8)	14·6% (13·5–15·7)	12·9% (11·8–14·0)	10·8% (9·1–12·4)	17·6% (15·7–19·5)

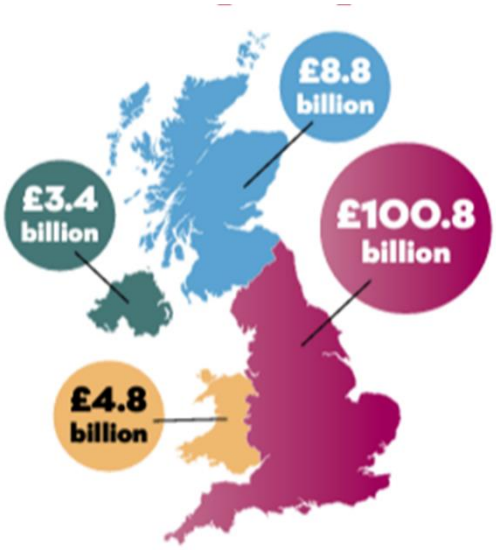
Data are proportion of participants with a clinically significant level of mental distress (95% CI). 53 314 total participants. Sample sizes are true (unweighted). All analyses are weighted, adjusting for complex survey design and non-response. *Based on financial year, from April to March.

Table 3: **Proportion of participants with a clinically significant level of mental distress, by year***

In 2022, a team at the Care Policy and Evaluation Centre, Department of Health Policy, London School of Economics and Political Science (LSE) produced a report with an overview of the economic case for the prevention of mental health conditions (McDaid et al., 2022), this report cited mental health problems costing UK economy at least £117.9 billion per year. The LSE report identified the costs by UK regions (Figure 1.4).

Figure 1.3

Map showing costs to UK economy of mental health problems – (McDaid et al., 2022)



Poor mental health was increasing across the world even before the pandemic. Anxiety and depression alone costs the global economy $1 trillion a year (World Economic Forum, 2020). However, different reporting mechanisms render the ability to conclude a consensus on financial statistics challenging. As an example, in 2020, the World Economic Forum reported more than 264 million people suffering from depression, citing this as a major cause of disability (World Economic Forum, 2020). In the same year, another group of researchers citied this number as 193 million (COVID-19 Mental Disorders Collaborators, 2021).

1.4 UK costs of poor mental health

In the UK, the 2014 'Five Year Forward View' report detailed poor mental health as an economic and social burden costing the £105 billion a year in England with mental health accounting for 23% of NHS activity (NHS, 2014). At the time of commencing this research, NHS England reported the national cost of dedicated mental health support services across government departments totalled £34 billion each year, excluding dementia and substance use (NHS, 2014). Following the pandemic, to meet the increasing demand on mental health services, the UK government published a report in January 2022 title '*Build Back Better: Our Plan for Health and Social Care* which highlighted the effects of the pandemic on mental health and the unique demands placed on all employees and the wider public (UK Government, 2022). The report highlighted the burden from chronic but

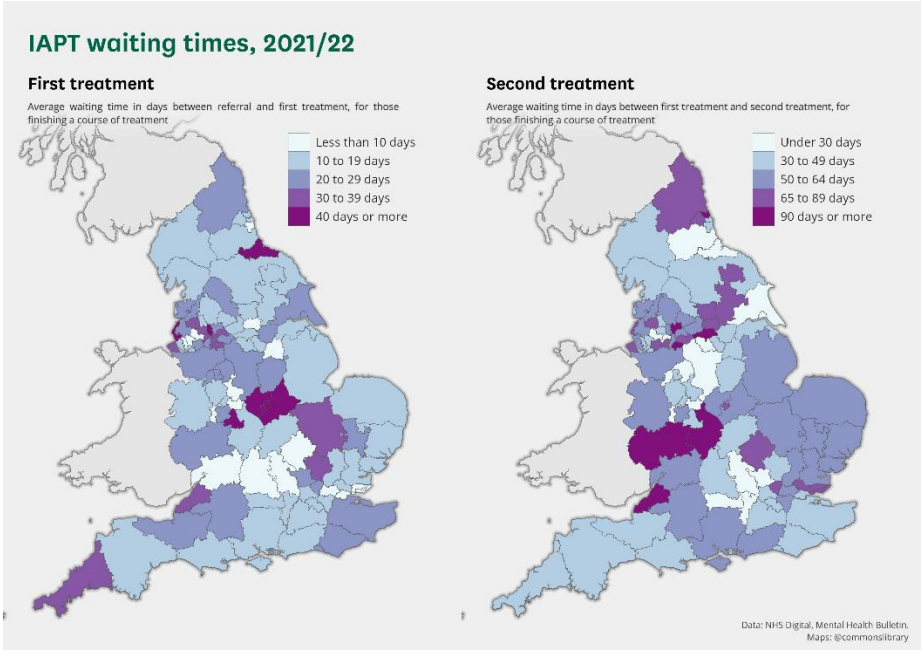
preventable conditions and stated the long-term priority to shift the NHS towards preventive care.

The revised financial commitment included £500 million for mental health recovery in 2021-22, which was allocated to address *"waiting times for mental health services, give more people the mental health support they need and invest in the NHS workforce"* (UK Government, 2022). The current situation in 2023 remains of concern to government as they invest an additional £150 million into mental health support services (Department for Health and Social Care, 2023).

The increased investment into mental health services may be having an impact despite the rising demand for services as the waiting time for specific mental health services in the UK has lowered over the period of writing this thesis. For example, in 2014 the average waiting time for NHS Improving Access to Psychological Therapies (IAPT) (now referred to as 'Talking Therapies' (NHS England, 2023), was 32 days (NHS Digital, 2015). Latest reports for the same statistics show the average waiting time have now reduced to 21 days (NHS Digital, 2022) (Figure 1.4).

Figure 1.4

Map showing waiting times for NHS Talking Therapies – (NHS Digital 2022)



There are varying reports, figures and plans in place which make a full report of the mental health situation in the UK a large and complex project, however, there is a consensus globally regarding the general increase in sickness reporting. The prevalence of mental health problems is on the rise, with data concluding that geographically, mental health is indiscriminate and prevalent across the globe (Dattani et al., 2021).

NHS England report depression has doubled since the start of the pandemic (NHS, 2021). As the increasing levels of mental health conditions places a significant burden on healthcare services, we see a continued need for a scalable, effective and cost-effective mental health interventions, concluding that this research is as relevant today as it was when this doctoral research began in 2014.

1.5 The workplace

To consider an intervention for the workplace to help alleviate the growing mental health burden, it is important to evaluate how appropriate the workplace is as a location for broad wellbeing intervention implementation. To do this, consideration needs to be given to access to population, for example:

- Would employers and employees have good rationale to engage in the intervention?
- What is the potential reach for the intervention? (i.e. how accessible is the workplace sector to engage in such an intervention?)
- Is the population able to engage in the intervention? (i.e is this a population well enough to engage in such an intervention?)

Stress is a known part of working life and identified as one of the main threats to the working environment, with only musculoskeletal problems considered to be more of a concern for employee health (Milczarek et al., 2009). Thus, employers are likely to be willing to engage with interventions to alleviate this organisational concern, and reduce the associated costs. Effectiveness and cost-effectiveness evidence is vital to aid in decision making for employers in this space.

In 2013 there was a positive trend with increasing employment rates in the UK. This trend continues with reports of reducing unemployment and inactivity in the UK (ONS, 2022b; Statista, 2022) (Figures 1.5 & 1.6). High employment rates signalled the workplace as a

meaningful location for broad impact of any intervention, providing access to a significant percentage of the population.

Figure 1.5

Graphs showing percentage of population in employment, unemployed or economically inactive – (ONS, 2022b)

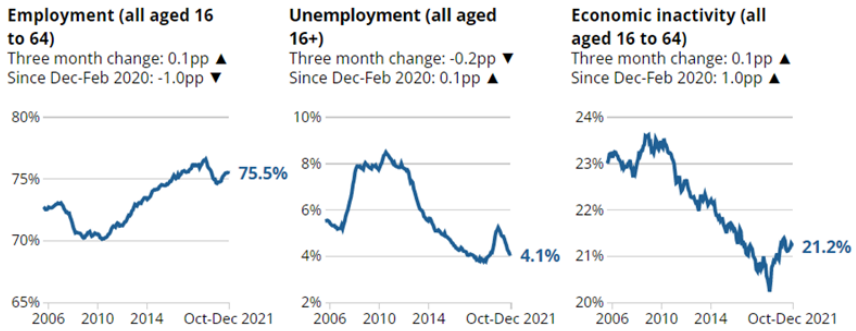
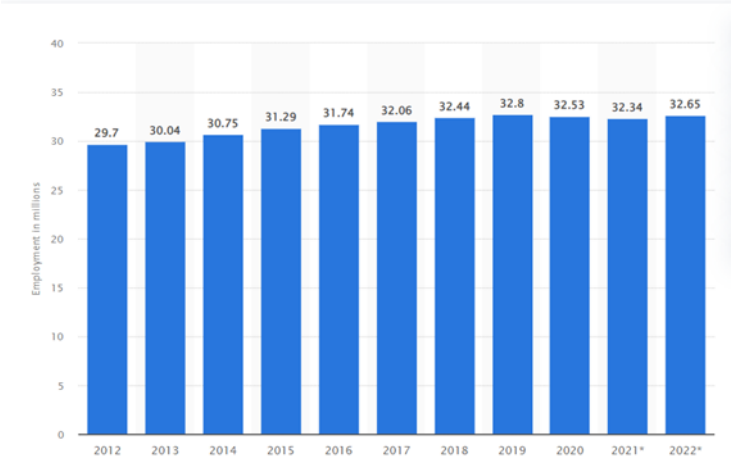


Figure 1.6

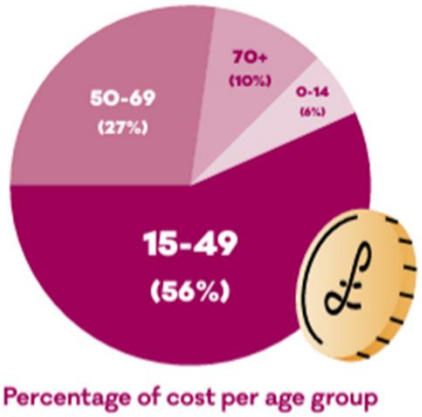
Graph showing UK Employment from 2012 to 2022 - (Statista 2022)



The report into the economic case for investing in the prevention of mental health conditions in the UK from LSE breaks down the costs into age brackets with 15–49-year-olds accounting for 56% and those aged between 50-69 accounting for a further 27% (Figure 1.7). Of the population in England and Wales, 62.9% (37.5 million) are aged between 16 to 64 years (ONS, 2023b), thus further supporting the theory that the workplace is a meaningful location for broad impact of any mental health intervention to reach a large population who could benefit from mental health support.

Figure 1.7

Percentage of costs to UK economy of mental health problems, broken down by age – (McDaid et al., 2022)

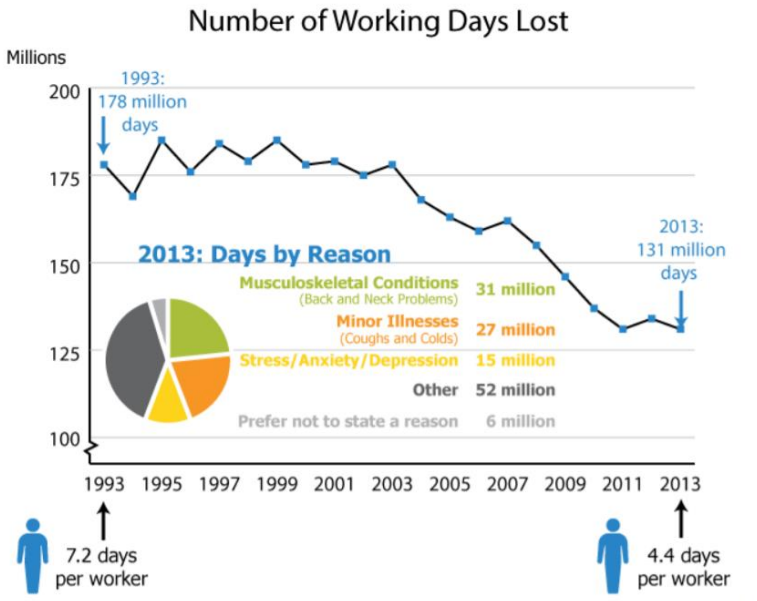


1.6 UK workforce and sickness

Whilst later figures are presented (below), when this doctoral research began, sickness levels in the UK workforce were on the decline: 131 million days lost due to sickness in 2013, down from 178 million days in 1993 (ONS, 2021) (Figure 1.8). Of the total sickness, 15 million working days were lost to poor mental health in 2013, although on the decline, these figures represented a significant number of days lost to mental health issues. It is unclear how many of those taking sickness absence in the workplace were accessing mental health services outside of the workplace. Sickness in the workplace presents a range of challenges, one estimate from a report in 2018 claimed that 1% of time employees take off sick equates to a loss of productivity of 0.24% in the workforce (Grinza & Rycx, 2020). Productivity or output losses are higher when the employee off sick works closely with others in the organisation or if they have personal knowledge which is not easily picked up by replacement workers (Giuliano et al., 2017, Pauly et al., 2008).

However, employers considering offering a workplace mental health intervention would not only see the possibility of preventing mental health problems in the workplace but serve the wider society by reducing the demands on public healthcare services (LaMontagne et al., 2014).

Figure 1.8
***Infographic showing UK Employment sickness* – (ONS, 2021)**



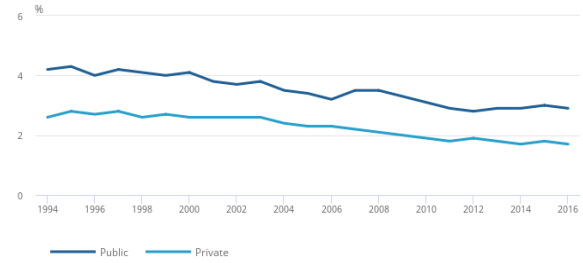
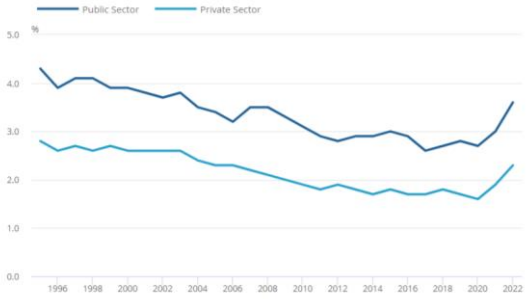
In general, the UK workforce is divided into public and private sector employees. The public sector employs approximately 22% of the overall UK workforce:

- December 2013 – 5.53 million people employed by public sector / 24.79 million people employed by private sector (ONS, 2016)
- December 2022 – 5.8 million people employed by public sector / 26.97 million people employed by private sector (ONS, 2023a)

In 2013, the public sector sickness absence rate was 2.9%, the private sector had a lower sickness absence rate of 1.8% (ONS, 2017). The sickness absence rate for public sector employees has been consistently higher than that of the private sector. Recent data reports the trend continuing (ONS, 2023a) (Figure 1.8). Due to the higher proportion of sickness rates identified at the commencement of this research and the impact of this on employers and the wider economy, this research focuses on the public sector workforce.

Figure 1.9

Graphs showing UK sickness rates public vs private sector – (ONS, 2023a)

	
Sickness absence rate by public and private sector, UK, 1994 to 2016 (ONS, 2017)	Sickness absence rate, by public and private sector, UK, 1995 to 2022 (ONS, 2023a)

1.7 Workplace intervention outcomes to support employee mental health

To assess and plan interventions for research it is necessary for outcomes to be clearly defined (Granlund et al., 2021). When designing this research, consideration was given to the existing literature in this area (further explored and detailed in Chapter two). A range of workplace interventions were already being researched to support employee mental health, for example psychosocial and cognitive-behavioural interventions, individual counselling, relaxation techniques and exercise (Corbière et al., 2009). Mindfulness interventions were also increasingly being explored to reduce stress, improve mood and work productivity (Klatt et al., 2009; Rössler, 2012), with research outcomes aligned with the common mental health problems reported in the workplace - stress, burnout, anxiety and depression (Rössler, 2012). There was less evidence of holistic business evaluation, reviewing employee health benefits alongside finances and measures more traditionally used in workplaces for optimal operations. To increase the usefulness of this study it was imperative that the outcomes measured were familiar to those in the workplace, therefore a range of measures were incorporated from the psychology, health economics and leadership sectors.

1.8 What is Mindfulness?

Mindfulness is an approach which involves a way of being and living with a meditation element to support the approach. Meditation is not a new concept to support wellbeing, it

is reported to date as far back as 5,000 to 3,500 BCE (Puff, 2013). Mindfulness combines modern psychology with the ancient wisdom of the Buddhist teachings. The approach is designed to provide a secular method to aid people to live life more fully and with a greater sense of perspective (Feldman & Kuyken, 2019). Mindfulness-Based Stress Reduction (MBSR) was first introduced to the mainstream in 1979 by Jon Kabat-Zinn, a scientist in the United States (US) (Kabat-Zinn, 2011). Kabat-Zinn drew on Buddhist traditions and his personal experiences from Zen teaching to develop a secular 8-week Mindfulness course, originally to help patients in his stress reduction clinic. There are now a range of secular programmes which have originated from this first secular interpretation of Buddhist teachings which are more generally referred to as 'Mindfulness'.

Mindfulness has seen its popularity steadily increase since its introduction to the western world in the late 1970's. The reasons for this growing interest in Mindfulness are not fully understood (Crane, 2017). It is possible, as society grapples with rising mental health problems, more people are turning towards, and increasing their acceptance of, therapeutic offerings to alleviate symptoms of distress and increase their satisfaction with life (Nehring & Frawley, 2020). Whilst the interest in Mindfulness has risen, it has not been without criticism. Mindfulness interventions, originally designed for clinical settings, are now being offered into a range of differing sectors with (in some cases) a limited evidence-base (Farias & Wikholm, 2016). The expansion of contexts and populations which are being introduced to Mindfulness requires further research to evaluate the most appropriate structure and suitability of these programmes when considering the participants and varying desired outcomes (Farias & Wikholm, 2016; UK Mindfulness All-Party Parliamentary Group, 2015).

Mindfulness courses are teacher-led, taught in a group context via an 8-week course, typically consisting of 2.5 hours per week teaching plus a full day of practice in-between weeks six and seven. Additionally, an investment of 'home practice' of approximately 45 minutes per day is required (Sigel et al., 2009). Courses typically include formal training in Mindfulness practices and exercises to help give participants a sense of balance through life's ups and downs. Those on a course would engage in group interactions, with discussion centred around challenges and achievements in daily life. This teaching and the discussions (known as inquiry) are aimed at supporting participants to recognise the helpful, and not-so-helpful habits of the mind. Learning is focused on how to respond

more skilfully when difficulties arise, engage with what is most important to them and learn to notice the pleasant moments that might otherwise pass them by. Participants learn to observe (via the range of teaching theory and experiential practices of meditation) what is happening in the present moment. Non-judgementally they explore techniques on how to recognise what is happening internally and externally, learning that thoughts are not necessarily facts (Carmody & Baer, 2008).

The origins of teaching seen in secular Mindfulness programmes today date back to the key teaching of the Buddha, with the key foundations in Mindfulness programmes linking back to the four noble truths (Mikulas, 1978). The four noble truths are:

1. The truth of suffering (Dukkha)
2. The truth of the origin of suffering (Samudāya)
3. The truth of the cessation of suffering (Nirodha)
4. The truth of the path to the cessation of suffering (Magga)

The truth of suffering is reference to there being suffering everywhere in life. The origins of suffering can be linked to a desire for something or for something to be different. The truth of the cessation of suffering is to let go of those desires, which in turn reduce the suffering. The path to achieve this is referred to as the 'Eightfold Path' or the 'Middle Way' (BBC, 2009) (Table 1.3).

Table 1.3

The Eightfold Path

1	**Right Understanding - Sammā ditthi**	To understand and discover oneself if the theory of the four foundations are true
2	**Right Intention - Sammā saṅkappa**	To foster the right intention and commitment to attitudes which support the elevation of suffering
3	**Right Speech – Sammā vācā**	To be kind, truthful in one's speech
4	**Right Action – Sammā kammanta**	To be honest, peaceful and kind. Not overindulgent
5	**Right Livelihood - Sammā ājīva**	Live in ways which are respectful for all others in the world, not causing harm or distress to others

6	**Right Effort – Sammā vāyāma**	Removing harmful and evil thoughts and states from oneself, cultivating positive states of mind
7	**Right Mindfulness - Sammā sati**	Understanding and developing awareness of the body, sensations, feelings and states of mind.
8	**Right Concentration - Sammā samādhi**	Appreciate, understand and developing the mental focus required to achieve this awareness.

Since 1979, various Mindfulness-Based Interventions have been developed to support a wide range of illnesses such as depression, anxiety, chronic pain, cancer, diabetes mellitus, hypertension, skin and immune disorders (Cherkin et al., 2016; Evans, 2016; Johns et al., 2015; Niazi & Niazi, 2011). Arguably the most popular adaptation of Kabat-Zinn's original MBSR programme is Mindfulness Based-Cognitive Therapy (MBCT) which has been approved by the National Institute for Health and Care Excellence (NICE) in the UK for the treatment of recurring depression (NICE, 2009).

1.9 Access to Mindfulness programmes

Access routes to Mindfulness vary on a global scale with governments, charitable and private organisations offering interventions under differing structures. There is no governing body or central organiser of Mindfulness (Chaskalson & Hadley, 2015) and therefore monitoring what is offered and in what format is challenging. In 2011 Niazi and Niazi reported that over 200 medical centres across the world were offering MBSR as an alternative treatment option to patients for stress (Niazi & Niazi 2011). In the UK, NICE have approved access to Mindfulness, specifically MBCT via the NHS Talking Therapies service for recurrent treatment of depression (NICE, 2009). However, availability through the NHS varies across the country and waiting lists can be long (Mind, 2022). The British Association of Mindfulness-based Approaches (BAMBA) lists 22 centres which offer Mindfulness (including NHS centres), all of which operate a self-referral structure (BAMBA, 2022).

In addition to structured group-based 8-week courses, there are increasing alternative methods for accessing Mindfulness. This landscape has altered dramatically since this doctoral research commenced in 2014. Most notably, the development of online and mobile phone apps and self-guided Mindfulness. A report from Sensor Tower highlighted that consumer spending on meditation apps from 2015 to 2019 increased by $187 million

(Williams, 2020) (Figure 1.10). Another report by Polaris Research predicted the global market value of Mindfulness apps to be $270.39 million in 2019 with predictions that this will rise to $4,206.12 million by 2027 (Polaris Market Research, 2020) (Figure 1.11).

Figure 1.10

Graph showing consumer spending on Mindfulness apps – (Sensor Tower, 2019)

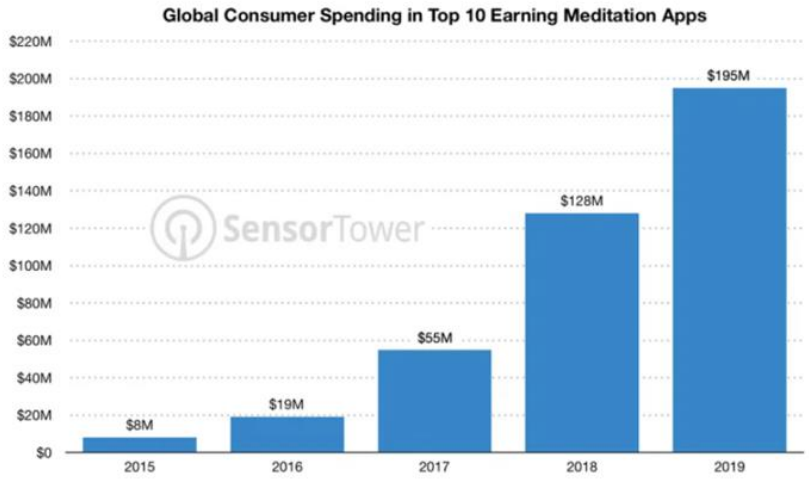
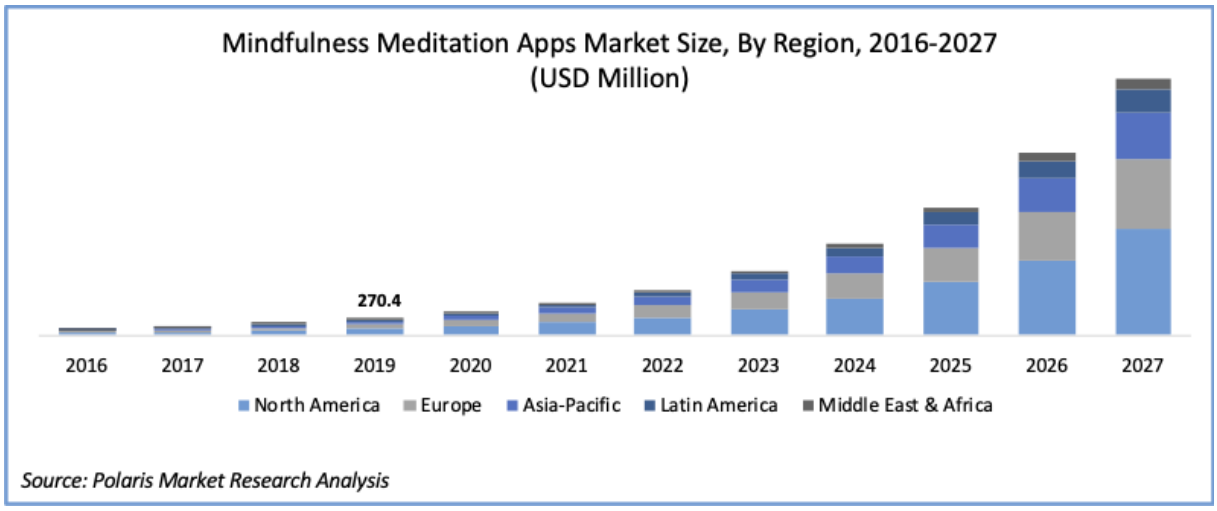


Figure 1.11

Graph showing Mindfulness App value and predictions - (Polaris Market Research, 2020)



Research in 2020 reported that 15% of adults in the UK had learnt to practice Mindfulness and most of them had learnt via an app, reading a book, or attending a course (Simonsson et al., 2020; Table 1.4). In 2023, it may be that an 8-week in-person course may no longer be the most popular format, particularly following the pandemic and a greater acceptance

of online communication. In 2013 the landscape was very different in both working practices and the population engagement with Mindfulness and therefore at the time of this doctoral research commencement, the 8-week in-person course was considered the most appropriate implementation approach for researching Mindfulness in the workplace.

Table 1.4
Pathways to learning to practice Mindfulness in Britain - (Simonsson et al., 2020)

Responses	% [95% CI]
Attending a course	24 [16, 34]
Reading a book	34 [24, 45]
Watching a video or DVD	17 [10, 27]
Visiting a website	15 [10, 22]
Using an app	35 [25, 47]
Some other way	13 [7, 22]
Don't know	0
Total	138

DVD: digital versatile disc. The percentages were weighted to reflect the sociodemographic profile of the adult population of Britain and were rounded to the closest integer. The total amounts to more than 100%, as the respondents could tick more than one option.

1.10 Critique of Mindfulness programmes

As the popularity of Mindfulness has grown, there has been a range of criticisms, with claims that Mindfulness programmes have been 'cherry-picked' from Buddhism, dropping elements of Buddhist teaching into secular Mindfulness approaches which has watered down the origins and 'cashing' in on a wellness trend (Purser, 2019). With the Mindfulness app market alone recently valued at $187 million (Williams, 2020) and expected to reach $4,206.12 by 2027 (Polaris Market Research, 2020), the questioning of Mindfulness being positioned as a saleable commodity is understandable.

There has been criticism of Mindfulness research and how Mindfulness has been presented to society by researchers and practitioners (Chiesa, 2013). For example, in a trial comparing the effectiveness of Mindfulness to antidepressants in treating people with recurrent depression, Kuyken et al., (2022) framed Mindfulness as 'training the brain as a muscle', it is claimed the work from Kuyken et al., lacked transparency of the potential harmful effects of Mindfulness (Farias, 2022). Additionally, there has been criticism of measures used which misrepresent findings (Rapgay & Bystrisky, 2009) and differences in the way Mindfulness is reported and understood (Chambers et al., 2009).

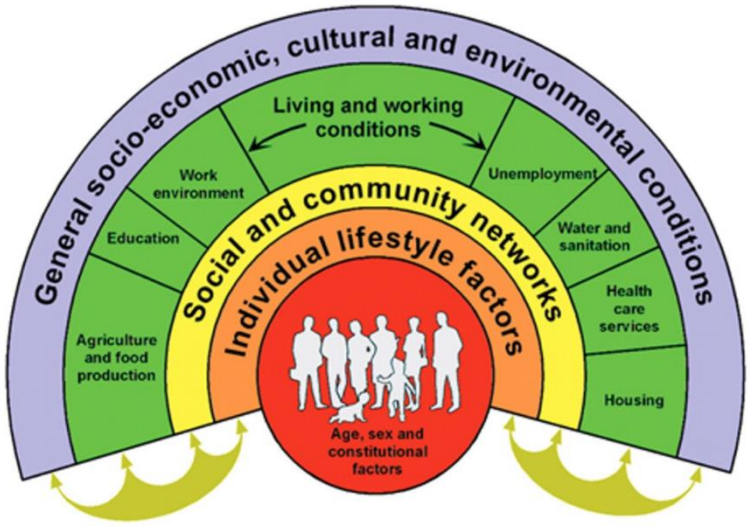
Whilst there are critics, there is also a growing body of evidence to support Mindfulness programmes in a range of sectors (Baminiwatta & Solangaarachchi, 2021; Eberth & Sedlmeier, 2012; Khoury et al., 2013). The potential impact of the original Buddha's teachings is undoubtedly beneficial; understanding suffering and working towards alleviating suffering is arguably a universal desire. The challenge is how to translate teachings, which derive from a context considered religious, into universally acceptable and appropriate secular programmes. All the while remaining respectful to, and honouring, the origins and original intentions.

1.11 How can Mindfulness support the whole population?

Mindfulness programmes are designed to support individuals to be more aware and mindful of oneself and one's surroundings (Richards et al., 2010). Courses are offered under the premise of supporting relationships with social and economic issues that contribute to mental health struggles. Courses support participants to make choices about how to respond and relate to their wider society (Sajjad & Shahbaz, 2020). This awareness provides the potential to increase consciousness, to enable a response and more considered decision to broader life choices. Linking the potential usefulness of Mindfulness to the whole population, these broader life choices are described by Dalgren and Whitehead as 'The main determinants of health' (Dalgren & Whitehead 1993, Figure 1.12).

Figure 1.12

Illustration of The Main Determinants of Health - (Dalgren & Whitehead, 1993)

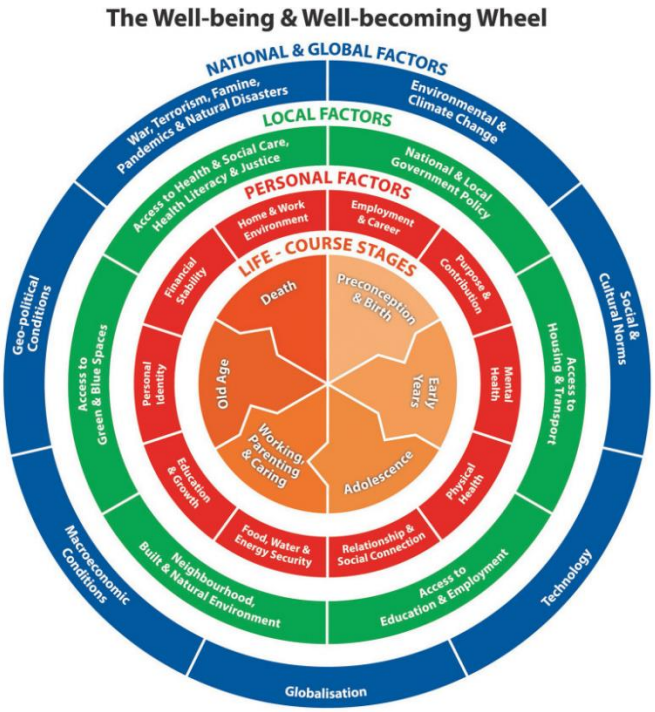


There is the potential that Mindfulness could impact on our relationships and engagement to community networks, work environment, living conditions, employment, education, housing and use of healthcare services. All of which contribute to our general wellbeing and mental health and could support the population as a whole.

The work of Dalgren & Whitehead was updated in 2022 with a new infographic designed to *"redefine well-being as a process of growth through life, articulated as well-becoming"* (Edwards, 2022) (Figure 1.13). Renamed 'The Well-being & Well-becoming Wheel', one key development with the new infographic is the inclusion of death which is often overlooked or avoided when discussing wellbeing (Edwards, 2022). The intention of the updated infographic is to highlight the impact and influence that social and economic factors have on stages in peoples lives and the cost-effectiveness of intervening with interventions across the life span (Edwards, 2022)

Figure 1.13

Illustration of The Well-being & Well-becoming Wheel - (Edwards, 2022)



Introducing Mindfulness with the intention to improve the broader determinants of health correlates to the WHO definition of mental health, described as a state of wellbeing in which the individual realises their own abilities. Mindfulness enables those who practice

to be more aware of oneself (Klussman et al., 2020); to cope with the normal stresses of life - a direct intention of Mindfulness (Kabat-Zinn, 2023); to work productively and fruitfully, and to be able to contribute to his or her community - aware of one's surroundings (Richards et al., 2010).

1.12 Why Mindfulness for this trial?

The rationale for selecting Mindfulness as the intervention in this doctoral research trial was threefold:

1. It is a therapeutic intervention which has an existing body of evidence in other contexts as a proactive intervention with the potential to offer a solution to the growing mental health concerns on a UK and global scale (e.g. Farb et al., 2010; Jha, et al. 2010; Walsh & Shapiro, 2006).
2. Disseminating Mindfulness does not require the teacher to be a clinician (unless teaching in a clinical context) (BAMBA, 2022) and therefore it is a scalable intervention across a range of sectors with teachers being able to tailor the programme to be relevant for the context and populations they are serving.
3. To carry out an exploration of how transferable existing Mindfulness programmes are into the workplace.

The research trial was planned and conducted before the Covid-19 pandemic, even then, there was a clear rationale for the exploratory research due to increasing healthcare demands. Mindfulness in the workplace is explored as an intervention to contribute to the growing population-wide mental health needs.

Due to a limited number of economic evaluations reviewing workplace interventions, this research is intended to contribute to the field with a high-quality economic evaluation of a Mindfulness intervention whilst reviewing the effectiveness, impact on stress, leadership style, cognitive failures and wellbeing related variables, which are important factors in the workplace. Originally developed for medical settings, Mindfulness programmes have now been introduced to a large section of society. In some populations and settings, the original format of delivery requires review and adaptation to increase the potential for acceptability and impact (Montero-Marin et al., 2022). As Mindfulness becomes increasingly mainstream, it is important to carefully consider the most

appropriate programme structure, implementation and cultural sensitivities when teaching Mindfulness. This trial sought to establish if an existing Mindfulness programme is effective and cost-effective when delivered into the workplace.

1.13 Positionality Statement

As a business professional in the Mindfulness field, I approach this research to build on my earlier MBA dissertation which explored mental health interventions in the workplace. I enjoy being in the workplace and commit a large amount of my life to work, having suffered personally with mental health challenges (specifically anxiety and depression). I am passionate about understanding the potential to implement proactive mental health interventions in the workplace. To increase the understanding of effectiveness, cost-effectiveness and workplace implementation of a Mindfulness intervention, I now bring together the fields of psychology, leadership and health economics with a multidisciplinary trial.

Working in the Mindfulness field I have existing authoritarian knowledge around the management and operational functioning of the Mindfulness field and some understanding of the various curriculums being offered. I had intuitive knowledge at the start of the trial regarding the potential benefits of Mindfulness in the workplace, which is generally informed by my work in this area and earlier research. Adding to the literature, reporting what would be most helpful for implementation of Mindfulness in the workplace, including both the effects and financial costs, is crucial for advancement of the field. Preventative healthcare interventions offered in locations where there are groups of people such as in schools or the workplace have the potential to return benefits not only to individuals but the wider economy and reduce costs to public sector healthcare systems (Arango et al., 2018). I therefore approach this research with an as agnostic as possible research position, to provide new empirical knowledge to the fields of psychology, leadership and health economics.

1.14 Disciplines relevant to this PhD: Health Economics, Leadership and Psychology

There are three disciplines relevant to this PhD: Health Economics, Leadership and Psychology, each discipline provides important contributions to the overall thesis. In 2013, when considering the research topic, the usefulness of the findings pushed the

boundaries of the original health economics agenda into additional territory. The broader intention was to explore the impact of a Mindfulness course on the employees in terms of stress, associated costs and leadership style, and how any knowledge gained would be helpful for the Mindfulness field. Mindfulness is a relatively new profession with researchers and professionals in the field still struggling to define Mindfulness (Phan-Le et al., 2022), therefore it has been categorised (and is often based) in the field of Psychology.

Allocating funds to preventive health care interventions can be challenging (Edwards & McIntosh, 2019). **Health Economics** focuses on the production and allocation of health care resources in the most economical way. This approach enables those working in the field to evaluate data and make informed recommendations when there are scarce resources (Barbu, 2023). The discipline of health economics can be traced back to 1623 when measurements were created (by Willem Petty, an English economist, scientist and philosopher) to value human life based on a person's contribution to national production, these measurements enabled data to be analysed for health policy planning by the government. (Banta, 1987). In 1963 Arrow (an American economist) published a paper, *"Uncertainty and the welfare economics of medical care"* which is now widely considered the seminal moment in the creation of health economics (Arrow, 1963; Savedoff, 2004; Watts, 2017), since Arrow's publication, the discipline of health economics has increased significantly (Barbu, 2023). The history of health economics is discussed further in Chapter four.

Leadership as a discipline is relatively new, in 2013 it was described as 'emerging' with disciplines being defined as such when *"substantial programs exist in universities, and a majority of faculty recognize those departments or programs"* (Harvey & Riggio, 2011; Riggio, 2013). A simple web search now (in 2023) easily identifies many universities with leadership programmes and departments plus academic journals dedicated to the field (Leadership, Journal of Leadership Studies, Journal of Leadership & Organizational Studies, Leadership & Organizational Development Journal & Psychology of Leaders and Leadership). Within the discipline, leadership styles and approaches differ from person to person and different cultures value and promote varying qualities in a leader (Munley, 2011), however the common denominator as a discipline is the vision for leaders to

influence employees and processes to achieve organisational goals (Benmira & Agboola, 2021; Chemers, 2014). Leadership theory is discussed further in Chapter five.

Psychology is described as the *"scientific study of behaviour, experience and mental process of all living creatures"* (Fernald, 2007). Psychology issues were discussed in ancient and medieval times, with the first written use of the word dating back to 1525 (Janssen & Hubbard, 2021), however **psychology as a discipline** is credited to Wilhelm Wundt (German physiologist, philosopher and professor) who in 1869, opened the first laboratory exclusively devoted to psychological studies in the University of Leipzig, Germany (Brennan & Houde, 2022). There are many branches of psychology which have evolved over the years: Clinical, Cognitive, Developmental, Evolutionary, Forensic, Health, Neuro, Occupational, and psychology (Medical News, 2023). Cognitive psychology increased in popularity in 1967 after Neisser published his book 'Cognitive Psychology' (Neisser, 2014). With a focus on studying mental processes, feelings and behaviours (Kellogg, 2003), cognitive psychology is the most relevant branch of psychology for this thesis.

1.15 Research themes and questions

Progressing through the thesis, key themes are addressed. They are explored via various methods and reported in chapters throughout this thesis. The themes explored include: review of existing literature to date focused on the effectiveness of Mindfulness in the workplace; exploration of the cost-effectiveness of Mindfulness in the workplace; an economic evaluation and leadership review, considering Mindfulness from an employer's perspective; and consideration of how the findings in this thesis might contribute to UK policy and guidance recommendations..

Throughout the thesis these themes are unpacked, beginning in **Chapter two** with a systematic review of the impact on job performance and the cost-effectiveness of Mindfulness interventions in the workplace. This systematic review builds on a previous literature review conducted by Lomas and colleagues (Lomas et al., 2017) which originally explored the experimental and correlative studies of Mindfulness delivered in work settings. Lomas' review did not specifically consider the cost-effectiveness of Mindfulness, an element which has been included in this review. In reviewing the Lomas findings there was nothing to answer the core question of the impact on job performance

and the cost-effectiveness of mindfulness interventions in the workplace. As the Lomas' review was comprehensive, it was considered a suitable guide and commencement date for this review period i.e, any literature relevant to the scope of this research would highly likely have been included in the Lomas paper. Not searching databases from the commencement of time has later been noted as a weakness in this review.

The literature review in Chapter two was conducted according to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines (Moher et al., 2009). Both the Drummond 10-item (Drummond et al., 2015) and the Consolidated Health Economic Evaluation Reporting Standards 2022 (CHEERS) checklists (Husereau et al., 2022a & Husereau et al., 2022b) were used within this review for critical appraisal. This review protocol was registered with the International Prospective Register of Systematic Reviews database (PROSPERO) on 23rd September 2021, registration number: CRD42021279822 (www.crd.york.ac.uk/PROSPERO).

Due to the multidisciplinary nature of the thesis, the trial findings are written in separate chapters with differing perspectives. **Chapter three** presents the trial methodology and effectiveness results. This chapter commences with a review of the Mindfulness programme offered in this trial, each of the measures used are then detailed with primary and secondary outcomes explained. This chapter focuses on the effectiveness findings of the trial and concludes with a consideration of the challenges in measuring proactive healthcare interventions.

Chapter four reviews the effectiveness detailed in Chapter three and explores the cost-effectiveness of the Mindfulness intervention from the employer perspective. The chapter commences with an exploration of the challenges of economic evaluation in healthcare before moving on to consider the various types of economic evaluation. The evaluation method selected in this review is explained with the rationale for selection before moving into the health economic evaluation.

The workplace outcome results from Chapter three are explored in more detail in **Chapter five** where the employer perspective is considered. The measures used are explained in more detail with a balanced review of their strengths and weaknesses. The chapter,

as with all previous chapters, concludes with a review of the strengths, limitations, and challenges of this specific chapter's findings.

In **Chapter six**, the full body of the thesis work is reviewed, revisiting the main themes and research questions posed at the start of the research. The outcomes and possible reasoning for the results are explored with theories offered and recommendations made for further research. Guidance is also offered to those working in both the Mindfulness and workplace sectors with a response to the recommendations made by the Mindfulness All-Party Parliamentary Group (via UK Mindfulness All-Party Parliamentary Group, 2015) which previously recommended government departments to encourage the research and development of Mindfulness programmes for staff in the public sector to improve organisational effectiveness.

Throughout this thesis, both the active and the passive voice will be used alongside APA format (APA, 2022). Focus will be given to the active voice and writing in a direct, clear, and concise style (APA Version 7).

The key thesis themes are broken down into questions and research areas, which are then addressed in chapters in this thesis (Table 1.5). Research questions are summarised at the start of each chapter for quick review then explored in more detail as the chapter progresses.

Table 1.5

Thesis research questions

Research Area	Research question #	Research Question	Chapter
Literature review & Effectiveness	1	What do we already know about the effectiveness of Mindfulness in the workplace?	Chapter two
Effectiveness	2	Is Mindfulness effective in the workplace	Chapter three
Effectiveness	3	How does Mindfulness influence perceived stress and related outcomes in the workplace?	Chapter three
Effectiveness	4	Is a Mindfulness programme, which originally designed to address specific health challenges, effective and transferable into the workplace?	Chapter three
Economic evaluation	5	Is Mindfulness in the workplace cost-effective? What are the financial implications for employers when offering Mindfulness?	Chapter four
Business Review	6	What are the business leadership considerations and the challenges of measuring Mindfulness in the workplace?	Chapter five
Discussion, conclusion and recommendations	7	Should workplace Mindfulness research findings influence existing guidance and policy recommendations?	Chapter six

After reviewing healthcare and the sickness levels in the UK workplace, Mindfulness has been identified as a possible intervention to support employee wellbeing. The next chapter reviews the existing literature in this area, with a specific focus on cost-effectiveness from an employer perspective.

Chapter Two

A systematic review of the impact on job performance and the cost-effectiveness of Mindfulness interventions in the workplace

2.0 Chapter preface

As detailed in Chapter one, there is a need for a proactive intervention in the workplace to support employee mental health, with the workplace providing a potentially useful location to introduce strategies to support mental health of a high percentage of the UK population. Whilst there is potential for impact in the wider society, this thesis focuses on the employer perspective. Specifically, the review in this chapter review will focus on economic evaluations that have a focus on job performance (rather than all economic evaluations). This approach has been taken due to financial stability being an essential requirement in any organisation and individual performance being directly linked to business success and the profitability of an organisation (López-Cabarcos et al., 2022)

This chapter will review the current literature in the field of economic evaluation and workers' performance in the workplace when implementing a Mindfulness programme. Building on existing research in this area, a systematic review was conducted.

As detailed in Chapter one, poor mental health as an economic and social burden is estimated to be costing £105 billion a year with mental health accounting for 23% of NHS activity (at the commencement of this research) (NHS, 2014). Prior to the Covid-19 pandemic there was a trend of increased mental health reporting in the UK and has intensified since the pandemic (ONS, 2023a). The primary objective of this systematic review (conducted September 2021 - December 2021 with a subsequent update in October 2022) was to systematically appraise the impact on job performance and the cost-effectiveness of mindfulness interventions in the workplace. This review was conducted to provide an additional contribution to the field with the inclusion of an economic evaluation review, the review refers to an earlier systematic review carried out by a team of researchers in 2017 (Lomas et al., 2017) and uses their ending timeframe as a search commencement date. This current review was conducted by two researchers and followed the international standard of a double screening approach (Edwards et al., 2002).

2.1 Reporting and registration

This review was conducted according to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines (Moher et al., 2009). Both the Drummond 10-item (Drummond et al., 2015) and the Consolidated Health Economic

Evaluation Reporting Standards 2022 (CHEERS) checklists (Husereau et al., 2022a) were used for critical appraisal.

This review protocol was registered with the International Prospective Register of Systematic Reviews database on 23rd September 2021, registration number: CRD42021279822 (www.crd.york.ac.uk/PROSPERO).

2.2 Methods Summary

Nine electronic databases were searched for Mindfulness in the workplace economic evaluations. Studies were included if an economic costing, measures for wellbeing **and** job performance were reported. Initially, 759 studies were identified, 65 duplicate studies were removed, 30 studies were identified as not English language and removed prior to title and abstract screening. 664 studies progressed to independent screening. All papers were independently double screened with results compared. Quality of the studies was assessed using the Drummond 10-item (Drummond et al., 2015) and the Consolidated Health Economic Evaluation Reporting Standards 2022 (CHEERS) checklists (Husereau et al., 2022a) for economic evaluations.

2.3 Results Summary

Two studies were included in the full analysis. One reported a Mindfulness programme to be effective and cost-effective when delivered into a care-giving workplace setting Singh et al. (2020). The other study found Mindfulness to be less effective and more costly when delivered in a government workplace setting (van Dongen et al., 2016).

2.4 Conclusions Summary

With only two studies meeting the full eligibility criteria, there is limited literature to review. The studies which met the criteria did not provide consistent findings with one review reporting the Mindfulness intervention as effective, where the other review did not. These findings conclude that there are inconsistencies in types of interventions being offered in the workplace, compounded with different populations and settings, comparisons are complex and varying levels of effectiveness are being reported. The transferability of effective Mindfulness programmes (as evidenced in earlier trials) into the workplace, is still unclear.

2.5 Why do we conduct literature reviews?

Decision-making is inherently impacted by personal biases (Tversky & Kahneman et al., 1974). The inclination to rely on a certain piece of information (often the first piece of information obtained) is referred to as "*anchoring bias*" (Richards & Wierzbicki, 1990). "*Confirmation bias*" is where the reader has a tendency to accept evidence to support a preconceived belief (Oswald & Grosjean, 2004). To reduce biases and support best practice in healthcare, policymakers and clinicians rely on robust research and evidence-based guidance (Gopalakrishnan & Ganeshkumar, 2013). However, sourcing, understanding and comparing published studies can be complex and time consuming. Systematic literature reviews facilitate access to evidence for busy healthcare professionals and decision-makers (Green, 2005).

2.6 Literature review introduction

Chapter one details the global health challenges and specifically looks at the UK mental health challenges. Proactive interventions to support the mental health of the population are considered with the workplace offering a possible location for wide dissemination. An existing body of evidence supports Mindfulness as a proactive intervention with Mindfulness approaches and outcomes researched in a range of health areas (Hiltona et al., 2017). However, economic evaluations and specifically those that consider the impact of Mindfulness in the workplace are lagging in terms of quality research although there is a growing interest in evaluating Mindfulness in the workplace. This chapter collates and reviews the research published between 29th January 2016 to 3rd October 2022) which considered the economic evaluation of workplace Mindfulness interventions, wellbeing measures and employee performance.

2.7 Methods

This review utilizes the timeframe of an existing systematic review of experimental and correlative studies of Mindfulness conducted in work settings (Lomas et al., 2017) Mindfulness as a commencement date for searching. Lomas et al., included a range of wellbeing and performance measures in their 2017 review which included papers from the start of database records to 28th January 2016. Economic evaluation was not part of their research eligibility criteria but was considered likely to be included (has later been noted as a weakness in this review). Economic evaluation was an essential inclusion criteria for this review.

Inclusion and exclusion criteria for this review:

Inclusion

- Published (or in press) in a peer-reviewed academic journal, in English between 29th January 2016 to 31st August to 3rd October 2022
- Participants were current employees of a company or organisation
- Evaluated a Mindfulness-Based Intervention defined as an intervention in which Mindfulness meditation was the central component (as indicated by Mindfulness either featuring in the title of the intervention or being given prominence in the abstract)
- Included a cost effectiveness evaluation
- Reviewed job performance
- Empirical studies featuring data collection
- Included a control group

Exclusion

- Published outside of timeframe of 29th January 2016 to 31st August to 3rd October 2022
- Participants not current employees of a company or organisation
- Not reviewing a Mindfulness-Based Intervention
- No cost effectiveness evaluation
- No review of job performance
- Not an empirical study
- No control group
- Theoretical articles or commentaries without statistical or qualitative analyses

Whilst this systematic review intends to add to the existing body of work, there are some differences from the Lomas et al review as detailed in Table 2.1.

Table 2.1

Previous and current literature review scope comparison

Review	Lomas et al. 2017	Current review (Hadley, 2023)
Databases searched	MEDLINE, Scopus	Cochrane Library, Embase, Lexis-Nexis MEDLINE, PsycINFO, PubMed, Scopus ScienceDirect, Web of Science
Search criteria	Mindfulness (AND) work OR occupation OR profession OR staff (in all fields in MEDLINE and limited to article title, abstract, and keywords in Scopus).	Mindfulness (AND) work OR workplace OR occupation OR profession OR staff OR employees (AND) cost (AND) health (OR) well-being (OR) wellbeing (OR) mental (OR) performance (OR) return on investment, and limited to article title and abstract
Date range	From the start of the database records to 28 January 2016	29th January 2016 to 31st August to 3rd October 2022
Participants	Current employees of a company or organisation	Current employees of a company or organisation
Interventions	MBI was defined as an intervention in which Mindfulness meditation was the central component (as indicated by Mindfulness either featuring in the title of the intervention or being given prominence in the abstract)	MBI was defined as an intervention in which Mindfulness meditation was the central component (as indicated by Mindfulness either featuring in the title of the intervention or being given prominence in the abstract)
Outcomes	Mindfulness, wellbeing, and job performance (with wellbeing used as an all-encompassing term, spanning physical, and mental health)	Mindfulness, wellbeing, and job performance (with wellbeing used as an all-encompassing term, spanning physical, and mental health). Job performance was essential.
Inclusion criteria	Empirical studies featuring data collection	Empirical studies featuring data collection
Exclusion criteria	Non-intervention studies of Mindfulness in the workplace	Non-intervention studies were excluded
Publication	Studies were required to be published (or in press) in a peer-reviewed academic journal, and to be in English	Studies were required to be published (or in press) in a peer-reviewed academic journal, and to be in English
Study design	Interventional Studies	Interventional Studies
Exclusion criteria	Theoretical articles or commentaries without statistical or qualitative analyses	Theoretical articles or commentaries without statistical or qualitative analyses
Exclusion criteria	Interventions in which Mindfulness practice is not the central component (even if they incorporate elements of Mindfulness practice or theory)	Interventions in which Mindfulness practice is not the central component (even if they incorporate elements of Mindfulness practice or theory)

Both the Lomas et al., (2017) review and this review included studies if a Mindfulness intervention was offered in the workplace to employees. Participants of any age, gender, nationality or ethnicity were eligible, and all studies with Mindfulness as the main

component were included. The essential element of economic evaluation alongside work performance measures was the key difference in this review.

An additional seven databases were searched in addition to the two included in the Lomas review. Electronic database searches were conducted using Cochrane Library, Embase, Lexis-Nexis, MEDLINE, PsycINFO, PubMed, Scopus, ScienceDirect and Web of Science. Titles, keywords, and text were searched for the terms Mindfulness (AND) work OR workplace OR occupation OR profession OR staff OR employees (AND) cost (AND) health (OR) well-being (OR) wellbeing (OR) mental (OR) performance (OR) return on investment. Due to the number of matches returned when terms were included in the full text (*n* = 14,052), search terms were limited to article title and abstract. The last search was conducted on 3rd October 2022. Data extraction included title, journal, volume number, pages, year, issn, doi, url, author, keywords and abstract.

Study inclusion was based on initial screening of title and abstract. Articles passing the initial screening (including where further information was required) were retrieved for full article and further review. All results were double screened by a second researcher based in the Centre for Health Economics and Medicines Evaluation (CHEME), Bangor University, UK. A protocol was in place for any disagreements between screeners to be taken to the Professor of Health Economics, Co-director of CHEME, for review and guidance; however, no disagreement between the screeners was experienced. The type of study, study design, intervention and outcomes measured were considered in the screening review and studies excluded were allocated a code based on inclusion criteria. Included studies were quality assessed using the Drummond 10-item (Drummond et al., 2015) and the CHEERS checklists (Husereau et al., 2022a) for robust economic evaluations.

Studies included variability in work environment, conditions of research and intervention. The studies were too diverse to enable a summary estimate of effect which rendered a meta-analysis unsuitable (Campbell et al., 2020). A narrative approach to data synthesis was used whilst adopting systematic search methods. The narrative approach in reviews is no less inferior in quality (Greenhalgh et al., 2018) and includes interpretation and appraisal which enhances the field understanding (Dixon-Woods et al., 2006).

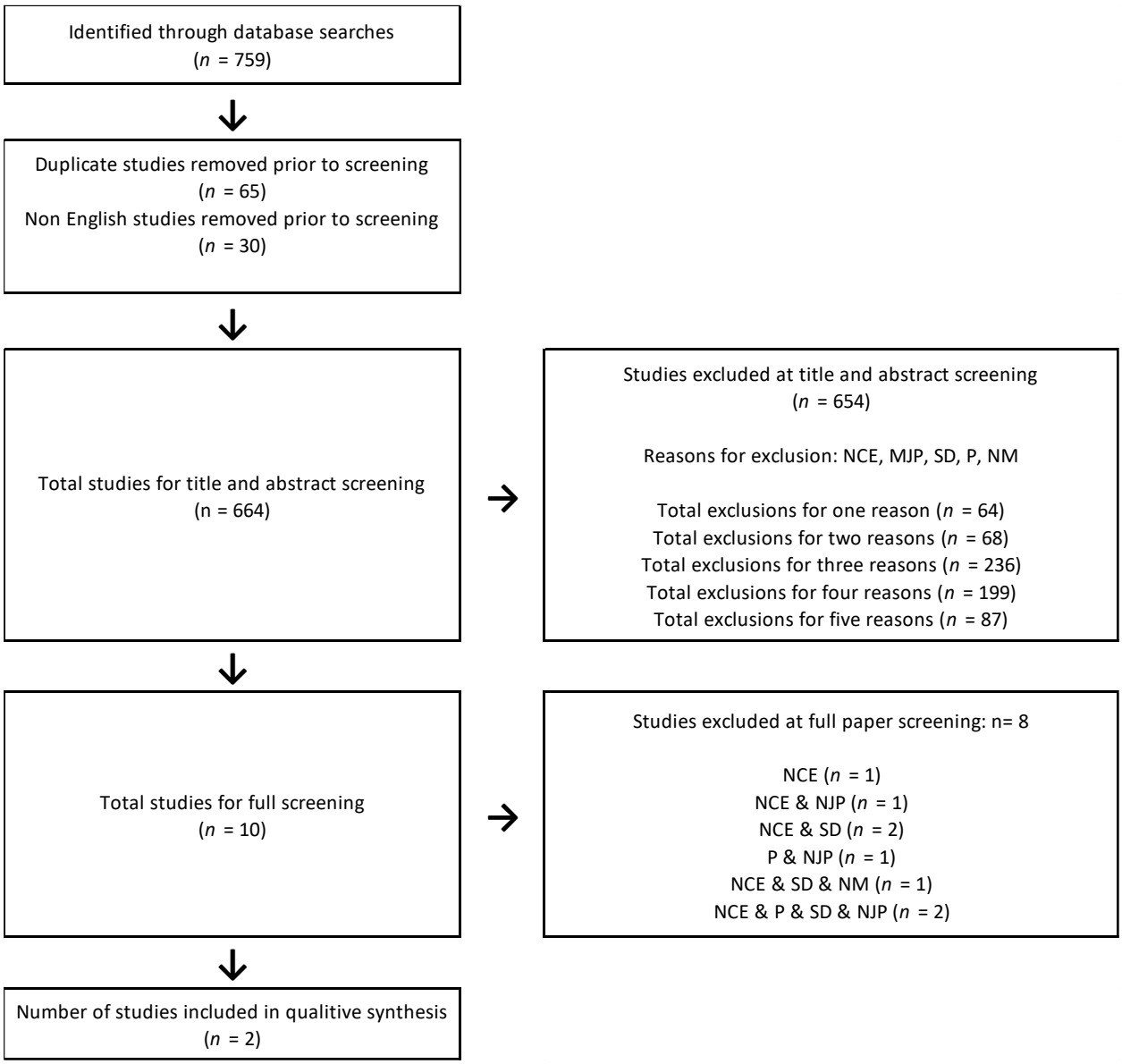
The measure of effectiveness (of the intervention) was the difference in mean scores on employee outcome measures between the intervention and control groups at the end of the research period.

2.8 Results

Using the search criteria, 759 studies were initially identified. 65 duplicate studies were removed, 30 studies were identified as not English language and removed prior to title and abstract screening. 664 studies progressed to independent screening by two researchers. These studies were retrieved from 299 different journals. The top three journals with studies matching the search criteria were: Personality and Individual Differences (*n* = 40), Complementary Therapies in Medicine (*n* = 15), and Complementary Therapies in Clinical Practice (*n* = 15). 654 studies were identified by both researchers for exclusion during the initial screening of title and abstract (Figure 2.1).

Figure 2.1

Flow of articles retrieved via electronic searches



Key:
NCE Not a cost effectiveness evaluation
NJP Not job performance
SD Study design
P Population
NM Not Mindfulness

Reasons for exclusion were categorised by both reviewers as:

- Not a cost effectiveness evaluation (NCE) – no evidence of an economic evaluation
- Not reviewing job performance (NJP) – impact of job performance was not explicitly considered
- Study design (SD) – does not meet criteria of review - no control group or no empirical research
- Population (P) – does not meet criteria of review - not employees / intervention not explicitly offered to employees
- Mindfulness not the main intervention (NM) – Mindfulness may have been a component but not the main intervention
- Not English language – most removed prior to title and abstract screening with 6 additional papers found during title and abstract screening

Of the 664 articles retrieved for title and abstract screening, 654 were excluded due to one or more of the above exclusion categories:

- Exclusions for one reason identified in the above categories (*n* = 64)
- Exclusions for two reasons from the above categories (*n* = 68)
- Exclusions for three reasons from the above categories (*n* = 236)
- Exclusions for four reasons from the above categories (*n* = 199)
- Exclusions for five reasons from the above categories (*n* = 87)

10 studies were included in the full paper review stage, eight were excluded due to one or more of the above exclusion categories:

- No economic evaluation (*n* = 1)
- No economic evaluation & not reviewing job performance (*n* = 1)
- No economic evaluation & study design (*n* = 2)
- Population & not job performance (*n* = 1)

- No economic evaluation & study design & not Mindfulness (*n* = 1)
- No economic evaluation & population & study design & not job performance (*n* = 2)

The two studies through for the final qualitative synthesis were (Table 2.2a & 2.2b):

- van Dongen et al. (2016) - Long-term cost-effectiveness and return-on-investment of a Mindfulness-based worksite intervention.
- Singh et al. (2020) - Comparative effectiveness of caregiver training in Mindfulness-based positive behaviour support (MBPBS) and positive behaviour support (PBS) in a randomised controlled trial (RCT).

2.9 Interventions included in review

The two studies included in the full review examined interventions that were classified (by the researcher) as psychosocial.

- van Dongen et al. (2016) study offered the **Mindful Vitality in Practice (VIP) programme** which was developed to improve the work engagement and energy balance-related behaviours (EBRB) of workers performing mentally demanding, sedentary work. The Mindful VIP programme was developed to specifically support both work engagement and EBRB (van Berkel et al., 2011).
- Singh et al., (2020) study offered the **Mindfulness-Based Positive Behaviour Support (MBPBS) Programme** which was developed to support parents / caregivers. The MBPBS programme consists of two components: Mindfulness-based practices and positive behaviour support (Singh et al. 2020).

Psychosocial interventions are broadly defined as non-pharmacological interventions which are focused on psychological or social factors (Trimboli et al., 2021). These interventions have an emerging evidence-base detailing their effectiveness to improve symptoms of distress, functioning, quality of life, and social inclusion (Barbuit et al., 2020). Psychosocial interventions could hold an important role in tackling the growing healthcare demands of an increasing population with mental health conditions.

Table 2.2a

Details of final two studies retrieved for full review

Characteristics of studies included in the review	
Authors	van Dongen et al., 2016
Study	Long-Term Cost-Effectiveness and Return-on-Investment of a Mindfulness-Based Worksite Intervention
Mindfulness Intervention	Mindful Vitality in Practice (Mindful VIP)
Location, Participants, Design and Follow up	Dutch Government Research Institute employees. RCT - 12 month follow-up
Number of participants	257 randomised. 207 completed
Measures	Baseline, 6 and 12 months. Work engagement - Utrecht Work Engagement Scale General Vitality - RAND-36 Vitality Scale Job satisfaction - Netherlands Working Conditions Survey Work ability - Work Ability Index Work Performance - The World Health Organization Health and Work Performance Questionnaire (WHO-HPQ) Presenteeism - assessed on a three-monthly basis using an item of WHO-HPQ
Perspectives and cost results	**Cost-Effectiveness:** Analysis was performed from both the societal and employer's perspective. In addition, an ROI analysis was performed from the employer's perspective. **Societal Perspective**: Cost-Effectiveness - reviewing all measures it was determined that the intervention was on average more costly and less effective than usual practice **Employer's Perspective:** Cost-Effectiveness - reviewing all measures it was determined that the intervention was more costly and less effective than usual practice **Employer's Perspective: Financial Return** - Total benefits in terms of absenteeism, presenteeism, and occupational health costs were on average €1,170 which suggests that the intervention was associated with a net loss to the employer of €1,635 per participant. None of the estimates were statistically significant.
Outcome results (I =intervention, C = control)	Compared with the control group, intervention group participants decreased their work engagement (Range: 0 to 6) by 0.19 points (95% CI: 0.38 to 0.01). No statistically significant differences were found for job satisfaction (0.02; 95% CI: –0.22 to 0.17) general vitality (3.0; 95% CI: 6.1 to 0.1), and work ability (0.34; 95% CI: 0.84 to 0.17). Work Performance not reported A statistically significant between-group difference was found in terms of their average presenteeism score (0.26 vs 0.23; difference =0.03; P=0.01).

Table 2.2b

Further details of final two studies retrieved for full review

Characteristics of studies included in the review	
Authors	Singh et al., 2020
Study	Comparative Effectiveness of Caregiver Training in Mindfulness-Based Positive Behavior Support (MBPBS) and Positive Behavior Support (PBS) in a Randomized Controlled Trial
Mindfulness Intervention	Mindfulness Based Positive Behaviour Support (MBPBS) vs Positive Behaviour Support (PBS)
Location, Participants, Design and Follow up	Caregivers from community group homes that provided services to people with intellectual and developmental disabilities. RCT with two active experimental conditions
Number of participants	123 randomised. 116 completed
Measures	10 week intervention, data collected during and the following 30 weeks **Caregiver Variables:** Perceived Stress Scale-10, Professional Quality of Life (ProQOL), Training Attendance, Meditation Practice **Client Variables:** Aggressive Events, Staff Injury, Peer Injury **Agency Variables:** Physical Restraints, Emergency Medication, One-to-one Staffing, Staff Turnover
Perspectives and cost results	Costs evaluated were employer costs **Cost-effectiveness:** The MBPBS condition was more cost-effective than PBS on a number of variables, including lost days of work due to staff injury, cost of additional one-to-one staffing, number of staff needing rehabilitation therapy, number of staff resignations due to injuries, and costs of training new staff. Lost days of work due to staff injury - MBPBS 61 days / $8,784.00 vs PBS 653 days / $94,032.00 Number of staff days and cost of 1:1 staff - MBPBS 53 days / $7,632.00 vs PBS 192days / $27,648.00 Number of staff needing medical and physical rehabilitation therapy - MBPBS 1 / $19,500.00 vs PBS 22 / $429,000.00 Number of staff resigned due to staff injury and training costs for new hires - MBPBS 1 / $1726.00 vs PBS 6 / $10,356.00 Number of training days and cost of MBPBS and PBS training - MBPBS 7 days / $21,000.00 vs PBS 7 days / $7,000.00 Cost of temporary staff during MBPBS or PBS training - MBPBS 60 / $60,480.00 vs PBS 63 / $63,504.00 Total additional costs for the two time periods - MBPBS $119,122.00 vs PBS $631,540.00 Total overall savings in favour of MBPBS $512,418.00
Outcome results (I =intervention, C = control)	**Caregiver Variables:** Training attendance, all caregivers in both MBPBS and PBS conditions attended all 7 days of training. Statistically significant for all four psychological measures (all p's < .001) **Client Variables:** The effect size of time for both MBPBS and PBS conditions was large for all client variables explaining between 40 and 63% of variance in the data, which indicates that both interventions were very effective in reducing the challenging behaviours of clients. Even after controlling for time effect, the MBPBS condition demonstrated small to moderate effect size in reducing aggression, staff injuries, and peer injuries, compared to the PBS condition (R2 change 0.07– 0.24). **Agency Variables:** Significant effects of both time and MBPBS comparison with PBS condition after controlling for time were observed in all three agency variables with all p values < .001. Staff Turnover - MBPBS condition had marginally significant effect (p = .05) compared to the PBS condition

2.10 Study Overview - Mindful VIP programme

The **Mindful VIP programme** evaluation conducted by van Dongen et al. (2016) hypothesised that if mental health was improved among workers, there would be positive correlation to work engagement, increased job satisfaction and reduced employee turnover. Study participants were made up from 257 Dutch Government employees, randomised to either the intervention (*n* = 129) or control group (*n* = 128). All participants were granted access to an intranet webpage containing links to various health promotion activities (e.g., in-company fitness programmes). Those randomised to the intervention group also received the 6-month Mindful VIP intervention which included group sessions of 4 to 17 participants per group (van Dongen et al., 2016).

There was no reference to formal withdrawals from the trial. Complete follow-up data was gathered from 88% of participants on the effect measures (intervention group participants, *n* = 118; control group participants, *n* = 108) and from 71% on the cost measures (intervention group participants, *n* = 91; control group participants, *n* = 90) (van Dongen et al., 2016)

Intervention group participants were offered Mindfulness training, e-coaching and the opportunity to join lunch-time walks. The Mindfulness course was delivered over eight weeks in groups with an average of 4 to 17 participants per group. Handouts and audio recordings with relaxation exercises were provided to accompany the course. The Mindfulness course was followed by an eight-week e-coaching programme to help implement the Mindfulness taught.

2.10.1 Measures

Effect measures were assessed at baseline, 6 and 12 months, and included work engagement (via the Utrecht Work Engagement Scale), general vitality (via the RAND-36 Vitality Scale), job satisfaction (via one question from the Netherlands Working Conditions Survey), and work ability (via the Work Ability Index [WAI]). As sub-items of the WAI measure can be used as a summary indicator of work ability, this measure was truncated to use only two concepts: (1) current work ability, and (2) work ability in relation to physical and mental job demands.

2.10.2 Micro-costing

Micro-costing was conducted via a bottom-up approach and used to estimate intervention costs. Data was gathered during the intervention delivery period and included an

extensive range of costs such as development and implementation costs. A micro-costing approach was used to create a unit cost which detailed preparation time, administrative time (i.e. email communication) etc. Gross hourly salaries (including holiday allowance and bonuses) were multiplied by investment time to calculate labour costs. The finance department provided invoices and further supporting information relating to material costs, perishable consumables (fruit and vegetables), technology costs such as website hosting etc were used to enable a calculation of capital costs. The expected number of programme users over the first five years was used to calculate the development costs when considering the final total costs.

Every three months, retrospective questionnaires were issued and evaluated to calculate health care utilisation. This included primary health care, secondary health care and the use of prescribed and over-the-counter medications. Healthcare utilisation was calculated using standards costs from the 2010 Dutch 'Manual for Cost Research, Methods and Standard Cost Prices for Economic Evaluations in Health Care' (Hakkaart-van Roijen et al., 2011). Where costs were unavailable, prices were estimated according to professional organisations guidance. Medication use was valued using unit prices provided by the Dutch Society of Pharmacy.

Every six months, retrospective questionnaires were issued and evaluated to calculate occupational health costs, these were valued from a societal perspective using a micro-costing approach and from an employer's perspective using market prices. For both costing methods, information was collected from finance department staff.

2.10.3 Calculating effectiveness

Linear regression was used to calculate effectiveness at 12-month follow-up with appropriate adjustments made for baseline values. Corrections were made considering the baseline to regression equations. Cost-effectiveness from a societal perspective was calculated with the work engagement and general vitality measures with cost-effectiveness from an employer perspective utilising the work engagement, job satisfaction and work ability measurements.

2.10.4 Calculating cost-effectiveness

The societal perspective incremental cost-effectiveness ratio (ICER) for work engagement was calculated as -7,321, "*indicating that a 1-point decrease in work engagement was associated with a societal cost of €7,321"* (van Dongen et al., 2016).

The societal perspective ICER for general vitality was calculated as -470, indicating that a 1-point increase in general vitality was associated with a societal cost of €470. van Dongen et al. (2016) calculated that the maximum probability of this intervention being effective in the trial context (from a societal perspective) being 0.17, summarising that the Mindful VIP programme was more costly and less effective than the usual practice in these circumstances.

The employer perspective ICER for work engagement was calculated as -8,593 indicating that a 1-point decrease in work engagement was associated with an employer cost of €8,593. The employer perspective ICER for job satisfaction was calculated as -81,295 and for work ability -8,081, indicating that a 1-point increase in job satisfaction was associated with an employer cost of €81,295 and €8,081 cost for 1-point increase in work ability. van Dongen et al. (2016) calculated that the maximum probability of this intervention being effective in the trial context (from an employer perspective) being 0.13 (work engagement), 0.25 (job satisfaction) and 0.13 (work engagement), summarising that the Mindful VIP programme was more costly and less effective (irrespective of the willingness to pay) than the usual practice in these circumstances.

The employer perspective financial return on investment (ROI) was calculated as -2.51. Absenteeism, presenteeism and occupational health costs were calculated and compared against intervention investment and delivery costs resulting in a net loss of €1,635 per participant (95%CI: -4,268 to 973).

2.11 Study overview - Mindfulness-Based Positive Behaviour Support (MBPBS) programme

The **Mindfulness-Based Positive Behaviour Support (MBPBS)** programme review conducted by Singh et al., (2020) hypothesised that caregivers of individuals with intellectual and developmental disabilities would benefit from improved mental health after participation in the MBPBS programme. It was hypothesised that there would be positive correlation to their own mental wellbeing as programme participants which would translate into an improvement to their 'client variables' such as a reduction in aggressive events, reduced staff injury and reduced peer injury. This RCT was conducted with two active experimental conditions: MBPBS and Positive Behaviour Support (PBS). 147 caregivers responsible for 40 individuals with intellectual and developmental needs were referred by their community group home employers to the programme. 18 were excluded on referral as they did not meet the criteria, a further six were excluded for other reasons

such as medical conditions or in the process of relocating, the remaining 123 were randomised into either the MBPBS programme (n=60) or PBS only (n=63). Withdrawals following randomisation resulted in 116 caregivers commencing the trial (MBPBS, *n* = 59; (PBS, *n* = 57).

Caregivers in the MBPBS programme were offered a 7-day course which was spread over the first 10 weeks of the trial. Courses had an average of 15 to 20 caregivers in each group, content included teaching meditation techniques and group practice during the course, followed a period of 30 weeks where no further training was provided however access to the trainer was available to respond to any queries and meditation practices, designed for specific situations that might arise in the work, were provided.

Caregivers in the PBS programme were offered positive behaviour support in a programme tailored for their setting. The same timeline and group sizes were utilised in both groups (intervention and active control). PBS programmes are intended to support those caring for individuals with aggressive behaviours by teaching skills to quickly assess the situation and modify the environment where problem behaviour occurs (Singh et al., 2016). The focus of the programme in this trial was *"on developing and strengthening positive behavior more than on managing or eliminating challenging behaviors, with the intent of enhancing each client's long-term quality of life"* (Singh et al., 2020).

2.11.1 Measures

Effect measures were assessed in the 30 weeks following completion of the intervention programme. There was no reference to baseline data gathered and no indication of the frequency of data collection was offered. Effect measures were broken down into three categories:

- Caregiver Variables – measured by: Perceived Stress Scale-10, Professional Quality of Life (ProQOL), Training Attendance, Meditation Practice
- Client Variables – measured by: Aggressive Events, Staff Injury, Peer Injury
- Agency Variables – measured by: Physical Restraints, Emergency Medication, One-to-one Staffing, Staff Turnover

2.11.2 Micro-costing

Whilst a costing exercise was reported, it is not clear if a comprehensive inventory of all costs incurred to deliver the programmes was undertaken, therefore it is not possible to

say for certain if the analysis undertaken meets the definition of micro-costing (Xu et al., 2014). Costs gathered for analysis included: days of work lost due to staff injury, number and cost of staff engagement, number of staff needing medical and physical rehabilitation therapy, number of staff resigned due to staff injury and training, costs for new hires, number of training days and cost of MBPBS and PBS training, cost of temporary staff during MBPBS or PBS training. Costs for venue hire and materials were not explicitly detailed although they may be included in the heading 'costs for MBPBS and PBS training' – this is unclear.

2.11.3 Calculating effectiveness

Multiple linear regression was used to calculate effectiveness after controlling for the effect of time. Where measures utilised enabled a calculation of radio-level data (such as number of aggressive events, physical restraints used and number of emergency medications issued) this was collated and analysed as a group count rather than an individual count. The perspective of evaluation was not detailed.

Singh et al., (2020) calculated that the MBPBS programme produced clinically and statistically significant changes for caregivers and their clients when compared to the PBS programme.

2.11.4 Calculating cost-effectiveness

Agency variables were measured and used to generate costs (as referenced in the micro-costing section). The financial costs for each of the variables were obtained from the agency's finance office and included all costs regardless of whether they were met by the agency or by workers' compensation scheme. Whilst not made explicit the costs are presented from an employer perspective i.e detailing the costs of a range of situations to the employer e.g staffing costs. No quality-adjusted life-year (QALY) or ICER is presented. A comparison table of costs details, lost days of work due to staff injury, MBPBS - 61 / $8,784 vs PBS 653 / $94,032. Number of staff days and cost of 1:1 staff (attendance on programme), MBPBS - 53 / $7,632 vs PBS – 192 / $27,648. Number of staff needing medical and physical rehabilitation therapy, MBPBS - 1 / $19,500 vs PBS 22 / $429,000. Number of staff resigned due to staff injury and training costs for new hires, MBPBS - 1 / $1,726 vs PBS – 6 / $10,356. Number of training days and cost of training, MBPBS 7 / $21,000 vs PBS – 7 / $7,000. Cost of temporary staff during training, MBPBS – 60 / $60,480 vs PBS – 63 / $63,504.

Total additional costs for the time periods, MBPBS - $119,122 vs PBS - $631,540 (vs no intervention or active control)

In addition to concluding an effectiveness benefit, Singh et al., (2020) calculated a $512,418 saving when delivering MBPHB vs PBS as an intervention in the sector caring for individuals with intellectual and developmental disabilities.

2.12 Study quality

The Drummond et al. (2015) 10-item checklist was used for an economic quality appraisal of the two papers included in the final analysis (Table 2.3; Appendix 1). A summary of scores of the appraisal was derived using a rating scale, developed by Doran (2008), adapted to provide a numerical score to each question based on the Poor (1) Average (2) Good (3) Doran rankings (Table 2.3).

The Consolidated Health Economic Evaluation Reporting Standards 2022 (CHEERS) checklist (Husereau et al., 2022a) was also used. This checklist is greater in detail and more recent than the Drummond checklist and further supports the standardisation and transparency in reporting economic evaluations. Using the CHEERS 2022 checklist, both studies were reviewed (Table 2.4; Appendix 2&3) with a summary table designed where results were reported for comparison.

2.12.1 Drummond et al., (2015) 10-item checklist findings

Using the Drummond et al. (2015) 10-item checklist (then converting to summary scores), van Dongen et al. (2016) score higher than Singh et al. (2020) in terms of documenting economic quality. The scoring reflects the reporting detail within published papers from which the quality of the study is assessed, whilst helpful the checklists are limited. Conversations with researchers when assessing economic quality could alter the scores, however limited resources do not allow for this.

Based on the scoring and assessment conducted there were four areas identified as ‘poor’ from the two studies:

- ‘comprehensive description of alternatives’ within the van Dongen et al. (2016) study
- ‘important & relevant costs & consequences for each alternative’, ‘costs & consequences valued credibly’, plus ‘allowance made for uncertainty in estimates’ all identified as ‘poor’ within the Singh et al. (2020) study.

Table 2.3

Adapted Drummond checklist - summary scores of literature review

Question #	Question	Van Dongen et al. (2016)	Score	Singh et al. (2020)	Score
1	Research question well defined?	Good	3	Average	2
2	Comprehensive description of alternatives?	Poor	1	Good	3
3	Effectiveness of program established?	Average	2	Average	2
4	Important & relevant costs & consequences for each alternative identified?	Average	2	Poor	1
5	Costs & consequences measured accurately & appropriately?	Good	3	Average	2
6	Costs & consequences valued credibly?	Good	3	Poor	1
7	Costs & consequences adjusted for differential timing?	Good	3	Good	2
8	Incremental analysis of costs & consequences performed?	Good	3	Good	3
9	Allowance made for uncertainty in estimates?	Good	3	Poor	1
10	Presentation & discussion of study results include all issues of concern to users?	Good	3	Average	2
		Total scores	**26**		**19**

A rationale for the study was provided by both authors, with research questions and objectives articulated and details of the alternative provided. The alternatives / control measures were discussed, Singh et al. (2020) provided links to papers which detailed additional information on the active control (Dunlap et al., 2020). Both studies' used active control groups i.e the control groups were offered an intervention, therefore it was not possible to evaluate how effective the main intervention was compared to usual practice in the specific settings. Caution should be taken and considerations documented when using active controls as it is possible to mis-calculate the impact of interventions in this type of research design i.e lack of effect between active control and intervention groups does not imply lack of treatment efficacy. Active control group design does not estimate absolute effects (Karlsson & Bergmark, 2014) - this is not given any consideration in either study. van Dongen et al. (2016) calculate losses in relation to return on investment, this is in comparison to active control (with its own costs), if the active control was not 'usual practice' the costs would be higher to the employer than the study suggests. Singh et al. (2020) present cost saving of intervention vs active control,

they also include ‘total additional costs’ for the period providing costs vs no intervention or active control.

The range of perspectives reported in each study varied, with employer, employee and societal perspectives reported by van Dongen et al. (2016). Nno perspective was articulated by Singh et al. (2020) although the employer perspective could be assumed based on the reporting. Quality of life measures in the Singh et al. (2020) study and the general vitality scale in the van Dongen et al. (2016) study both measured participant self-declaration of health. Other measures in the Singh et al. (2020) study were categorised into caregiver, client and agency variables.

Unit prices were reportedly used by van Dongen et al., (2016) the price year was not provided, the references offered in relation to that specific reporting were seven years prior to the publication date therefore it is not clear what data has been used to calculate costs. Unit prices were not reported in the Singh et al. (2020) study. The van Dongen et al., (2016) study adopted a 12-month follow up design, reporting that discounting of costs and effects was not necessary quoting Drummond et al., 2015 for reference. Discounting was not reported by Singh et al., (2020) as the study period was less than 12-months, following the same guidance this would also not be necessary (Drummond et al., 2015).

Incremental cost-effectiveness analysis was performed by van Dongen et al., (2016). The cost-effectiveness analysis by Singh et al., (2020) was not detailed other than to say there was a cost-effectiveness comparison between the intervention and the active control.

2.12.2 CHEERS (2022) checklist findings

Using the CHEERS 2022 checklist, both studies were reviewed (full reports Appendix 2&3) with a summary table designed where results were reported for comparison. In the summary table (Table 2.4), where information was available to meet the question criteria, this was categorised as ‘Reported’. Where information was missing in the original paper, this was categorised as ‘Not reported’, as per the CHEERS 2022 guidance (Husereau et al., 2022a). Where partial information was available, the summary table was coded as ‘Reported’. Using this summary method, the studies were more comparable (in terms of quality) vs the seven-point difference using the Drummond checklist. The CHEERS checklist returned a one-point difference with the Singh et al. study once again falling below the level of van Dongen et al.

Table 2.4

Adapted CHEERS 2022 checklist - summary scores of literature review

Item #	Question	Van Dongen et al., (2016)	Singh et al., (2020)
1	Identify the study as an economic evaluation, specify interventions	Reported	Reported
2	Provide summary context, key methods, results, and alternative analyses	Reported	Reported
3	Context for the study, study question, relevance for decision making	Reported	Reported
4	Health economic analysis plan developed and where available	Not reported	Not reported
5	Characteristics of the study population	Reported	Reported
6	Provide relevant contextual information that may influence findings	Reported	Reported
7	Describe the interventions or strategies being compared and why chosen	Reported	Reported
8	State the perspective(s) adopted by the study and why chosen	Reported	Not reported
9	State the time horizon for the study and why appropriate	Reported	Reported
10	Report the discount rate(s) and reason chosen	Reported	Not reported
11	Outcomes used as the measure(s) of benefit(s) and harm(s)	Reported	Reported
12	How did outcomes capture benefit(s) and harm(s) measured	Reported	Reported
13	Population and methods used to measure and value outcomes	Reported	Reported
14	Describe how costs were valued	Reported	Reported
15	Dates of the estimated resource quantities and unit costs, currency and year of conversion	Reported	Not reported
16	If modelling is used, describe in detail and why used. Report if the model is publicly available and where it can be accessed	Not reported	Reported
17	Methods for analysing or statistically transforming data, any extrapolation methods, and approaches for validating any model used	Reported	Reported
18	Methods for estimating how the results of the study vary for subgroups	Not reported	Reported
19	How impacts are distributed across different individuals or adjustments made to reflect priority populations	Not reported	Not reported
20	Methods to characterise any sources of uncertainty in the analysis	Reported	Not reported
21	Approaches to engage patients or service recipients, the general public, communities, or stakeholders in the design of the study	Not reported	Reported
22	Report all analytic inputs including uncertainty or distributional assumptions	Reported	Reported
23	Report the mean values for the main categories of costs and outcomes	Reported	Reported
24	How uncertainty about analytic judgments, inputs, or projections affect findings. Report the effect of choice of discount rate and time horizon, if applicable	Reported	Not reported
25	Difference patient/service recipient, general public, community, or stakeholder involvement made to the approach or findings of the study	Not reported	Not reported
26	Key findings, limitations, ethical or equity considerations not captured, and how these could affect patients, policy, or practice	Reported	Reported
27	How the study was funded and any role of the funder in the identification, design, conduct, and reporting of the analysis	Not reported	Reported
28	Authors conflicts of interest	Reported	Reported
	Total scores	**21**	**20**

Neither of the studies reported on the below CHEERS criteria:

- Indicate whether a health economic analysis plan was developed and where available
- Describe how impacts are distributed across different individuals or adjustments made to reflect priority populations
- Report on any difference patient/service recipient, general public, community, or stakeholder involvement made to the approach or findings of the study

Crucially, the CHEERS 2022 checklist highlighted that the Singh et al. paper was not presented as a full economic evaluation and this may explain the missing reporting elements when reviewing against economic evaluation tools, it was however included in the review as the paper reported on cost-effectiveness from the outset.

2.13 Comparison considerations

Quality checklists are commonly used in economic evaluations, however, many checklists do not enable the reader to evaluate the quality of the study, merely they help establish if the reporting is complete (Frederix, 2019). Not every item in a checklist may be relevant to the study in question and a simple formula of calculating items can lead to a skewed scoring system presenting misleading results.

In comparing studies, the aim is to explore variances in outcomes from the adoption of an intervention. However, the lack of heterogeneity in study composition should be noted and considered, an additive scoring system assumes comparable study factors which is not necessarily true (Lau & Holbrook, 2017). Country, setting, design, analysis, intervention and outcomes all vary in the two studies compared. In addition, the sample size, costs, sources of bias and confounders also affect the ability to make direct comparisons. Also relevant to note is this process of comparison is based on the published results, the choice and adherence to reporting guidelines heavily impacts on the capacity to compare and report accurately.

To enable the comparison to be most accurate, a synthesis model would be required to consider the exchangeability of data across the studies and their variables (Sculpher et al., 2004). Due to limited recourses, for the purpose of this study the challenges and considerations in comparing the studies have been noted and recommendations for exchangeability and generalisation to be considered in future research made.

2.14 Strengths & limitations plus challenges of the review

2.14.1 Strengths

Whilst reviews can never replace clinical trials (Cook et al., 1997), they can help professionals and decision-makers to review large volumes of data and make key decisions. There are several methods which can be adopted when conducting a review (Table 2.5), with systematic reviews considered a trustworthy method as they are conducted using strategies that limit bias and random error (Cook et al., 1997).

This review process enabled database search results to be combined and considered in a methodical way with minimal bias (Finckh & Tramèr, 2008).

It is possible for studies to be missed when screening such a large volume of data when a single screening approach is used (Waffenschmidt et al., 2019). To increase the reliability of results and for increased transparency (of the selection process) a double screening approach was used.

Table 2.5

Details of 'review' types – taken from Finckh & Tramèr M. (2008)

Study type	Definition
Review (narrative)	Narrative, conventional review articles examine recent or current literature at various levels of completeness and comprehensiveness.[53] Narrative reviews might be limited by a potential reviewer bias, since typically, methods for identifying information are not stated and the study selection process may be arbitrary. Generally, selected studies are not critically appraised, the strength of the evidence is not weighted and no quantitative synthesis of the data is performed.[5]
Systematic review	Reviews prepared with a systematic approach to minimize selection bias, which is explicitly documented in the method section of the review.[7] Systematic reviews may be **qualitative,** when combining the data would be impossible or inappropriate, or **quantitative, when** combined treatment effects are obtained using biostatistical methods of meta-analysis.
Meta-analysis	A quantitative method of combining the results of independent studies and synthesizing summaries and conclusions.[53]

2.14.2 Limitations

The key limitation of this systematic review was a lack of search results meeting the criteria (i.e findings reporting on an economic evaluation and impact on job performance following a Mindfulness programme in the workplace). The number of studies meeting the criteria limited the ability to evaluate across a broad spectrum. In addition, the differing population, location and intervention programme raises uncertainty about the comparability and ability to draw sound conclusions.

Narrowing of the search criteria due to the word 'work' being broad and returning a large volume of results and to could have enabled studies which omitted the key words from

title or abstract to go undetected. This was weighted against the resources and time available and the trade-off justified.

2.14.3 Challenges

Gathering and summarising healthcare evidence is challenging as researchers use varying methods, designs, populations etc for the same intervention (Collins & Fauser, 2005). Indeed, how the intervention is delivered also varies, as does entry and exclusion criteria resulting in a challenge firstly to locate all the relevant research and then work to amalgamate different types of data reported (Kuntz et al., 2013).

Systematic reviews in health economics are resource heavy and often produce large volumes of information (Jacobsen et al., 2020). To limit the volume of data to a manageable level the search criteria in this review was narrowed which enabled the review to take place.

An additional challenge for this review was the overlap of disciplines (workplace and healthcare) which required the search to consider a wider range of databases and locations for review (Waffenschmidt et al., 2019).

2.15 Findings summary

The reporting of study findings from van Dongen et al., (2016) was more detailed than that from Singh et al., (2020) (as evidenced by both the Drummond and CHEERS checklist processes).

Each trial had significantly different outcomes in relation to effectiveness of the intervention studied. van Dongen et al., (2016) observed a difference in work engagement in favour of the control group, which was statistically significant, meaning those who did not engage with the intervention were more engaged with their work than their colleagues who took part in the Mindful VIP Programme. Participants in the intervention group accessing the Mindful VIP Programme reported higher levels of absence due to medical reasons and higher levels of presenteeism (attending work whilst ill, Johns, 2010). The Mindful VIP programme was more costly and less effective than the active control group – it is not clear what the cost difference would be to 'treatment as usual' (i.e. if no intervention were offered at all).

Singh et al. (2020) observed both effectiveness and cost-effectiveness when offering the Mindfulness-Based Positive Behaviour Support programme in the workplace. The

intervention in this trial proved maximum probably of the intervention being cost-effective in reducing perceived stress, aggressive events, staff injury and peer injury in addition to improving quality of life. The intervention group also reported lower frequency of physical restraints use, emergency medication, and reduced staff turnover (in comparison to the active control group).

$512,418 saving was reported by Singh et al., (2020) in comparison to the active control. It was not clear what the cost difference would be to 'treatment as usual' (i.e. if no intervention were offered at all).

The different study group populations within the trials may have contributed to the differences in outcomes. As detailed in the Health Belief Model (Janz & Becker, 1984), behaviours (of participants) are influenced by key factors such as:

- beliefs about health conditions
- perceived threat (of) sickness or disease
- belief of consequence
- potential positive benefits of action
- perceived barriers to action
- exposure to factors that prompt action
- confidence in ability to succeed

There are reported occupational differences in the prevalence of mental health issues (Stansfeld et al., 2009) with the caring profession often cited in the top profession reporting poor mental health (Wulsin et al., 2014). It is possible that caregivers may be more familiar with mental health challenges by nature of their profession, working in an environment with a high prevalence of mental health reporting. The exposure to mental health conditions of the care workers (deemed higher by profession) may have impacted on their health beliefs with particular increased beliefs / understanding of mental health conditions and perceived threat of poor mental health.

Neither of the studies reported economic modelling with a longer time horizon. As per the summary of types of decision model structures (Kuntz et al., 2013, Table 2.6) there are several models available. The Markov model is popular in health economic evaluations (Karon & Brown, 1998), there are limitations and benefits to all models (Caro et al., 2010). Both the Markov and Discrete Event Simulation models could have been effective in the analysis of these studies.

Findings are summarised from the information available. Reporting styles and inclusion (or omission) of key information does not always offer a definitive account of trial activity, however with limited resources available this is what is relied on for guidance and subsequent systematic reviews.

Table 2.6

Summary of types of decision model structures - (Kuntz et al., 2013)

Model Type	General Description	Type of Decision Best Suited For
Decision tree	Diagrams the risk of events and states of nature over a fixed time horizon.	Interventions for which the relevant time horizon is short and fixed.
Markov (cohort) model	Simulates a hypothetical cohort of individuals through a set of health states over time.	Modelling interventions for diseases or conditions that involve risk over a long time horizon and/or recurrent events
Microsimulation (individual) model	Simulates one individual at a time; tracks the past health states of individual and models risk of future events stochastically.	Modelling complex disease processes, when Markov models are too limiting.
Dynamic model	System of differential equations that simulates the interactions between individuals and the spread of disease.	Modelling interventions for communicable diseases, such as vaccinations.
Discrete event simulation model	Simulates one individual at time as well as interactions among individuals or within a health care system.	Evaluating alternative health care systems (e.g., workflow, staffing) though flexible enough to address questions in several different areas.

2.16 Summary and conclusions of the literature review

A helpful outcome from this review would be to link findings to theories of behavioural change (Bero et al., 1998) to determine the impact on job performance and the cost-effectiveness of Mindfulness interventions in the workplace. This has not been possible as the results were a) few in numbers and b) differing in findings.

Whilst Mindfulness programmes would benefit from tailoring in each population and setting, future research is required to examine how best to utilise an existing programme with evidence of effectiveness and consideration of populations (in achieving the desired health outcomes) and the context-specific needs to increase likelihood of successful transferability and cost implications of delivery in the workplace.

On a broader note, the ability to judge the effectiveness and potential cost-effectiveness of Mindfulness in the workplace, based off information provided in these two studies is extremely limited. There was much variance between the studies, countries, population and actual intervention resulting in difficulty to generalise the findings and make wider recommendations to employers and policy makers (Sculpher et al., 2004). It is clear Mindfulness as an intervention has potential in certain circumstances and could be costly and non-effective in other contexts. The factors which influence success require careful consideration and exploration of replicability.

2.17 Research question and brief findings summary

Key question - What do we already know about the effectiveness of Mindfulness in the workplace?

The existing literature on effectiveness of Mindfulness programmes in the workplace is a fast-growing area with over 14,000 papers returned in the first database search. When the search is narrowed to include economic evaluations, including cost-effectiveness, the results are much reduced. Furthermore, when 'job performance' is included in the search criteria and full screening is carried out by two researchers, there are only two studies which meet the full criteria. The literature which meets the criteria is not homogeneous and does not offer clear guidance to the field. One review concludes an increase in job performance and cost-effectiveness and the other reports no effectiveness and increased costs following the implementation of Mindfulness.

After reviewing the existing research and evidence-base, it is apparent that further research is required to understand the impact and economics of Mindfulness as a proactive mental health intervention in the workplace. The next chapter details the RCT conducted as part of this thesis, providing an additional contribution to this growing field of research.

Chapter Three

Effectiveness of a Mindfulness-Based Programme in the Workplace

3.0 Chapter preface

As shown in Chapter one, there is a high incidence of workplace sickness with 15.1 million days lost to mental health sickness in 2013 (at the start of this research). These sickness levels can lead to substantial costs to the employer, employee and society. In Chapter one, Mindfulness was presented as a possible proactive intervention to support mental health in the workplace. The findings from a systematic review of Mindfulness interventions in the workplace (Chapter two) demonstrated there was potential for Mindfulness to be cost-effective, however, further research was required. Therefore, an RCT was undertaken examining the effectiveness and cost-effectiveness of a mindfulness-based workplace intervention. The results of the trial effectiveness are presented in this chapter. See Chapter four for findings from the cost-effectiveness analysis, Chapter five for the business leadership review (from the employer perspective), and Chapter six for a discussion of the overall findings and conclusions from the trial.

3.1 Abstract

The aim of this study was to conduct an RCT to evaluate the effectiveness and cost-effectiveness of a workplace Mindfulness intervention and review the findings from an employer perspective.

3.1.1 Methods: In 2015, employees in the UK from Public Health England, NICE, Cabinet Office and an NHS hospital were invited to take part in a parallel arm RCT. Three hundred and eight participants were randomly assigned to the mindfulness intervention (n = 170) or the control group (n =138).

3.1.2 Outcomes: The primary outcome was stress measured using the Perceived Stress Scale. Secondary outcome measures included; The Five Facet Mindfulness Questionnaire; WHOQOL-Brief; The Cognitive Failures Questionnaire; Multifactor Leadership Questionnaire; a bespoke Service Use Measure;
ICECAP-A; The EQ-5D.

3.1.3 Results: the Mindfulness intervention was not found to be effective when reviewing the primary **outcome,** with no statistically significant impact on stress (Perceived Stress Scale) at any time point. In the **secondary outcome measures,** statistically significant changes were reported in the intervention group's Mindfulness traits (Five Factor Mindfulness Questionnaire) at both post intervention (POST) and 12 months following the start of the intervention (12-MONTHS). There were no statistically

significant changes observed in wellbeing (The WHOQOL-BREF) or leadership (Multifactor Leadership Questionnaire) at any time point. At POST intervention time point, there was no statistically significant impact on cognitive failures observed however at the 12-MONTH time point, statistically significant impact was observed with reduced cognitive failures in the intervention group (Cognitive Failures Questionnaire). The intervention was not found to be cost-effective (ICECAP-A, EQ5D-3L and EQ5D-VAS).

3.1.4 Conclusion:

The results suggest that there is potential for Mindfulness interventions to be introduced into the workplace to proactively support employee wellbeing. However, this trial structure did not see levels of impact which fully support implementation of this particular design. Further research is recommended with a full review of the most appropriate structure of Mindfulness in the workplace.

3.2 Introduction to the trial aims and objectives

The main aims and objectives of this trial are to conduct an RCT to evaluate the effectiveness and cost-effectiveness of Mindfulness in the workplace, reviewing the findings from primarily an employer perspective but also informing others in the field. The objective is to review the impact of mindfulness in the workplace and contribute to the growing evidence-base with guidance informed by the trial being offered to a range of stakeholders:

For Employers:

- How Mindfulness influences perceived stress and related outcomes in the workplace
- If mindfulness in the workplace is cost-effective
- What the financial implications are for employers when offering Mindfulness
- What are the business leadership considerations
- What are the challenges of measuring Mindfulness in the workplace

For other stakeholders including Mindfulness teachers, policy makers and researchers:

- Is a Mindfulness programme, which originally designed to address specific health challenges, effective and transferable into the workplace?

- Should workplace Mindfulness research findings influence existing field guidance for implementation?
- Should workplace Mindfulness research findings influence policy recommendations?
- And again, from a range of perspectives, what are the challenges of measuring Mindfulness in the workplace

Whilst there are a range of RCT design options available (Nair, 2019), this RCT used a 'waiting list' design to enable an untreated comparison to the intervention group to determine if the intervention had an effect whilst also addressing any ethical concerns of withholding the intervention from any participants (American Psychological Association, 2023). Those randomised to the control group were offered the Mindfulness course at the end of the trial, pending no harmful incidents reported by participants who had already completed the course. Participants in both groups were able to access 'services as usual', which included access to any existing support initiatives in the workplace (e.g. occupational health services) and were advised to access external services as usual (e.g. GP and other healthcare providers).

Key principles outlined by the National Institute for Health and Care Research (NIHR, 2021) were followed during trial management to ensure sound governance. As per the NIHR Guidance, this included ensuring:

- Appropriate trial population
- Robust intervention allocation
- Adequate sample size
- All possible blinding and masking of allocated trial intervention
- Adherence to allocated trial intervention
- Completeness of follow-up
- Relevant measures of outcomes
- Proportionate, efficient and reliable capture of data
- Appropriate statistical analysis

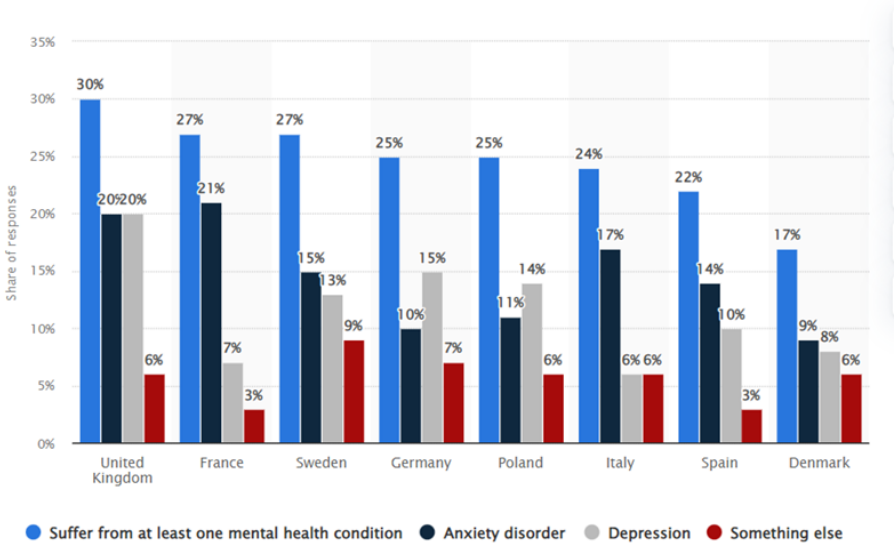
The researcher was blind to group allocation, however due to the nature of the intervention it was not possible for participants or Mindfulness teachers to be blind to group allocations.

The trial was ISRCTN registered (ISRCTN03386834) as a parallel RCT with pre-post and follow-up test design. The protocol was approved by the Bangor University Ethics Committee (Ref. No: 2013-9304-A13243). NHS ethics approval was not required as the intervention was restricted to office-based staff (i.e. not offered to NHS patients).

Twenty percent of the world's population experiences a mental health condition, a 13% increase in the last decade (World Health Organization, 2021). Whilst this trial was conducted in 2015, it is pertinent to consider the current situation (references post January 2020 are affected by the Covid-19 pandemic) as in the UK, the pandemic has impacted on the number of adults (aged 18 and above) reporting a clinically significant level of psychological distress (as detailed in Chapter one). Figures increased from 21% in 2019 to 29.5% in April 2020, after a slight drop, there was then a further increase to 27.1% in January 2021, followed by a decrease to 24.5% in late March 2021 (ONS, 2021). The number of people in the UK contacting the NHS seeking help for mental health problems is at a record high (UK Parliament Post, 2021). Thirty percent of the UK population reported suffering from a mental health condition between 2nd November to 11th November 2020, representing the highest percentage of the European population surveyed (Statista, 2020) (Figure 3.1).

Figure 3.1

Graph showing percentage of population reporting mental health conditions. (Statista, 2020)



With a growing mental health concern, governments across the world are facing increasing demands on health services and increasing financial costs. Despite the rising

numbers, the same WHO (2021) data reports that the global median of government expenditure allocated to mental health is less than 2%, a stark contrast to the percentage of those suffering. Researching and implementing effective, cost-effective and proactive interventions to support population-wide mental health has been a growing priority for some time (UK Mindfulness All-Party Parliamentary Group, 2015) and contributed to the rationale for this trial.

From a societal perspective, utilising the workplace as a platform to support wellbeing is one strategy with a potentially broad reach (discussed in Chapter one), providing a strong rationale to introduce proactive mental wellbeing interventions (the psychosocial case) and to support optimum organisational health (the business case).

From an employer perspective, employees with decreased stress levels show increased work performance and higher job satisfaction (Gilboa et al., 2008; Kalia, 2002; Zangaro & Soeken, 2007). With a recent estimation of £56 billion a year, poor mental health is extremely costly for employers (Deloitte, 2022).

3.3 The Mindfulness programme

Mindfulness: A Practical Guide to Finding Peace in a Frantic World (Frantic World) is an adaptation of the original Mindfulness-based Cognitive Therapy (MBCT) programme. Frantic World was developed by Mark Williams and Danny Penman in 2011, originally as a self-help / self-guided programme for the general population (Montero-Marin et al. 2021). The authors of Finding Peace describe it as a "*straightforward form of Mindfulness meditation which takes just a few minutes a day for the full benefits to be revealed*" (Williams & Penman, 2020). 'Low-dose programmes' such as the Frantic World curriculum have been since widely recognised as an effective and accessible programme for busy individuals (Hoeve et al., 2021; Karing & Beelmann, 2021; Klatt et al., 2009, Montero-Marin et al., 2021; Moynihan et al., 2013). This intervention was specifically chosen due to the short nature of practice and the considered suitability for a busy workplace.

However, there is limited evidence of the cost-effectiveness of Frantic World, or other low-dose programmes particularly in the workplace. The aim of this study was to address this gap in knowledge via a cost-effectiveness analysis (see Chapter four) and business leadership review (see Chapter five) comparing a workplace Mindfulness programme to wait-list control. The Mindfulness programme used in this trial was developed by the Centre for Mindfulness Research and Practice (CMRP) at Bangor University, UK and is

closely modelled on the Frantic World curriculum enabling comparisons to similar 'low-dose' programmes in later evaluation.

3.4 Methods

3.4.1 Study population and design

The study involved 273 employees from the administrative / non-clinical workforce within government sectors such as Public Health England, the NHS and NICE. The original plan was for this to be a pilot study with a target sample of 60 participants; however, as the research advanced, the engagement from the involved workplaces and recruitment rates of individuals allowed consideration of a larger study. Given that no harmful effects had been noted in the initial stages and the high engagement of the population, the sample size was expanded to 270 to allow a more robust assessment of the effectiveness of this intervention in relation to the main clinical effectiveness measure, the Perceived Stress Scale (Cohen, 1983). The Mindfulness programme was offered to employees who were in work (i.e. not absent due to illness) via a self-referral application process. Recruitment was supported via internal organisational notice boards, staff newsletters and social media promotion.

Screening of applications was carried out by the researcher and a senior trainer from the CMRP. As wellbeing and mental health challenges are a normal part of people's lives (Granlund et al., 2021), it was important to be inclusive of generally well participants during this trial and not exclude if there were reported levels of stress, anxiety and depression that were not severe. There were two stages of eligibility:

1) Eligible to join the research trial

► Must be an employee of a public sector agency (e.g. PHE, NICE, NHS England)

► Must be in work and not currently off sick

► Must be able to access a computer and the internet

2) Eligible to join the Mindfulness course

► Not have an active or recent addiction to alcohol or drugs

► Not be currently unwell with a serious mental health issue (i.e. accessing mental health treatment or services which could be impacted by Mindfulness)

► Not be currently experiencing a life crisis such as recent bereavement or divorce

► Able to attend a minimum of 6 out of 8 of the sessions

As the courses were dedicated to the research, all participants were required to meet both stages of criteria to participate (those interested in Mindfulness but not consenting to research would be offered a Mindfulness course at the end of the trial).

The Mindfulness course was offered during working hours to encourage participation. The eight-week course was delivered in four UK locations: Liverpool, Manchester, Leeds and London using public sector buildings. At the recruitment stage, all participants were provided with information on Mindfulness and what the Mindfulness course would entail (via a link to the CMRP website for general information on Mindfulness and Mindfulness courses). Email addresses for further queries / information were provided which linked directly to the CMRP where the administrative team familiar with the programme could answer any general queries on Mindfulness. A dedicated administrator (listed on the ethics application to support ongoing queries) was located in the CMRP to answer any specific research queries. No set deadlines were given for participants to apply. Once an application to take part in the trial was received (and prior to randomisation), participants who had registered for the Mindfulness course were emailed research information forms (with further contact details for research queries) and sent an electronic link to tick and confirm they had read and understood the research information and provide informed consent, if they were willing to engage in the research (see Appendix 4 for the participant consent form). Any consent forms not returned were followed up via a telephone call by the dedicated administrator who was available for further queries. Participants were randomised into either the intervention group or wait-list control group on a 1:1 ratio once the target recruitment number was met. The dates of the courses were not available to applicants at recruitment. Therefore, on randomisation there were a number of withdrawals linked to participant availability / work pressures.

Experimental evaluation is typically expensive (Little et al., 2012). To keep costs to a minimum, a randomisation service was gifted to the trial from the North Wales Organisation for Randomised Trials in Health (NWORTH), Bangor University and statistical support was offered through a senior NWORTH team member. Course materials and teacher supervision were offered by the CMRP with costs waivered. In support of the research and employee wellbeing, teachers delivered the programme without charge and venues waivered room hire costs.

The research outcomes were measured via self-report measures completed by participants in both the intervention and control groups. Once participants had been allocated to groups, they were assigned a unique unidentifiable number which linked the participant and their group allocation. Automatically generated emails were pre-loaded into a bespoke built system which were then issued at the relevant time points. These emails requested the participant complete the measures via clicking on a link in their email. This link was unique to each individual and time point and would expire after the time point 'window' (explained below) passed or a submission had been made. This process prevented multiple submissions or submissions being allocated to incorrect time points. These self-report measures were gathered (from the intervention and control groups) within two week 'windows' of prior to course commencement (PRE), within two weeks after course completion (POST) and one year (within two weeks) after start date (12-MONTHS) time points. The courses were delivered by individuals trained to teach Mindfulness either originally by the CMRP or, if from another organisation, their teaching was assessed by the CMRP as meeting Good Practice Guidance standards. Supervision through the duration of teaching was offered to the teachers by a senior trainer in the CMRP. De-briefing information was sent to participants after the trial (Appendix 5).

3.4.2 Intervention and control groups

After randomisation, intervention group participants were invited to join the 8-week course. Control group participants were advised to continue as usual whilst participating in the research element only of the trial. The Mindfulness training programme was 8 weeks in duration, comprising of 2.5 hours per week plus one 'all day' session of 5 hours meditation. Course attendees were not permitted to swap between Mindfulness course groups. All training took place in the workplace to encourage attendance with timing of sessions varying between groups although all were within working hours of 8am to 6pm. Intervention group participants received a workbook designed by the CMRP which outlined each session, mediation sessions to practice, homework sheets plus a CD with guided meditation audio tracks (again recoded and provided by the CMRP team). Email access to the teacher was available during course for any queries.

3.4.3 Outcomes and outcome measures

Outcome measures (Appendix 6) were selected (from the many available) as they were validated measures, reliable, well-used in this research field and therefore results could be more easily compared with other study findings. Additionally, the measures chosen

where compatible with online self-completion, relatively easy to administer and quick to complete therefore less burdensome for participants. Outcome measures were assessed at baseline, post and 12 months and included perceived stress, Mindfulness facets, wellbeing, quality of life, cognitive failures, leadership style, sickness absence and healthcare service usage.

3.4.4 Primary effectiveness measure

Perceived stress was measured using the Perceived Stress Scale (PSS). The PSS is a self-report questionnaire designed to measure "*the degree to which individuals appraise situations in their lives as stressful*" (Cohen et al., 1983). The scale evaluates the degree to which individuals believe their life has been unpredictable, uncontrollable, and overloaded during the previous month (Lee, 2012). The higher the scores the higher the perceived stress.

3.4.5 Secondary outcome measures

The Five Facet Mindfulness Questionnaire" (FFMQ) was used to assess the tendency of participants to be mindful in daily life. The FFMQ is a 39-item self-report measure that was developed by integrating items from various pre-existing Mindfulness scales (Baer et al., 2004). The higher the scores the higher the Mindfulness traits.

The WHOQOL-BREF was used to assess four domains related to quality of life: physical health, psychological, social relationships and environment. It also includes one facet on overall quality of life and general health (The WHOQOL Group, 1998). The higher the scores the higher quality of life.

The Cognitive Failures Questionnaire measured the frequency people experienced cognitive failures, such as absent-mindedness, errors of perception, memory, and motor functioning (Broadbent et al., 1982). Higher scores indicate more cognitive failures.

Leadership style was assessed using the Multifactor Leadership Questionnaire (Avolio & Bass, 2004) which measured transformational, transactional, and passive/avoidant leadership styles. The scoring for leadership style is broken down into a range of sections and styles (detailed further in Chapter five).

A bespoke Service Use Measure developed by Professor Dyfrig Hughes, Centre for Health Economics and Medicines Evaluation (CHEME) at Bangor University, was used to assess the frequency of service use such as GP and mental health services and record

workplace sickness monitoring. Scoring of service use and sickness was simple addition: the higher the number the more frequent the service use and sickness.

3.4.6 Health economics measures

ICECAP-A (Al-Janabi et al., 2012) was included to be used as part of the planned cost-effectiveness analysis. The ICECAP-A enables a calculation of wellbeing from an individual perspective based on their perceived ability to 'do' and 'be' the things that are important in life (Al-Janabi et al., 2012). The EQ-5D-3L (Balestroni, 2012) was also included to calculate the planned cost-effectiveness analysis. This measure utilises a descriptive scoring system and a visual scoring system to evaluate five key areas: mobility, self-care, usual activities, pain/discomfort and anxiety/depression with three levels of choice (EuroQol, 2022). Findings relating to these measures are reported in Chapter four where cost-consequence and micro-costing analyses were undertaken to assess the cost-effectiveness of the workplace Mindfulness intervention.

3.4.7 Resource use and valuation

The employer perspective was evaluated using bottom-up micro-costing to estimate the intervention costs. Healthcare utilisation was assessed via the Service Use Measure with unit costs calculated using the 2020 costing guide devised by the University of Kent and the Centre for Health Economics at the University of York Personal Social Services Research Unit (PSSRU) (Curtis & Burns, 2020).

To enhance the business leadership review with measures with a workplace focus, leadership style and impact on cognitive failures were analysed using the employer perspective. Self-reported sickness absence was collated via the Service Use Measure questionnaires. This analysis is discussed further in Chapter four.

3.4.8 Data collection

Questionnaires were delivered to participants via a custom-built online system. The system recorded the responses in a MySQL database. Additionally, raw responses were stored in a capture log, also a MySQL database, which proved to be important as some data points, for unknown reasons, had not been correctly stored in the main database.

3.4.9 Importing data

Data processing steps in preparation for statistical analyses were conducted in a software system (Python using Jupyter Notebook) (Kluyver et al., 2016), data was imported from

the MySQL databases (McKinney, 2012). Jupyter notebooks were structured in such a way as to enable easily rerunning the entire data processing pipeline with minimal manual intervention.

As not all data had been correctly stored in the main database, the separate capture log database containing raw text of responses sent from the participant's browser to the main server was utilised to retrieve participant responses. Parsing of the text responses was required using regular expressions. Multiple automated and manual checks were performed, recorded in the software (Jupyter notebooks) to ensure data was correctly retrieved from the logs. Data from the main database was combined with the data obtained by parsing (converting codes info language the software can sort) the capture log.

During the data preparation phase, a formula was developed to automatically match each of the master keys to a time point based on submission dates and master key expiry dates. The time point estimates were then manually reviewed. Each master key which had a missing time point was assigned a time point manually.

3.4.10 Handling data

While reviewing the data, five instances were found of two submissions corresponding to a single data point. The two submissions were typically two weeks apart. Four out of five instances of this occurred for POST time point. These double submissions most likely occurred because participants received an erroneous reminder to fill out the forms when they had in fact previously completed the questionnaires. In all five instances of these multiple submissions, only the latter submission was utilised, since it may have reflected a participant's realisation that they had given inaccurate results in the first instance.

The correct scoring process was identified from guidance on each measure. A script was written to score all the data in the database before exporting to Microsoft Excel. A manual check was carried out to review the data, check the correct number of items were being imported, and check the scoring. Finally, a manual check was done to test different combinations of missing data scoring to check for coding accuracy. Data was then sorted to enable calculation of time points based on the date. The number of days in-between data submissions were checked against the date of the first response.

It was possible for time points to have multiple records as several email requests for data submission could have been issued if there was no data return. Each request for data

submission generated a new code and stamp. All data in these 'clusters' were allocated the first data request time point for time point allocation and last data submission for results analysis.

3.4.11 Missing data

Where there was specific guidance from the instrument to handle missing data, this was followed. Where there was no specific guidance from the instrument, missing responses on individual questionnaire questions (item level) were handled by replacing the missing response with an average of the participant's other responses for that questionnaire. This process of mean imputation for handing missing data was considered acceptable as less than 20% of individual responses were missing on individual questions within measures and therefore it was assumed that single question missing returns was completely at random thus the mean total created remains unbiased (Grace-Martin, 2020).

Complete missing data (i.e. no return for a time point) was left blank for import into SPSS where a multiple imputation method (59 imputations based on the percentage of data missing) was used to handle missing data (White et al., 2011).

3.4.12 Statistical analysis

For all analyses, statistical tests are testing for differences between groups at relevant follow-up points. SPSS was used to run one-way between-subjects Analysis of Covariance (ANCOVA) which investigated the effects of the intervention on the outcomes at POST whilst controlling for the outcomes at PRE, study site, phase number, and gender. Similarly, one-way ANCOVA examined changes in outcomes at 12-MONTHS between the groups after adjusting for key variables (i.e., outcomes at PRE, study site, phase number, and gender). The ANCOVA tests used for the sickness analysis also adjusted for marital status and age. Levene's test of error variances and normality checks were carried out on all outcomes and the assumptions met.

A 'modified intention to treat' principle was adopted for analyses (i.e. included all participants who were randomised even if they then later dropped out of the study); therefore, the findings more closely reflect what may happen in reality (with the modification / restriction in this trial to remove those from whom there was no demographic data, this included withdrawals on allocation and those who did not formally withdraw but did not provide demographic data at PRE measures). Missing data was multiply imputed and stratified for group. The imputation model included site location,

phase of training, group, gender, age, education and health status. Using Fully Conditional Specification and Predictive Mean Matching, 59 complete data sets were created in SPSS (IBM SPSS Statistics v28.0). Pooled estimates were calculated using Rubin's rules (White et al., 2011). Tabular analysis of complete case baseline data for each group was conducted, reporting on mean, median and standard deviation.

3.4.13 Assumption testing

The four key ANCOVA assumption tests were carried out: normality, homogeneity, homogeneity of regression slopes and linearity. There were non-normally distributed variables returned in the EQ5D-3L, EQ5D-VAS and the ICECAP-A, on further testing, assumptions were still met and results trusted.

3.4.14 Power calculation / sample size

A sample of 270 participants (135 in each group) will achieve 90% power to detect a standardised effect of 0.4 on the Perceived Stress Scale at a 5% significance level using a two-sample t-test. A standardised effect of 0.4 is considered a medium effect size. The minimal clinically important difference for the PSS is considered 11 points (Eskildsen et al., 2015), an effect size of 0.4 allows the observed standard deviation of the measure to approach 27.5. This is considered a conservative estimate of the sample size required as the ANCOVA method of analysis planned will be more sensitive than a simple-two sample t-test.

3.5 Results

3.5.1 Descriptive statistics / participant details

The checklist follows CONSORT good practice guidance (Moher et al., 2010) and summarises the recruitment, allocation, follow-up and analysis flow (Figure 3.2). Across the four sites, 308 participants originally consented and were randomised with 35 withdrawing on allocation. Reasons for withdrawal included: intervention session dates were not convenient (*n* = 10), work pressures (*n* = 6), no reason given (*n* = 6), maternity leave (*n* = 2), poor health (*n* = 2), did not receive notification of dates (*n* = 2), moved to a new role (*n* = 2), family commitments (*n* = 1), childcare problems (*n* = 1), joined another Mindfulness course (*n* = 1), moving location (*n* = 1), and did not want to wait for the course (*n* = 1). The remaining 273 participants commenced the trial (intervention group, *n* = 139; control, *n* = 134) (Table 3.1). After trial commencement, nine participants formally withdrew, with reasons including: sickness (*n* = 3), no reason given (*n* = 3), work

pressures (*n* = 1), bereavement (*n* = 1), and leaving employment (*n* = 1). As the modified intention to treat principle was adopted data from these nine participants was included in the analysis.

Baseline data was collected from 263 (96.34%) participants after randomisation (PRE). After completion of the 8-week Mindfulness course, data was collected from 157 (57.5%) participants (POST). Twelve months after course commencement data was collected from 168 (61.53%) participants (Table 3.1). Baseline data was not adjusted for variables. Protection against chance bias could have been further reduced by adjusting baseline data for variables, this is a noted limitation.

One participant from each group failed to provide demographic information at any time point through the trial. These two participants were excluded from the full data analysis as per the modified intention to treat process. Following 35 withdrawals (after randomisation) and two exclusions due to lack of demographics, the full analysis included 138 participants in the intervention group and 133 participants in the control group (total *n* = 271). Of the participants, 225 were female (83.03%), 46 were male (16.97%), the mean age was 43.6 years (Table 3.2 & Table 3.3). As this was an RCT, no testing for statistical difference at baseline was required (De Boer et al., 2015).

Figure 3.2

COHORT Checklist of trial

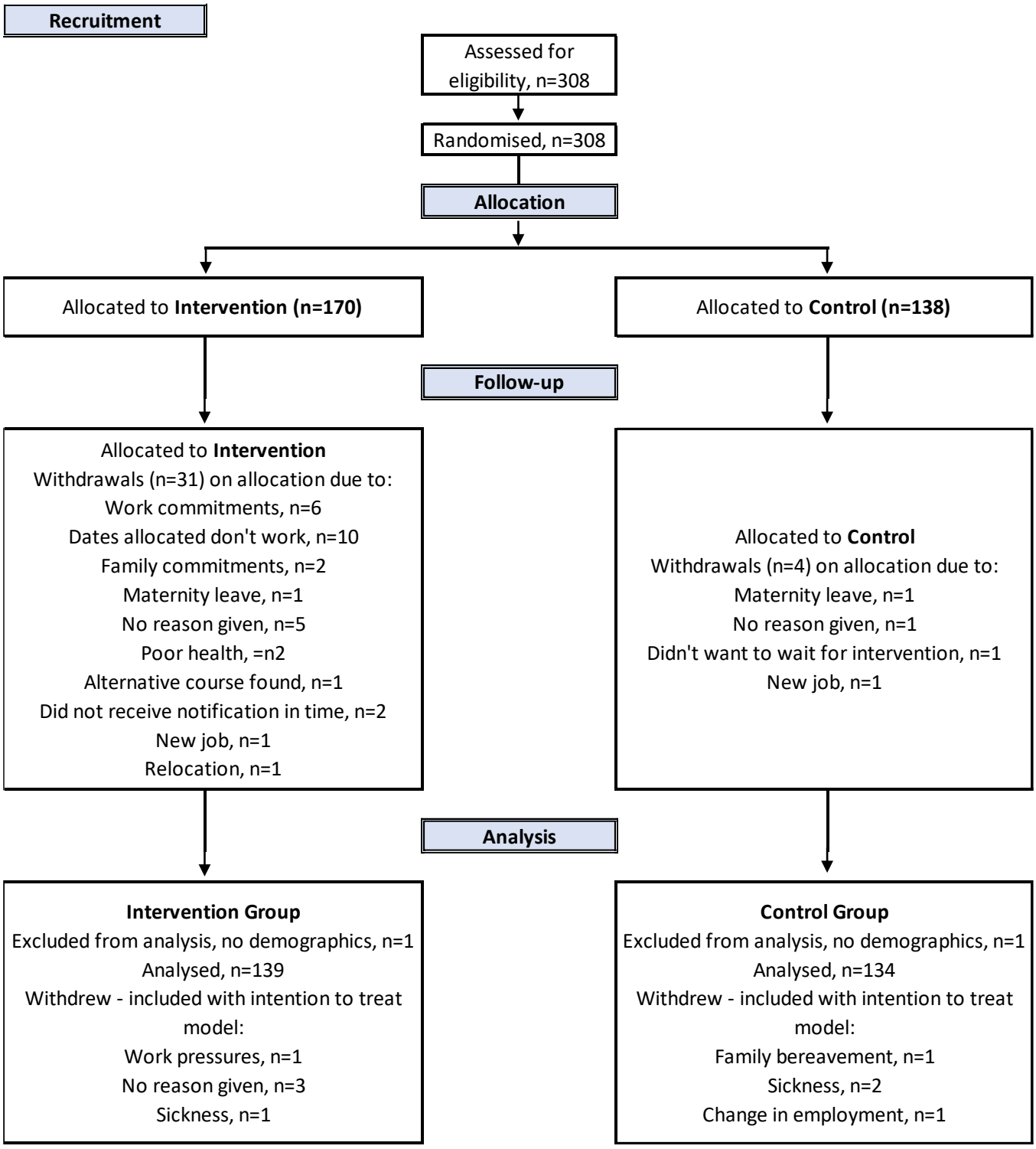


Table 3.1

Data returned at each time point – statistics from all participants after withdrawals

	PRE (n)	PRE (%)	POST (n)	POST (%)	12-MONTHS (n)	12-MONTHS (%)
Completed	263	96.3	157	57.5	168	61.5
No data	10	3.7	116	42.5	105	38.5
Total	273	100	273	100	273	100

Table 3.2

Demographics of participants in trial

		Intervention group (*n* = 138 – 50.9%))	Control group (*n* = 133 – 49.1%)	Total
Location	Leeds	37 (26.8%)	39 (29.4%)	271
	Liverpool	17 (12.3%)	9 (6.8%)	
	London	30 (21.7%)	32 (24.0%)	
	Manchester	54 (39.2%)	53 (39.8%)	
Gender	Male	25 (18.1%)	21 (15.8%)	271
	Female	113 (81.9%)	112 (84.2%)	
Age	20-30	12 (8.7%)	12 (9.8%)	271
	31-40	45 (32.6%)	48 (36.1%)	
	41-50	36 (26.1%)	44 (33.1%)	
	51-60	36 (26.1%)	25 (18.8%)	
	61-70	9 (6.5%)	4 (3.0%)	
Marital Status	Divorced	7 (5.1%)	8 (6.0%)	271
	Living as married	21 (15.2%)	25 (18.8%)	
	Married	67 (48.6%)	57 (42.8%)	
	Separated	4 (2.9%)	4 (3.0%)	
	Single	39 (28.2%)	37 (27.9%)	
	Widowed	0 (0.0%)	2 (1.5%)	
Education Level	Secondary	10 (7.2%)	6 (4.5%)	271
	Tertiary	128 (92.8%)	127 (95.5%)	
Leadership Role	No	73 (52.8%)	75 (56.8%)	270*
	Yes	65 (47.2%)	57 (43.2%)	

*One participant from the control group did not provide leadership position information

Table 3.3

Data of participants engaging in the trial taken from original case data

Measure	Time point	Mean (I)	Mean (C)	Median (I)	Median (C)	Standard deviation (I)	Standard deviation (C)
PSS	PRE	18.66	17.77	19.00	18.00	5.57	6.78
PSS	POST	14.45	16.64	14.00	17.00	5.78	6.32
PSS	12-MONTHS	15.16	16.05	15.00	17.00	6.62	6.82
ICECAP-A	PRE	.78	.83	.85	.88	.14	.13
ICECAP-A	POST	.85	.85	.89	.89	.12	.13
ICECAP-A	12-MONTHS	.84	.85	.88	.88	.14	.13
FFMQ	PRE	61.53	64.61	62.00	65.00	11.41	12.23
FFMQ	POST	69.65	64.58	71.00	65.00	9.10	12.11
FFMQ	12-MONTHS	69.25	65.09	70.00	64.50	11.42	12.31
CFQ	PRE	47.96	43.97	74.00	43.50	14.31	13.34
CFQ	POST	39.12	42.90	38.00	42.00	11.65	13.96
CFQ	12-MONTHS	38.03	45.40	38.50	44.00	12.64	13.86
EQ5D-3L	PRE	.85	.85	.85	.85	.14	.18
EQ5D-3L	POST	.87	.88	1.00	.94	.17	.17
EQ5D-3L	12-MONTHS	.88	.84	1.00	.85	.15	.20
EQ5D-VAS	PRE	75.01	70.09	80.00	80.00	15.89	26.08
EQ5D-VAS	POST	79.71	75.86	80.00	80.00	11.90	20.32
EQ5D-VAS	12-MONTHS	77.71	76.05	85.00	80.00	19.37	15.54
WHO – Quality of Life	PRE	3.89	4.06	4.00	4.00	.78	.67
WHO – Quality of Life	POST	4.12	4.10	4.00	4.00	.59	.59
WHO – Quality of Life	12-MONTHS	4.08	4.20	4.00	4.00	.74	.70
WHO – Satisfaction with Health	PRE	3.35	3.59	4.00	4.00	1.05	.95
WHO – Satisfaction with Health	POST	3.66	3.72	4.00	4.00	.91	.88
WHO – Satisfaction with Health	12-MONTHS	3.66	3.68	4.00	4.00	.97	1.01

Key. I = intervention group; C = control group.

3.5.2 Primary effectiveness measure results

Perceived Stress Scale (PSS)

Outcomes from the PSS analysis showed that there was no statistically significant difference between groups at POST or 12-MONTHS time points. A medium effect size was observed at POST which fell to a small effect size at 12-MONTHS.

The pooled estimate from 59 imputed datasets indicated that there was **no significant main effect of the intervention on PSS at POST between the groups** (B=-1.927, 95% CI=-4.315-0.460, p=0.113). **A medium effect size was calculated from complete case**

data, η_p^2 = 0.061. The adjusted mean PSS for intervention group at POST across imputed datasets (M=15.680, SE=1.208, 95% CI=13.287-18.072), not significantly different to the adjusted mean PSS of control group at POST across imputed datasets (M=17.607, SE=1.003, 95% CI=15.628-19.586).

The pooled estimate from 59 imputed datasets indicated that there was there was **no significant main effect of the intervention on PSS at 12-MONTHS between the groups** (B=-1.286, 95% CI=-4.008, -1.437, p=0.353). **A small effect size was calculated from complete case data**, η_p^2=0.019. The adjusted mean PSS for intervention group at 12-MONTHS across imputed datasets (M=14.556, SE=1.063, 95% CI=12.458-16.655), not significantly different than the adjusted mean PSS of control group at 12-MONTHS across imputed datasets (M=15.842, SE=0.921, 95% CI=14.028-17.655).

Figure 3.3 shows the distribution of data at the PRE time point for PSS, Figure 3.4 shows the distribution of data at the POST time point for PSS, Figure 3.5 shows the distribution of data at the 12-MONTHS time point for PSS.

Figure 3.3

Histogram distribution of data at PRE time point for PSS

(Group 1 = Intervention, Group 2 = Control)

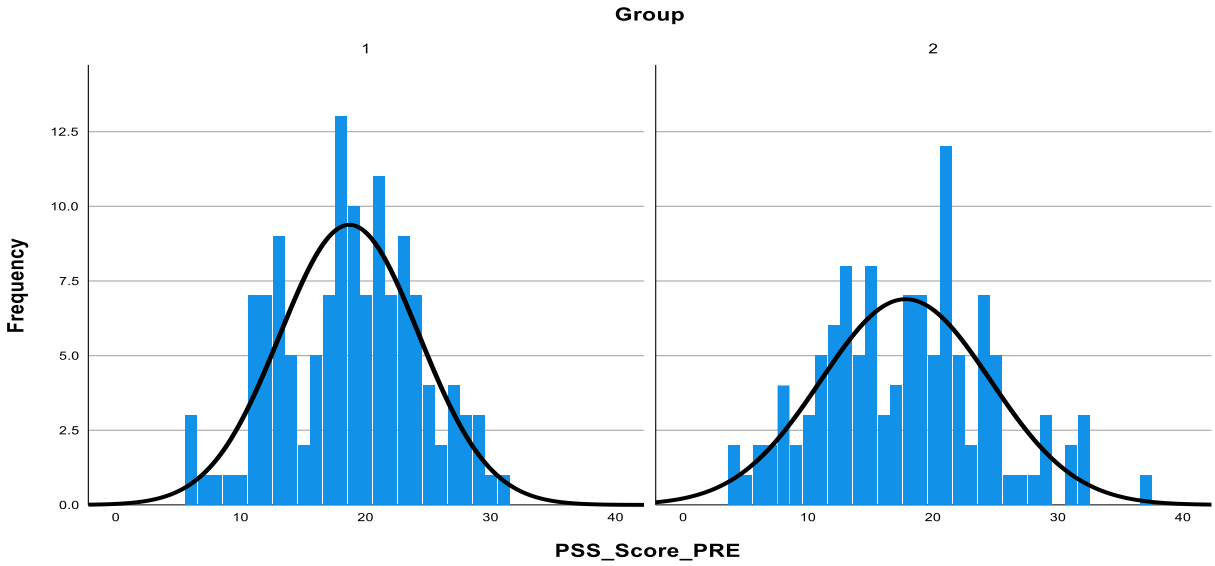


Figure 3.4

Histogram distribution of data at POST time point for PSS
(Group 1 = Intervention, Group 2 = Control)

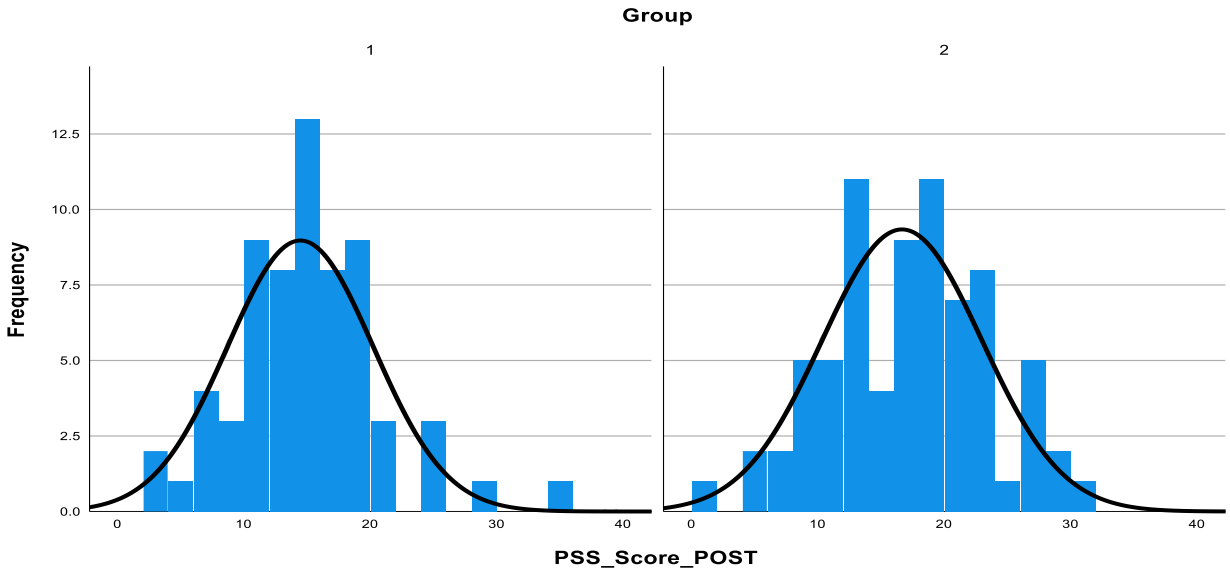
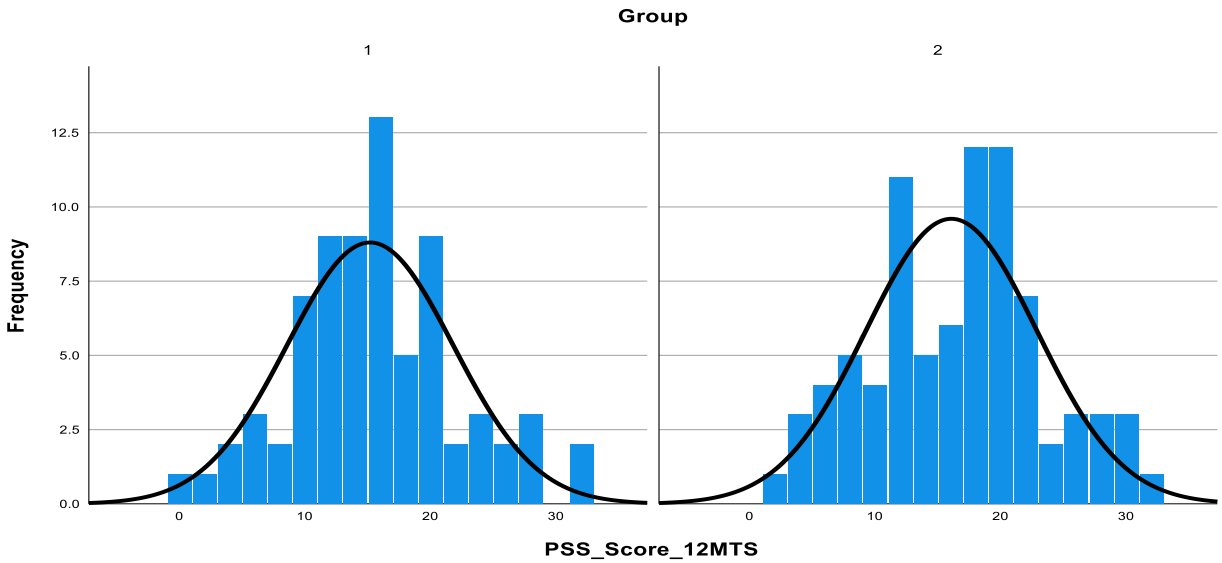


Figure 3.5

Histogram distribution of data at 12-MONTHS time point for PSS
(Group 1 = Intervention, Group 2 = Control)



3.5.3 Secondary measures results

3.5.3.1 Five Factor Mindfulness Questionnaire (FFMQ)

Outcomes from the FFMQ analysis showed that there was a statistically significant difference between groups at POST and 12-MONTHS. A large effect size was observed at POST which fell to a medium effect size at 12-MONTHS.

The pooled estimate from 59 imputed datasets indicated that there was **a significant main effect in FFMQ at POST between the groups** (B=5.873, 95% CI=1.739-10.007, p=0.006). **A large effect size in favour of the intervention was calculated from complete case data**, η_p^2=0.198. The adjusted mean FFMQ for intervention group at POST across imputed datasets (M=68.658, SE=2.205, 95% CI=64.275-73.042) is significantly different to the adjusted mean FFMQ of control group at POST across imputed datasets (M=71.591, SE=1.660, 95% CI=59.771-65.800).

The pooled estimate from 59 imputed datasets indicated that there was **a significant main effect in FFMQ at 12-MONTHS between the groups** (B=6.969, 95% CI=2.691-11.246, p=0.002). **A medium effect size was calculated from complete case data**, η_p^2=0.133. The adjusted mean FFMQ for intervention group at 12-MONTHS across imputed datasets (M=62.785, SE=1.526, 95% CI=68.312-74.871) is significantly different to the adjusted mean FFMQ of control group at 12-MONTHS across imputed datasets (M=64.623, SE=1.420, 95% CI=61.828-67.417).

Figure 3.6 shows the distribution of data at the PRE time point for FFMQ, Figure 3.7 shows the distribution of data at the POST time point for FFMQ, Figure 3.8 shows the distribution of data at the 12-MONTHS time point for FFMQ.

Figure 3.6

Histogram distribution of data at PRE time point for FFMQ

(Group 1 = Intervention, Group 2 = Control)

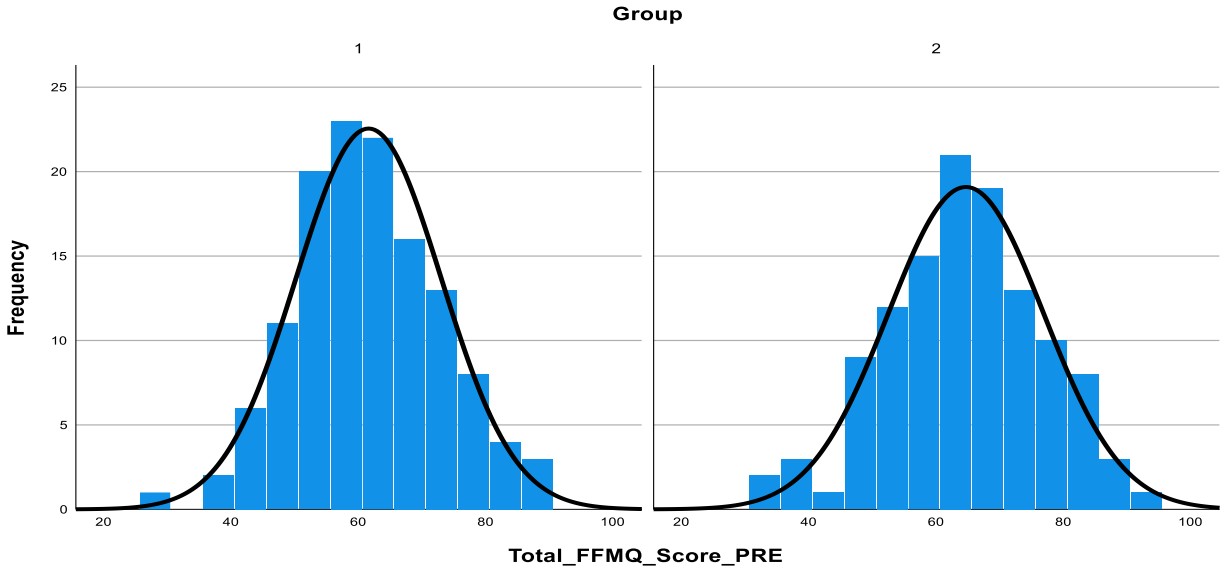


Figure 3.7

Histogram distribution of data at POST time point for FFMQ

(Group 1 = Intervention, Group 2 = Control)

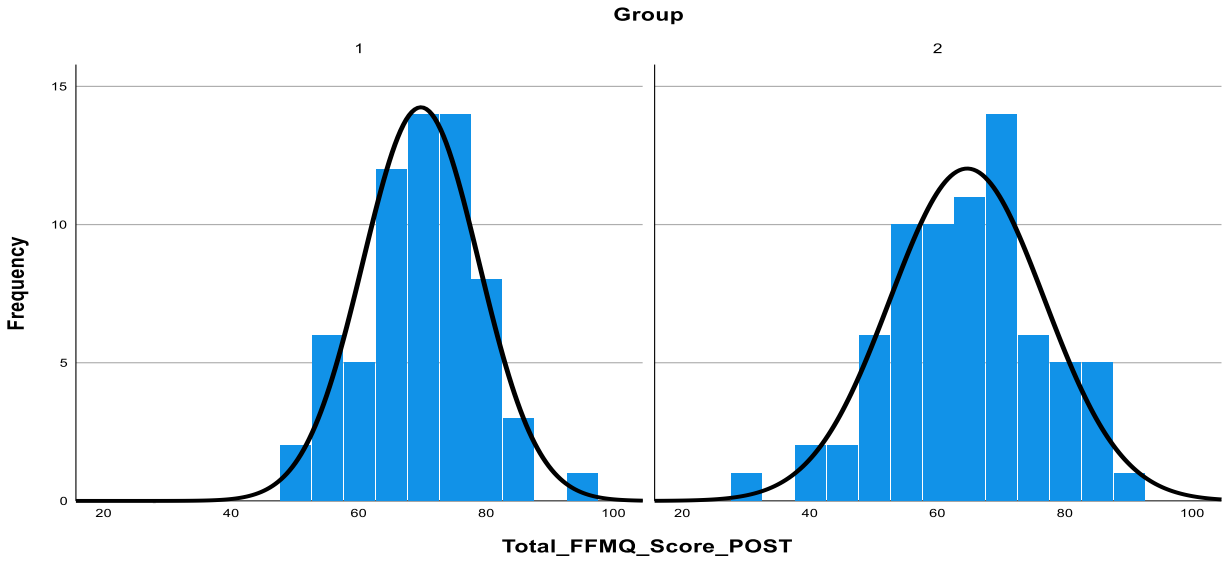
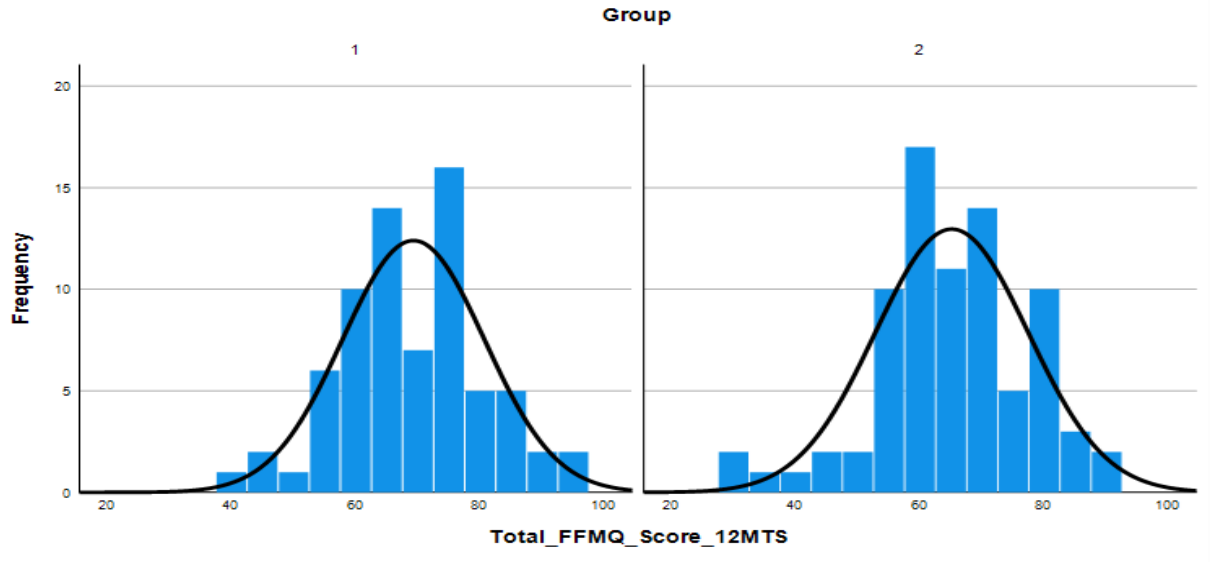


Figure 3.8

Histogram distribution of data at 12-MONTHS time point for FFMQ

(Group 1 = Intervention, Group 2 = Control)



3.5.3.2 World Health Organization – Summary Quality of Life (WHOQOL-Brief Quality)

Outcomes from the WHOQOL-Brief Quality analysis showed that there was no statistically significant difference between groups at POST or 12-MONTHS. A small effect size was observed at POST which reduced to zero effect at 12-MONTHS.

The pooled estimate from 59 imputed datasets indicated that there was **no significant main effect in WHOQOL-Brief Quality at POST between the groups** (B=0.146, 95% CI=-0.136-0.428, p=0.308). **A small effect size was calculated from complete case data**, η_p^2=0.022. The adjusted mean WHOQOL-Brief Quality for intervention group at POST across imputed datasets (M=4.079, SE=0.132, 95% CI=3.817-4.342) is not significantly different to the adjusted mean WHOQOL-Brief Quality of control group at POST across imputed datasets (M=3.933, SE=0.098, 95% CI=3.741-4.126).

The pooled estimate from 59 imputed datasets indicated that there was **no significant main effect in WHOQOL-Brief Quality at 12-MONTHS between the groups** (B=-0.040, 95% CI=-0.280-0.200, p=0.742). **No effect was calculated from complete case data**, η_p^2=0.001. The adjusted mean WHOQOL-Brief Quality for intervention group at 12-MONTHS across imputed datasets (M=4.115, SE=0.095, 95% CI=3.927-4.302) is not

significantly different to the adjusted mean WHOQOL-Brief Quality of control group at 12-MONTHS across imputed datasets (M=4.155, SE=0.080, 95% CI=3.998-4.312).

Figure 3.9 shows the distribution of data at the PRE time point for WHOQOL-Brief – Quality, Figure 3.10 shows the distribution of data at the POST time point for WHOQOL-Brief – Quality, Figure 3.11 shows the distribution of data at the 12-MONTHS time point for WHOQOL-Brief - Quality.

Figure 3.9

Histogram distribution of data at PRE time point for WHOQOL-Brief - Quality

(Group 1 = Intervention, Group 2 = Control)

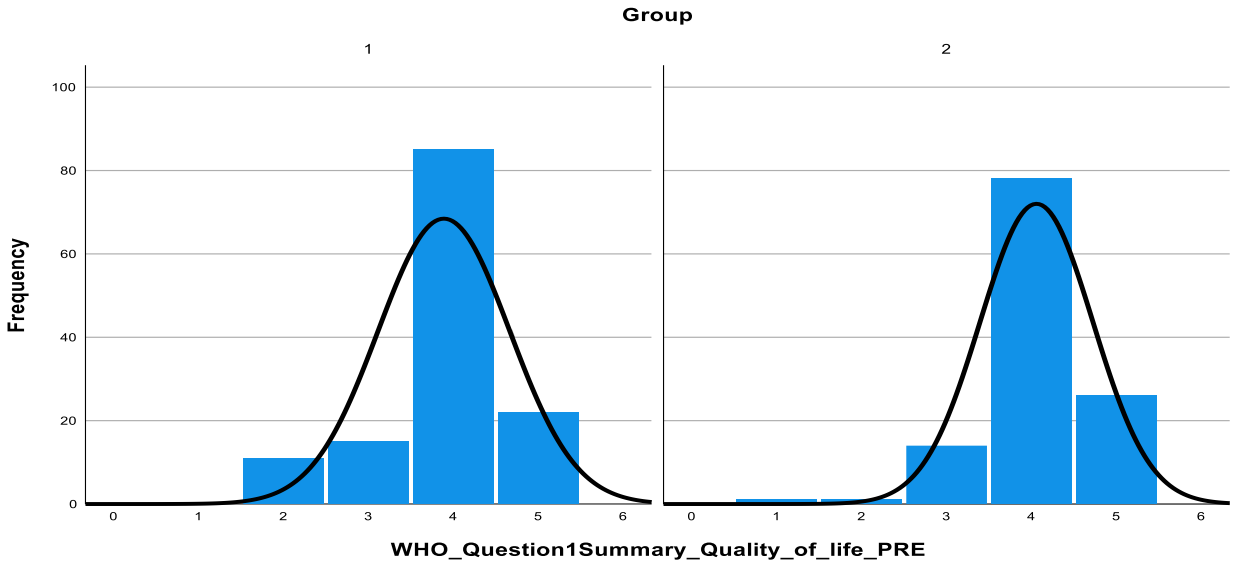


Figure 3.10

Histogram distribution of data at POST time point for WHOQOL-Brief - Quality

(Group 1 = Intervention, Group 2 = Control)

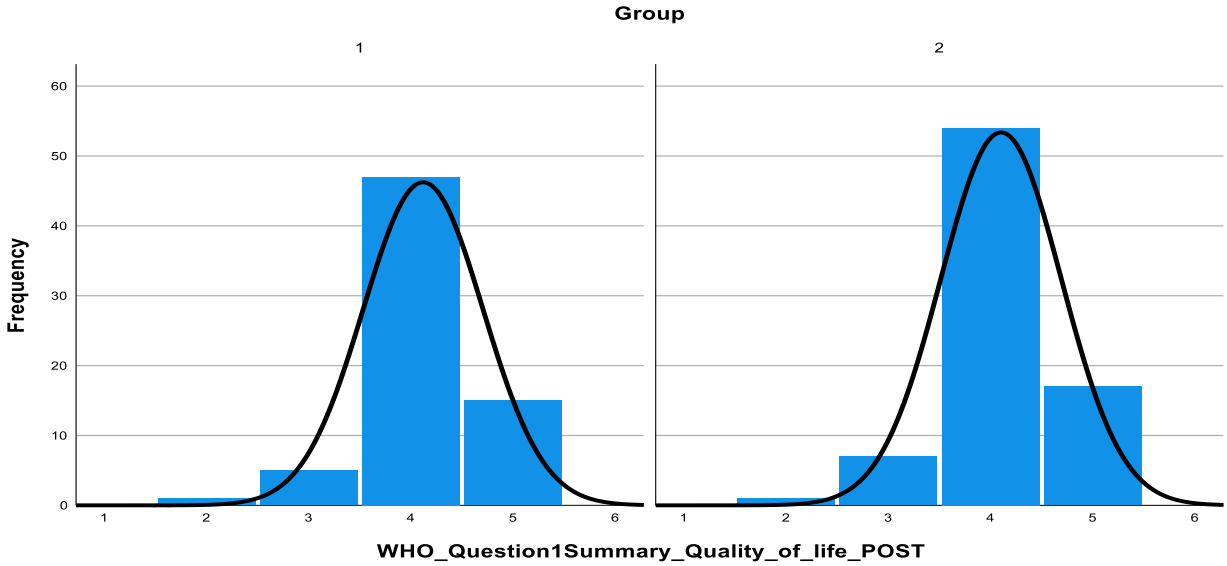
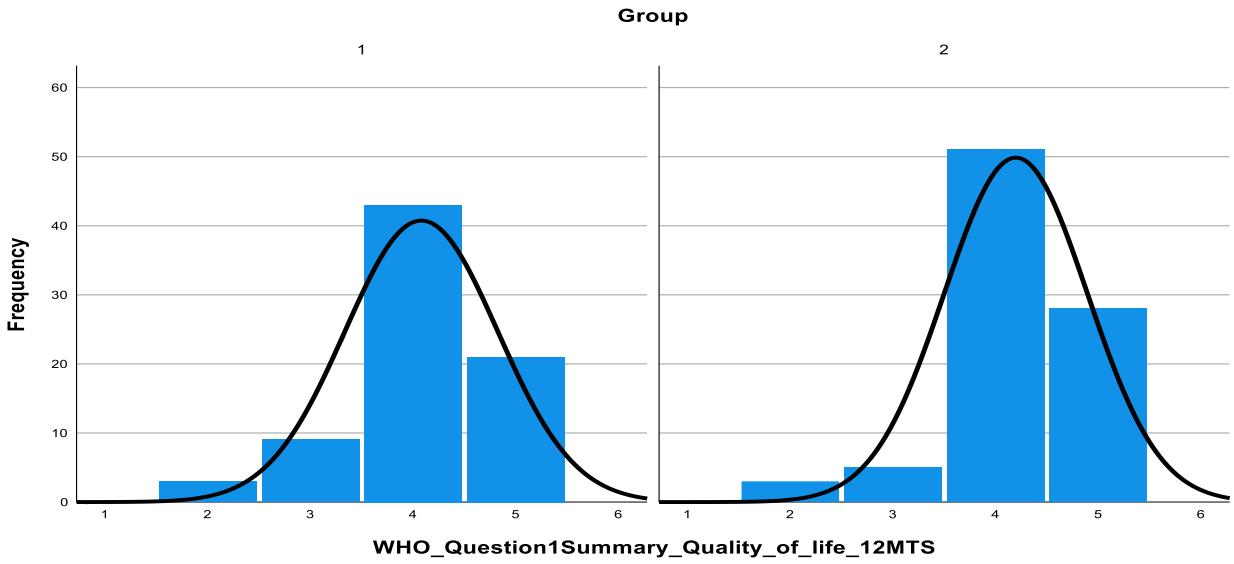


Figure 3.11

Histogram distribution of data at 12-MONTHS time point for WHOQOL-Brief - Quality

(Group 1 = Intervention, Group 2 = Control)



3.5.3.3 World Health Organization – Satisfaction with Health (WHOQOL-Brief Satisfaction)

Outcomes from the WHOQOL-Brief Satisfaction analysis showed that there was no statistically significant difference between groups at POST or 12-MONTHS. A small effect size was observed at POST which reduced to zero effect at 12-MONTHS.

The pooled estimate from 59 imputed datasets indicated that there was **no significant main effect in WHOQOL-Brief Satisfaction at POST between the groups** (B=0.073, 95% CI=-0.282-0.429, p=0.684). **A small effect size was calculated from complete case data**, η_p^2=0.015. The adjusted mean WHO Satisfaction for intervention group at POST across imputed datasets (M=3.640, SE=0.185, 95% CI=3.272-4.008) is not significantly different to the adjusted mean WHOQOL-Brief Satisfaction of control group at POST across imputed datasets (M=3.537, SE=0.120, 95% CI=3.330-3.803).

The pooled estimate from 59 imputed datasets indicated that there was **no significant main effect in WHO Satisfaction at 12-MONTHS between the groups** (B=0.029, 95% CI=-0.304-0.362, p=0.863). **No effect was calculated from complete case data**,

η_p^2=0.002. The adjusted mean WHOQOL-Brief Satisfaction for intervention group at 12-MONTHS across imputed datasets (M=3.728, SE=0.128, 95% CI=3.475-3.982) is not significantly different to the adjusted mean WHOQOL-Brief Satisfaction of control group at 12-MONTHS across imputed datasets (M=3.699, SE=0.109, 95% CI=3.485-3.914).

Figure 3.12 shows the distribution of data at the PRE time point for WHOQOL-Brief – Satisfaction, Figure 3.13 shows the distribution of data at the POST time point for WHOQOL-Brief - Satisfaction. Figure 3.14 shows the distribution of data at the 12-MONTHS time point for WHOQOL-Brief - Satisfaction.

Figure 3.12

Histogram distribution of data at PRE time point for WHOQOL-Brief – Satisfaction

(Group 1 = Intervention, Group 2 = Control)

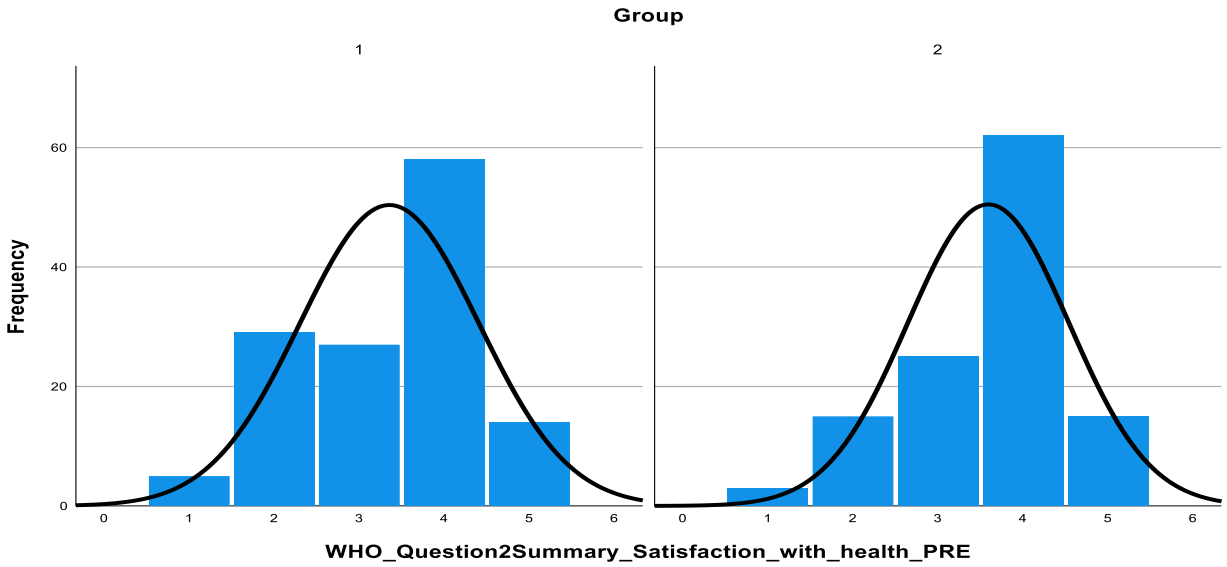


Figure 3.13

Histogram distribution of data at POST time point for WHOQOL-Brief – Satisfaction

(Group 1 = Intervention, Group 2 = Control)

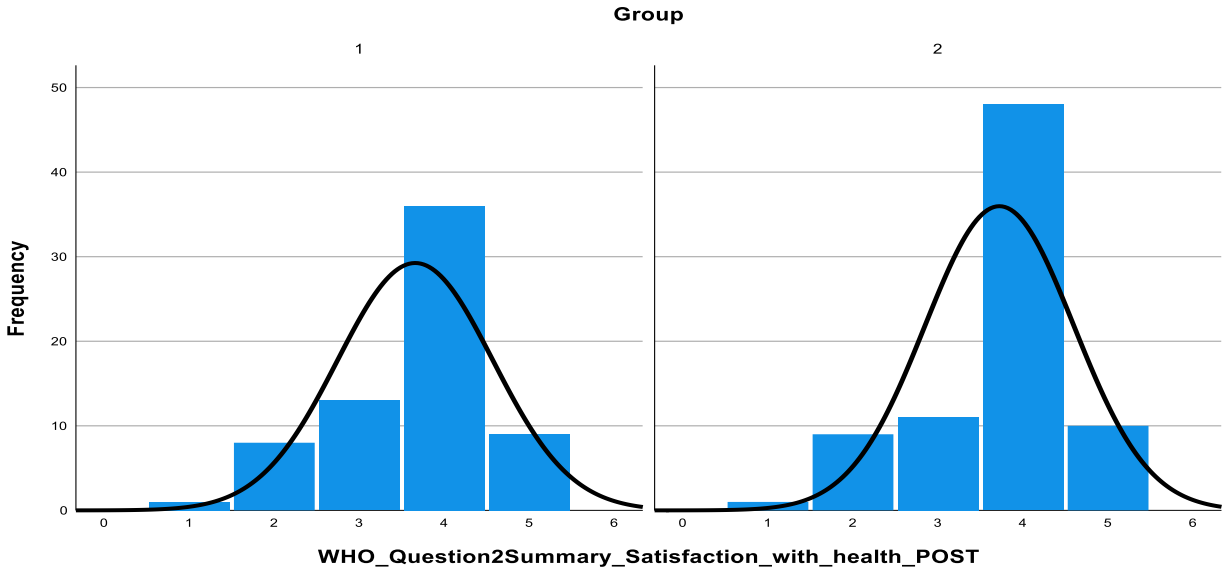
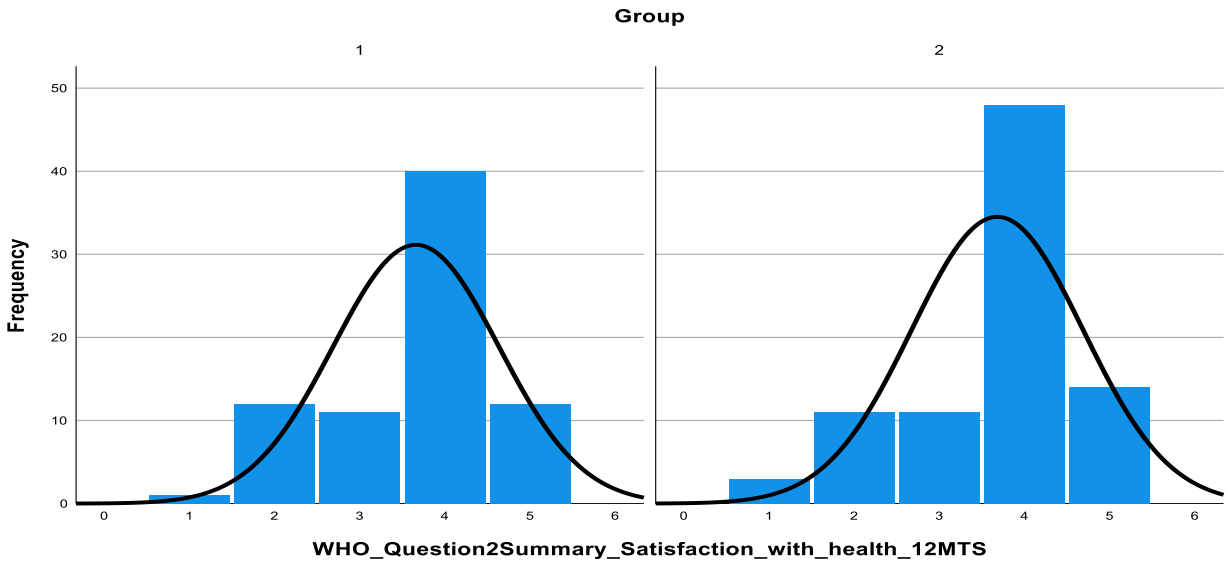


Figure 3.14

Histogram distribution of data at 12-MONTHS time point for WHOQOL-Brief – Satisfaction

(Group 1 = Intervention, Group 2 = Control)



3.5.3.4 Cognitive Failures Questionnaire (CFQ)

Outcomes from the CFQ analysis showed that there was no statistically significant difference between groups at POST but there was a statistically significant difference at 12-MONTHS. A medium effect size was observed at POST which remained at 12-MONTHS.

The pooled estimate from 59 imputed datasets indicated that there was **no significant main effect in CFQ at POST between the groups** (B=-3.613, 95% CI=-8.479-1.254, p=0.145). **A medium effect size was calculated from complete case data**, η_p^2=0.127. The adjusted mean CFQ for intervention group at POST across imputed datasets (M=41.696, SE=2.823, 95% CI=36.083-47.310) is not significantly different to the adjusted mean CFQ of control group at POST across imputed datasets (M=45.309, SE=2.287, 95% CI=40.776-49.842).

The pooled estimate from 59 imputed datasets indicated that there was **a significant main effect in CFQ at 12-MONTHS between the groups** (B=-6.754, 95% CI=-10.934-2.574, p=0.002). **A medium effect size was calculated from complete case data**, η_p^2=0.110. The adjusted mean CFQ for intervention group at 12-MONTHS across imputed datasets (M=38.521, SE=1.622, 95% CI=35.327-41.716) is significantly different to the adjusted mean CFQ of control group at 12-MONTHS across imputed datasets (M=45.275, SE=1.552, 95% CI=42.223-48.327).

Figure 3.15 shows the distribution of data at the PRE time point for CFQ, Figure 3.16 shows the distribution of data at the POST time point for CFQ. Figure 3.17 shows the distribution of data at the 12-MONTHS time point for CFQ.

Figure 3.15

Histogram distribution of data at PRE time point for CFQ

(Group 1 = Intervention, Group 2 = Control)

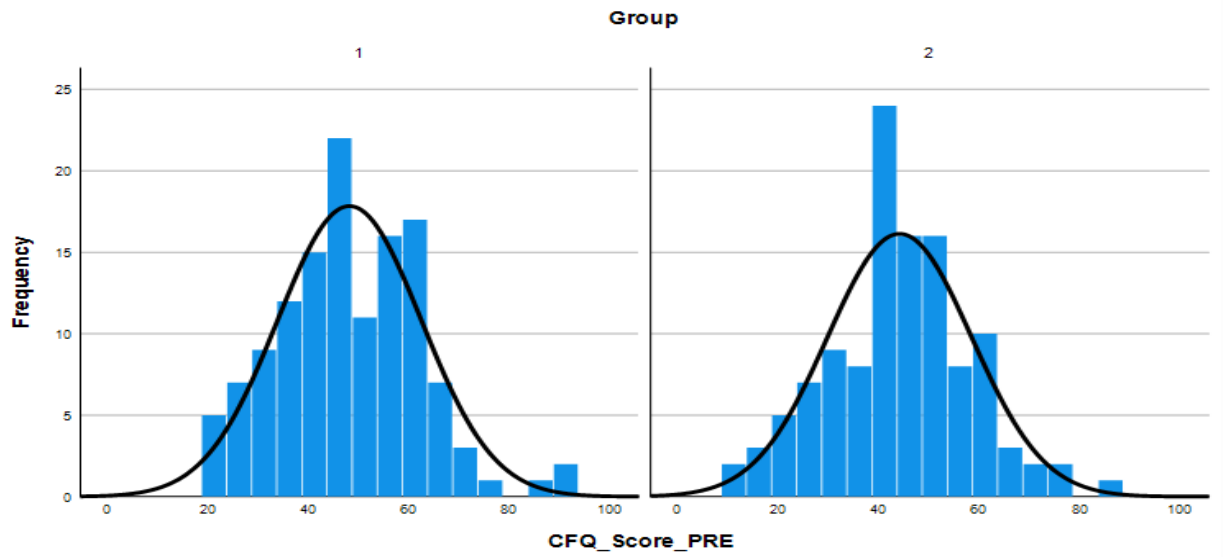


Figure 3.16

Histogram distribution of data at POST time point for CFQ

(Group 1 = Intervention, Group 2 = Control)

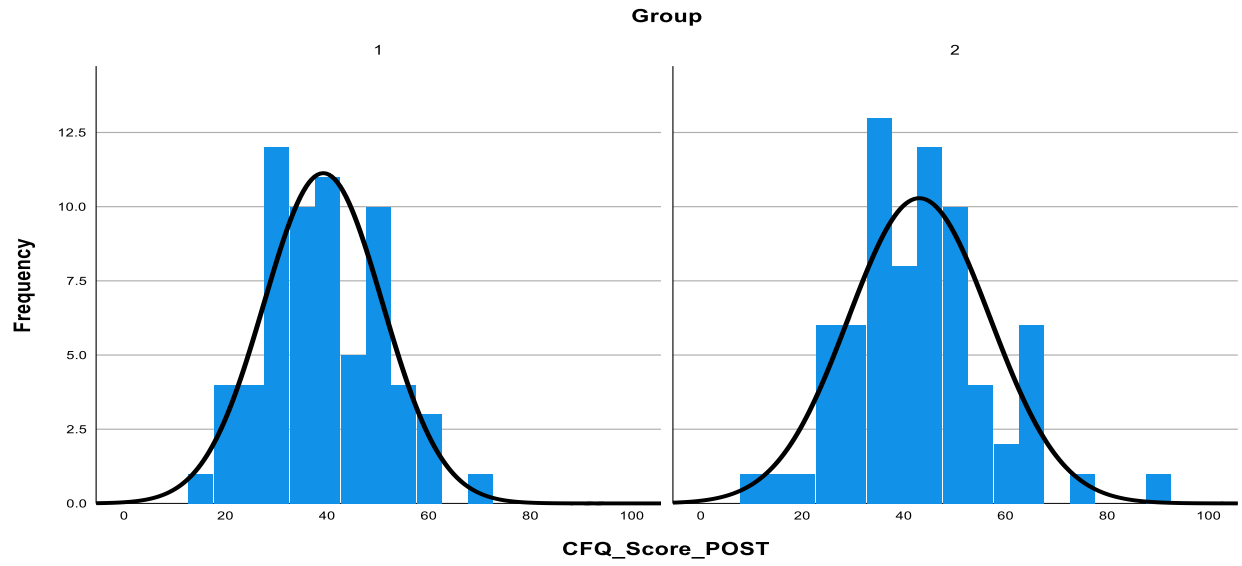
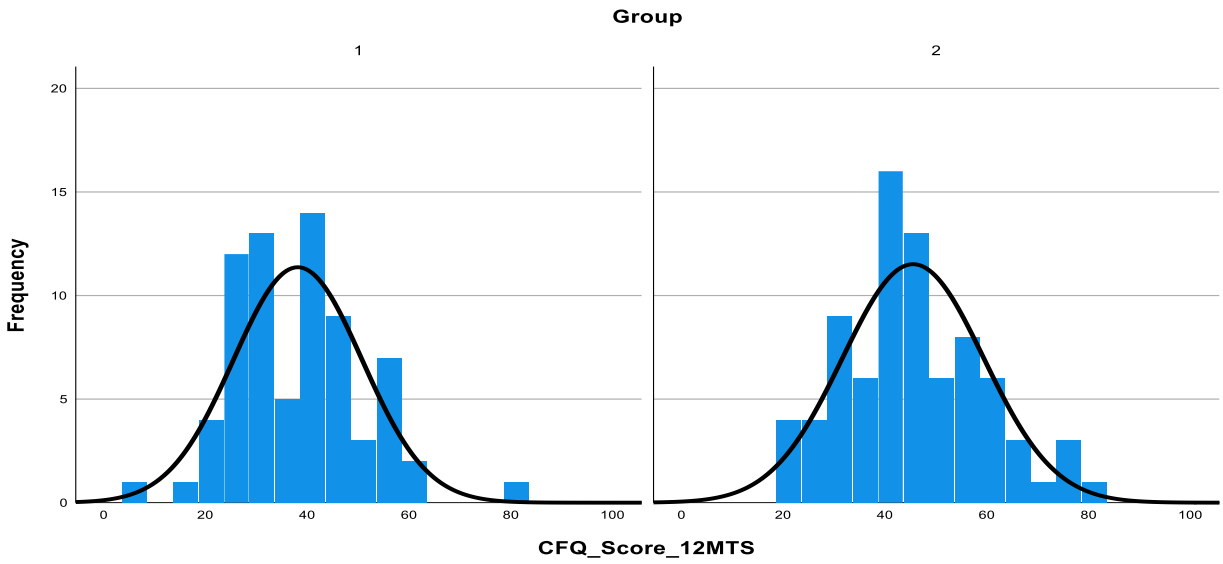


Figure 3.17

***Histogram distribution of data at* 12-MONTHS time point for CFQ**

(Group 1 = Intervention, Group 2 = Control)



3.5.3.5 ICECAP-A

Outcomes from the ICECAP-A analysis showed that there was no statistically significant difference between groups at POST or 12-MONTHS. A medium effect size was observed at POST which reduced to a small effect at 12-MONTHS.

The pooled estimate from 59 imputed datasets indicated that there was **no significant main effect in ICECAP-A at POST between the groups** (B=0.042, 95% CI=-0.021-0.104, p=0.191). **A medium effect size was calculated from complete case data**, η_p^2=0.074. The adjusted mean ICECAP-A for intervention group at POST across imputed datasets (M=0.862, SE=0.031, 95% CI=0.801-0.924) is not significantly different to the adjusted mean ICECAP-A of control group at POST across imputed datasets (M=0.821, SE=0.020, 95% CI=0.781-0.861).

The pooled estimate from 59 imputed datasets indicated that there was **no significant main effect in ICECAP-A at 12-MONTHS between the groups** (B=0.023, 95% CI=-0.034-0.080, p=0.430). **A small effect size was calculated from complete case data**, η_p^2=0.010. The adjusted mean ICECAP-A for intervention group at 12-MONTHS across imputed datasets (M=0.875, SE=0.020, 95% CI=0.818-0.897) is not significantly different

to the adjusted mean ICECAP-A of control group at 12-MONTHS across imputed datasets (M=0.834, SE=0.019, 95% CI=0.769 – 0.872).

Figure 3.18 shows the distribution of data at the PRE time point for ICECAP-A, Figure 3.19 shows the distribution of data at the POST time point for ICECAP-A. Figure 3.20 shows the distribution of data at the 12-MONTHS time point for ICECAP-A.

Figure 3.18

Histogram distribution of data at PRE time point for ICECAP-A

(Group 1 = Intervention, Group 2 = Control)

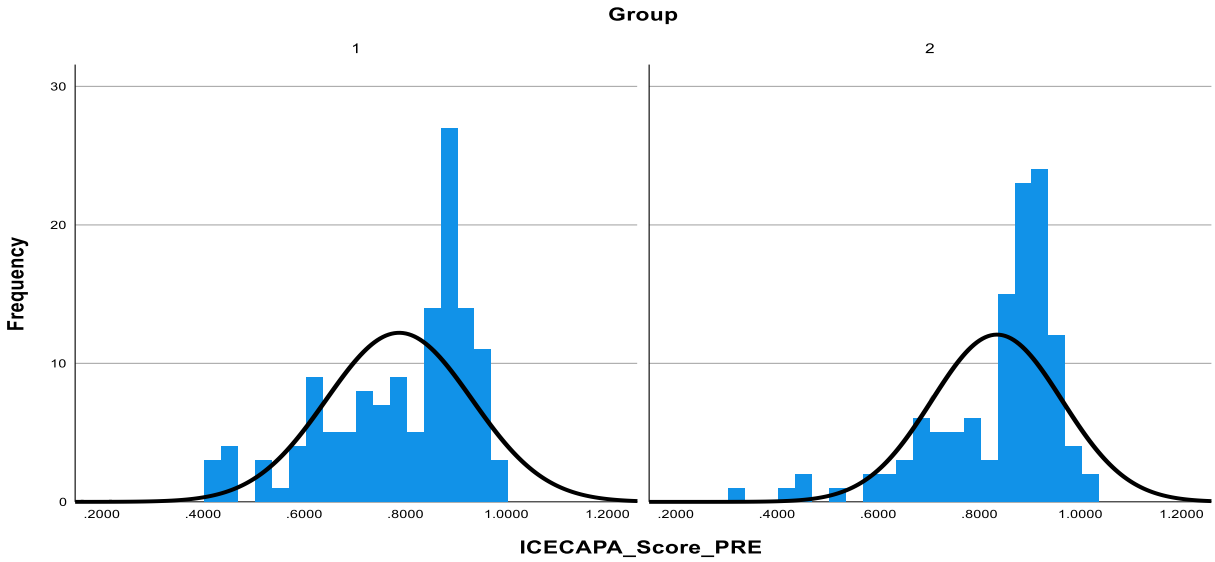


Figure 3.19

Histogram distribution of data at POST time point for ICECAP-A

(Group 1 = Intervention, Group 2 = Control)

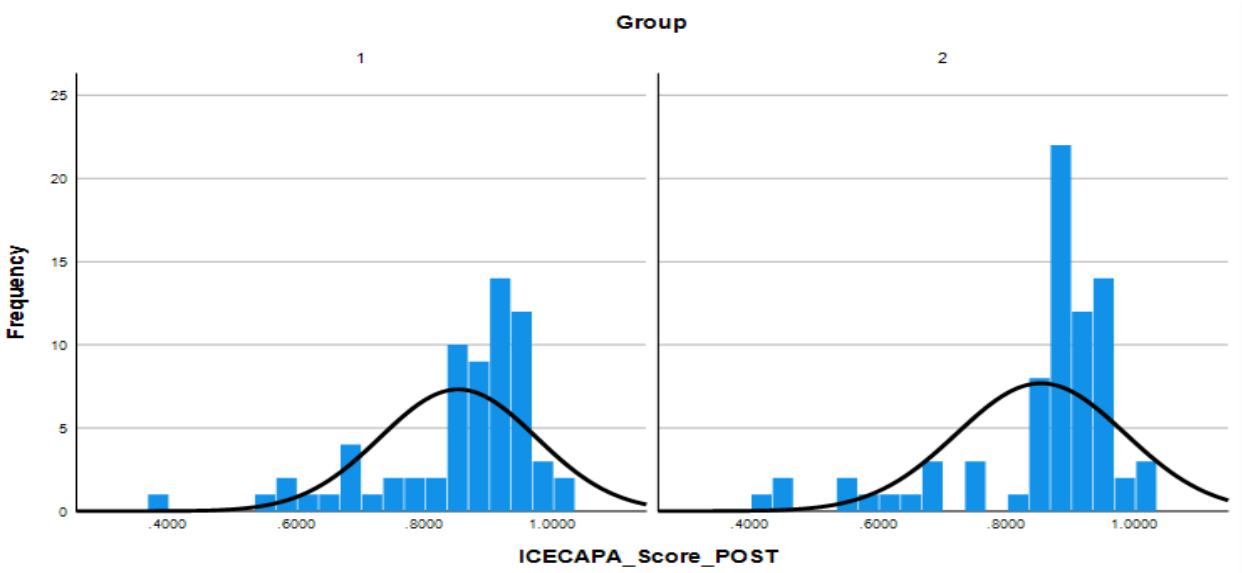
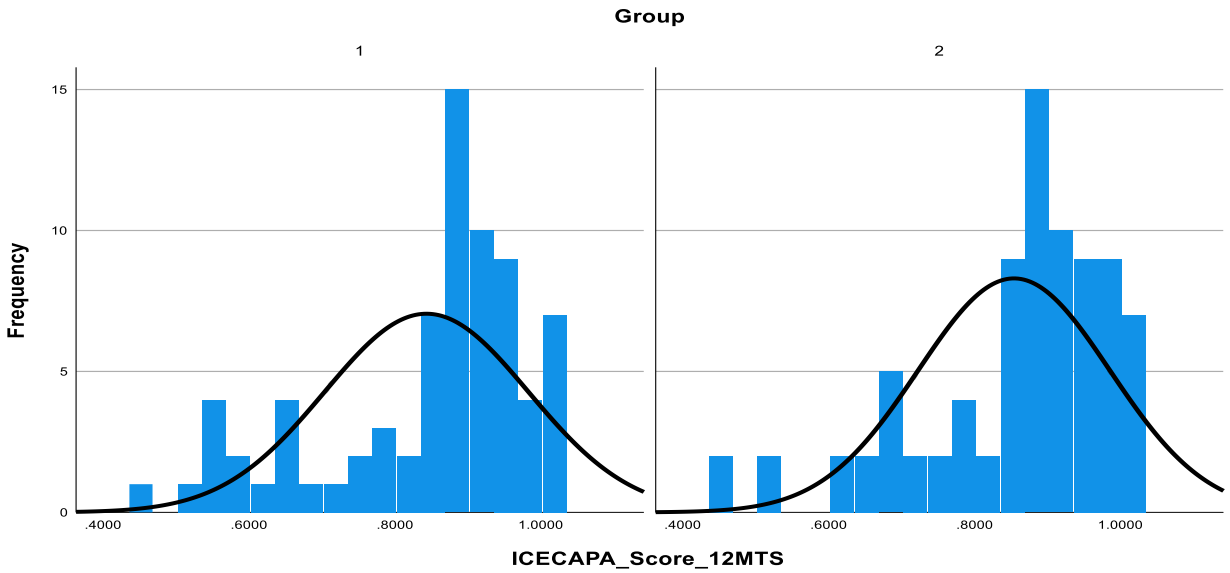

Group
1
2
Frequency
25
20
15
10
5
0
.4000
.6000
.8000
1.0000
ICECAPA_Score_POST

Figure 3.20

Histogram distribution of data at 12-MONTHS time point for ICECAP-A

(Group 1 = Intervention, Group 2 = Control)



3.5.3.6 EQ5D-3L

Outcomes from the EQ5D-3L analysis showed that there was no statistically significant difference between groups at POST or 12-MONTHS. No effect size was observed at POST or 12-MONTHS.

The pooled estimate from 59 imputed datasets indicated that there was **no significant main effect in EQ5D-3L at POST between the groups** (B=0.035, 95% CI=-0.039-0.109, p=0.357). **No effect size was calculated from complete case data**, η_p^2=0.003. The adjusted mean EQ5D-3L for intervention group at POST across imputed datasets (M=0.911, SE=0.037, 95% CI=0.837-0.984) is not significantly different to the adjusted mean FFMQ of control group at POST across imputed datasets (M=0.876, SE=0.025, 95% CI=0.827-0.925).

The pooled estimate from 59 imputed datasets indicated that there was **no significant main effect in EQ5D-3L at 12-MONTHS between the groups** (B=0.030, 95% CI=-0.036-0.096, p=0.374). **No effect size was calculated from complete case data**, η_p^2=0.008. The adjusted mean EQ5D-3L for intervention group at 12-MONTHS across imputed datasets (M=0.869, SE=0.024, 95% CI=0.822-0.916 is not significantly different

to the adjusted mean EQ5D-3L of control group at 12-MONTHS across imputed datasets (M=0.839, SE=0.022, 95% CI=0.795-0.883).

Figure 3.21 shows the distribution of data at the PRE time point for EQ5D-3L, Figure 3.22 shows the distribution of data at the POST time point for EQ5D-3L. Figure 3.23 shows the distribution of data at the 12-MONTHS time point for EQ5D-3L.

Figure 3.21

Histogram distribution of data at PRE time point for EQ5D-3L

(Group 1 = Intervention, Group 2 = Control)

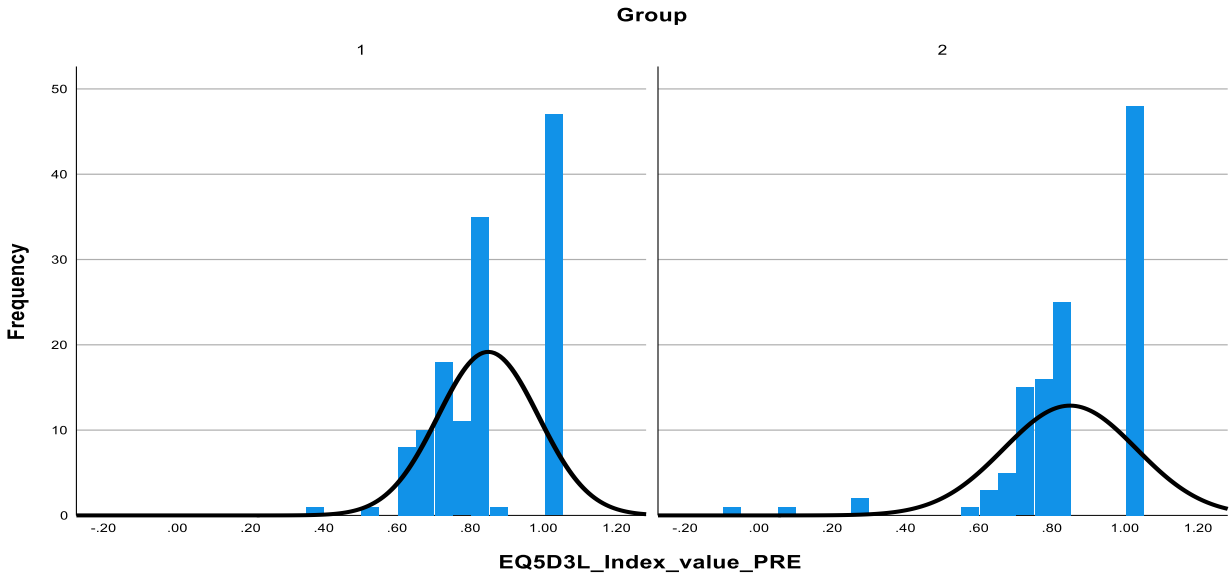


Figure 3.22

Histogram distribution of data at POST time point for EQ5D-3L

(Group 1 = Intervention, Group 2 = Control)

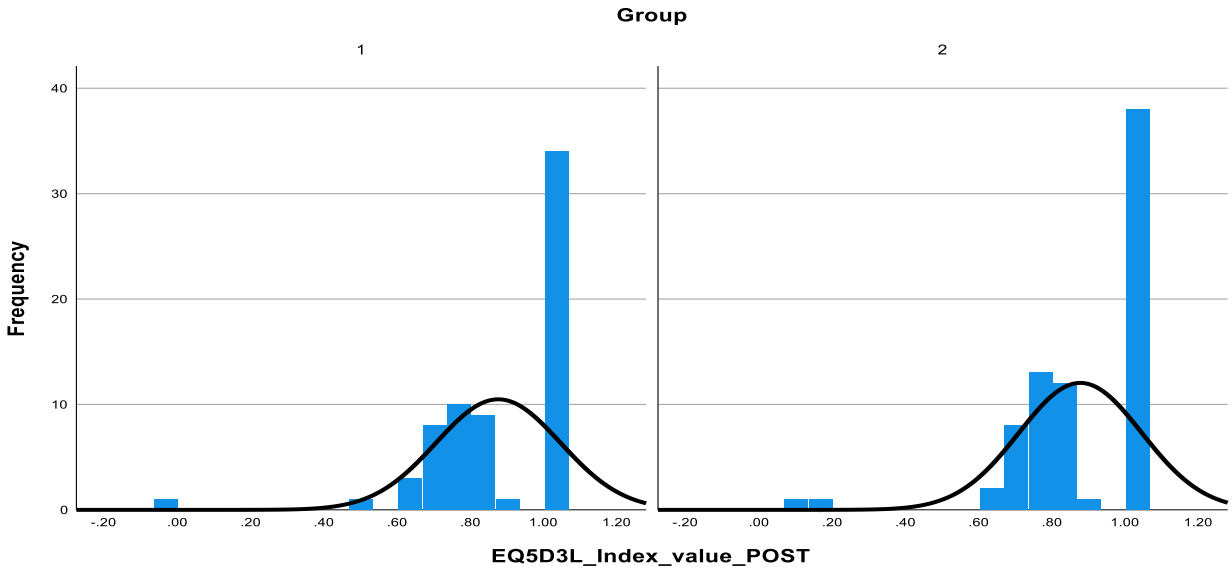
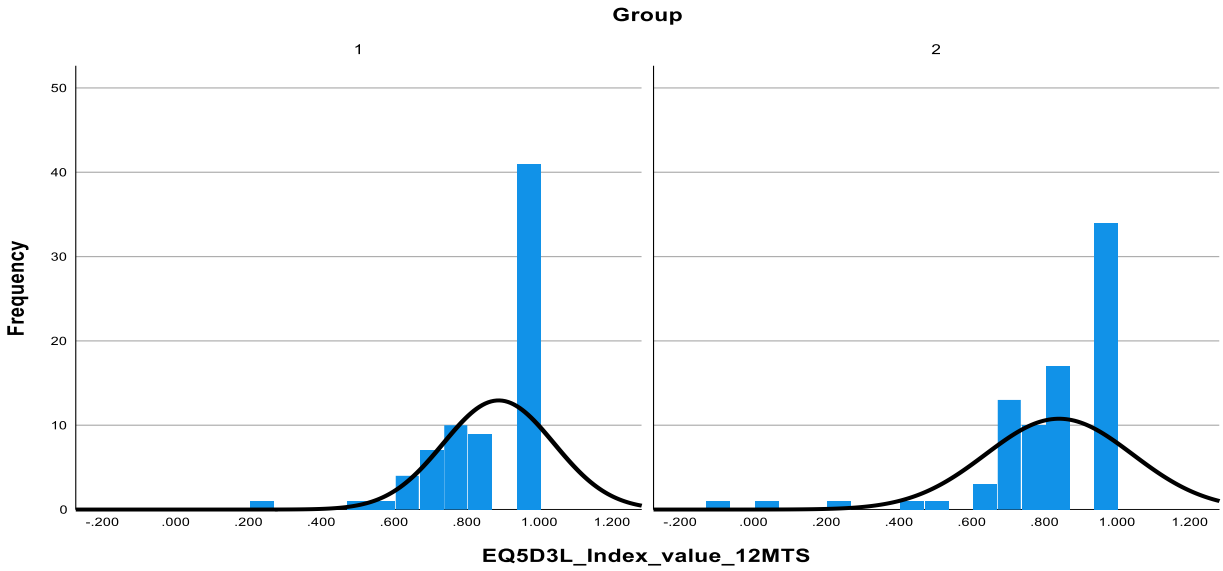


Figure 3.23

Histogram distribution of data at 12-MONTHS time point for EQ5D-3L

(Group 1 = Intervention, Group 2 = Control)



3.5.3.7 EQ5D-VAS

Outcomes from the EQ5D-VAS analysis showed that there was no statistically significant difference between groups at POST or 12-MONTHS. No effect size was observed at POST or 12-MONTHS.

The pooled estimate from 59 imputed datasets indicated that there was **no significant main effect in EQ5D-VAS at POST between the groups** (B=0.645, 95% CI=-1.649-2.939, p=0.581). **No effect size was calculated from complete case data**, η_p^2=0.001. The adjusted mean EQ5D-VAS for intervention group at POST across imputed datasets (M=78.179, SE=0.784, 95% CI=76.642-79.716) is not significantly different to the adjusted mean EQ5D-VAS of control group at POST across imputed datasets (M=77.534, SE=0.818, 95% CI=75.930-79.138).

The pooled estimate from 59 imputed datasets indicated that there was **no significant main effect in EQ5D-VAS at 12-MONTHS between the groups** (B=5.677, 95% CI=-5.612-16.967, p=0.017). **A small effect size was calculated from complete case data**, η_p^2=0.010. The adjusted mean EQ5D-VAS for intervention group at 12-MONTHS across imputed datasets (M=80.536, SE=4.808, 95% CI=71.003-90.068) is not significantly different to the adjusted mean EQ5D-VAS of control group at 12-MONTHS across imputed datasets (M=74.858, SE=3.912, 95% CI=67.134-82.583).

Figure 3.24 shows the distribution of data at the PRE time point for EQ5D-VAS, Figure 3.25 shows the distribution of data at the POST time point for EQ5D-VAS. Figure 3.26 shows the distribution of data at the 12-MONTHS time point for EQ5D-VAS.

Figure 3.24

Histogram distribution of data at PRE time point for EQ5D-VAS

(Group 1 = Intervention, Group 2 = Control)

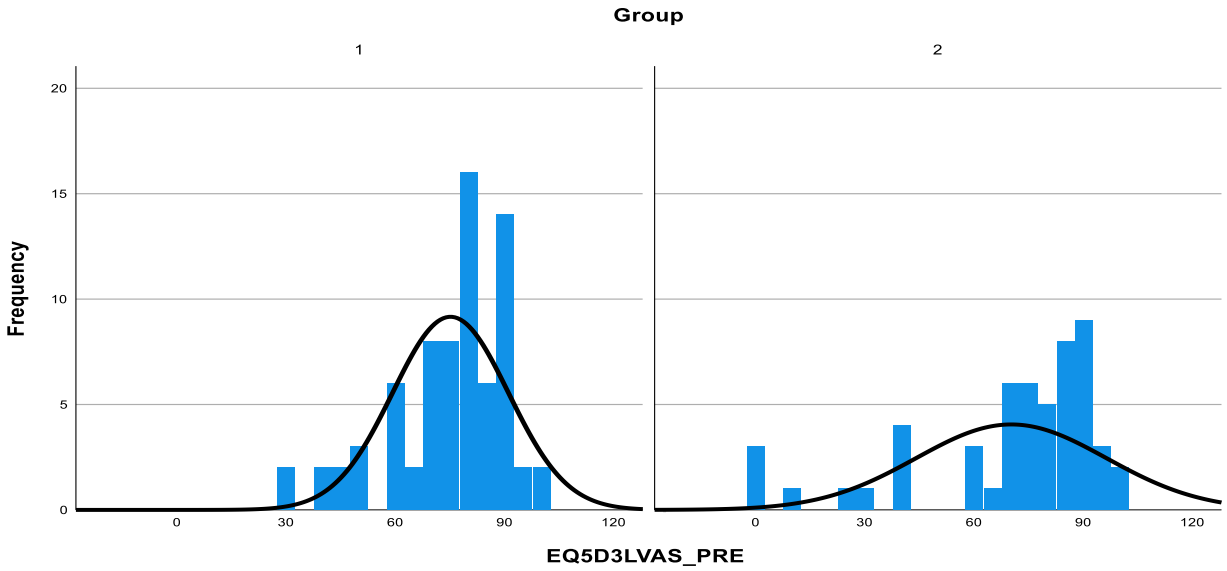


Figure 3.25

Histogram distribution of data at POST time point for EQ5D-VAS

(Group 1 = Intervention, Group 2 = Control)

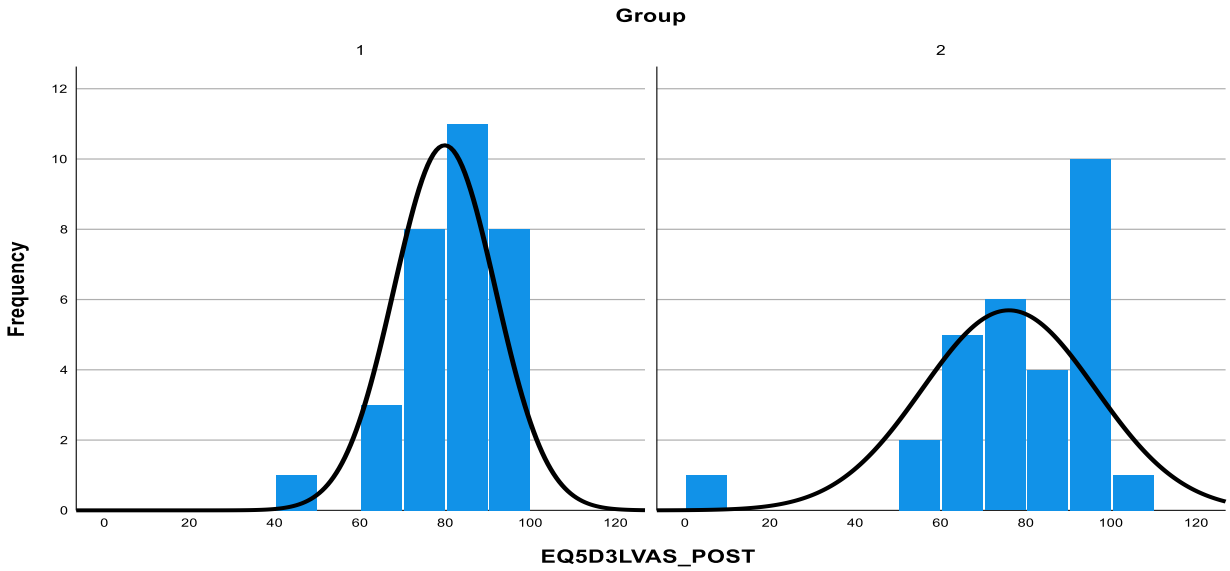
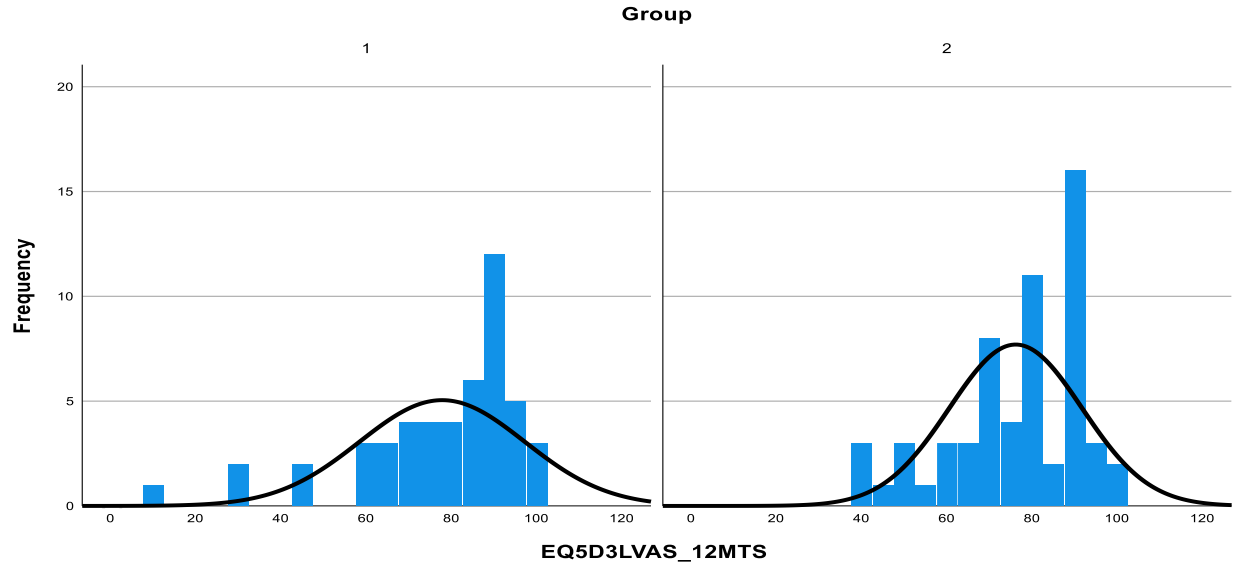


Figure 3.26

Histogram distribution of data at 12-MONTHS time point for EQ5D-VAS

(Group 1 = Intervention, Group 2 = Control)



3.5.3.8 Leadership - The Multifactor Leadership Questionnaire MFQ

To evaluate the leadership measures, all the participants who did not identify themselves as a leader at baseline were removed from the dataset to ensure only the impact on those in a leadership position were included, thus the multiple imputation did not populate into invalid participant data lines.

Once the original dataset was cleaned of non-leaders the multiple imputation process was conducted to calculate missing data time points. Missing data within a time point was handled as per the measure's guidelines. A repeated measures ANOVA was then conducted taking each measure at baseline, post and 12-month intervals, predicting from control vs treatment.

The leadership measurement used is broken into 12 leader attributes and no single score is offered but a review of each attribute as detailed below. The details of attributes and their potential impact in the workplace is discussed further in Chapter five.

Leadership Effectiveness

Outcomes from the Leadership Effectiveness analysis showed that there was no statically significant difference between groups at POST or 12-MONTHS. No effect size was observed at POST or 12-MONTHS.

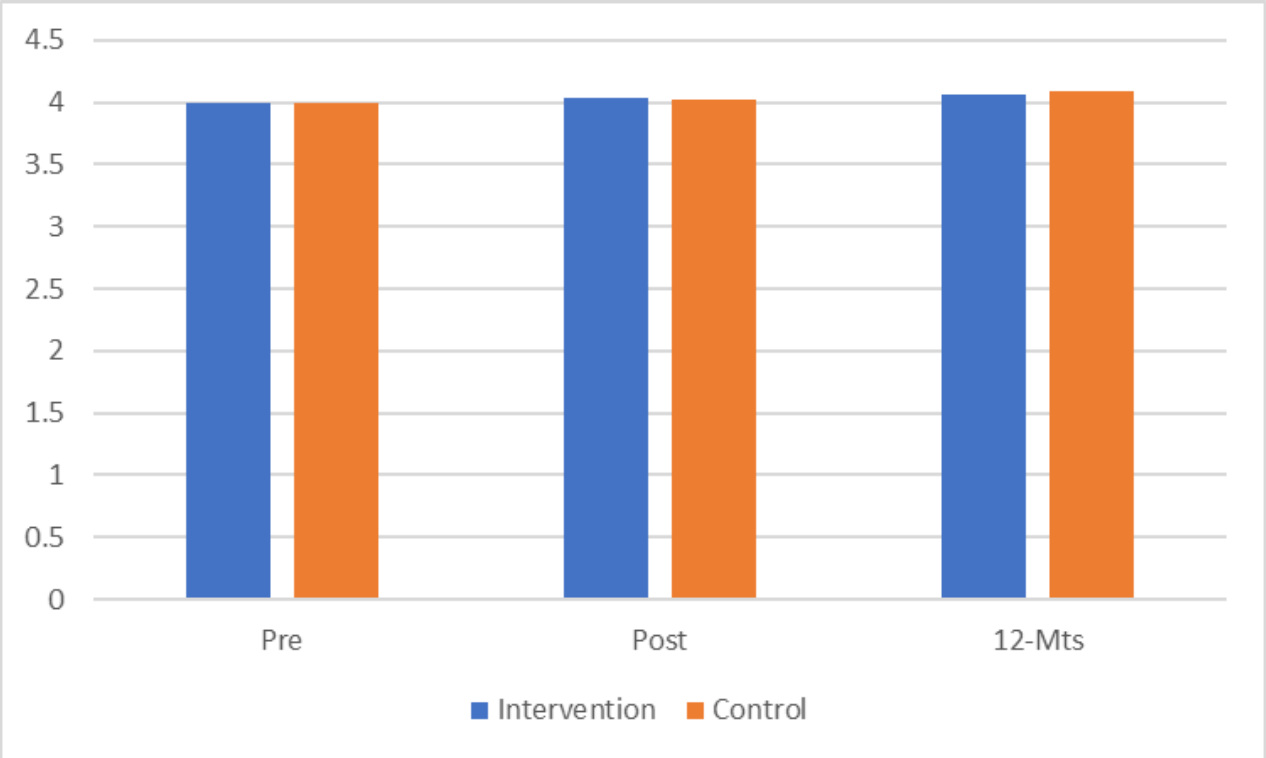
The pooled estimate from 59 imputed datasets indicated that there was **no significant main effect in Leadership Effectiveness at POST** between the groups (B=0.025, 95% CI= -0.266 – 0.315, p=0.866). The adjusted mean Leadership Effectiveness for intervention group at POST across imputed datasets (M=4.042, SE=0.106, 95% CI=3.833-4.250) was **not significantly different** to the adjusted mean Leadership Effectiveness of control group **at POST** across imputed datasets (M=4.017, SE=0.093, 95% CI=3.834-4.199). Partial eta squared was 0.000 indicating no effect.

The pooled estimate from 59 imputed datasets indicated that there was **no significant main effect in Leadership Effectiveness at 12-MONTHS** between the groups (B= -0.035, 95% CI=-0.302 - 0.232, p=0.799). The adjusted mean Leadership Effectiveness for intervention group at 12-MONTHS across imputed datasets (M=4.058, SE=0.094, 95% CI=3.872-4.243) was **not significantly different** to the adjusted mean Leadership Effectiveness of control group **at 12-MONTHS** across imputed datasets (M=4.092, SE=0.096, 95% CI=3.903-4.281). Partial eta squared was 0.032 indicating no effect.

Figure 3.27 shows the Leadership Effectiveness results at PRE, POST and 12-MONTHS for both the intervention and control groups.

Figure 3.27

Leadership Effectiveness results



Leadership Extra Effort

Outcomes from the Leadership Extra Effort analysis showed that there was no statically significant difference between groups at POST or 12-MONTHS. No effect size was observed at POST or 12-MONTHS.

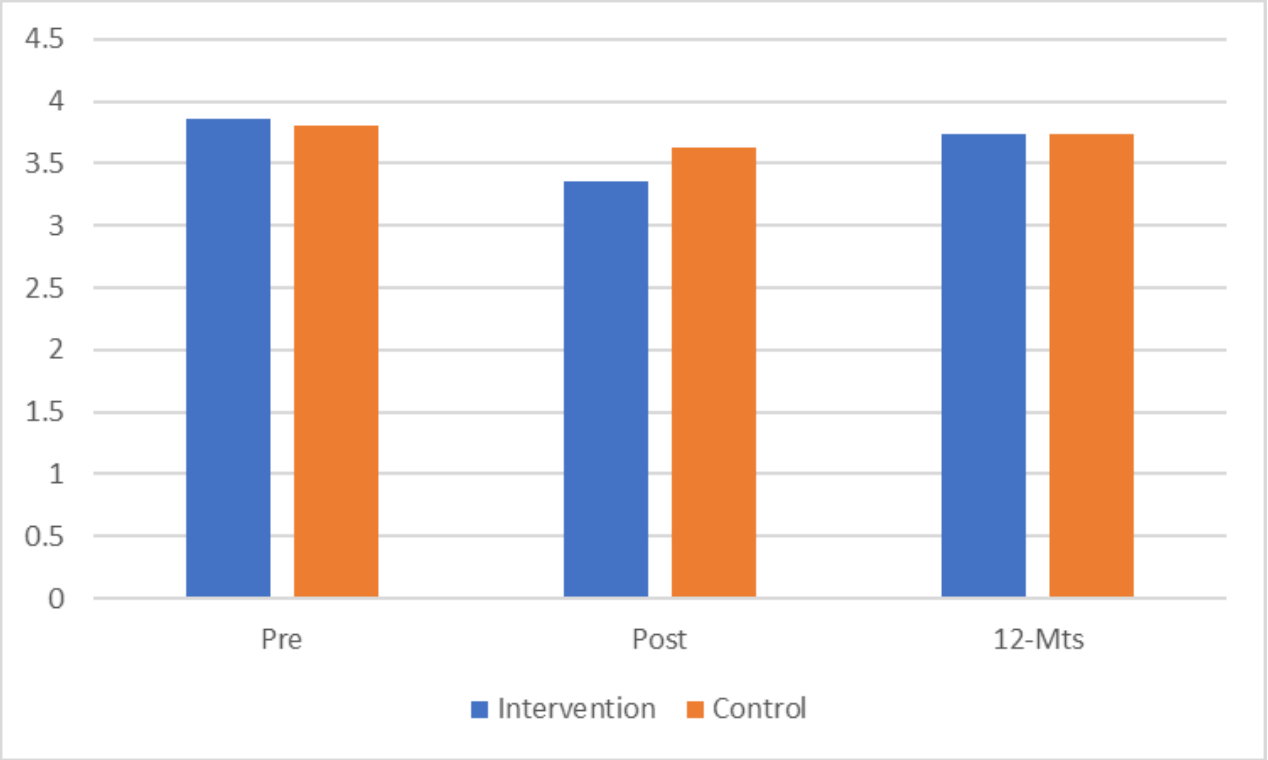
The pooled estimate from 59 imputed datasets indicated that there was **no significant main effect in Leadership Extra Effort at POST** between the groups (B=0.010, 95% CI= -0.338 - 0.358, p=0.955). The adjusted mean Leadership Extra Effort for intervention group at POST across imputed datasets (M=3.636, SE=0.127, 95% CI=3.385-3.887) was **not significantly different** to the adjusted mean Leadership Extra Effort of control group at POST across imputed datasets (M=3.626, SE=0.115, 95% CI=3.400-3.852). Partial eta squared was 0.000 indicating no effect.

The pooled estimate from 59 imputed datasets indicated that there was **no significant main effect in Leadership Extra Effort at 12-MONTHS** between the groups (B=0.027, 95% CI= -0.275 - 0.329, p=0.862). The adjusted mean Leadership Extra Effort for intervention group at 12-MONTHS across imputed datasets (M=3.763, SE=0.110, 95% CI=3.547-3.979) was **not significantly different** to the adjusted mean Leadership Extra Effort of control group at 12-MONTHS across imputed datasets (M=3.736, SE=0.116, 95% CI=3.507-3.965). Partial eta squared was 0.000 indicating no effect.

Figure 3.28 shows the Leadership Extra Effort results at PRE, POST and 12-MONTHS for both the intervention and control groups.

Figure 3.28

Leadership Extra Effort results



Leadership Satisfaction

Outcomes from the Leadership Satisfaction analysis showed that there was no statically significant difference between groups at POST or 12-MONTHS. No effect size was observed at POST or 12-MONTHS.

The pooled estimate from 59 imputed datasets indicated that there was **no significant main effect in Leadership Satisfaction at POST** between the groups (B=0.055, 95% CI= -0.209 - 0.320, p=0.681). The adjusted mean Leadership Satisfaction for intervention group at POST across imputed datasets (M=4.112, SE=0.94, 95% CI=3.926-4.298) was **not significantly different** to the adjusted mean Leadership Satisfaction of control group **at POST** across imputed datasets (M=4.057, SE=0.096, 95% CI=3.868-4.245). Partial eta squared was 0.000 indicating no effect.

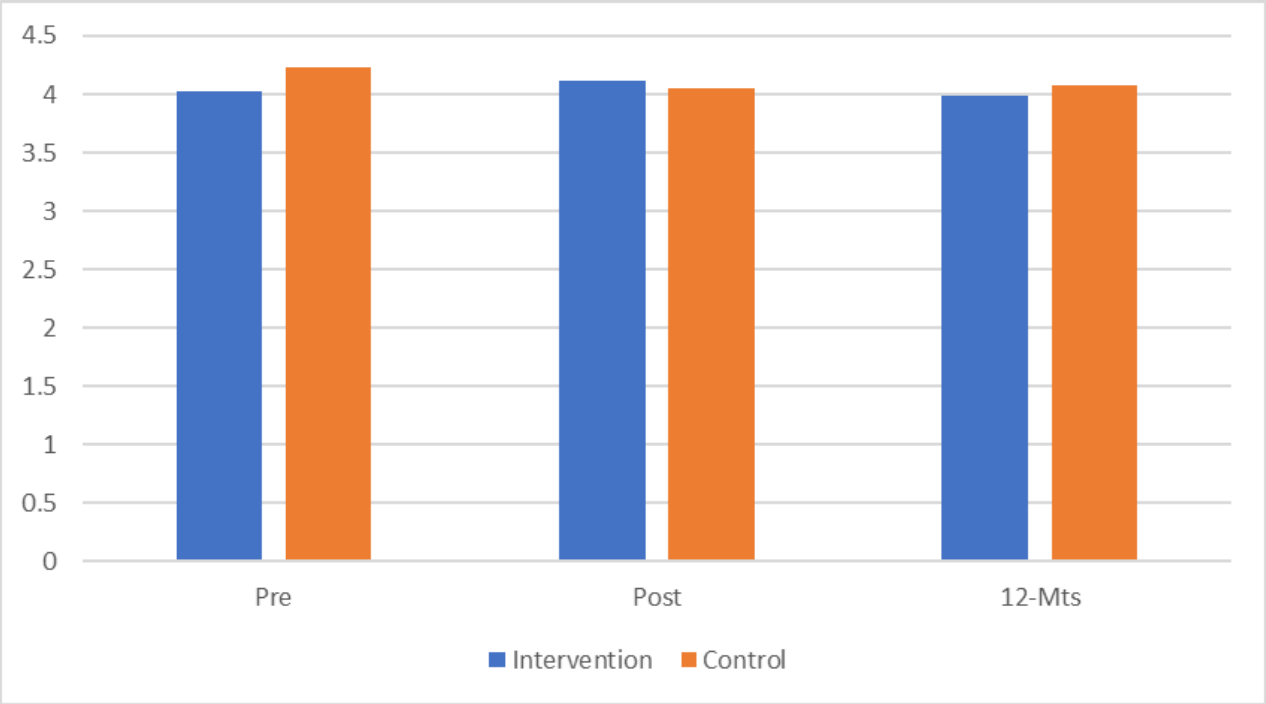
The pooled estimate from 59 imputed datasets indicated that there was **no significant main effect in Leadership Satisfaction at 12-MONTHS** between the groups (B=-0.089, 95% CI= -0.372 – 0.194, p=0.537). The adjusted mean Leadership Satisfaction for intervention group at 12-MONTHS across imputed datasets (M=3.992, SE=0.098, 95% CI=3.799-4.185) was **not significantly different** to the adjusted mean Leadership

Satisfaction of control group at **12-MONTHS** across imputed datasets (M=4.081, SE=0.109, 95% CI=3.866-4.297). Partial eta squared was 0.038 indicating no effect.

Figure 3.29 shows the Leadership Satisfaction results at PRE, POST and 12-MONTHS for both the intervention and control groups.

Figure 3.29

Leadership Satisfaction results



Leadership Passive Avoidant Style Laissez Faire

Outcomes from the Leadership Passive Avoidant Style Laissez Faire analysis showed that there was no statically significant difference between groups at POST or 12-MONTHS. No effect size was observed at POST or 12-MONTHS.

The pooled estimate from 59 imputed datasets indicated that there was **no significant main effect in Leadership Passive Avoidant Style Laissez Faire at POST** between the groups (B=0.049, 95% CI= -0.208 - 0.307, p=0.707). The adjusted mean Leadership Passive Avoidant Style Laissez Faire for intervention group at POST across imputed datasets (M=1.905, SE=0.092, 95% CI=1.724-2.086) was **not significantly different** to the adjusted mean Leadership Passive Avoidant Style Laissez Faire of control group **at**

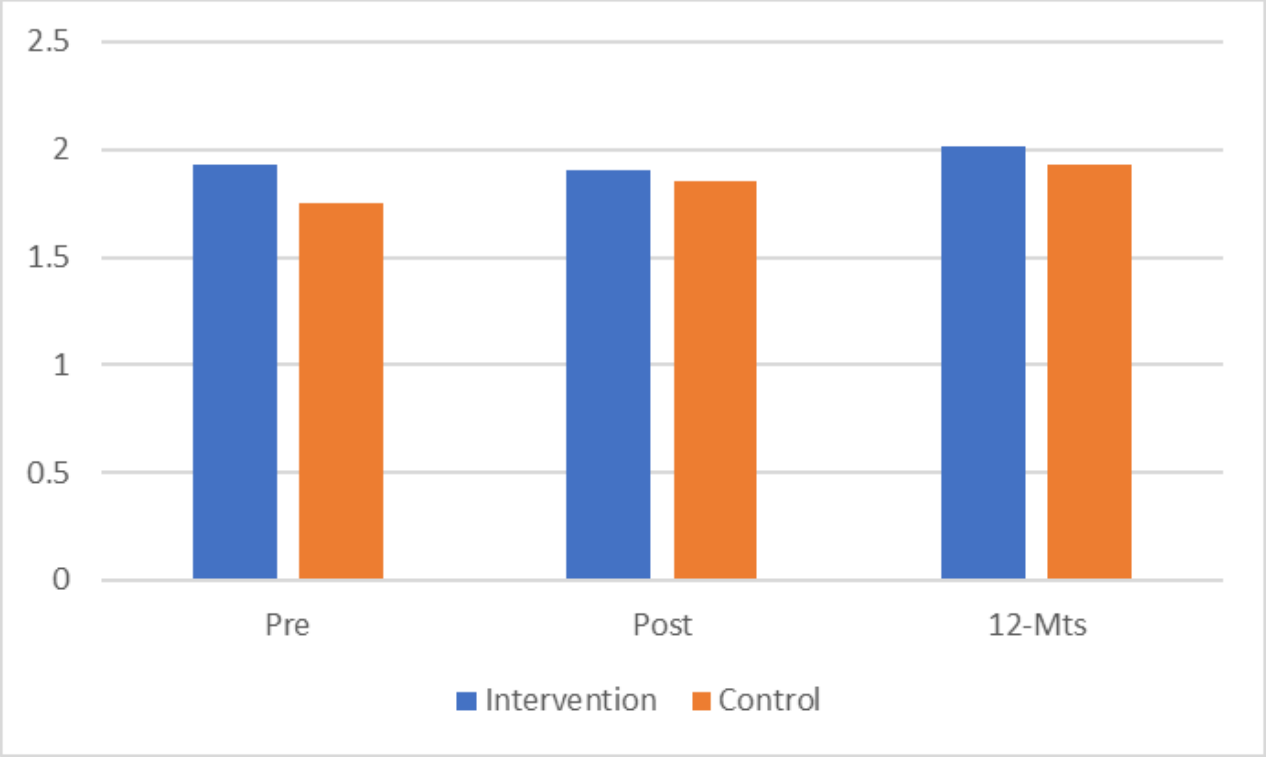
POST across imputed datasets (M=1.856, SE=0.091, 95% CI=1.677-2.035). Partial eta squared was 0.056 indicating no effect.

The pooled estimate from 59 imputed datasets indicated that there was **no significant main effect in Leadership Passive Avoidant Style Laissez Faire at 12-MONTHS** between the groups (B=0.084, 95% CI= -0.246 - 0.414, p=0.617). The adjusted mean Leadership Passive Avoidant Style Laissez Faire for intervention group at 12-MONTHS across imputed datasets (M=2.012, SE=0.144, 95% CI=1.787-2.237) was **not significantly different** to the adjusted mean Leadership Passive Avoidant Style Laissez Faire of control group **at 12-MONTHS** across imputed datasets (M=1.928, SE=0.117, 95% CI=1.698-2.157). Partial eta squared was 0.058 indicating no effect.

Figure 3.30 shows the Leadership Passive Avoidant Style Laissez Faire results at PRE, POST and 12-MONTHS for both the intervention and control groups.

Figure 3.30

Leadership Passive Avoidant Style Laissez Faire results



Leadership Passive Avoidant Style Management by Exception Passive

Outcomes from the Leadership Passive Avoidant Style Management by Exception analysis showed that there was no statically significant difference between groups at POST or 12-MONTHS. No effect size was observed at POST or 12-MONTHS.

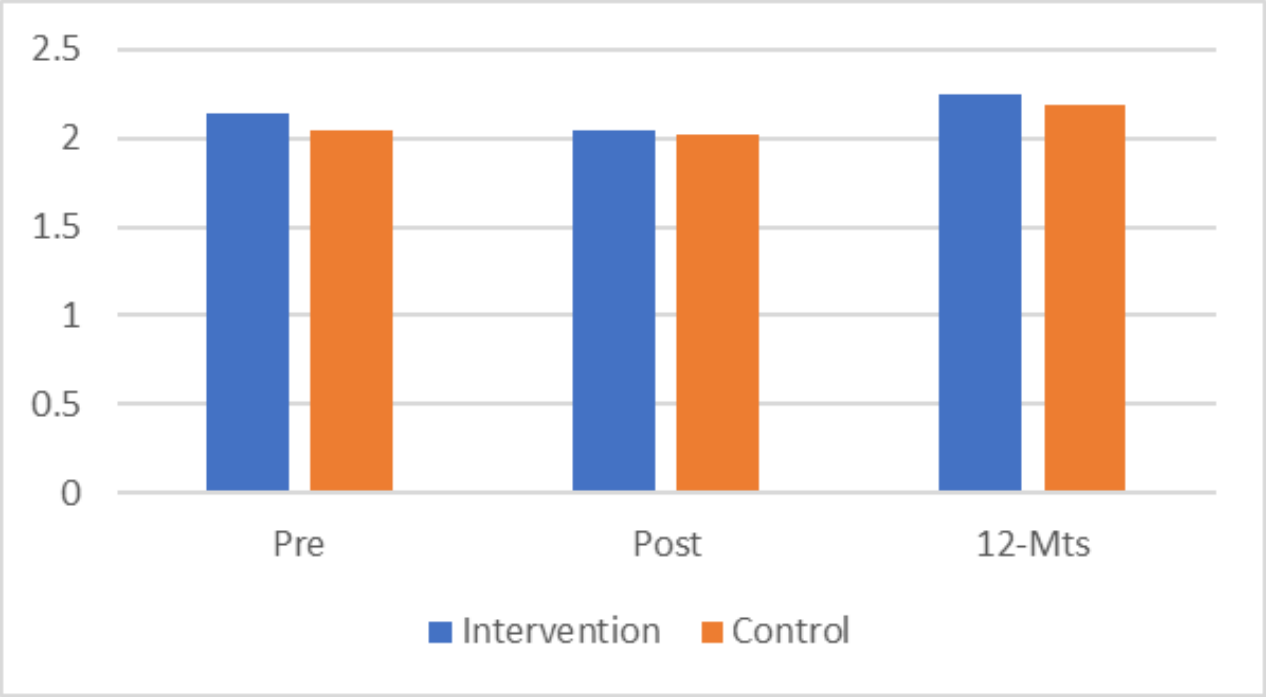
The pooled estimate from 59 imputed datasets indicated that there was **no significant main effect in Leadership Passive Avoidant Style Management by Exception Passive at POST** between the groups (B=0.018, 95% CI= -0.273 - 0.309, p=0.903). The adjusted mean Leadership Passive Avoidant Style Management by Exception Passive for intervention group at POST across imputed datasets (M=2.040, SE=0.112, 95% CI=1.819-2.261) was **not significantly different** to the adjusted mean Leadership Passive Avoidant Style Management by Exception Passive of control group **at POST** across imputed datasets (M=2.022, SE=0.102, 95% CI=1.821-2.222). Partial eta squared was 0.014 indicating no effect.

The pooled estimate from 59 imputed datasets indicated that there was **no significant main effect in Leadership Passive Avoidant Style Management by Exception Passive at 12-MONTHS** between the groups (B=0.059, 95% CI= -0.235 - 0.352, p=0.696). The adjusted mean Leadership Passive Avoidant Style Management by Exception Passive for intervention group at 12-MONTHS across imputed datasets (M=2.248, SE=0.112, 95% CI=2.028-2.469) was **not significantly different** to the adjusted mean Leadership Passive Avoidant Style Management by Exception Passive of control group **at 12-MONTHS** across imputed datasets (M=2.190, SE=0.113, 95% CI=1.968-2.412). Partial eta squared was 0.022 indicating no effect.

Figure 3.31 shows the Leadership Passive Avoidant Style Management by Exception results at PRE, POST and 12-MONTHS for both the intervention and control groups.

Figure 3.31

Leadership Passive Avoidant Style Management by Exception results



Leadership Transactional Style Contingent Reward

Outcomes from the Leadership Transactional Style Contingent Reward analysis showed that there was no statically significant difference between groups at POST or 12-MONTHS. No effect size was observed at POST or 12-MONTHS.

The pooled estimate from 59 imputed datasets indicated that there was **no significant main effect in Leadership Transactional Style Contingent Reward at POST** between the groups (B= -0.021, 95% CI= -0.336 - 0.294, p=0.896). The adjusted mean Leadership Transactional Style Contingent Reward for intervention group at POST across imputed datasets (M=3.760, SE=0.120, 95% CI=3.523-3.997) was **not significantly different** to the adjusted mean Leadership Transactional Style Contingent Reward of control group **at POST** across imputed datasets (M=3.781, SE=0.111, 95% CI=3.562-4.000). Partial eta squared was 0.000 indicating no effect.

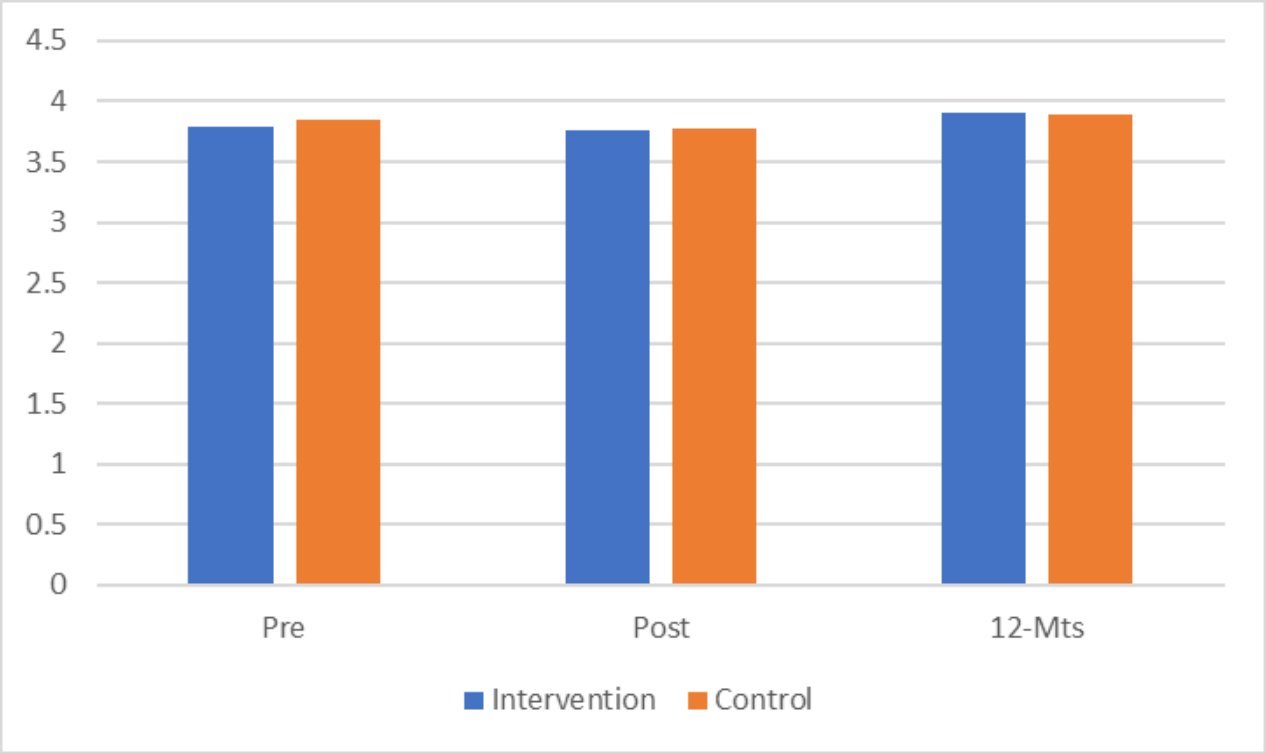
The pooled estimate from 59 imputed datasets indicated that there was **no significant main effect in Leadership Transactional Style Contingent Reward at 12-MONTHS** between the groups (B=0.020, 95% CI= -0.268 - 0.309, p=0.889). The adjusted mean Leadership Transactional Style Contingent Reward for intervention group at 12-MONTHS across imputed datasets (M=3.906, SE=0.097, 95% CI=3.715-4.097) was **not significantly different** to the adjusted mean Leadership Transactional Style Contingent

Reward of control group **at 12-MONTHS** across imputed datasets (M=3.885, SE=0.110, 95% CI=3.670-4.101). Partial eta squared was 0.015 indicating no effect.

Figure 3.32 shows the Leadership Transactional Style Contingent Reward results at PRE, POST and 12-MONTHS for both the intervention and control groups.

Figure 3.32

Leadership Transactional Style Contingent Reward results



Leadership Transactional Style Management by Exception Active

Outcomes from the Leadership Transactional Style Management by Exception Active analysis showed that there was no statically significant difference between groups at POST or 12-MONTHS. No effect size was observed at POST or 12-MONTHS.

The pooled estimate from 59 imputed datasets indicated that there was **no significant main effect in Leadership Transactional Style Management by Exception Active at POST** between the groups (B=-0.035, 95% CI= -0.377 - 0.307, p=0.841). The adjusted mean Leadership Transactional Style Management by Exception Active for intervention group at POST across imputed datasets (M=2.640, SE=0.129, 95% CI=2.387-2.894) was **not significantly different** to the adjusted mean Leadership Transactional Style

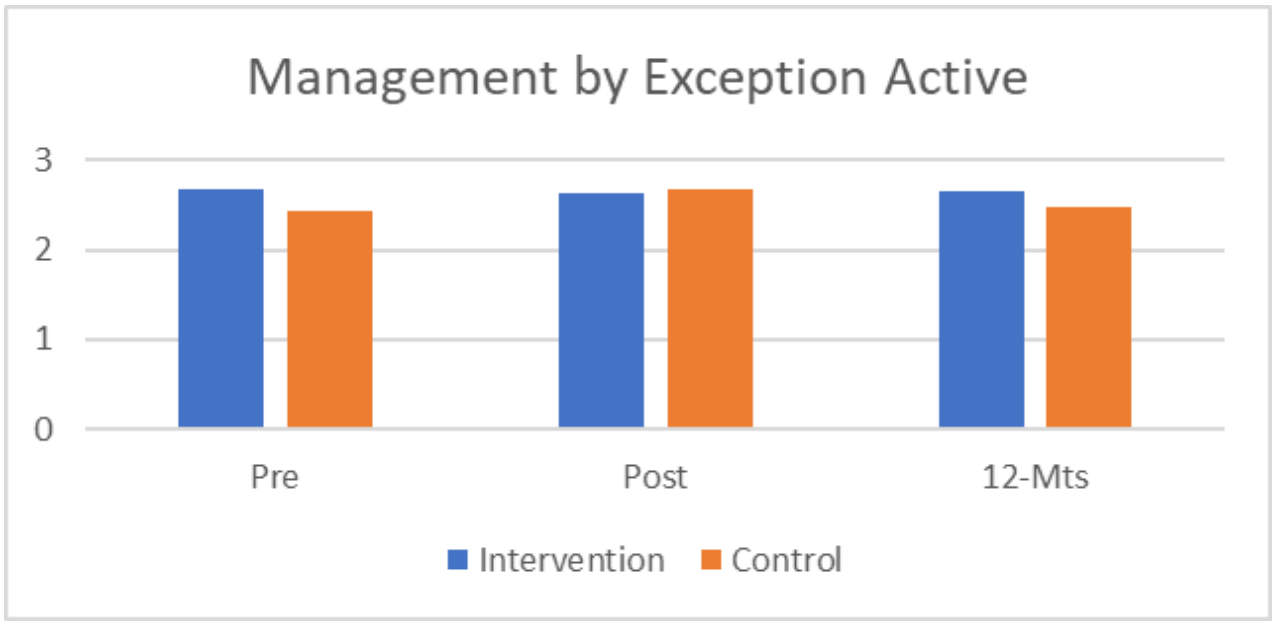
Management by Exception Active of control group **at POST** across imputed datasets (M=2.675, SE=0.121, 95% CI=2.438-2.912). Partial eta squared was 0.003 indicating no effect.

The pooled estimate from 59 imputed datasets indicated that there was **no significant main effect in Leadership Transactional Style Management by Exception Active at 12-MONTHS** between the groups (B=0.188, 95% CI= -0.169 - 0.545, p=0.301). The adjusted mean Leadership Transactional Style Management by Exception Active for intervention group at 12-MONTHS across imputed datasets (M=2.662, SE=0.131, 95% CI=2.405-2.919) was **not significantly different** to the adjusted mean Leadership Transactional Style Management by Exception Active of control group **at 12-MONTHS** across imputed datasets (M=2.474, SE=0.131, 95% CI=2.216-2.731). Partial eta squared was 0.027 indicating no effect.

Figure 3.33 shows the Leadership Transactional Style Management by Exception Active results at PRE, POST and 12-MONTHS for both the intervention and control groups.

Figure 3.33

Leadership Transactional Style Management by Exception Active results



Leadership Transformational Style Idealized Attributes

Outcomes from the Leadership Transformational Style Idealized Attributes analysis showed that there was no statically significant difference between groups at POST or 12-MONTHS. No effect size was observed at POST or 12-MONTHS.

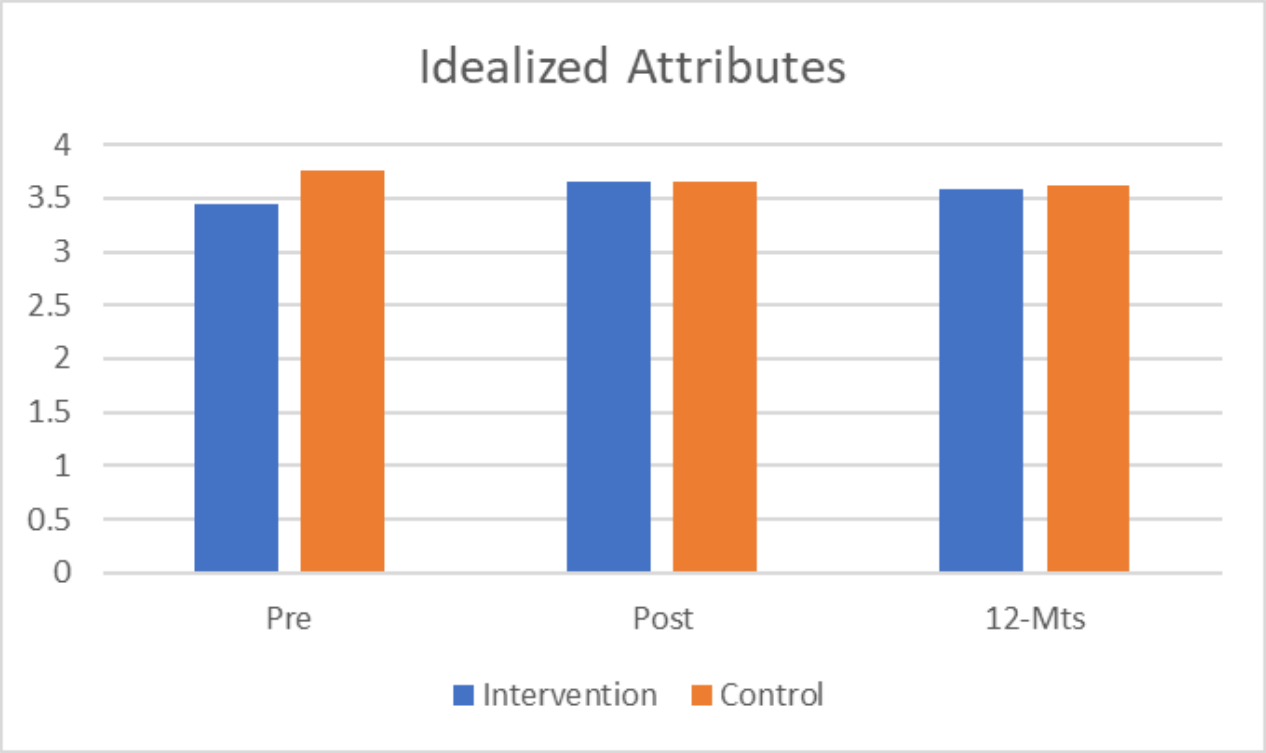
The pooled estimate from 59 imputed datasets indicated that there was **no significant main effect in Leadership Transformational Style Idealized Attributes at POST** between the groups (B=-0.003, 95% CI= -0.294 - 0.288, p=0.983). The adjusted mean Leadership Transformational Style Idealized Attributes for intervention group at POST across imputed datasets (M=3.648, SE=0.106, 95% CI=3.439-3.857) was **not significantly different** to the adjusted mean Leadership Transformational Style Idealized Attributes of control group **at POST** across imputed datasets (M=3.651, SE=0.109, 95% CI=3.437-3.866). Partial eta squared was 0.000 indicating no effect.

The pooled estimate from 59 imputed datasets indicated that there was **no significant main effect in Leadership Transformational Style Idealized Attributes at 12-MONTHS** between the groups (B= -0.036, 95% CI= -0.373 - 0.300, p=0.831). The adjusted mean Leadership Transformational Style Idealized Attributes for intervention group at 12-MONTHS across imputed datasets (M=3.589, SE=0.115, 95% CI=3.362-3.816) was **not significantly different** to the adjusted mean Leadership Transformational Style Idealized Attributes of control group **at 12-MONTHS** across imputed datasets (M=3.625, SE=0.118, 95% CI=3.394-3.857). Partial eta squared was 0.000 indicating no effect.

Figure 3.34 shows the Leadership Transformational Style Idealized Attributes results at PRE, POST and 12-MONTHS for both the intervention and control groups.

Figure 3.34

Leadership Transformational Style Idealized Attributes results



Leadership Transformational Style Idealized Behaviours

Outcomes from the Leadership Transformational Style Idealized Behaviours analysis showed that there was no statically significant difference between groups at POST or 12-MONTHS. No effect size was observed at POST or 12-MONTHS.

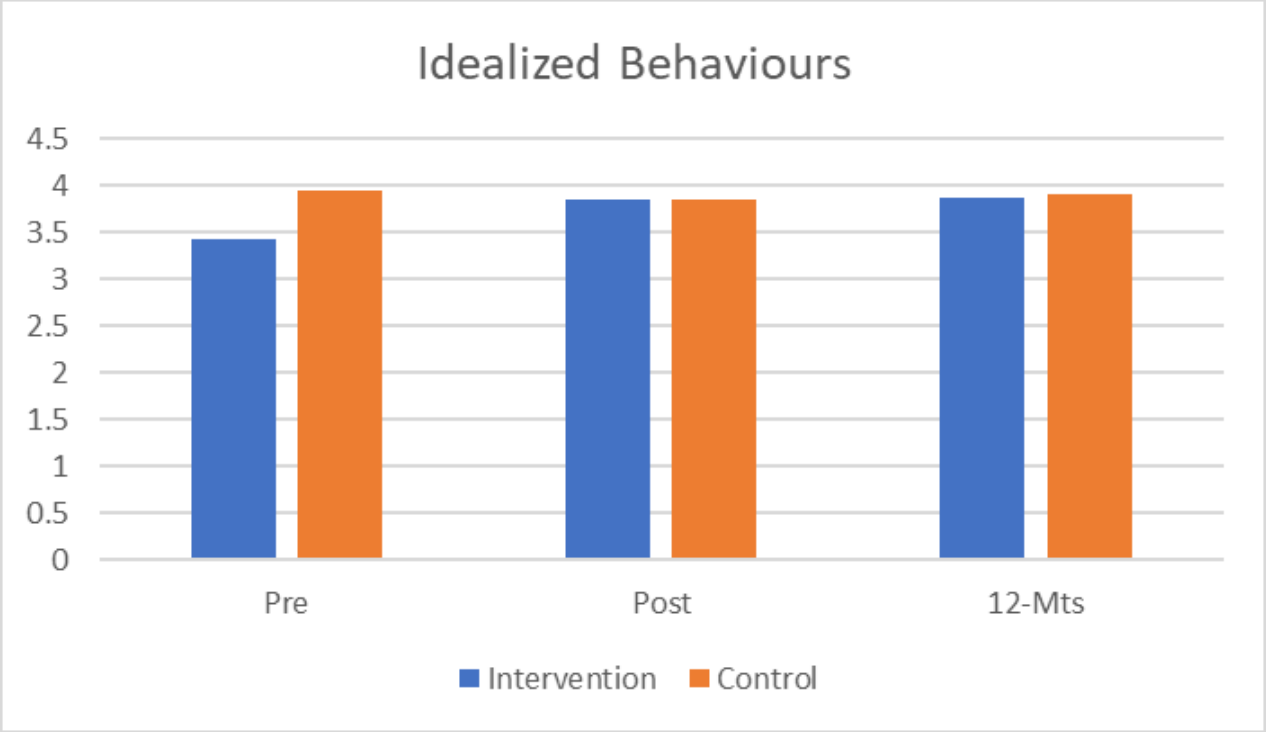
The pooled estimate from 59 imputed datasets indicated that there was **no significant main effect in Leadership Transformational Style Idealized Behaviours at POST** between the groups (B=-0.002, 95% CI= -0.282 – 0.278, p=0.988). The adjusted mean Leadership Transformational Style Idealized Behaviours for intervention group at POST across imputed datasets (M=3.851, SE=0.104, 95% CI=3.648-4.055) was **not significantly different** to the adjusted mean Leadership Transformational Style Idealized Behaviours of control group **at POST** across imputed datasets (M=3.853, SE=0.096, 95% CI=3.664-4.043). Partial eta squared was 0.005 indicating no effect.

The pooled estimate from 59 imputed datasets indicated that there was **no significant main effect in Leadership Transformational Style Idealized Behaviours at 12-MONTHS** between the groups (B= -0.039, 95% CI= -0.319 - 0.241, p=0.785). The adjusted mean Leadership Transformational Style Idealized Behaviours for intervention

group at 12-MONTHS across imputed datasets (M=3.880, SE=0.102, 95% CI=3.680-4.081) was **not significantly different** to the adjusted mean Leadership Transformational Style Idealized Behaviours of control group **at 12-MONTHS** across imputed datasets (M=3.919, SE=0.098, 95% CI=3.727-4.111). Partial eta squared was 0.012 indicating no effect.

Figure 3.35 shows the Leadership Transformational Style Idealized Behaviours results at PRE, POST and 12-MONTHS for both the intervention and control groups.

Figure 3.35
Leadership Transformational Style Idealized Behaviours results



Leadership Transformational Style Individual Consideration

Outcomes from the Leadership Transformational Style Individual Consideration analysis showed that there was no statically significant difference between groups at POST or 12-MONTHS. No effect size was observed at POST or 12-MONTHS.

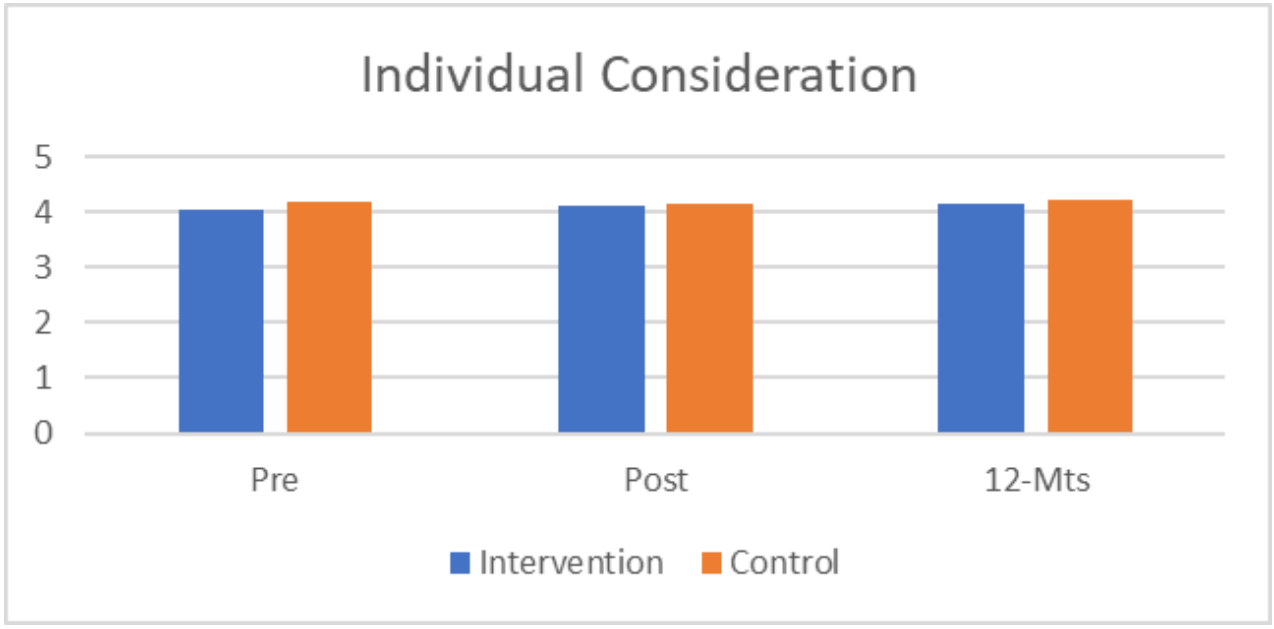
The pooled estimate from 59 imputed datasets indicated that there was **no significant main effect in Leadership Transformational Style Individual Consideration at POST** between the groups (B=-0.023, 95% CI= -0.297 - 0.251, p=0.870). The adjusted mean Leadership Transformational Style Individual Consideration for intervention group at

POST across imputed datasets (M=4.131, SE=0.096, 95% CI=3.941-4.321) was **not significantly different** to the adjusted mean Leadership Transformational Style Individual Consideration of control group **at POST** across imputed datasets (M=4.154, SE=0.093, 95% CI=3.970-4.337). Partial eta squared was 0.010 indicating no effect.

The pooled estimate from 59 imputed datasets indicated that there was **no significant main effect in Leadership Transformational Style Individual Consideration at 12-MONTHS** between the groups (B= -0.051, 95% CI= -0.306 - 0.204, p=0.694). The adjusted mean Leadership Transformational Style Individual Consideration for intervention group at 12-MONTHS across imputed datasets (M=4.171, SE=0.090, 95% CI=3.993-4.348) was **not significantly different** to the adjusted mean Leadership Transformational Style Individual Consideration of control group **at 12-MONTHS** across imputed datasets (M=4.222, SE=0.095, 95% CI=4.035-4.408). Partial eta squared was 0.011 indicating no effect.

Figure 3.36 shows the Leadership Transformational Style Individual Consideration results at PRE, POST and 12-MONTHS for both the intervention and control groups.

Figure 3.36
Leadership Transformational Style Individual Consideration results



Leadership Transformational Style Inspirational Motivation

Outcomes from the Leadership Transformational Style Inspirational Motivation analysis showed that there was no statically significant difference between groups at POST or 12-MONTHS. No effect size was observed at POST or 12-MONTHS.

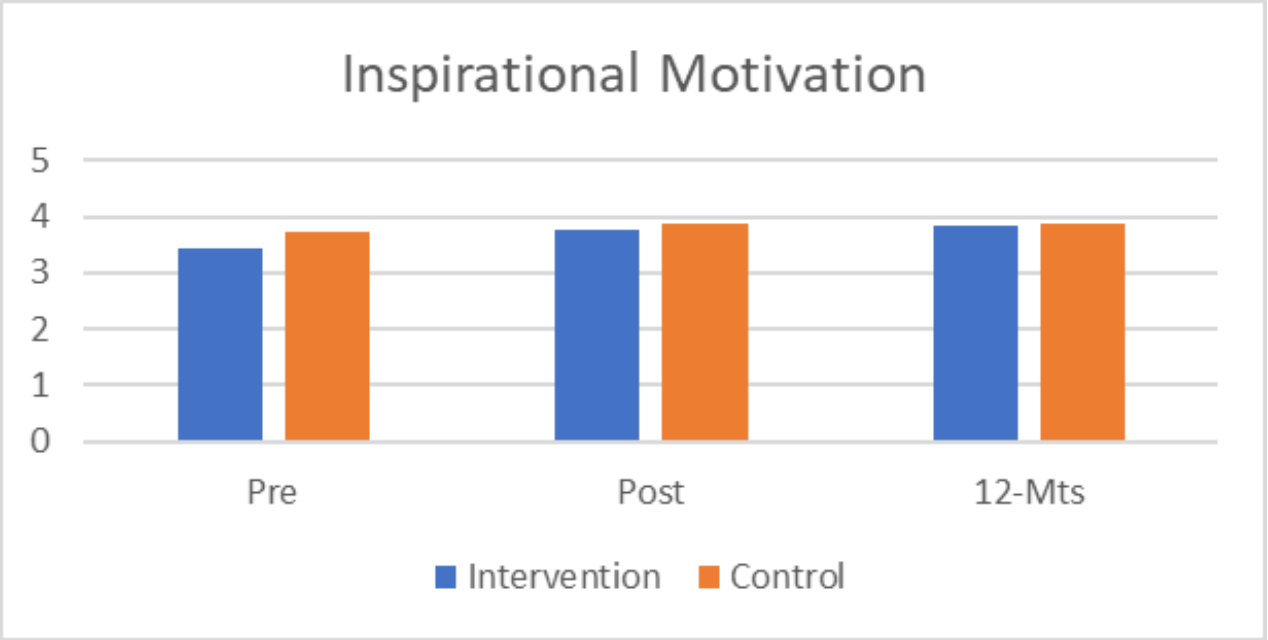
The pooled estimate from 59 imputed datasets indicated that there was **no significant main effect in Leadership Transformational Style Inspirational Motivation at POST** between the groups (B= -0.081, 95% CI= -0.400 - 0.238, p=0.618). The adjusted mean Leadership Transformational Style Inspirational Motivation for intervention group at POST across imputed datasets (M=3.777, SE=0.115, 95% CI=3.551-4.002) was **not significantly different** to the adjusted mean Leadership Transformational Style Inspirational Motivation of control group **at POST** across imputed datasets (M=3.858, SE=0.107, 95% CI=3.647-4.068). Partial eta squared was 0.062 indicating no effect.

The pooled estimate from 59 imputed datasets indicated that there was **no significant main effect in Leadership Transformational Style Inspirational Motivation at 12-MONTHS** between the groups (B= -0.035, 95% CI= -0.343 - 0.272, p=0.822). The adjusted mean Leadership Transformational Style Inspirational Motivation for intervention group at 12-MONTHS across imputed datasets (M=3.830, SE=0.106, 95% CI=3.622-4.039) was **not significantly different** to the adjusted mean Leadership Transformational Style Inspirational Motivation of control group **at 12-MONTHS** across imputed datasets (M=3.865, SE=0.105, 95% CI=3.659-4.072). Partial eta squared was 0.063 indicating no effect.

Figure 3.37 shows the Leadership Transformational Style Inspirational Motivation results at PRE, POST and 12-MONTHS for both the intervention and control groups.

Figure 3.37

Leadership Transformational Style Inspirational Motivation results



Leadership Transformational Style Intellectual Stimulation

Outcomes from the Leadership Transformational Style Intellectual Stimulation analysis showed that there was no statically significant difference between groups at POST or 12-MONTHS. No effect size was observed at POST or 12-MONTHS.

The pooled estimate from 59 imputed datasets indicated that there was **no significant main effect in Leadership Transformational Style Intellectual Stimulation at POST** between the groups (B=0.004, 95% CI= -0.214 - 0.223, p=0.969). The adjusted mean Leadership Transformational Style Intellectual Stimulation for intervention group at POST across imputed datasets (M=3.891, SE=0.079, 95% CI=3.736-4.047) was **not significantly different** to the adjusted mean Leadership Transformational Style Intellectual Stimulation of control group **at POST** across imputed datasets (M=3.887, SE=0.075, 95% CI=3.740-4.034). Partial eta squared was 0.002 indicating no effect.

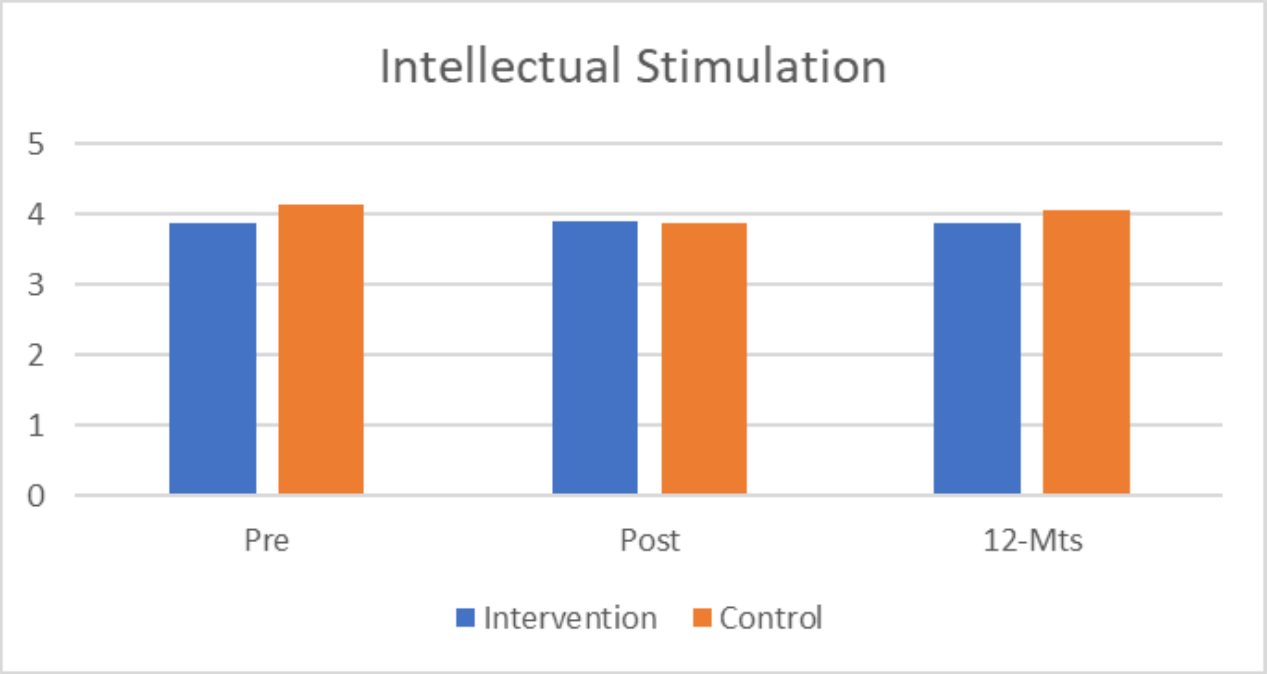
The pooled estimate from 59 imputed datasets indicated that there was **no significant main effect in Leadership Transformational Style Intellectual Stimulation at 12-MONTHS** between the groups (B= -0.212, 95% CI= -0.485 - 0.061, p=0.128). The adjusted mean Leadership Transformational Style Intellectual Stimulation for intervention group at 12-MONTHS across imputed datasets (M=3.863, SE=0.096, 95% CI=3.674-4.051) was **not significantly different** to the adjusted mean Leadership

Transformational Style Intellectual Stimulation of control group **at 12-MONTHS** across imputed datasets (M=4.074, SE=0.099, 95% CI=3.879-4.270). Partial eta squared was 0.139 indicating no effect.

Figure 3.38 shows the Leadership Transformational Style Inspirational Motivation results at PRE, POST and 12-MONTHS for both the intervention and control groups.

Figure 3.38

Leadership Transformational Style Inspirational Motivation results



3.6 Service Use Measure – All Sickness

Outcomes from the Service Use Measures – All sickness analysis showed that there was no statistically significant difference between groups at POST or 12-MONTHS. A small effect size was observed at POST and 12-MONTHS.

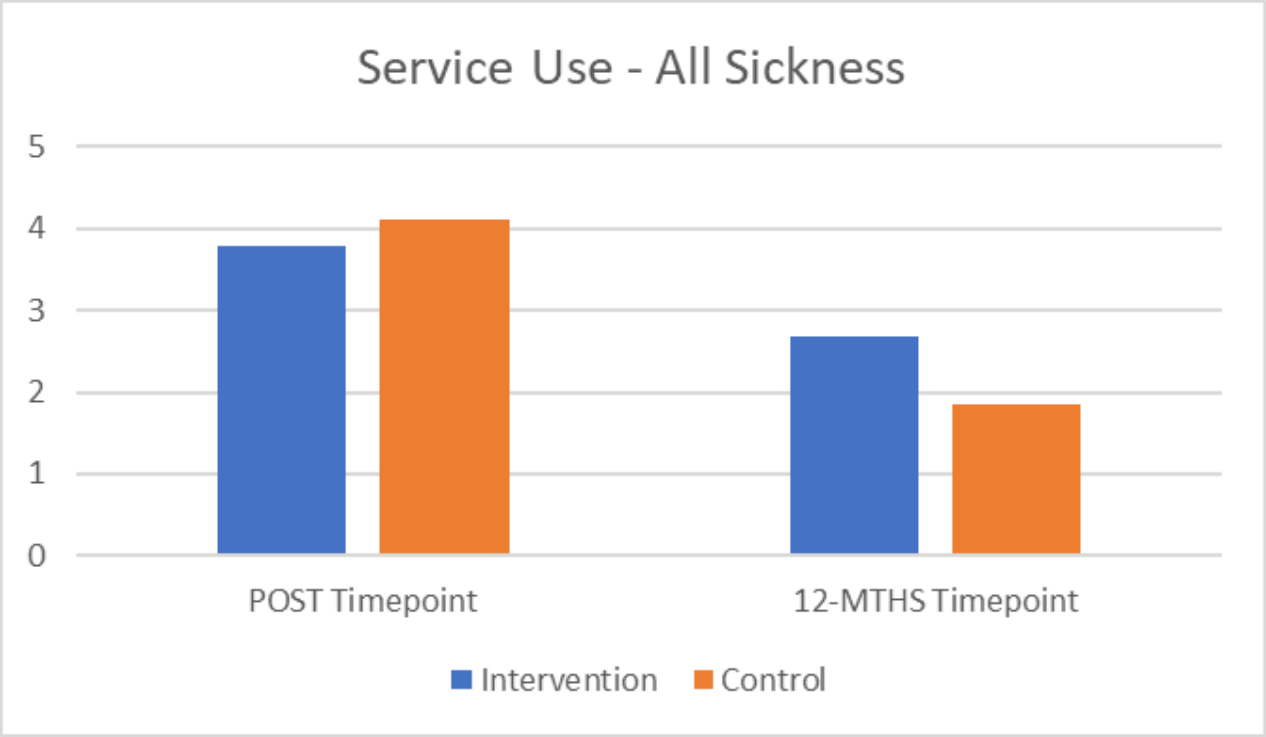
The pooled estimate from 59 imputed datasets indicated that there was no significant difference in the number of sick days at POST between the groups (B=-0.31, 95% CI= -9.87- 9.26, p=0.949). A small effect size was calculated from complete case data, η_p^2=0.001. The adjusted mean number of sick days in the intervention group at POST across imputed datasets (M=3.79, SE=6.03, 95% CI= -8.11 – 15.68) is not significantly different from the adjusted mean number of sick days in the control group at POST across imputed datasets (M=4.10, SE=6.25, 95% CI= -8.27 – 16.46).

The pooled estimate from 59 imputed datasets indicated that there was no significant difference in the number of sick days at 12-MONTHS between the groups (B=0.84, 95% CI=-6.71 – 8.39, p=0.827). A small effect size was calculated from complete case data, η_p^2=0.000. The adjusted mean number of sick days in the intervention group at 12-MONTHS across imputed datasets (M=2.68, SE=5.24, 95% CI= -7.66 – 13.01) is not significantly different from the adjusted mean number of sick days in the control group at 12-MONTHS across imputed datasets (M=1.84, SE=4.03, 95% CI= -6.07 – 9.75).

Figure 3.39 shows all the Sickness Data results at POST and 12-MONTHS for both the intervention and control groups.

Figure 3.39

Service Use – All Sickness Data results



3.6.1 Service Use Measure – Mental health related sickness

Outcomes from the Service Use Measures – Mental health related sickness analysis showed that there was no statistically significant difference between groups at POST or 12-MONTHS. A small effect size was observed at POST and 12-MONTHS.

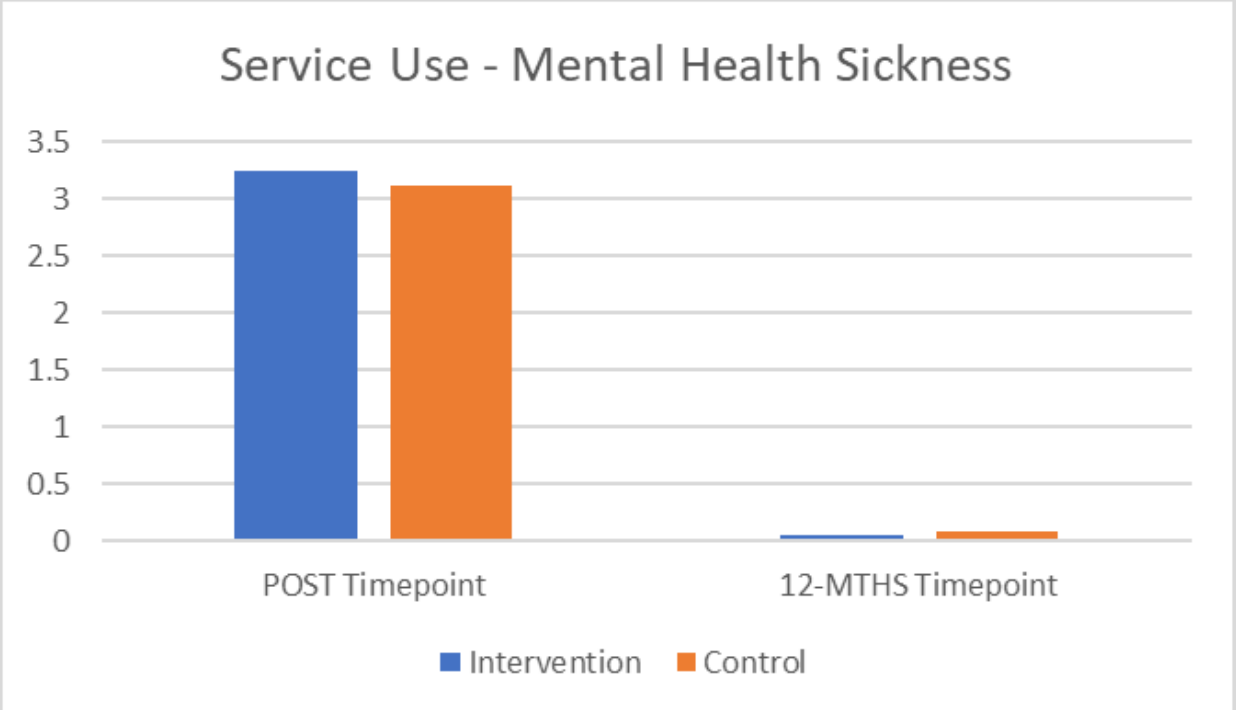
The pooled estimate from 59 imputed datasets indicated that there was no significant difference in the number of psychology days at POST between the groups (B=0.12, 95% CI= -1.15 – 1.38, p=0.856). A small effect size was calculated from complete case data, η_p^2=0.006. The adjusted mean number of psychological days in the intervention group at POST across imputed datasets (M=3.24, SE=0.98, 95% CI= 1.32 – 5.16) is not significantly different from the adjusted mean number of psychological days in the control group at POST across imputed datasets (M=3.12, SE=0.95, 95% CI= 1.26 – 4.98).

The pooled estimate from 59 imputed datasets indicated that there was no significant difference in the number of psychological days at 12-MONTHS between the groups (B= -0.03, 95% CI= -0.22 – 0.16, p=0.735). A small effect size was calculated from complete case data, η_p^2=0.005. The adjusted mean number of psychological days in the intervention group at 12-MONTHS across imputed datasets (M=0.051, SE=0.12, 95% CI= -0.18 – 0.29) is not significantly different from the adjusted mean number of psychological days in the control group at 12-MONTHS across imputed datasets (M=0.08, SE=0.11, 95% CI= -0.12 – 0.29).

Figure 3.40 shows the Mental Health Sickness Data results at POST and 12-MONTHS for both the intervention and control groups.

Figure 3.40

Service Use – Mental Health Sickness Data results



3.7 Summary main effect and effect sizes

Effect size indicates the extent of differences found, opposed to statistical significance which examines whether the findings are likely to be due to chance. Reporting the statistical significance at 5% level (P value) indicates if an effect exists however, it will not indicate the size of the effect. To support with the analysis and aid decision makers when considering a cost consequence analysis, both the statistical significance and the effect sizes have been reported (Table 3.4).

Table 3.4

Summary of all Measures Statistical Significance and Effect sizes

	Statistical Significance		**Effect size**	
Outcome	**POST**	**12-MONTHS**	**POST**	**12-MONTHS**
Perceived Stress Scale	No	No	Medium	Small
Five Factor Mindfulness Questionnaire	Yes	Yes	Large	Medium
World Health Organization – Summary Quality of Life	No	No	Small	No
World Health Organization – Satisfaction with Health	No	No	Small	No
Cognitive Failures Questionnaire	No	Yes	Medium	Medium
ICECAP-A	No	No	Medium	Small
EQ5D-3L	No	No	No	No
EQ5D-VAS	No	No	No	No
Leadership - The Multifactor Leadership Questionnaire MFQ	No	No	No	No
Service User Measure – Sickness	No	No	Small	Small

3.8 Effectiveness discussion

This Mindfulness in the workplace trial reported mixed effects on the various measures used. Both the primary measure of Perceived Stress and secondary measure of ICECAP-A returned a medium effect at POST which reduced to a small effect at the 12-MONTHS follow up stage, however these effects were not statistically significant with either measure. The Five Factor Mindfulness Questionnaire returned statistically significant effects at both the POST and 12-MONTHS time points with the large effect

size observed at the POST stage reducing to a medium effect at the 12-MONTHS follow up. The World Health Organization measure (which had two elements) did not return any statistically significant results with the small effect size observed at POST intervention disappearing by the 12-MONTHS follow up stage. The Cognitive Failures measure initially did not see a statistically significant change however at the 12-MONTHS follow up a statistically significant change was observed, the medium effect size observed at POST was maintained at the 12-MONTHS follow up period. The EQ5D-3L measure (which also had two elements), did not return any statistically significant results nor an effect size observed at either POST or 12-MONTHS time points. The Leadership measure did not return any statistically significant effects or effect sizes in any of the styles analysed at any time point throughout the trial.

The results from this study indicate that Mindfulness (in the form which was delivered in this trial) has mixed levels of impact. The general wellbeing measures used to evaluate the effectiveness in this study are commonly used in trials reviewing the impact of Mindfulness interventions. Previously reported trial observations ranged from no effect to statistically significant (de Bruin et al., 2020, Hoeve et al., 2021; Medlicott et al., 2021).

Mindfulness traits (as identified via the FFMQ) where higher for those who engaged with the intervention. The FFMQ measures five key areas (defined as facets) which are impacted by Mindfulness: observation, description, aware actions, non-judgmental inner experience, and non-reactivity (Baer et al., 2008). Examples of the Mindfulness 5 Facets are shown in Table 3.5.

Table 3.5

Example Items for Mindfulness Facets (Baer et al., 2008)

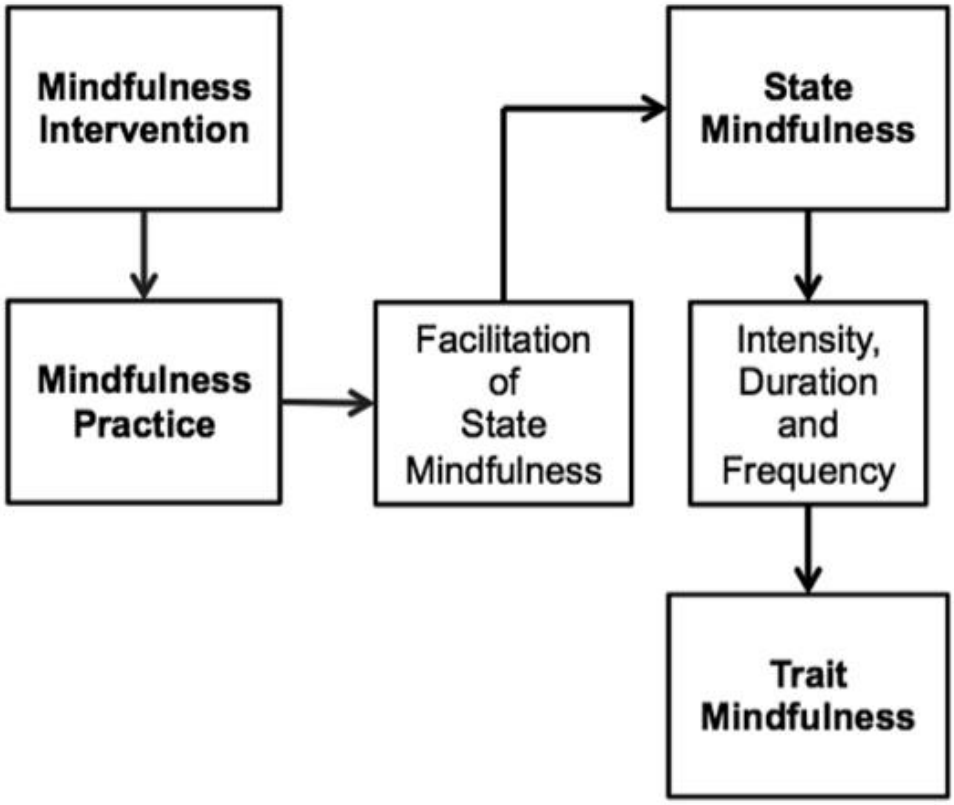
Facet	Example Item
Observing	I notice the smells and aromas of things
Describing	I am good at finding words to describe my feelings
Acting with awareness	I find myself doing things without paying attention (R)
Nonjudging of inner experience	I think some of my emotions are bad or inappropriate and I should not feel them (R)
Nonreactivity to inner experience	I perceive my feelings and emotions without having to react to them.

Note. R =reverse-scored item (higher scores represent higher levels of Mindfulness).

'Trait' Mindfulness (i.e. the ability to act in a way which incorporates the above five facets over a period of time) is different to 'state' Mindfulness, which describes behaviours at any one moment (Sala et al., 2020). Trait Mindfulness could be considered a part of one's personality (Sezer et al., 2022) which does not alter over time without intervention (Kiken et al., 2015). This theory is supported with the change seen in trait Mindfulness in the group offered the intervention vs no change in the control group. The impact in trait Mindfulness remains over a period of time which is promising and indicates a change in personality trait to a more mindful approach. One theory from Jamieson and Tuckey (2017) regarding state and trait Mindfulness describes 'state' as being engaged at a moment in time and 'trait' being a more prominent way of being mindful which is achieved with a higher intensity of Mindfulness / being mindful (Figure 3.41)

Figure 3.41

Overview of the relationships between the concepts of Mindfulness intervention, Mindfulness practice, state Mindfulness, and trait Mindfulness (Jamieson & Tuckey, 2017)



It is possible that the shift in trait Mindfulness observed has been achieved (when other variables have been less responsive) is a causation of the psychosocial education element of the Mindfulness course and was less dependent on the meditation aspect (Eberth & Sedlmeier, 2012). Learning and noticing the five mentioned facets is one effect, how this knowledge is then translated into impacting one's life, such as reducing perceived stress or improving perceived quality of life is another matter. Whilst there is a body of evidence which links Mindfulness traits to improved wellbeing outcomes (Carpenter et al., 2019), in this trial, increases in trait Mindfulness have not translated into changes in the other wellbeing factors.

When considering why the Mindfulness intervention in this trial has not been effective in all areas observed there are a range of possibilities (discussed further in Chapter six). These are discussed below.

Intention:

Mindfulness courses are experiential and require a personal commitment to the programme and a lifestyle change to incorporate practices into daily life (Santorelli, 2014). Participation in this trial was voluntary and via a self-referral basis. Voluntary participation in workplace Mindfulness courses is good practice (Wang & Adams, 2016) and is likely to increase commitment to adopt Mindfulness practices (Chmielewski et al., 2020), incorporate the learning into everyday life, and impact on outcomes. On one occasion during this trial, a potential course participant contacted the research team to seek guidance as their line manager had advised them to join the trial. They were concerned that their manager considered them to be stressed, anxious or depressed and were looking for guidance on the intentions of the programme. Whilst only a single contact was made with this query, it does raise the possibility that others were 'referred' to the programme by their employers, possibly with good intent, however, the intention or reason for individuals engaging was not sought from participants and a full evaluation of intention impact has not been possible.

Location:

Delivering a full 8-week Mindfulness course in the workplace poses unique challenges. On a practical level, finding suitable space for a Mindfulness course can be difficult. In this trial, several teachers reported back to the research team that the space they had been allocated was not ideal for a Mindfulness course with precious time at the start and

end of the class being spent reconfiguring the tables and chairs in a room to be conducive to a Mindfulness course. Interruptions to the class were also noted with instances reported of sessions being stopped and the participants and teacher being asked to vacate to enable the room to be used for another event. Individual participants were called out mid-session for urgent phone calls or other work-related matters. One location reported being allocated a room in a communal space with all glass walls resulting in participants reporting feeling self-conscious and distracted by their passing colleagues and various day-to-day activity happening just outside the room. Whilst the ideal setting was discussed in advance with the workplace contacts, the spaces offered were often not organised by the initial contact person. There is requirement to think holistically about Mindfulness in a workplace context, considering not only the curricula and the trainers, but also the environment (Vich, 2015). How this lack of suitable room space impacted on the outcomes was not evaluated and is discussed further as part of future recommendations in Chapter six.

Group dynamics:

Mindfulness delivered via an 8-week course (such as in this trial) place group dynamics as a central role to the success of the programme (Bogosian et al., 2016). When delivered in the workplace, the group dynamics do not always replicate those which have been present in many of the earlier studies which have typically focused on bringing groups together with healthcare issues in common. Whilst there is some evidence that Mindfulness in the workplace can bring groups of colleagues together (Islam et al., 2022), there is also the risk that workplace dynamics can impact on engagement in the programme (Harrison, 2019). As an example, in a workplace group there could be managers and subordinates with undercurrent power dynamics present or sensitive employment issues happening outside of the sessions. Data was not collected on how safe the workplace group felt and how able participants felt to share personal experiences with a group of colleagues. Discussion and sharing is an important consideration as the group element of a Mindfulness course, active and caring groups have been found to significantly impact on outcomes. In one study, positive interaction with the group resulted in a 7% increase in improved outcomes (Imel et al., 2008).

Contamination:

Research has shown that meditating can benefit others around the person practising meditation, such as family members and workplace colleagues (Willard, 2020). This

benefit in the wider world is of course welcomed, however in a research trial, the learning creeping out into the wider environment is problematic. This 'contamination' is a well-known possibility during a research trial with complex interventions where the control and intervention groups are not physically separated (Magill et al., 2019). In this trial there were four site locations (Liverpool, Leeds, Manchester and London). Across all the sites the intervention and control group were colleagues from the same employer meaning that contamination was highly probable and may have impacted on the outcomes. Challenges of measuring complex interventions is discussed in greater details below in section 3.10.

Level of practice:

The amount of practice participants undertake is reported to have a correlation to outcomes (de Bruin et al., 2020). The level of practice was not tracked as part of this research design. It is possible, especially if the learning of the practices was interrupted in the actual sessions, that this could account for some of the varying impact reported in this study versus the higher level of impact seen in other sectors using similar interventions.

In specific relation to home practice, there is evidence from previous trials that increased levels of weekly home practice is associated with better treatment outcomes (Crane et al., 2014). The level of participants' home practice was also not gathered and therefore it was not possible to make an assessment of the impact of this element in the results.

Experience of teachers:

Research in 2017 found that participants taught by more experienced Mindfulness teachers had significantly greater outcomes on well-being and reductions in perceived stress (Ruijgrok-Lupton et al., 2017). The delivery skills of teachers in this study was variable with a mix of new and experienced teachers. Although all teachers were assessed as competent and supervised during their delivery, their varying skills may have contributed to the mixed findings in this trial.

Implementation:

The successful implementation of Mindfulness is dependent on a range of factors (Crane & Kuyken, 2013), including having strategies in place to adopt the intervention into a specific workplace context and the personal circumstances of the participants (Bate et al., 2007). Lack of managerial support to implement Mindfulness in a workplace alongside the reliance on one or two individuals to 'champion' the programme, lack of

understanding of the programme and the cultural understanding required when introducing Mindfulness in the workplace are all reported as challenges to successful implementation (Crane & Kuyken, 2013). Many of these factors are identified as present in this study and may have impacted on the outcomes reported.

The varying results and possible factors affecting impact in this study are discussed further in Chapter six.

3.9 Strengths and limitations plus challenges of the effectiveness review

As with all trials, there are strengths and limitations which both supported the study and also limited the possibilities for greater understanding.

3.9.1 Strengths of this study

There are a range of factors which support the strength of this study including **the quantitative nature** of the analysis which provides data in numerical form enabling a snapshot of data at each time point which is then easily presented as descriptive statistics including the mean, median, and standard deviation of the population.

The study was under the guidance of the Bangor University ethics team who ensured the highest ethical standards for the trial and the North Wales Organisation for Randomised Trials in Health (NWORTH), Bangor University who (as a UK fully registered Clinical Trials Unit) provided oversight of the RCT.

The PRE, POST and 12-MONTHS data collection periods allowed the exploration of immediate results and then the ability to review if the results altered over a period of time. The number of participants engaging in this trial was a sufficient sample size to provide confidence in the results (within the recognised limitations listed below).

The **eligibility criteria and outcome assessments were clearly documented** enabling replication in future studies with all outcomes measures easily available for follow up research.

Employer engagement in this study resulted in staff being granted time off work to attend and space in the workplace being offered as training rooms. Whilst there were some challenges identified with the space offered, being in the same work vicinity enabled easier access and provided the opportunity to review real-life scenarios for implementation in the workplace.

3.9.2 Limitations of this study

Whist recognising the strengths, it is also important to highlight the limitations of this study, which included **weak personal practice monitoring**. This meant that it was not possible to evaluate the impact of personal practice and levels of participant engagement with the programme, this weakens the intervention link to outcomes. Whilst this would be an interesting question to further explore to expand on the work of Crane et al. (2014), this was not an active element of the trial design, meaning there are limitations on the conclusions we can make with this missing information.

Staff turnover within the workplaces meant that the longitudinal study was impacted by the loss of contact with participants. Whilst some participants advised us of employment changes, it is likely not all did and the missing data time points of some could have been due to them leaving their post. The public sector had an average turnover rate of 13.2% during the time of this trial (Local government workforce, 2021). Data collection methods such as utilising a work and personal email address could benefit future trials.

Linked to the above, **data collection** was dependent on communication via an email address. Over a 12-month period it was likely that participants had moved on from roles or changed email addresses, and some of the missing data could have been gathered if there were alternative ways to communicate with the participants. In addition, it is known that one person reported not receiving the emails – reason unknown.

Varying experience in the teaching team may have resulted in differing teaching experiences for the groups which could have impacted on outcomes. Whilst this was mitigated by the teaching team all being supervised by one experienced Mindfulness trainer, there remains the potential for teacher skill having an impact on outcomes.

Teacher sector knowledge and relatability to participants may have been a limitation in this study. Since the design of the study there has been an increased understanding of the importance of the teacher being able to relate to the challenges of the participants and understand the sector within which they are teaching (Crane et al., 2017).

The **lack of qualitative analysis** means that whilst there is some insight into *what* does or does not impact on outcomes measured (i.e., the impact of the intervention directly), there is limited understanding from this trial about *why* this impact is present (i.e. level of practice, other life events which may impact on participants' wellbeing).

The **training dates were not disclosed at the recruitment** stage, which resulted in 16 withdrawals directly citing work commitments clashing with course dates. Whilst disclosing the dates was not possible for this design (due to the uncertainty of interest and the requirement to recruit a sufficient number before randomisation), future trials would benefit from disclosing dates at recruitment stage.

Using self-report measures does pose some limitations. This method is open to individual self-interpretation of their situation and self-assessment of their wellbeing, which can all be impacted on that respondent's moment to moment experience. Responses are subject to the risk of mis-remembering or outside factors influencing how they respond at each moment in time at each time point (Lucas, 2018).

Multiple submissions in five instances required the lead researcher (PhD candidate) to determine how to use that data. In all five instances of these multiple submissions, only the latter submission was utilised (detailed above); however, a re-submission could have been impacted by recall bias.

Prior to research commencement there was no **review of the measures** to specifically consider their comparability across different groups and demographics. This type of evaluation is considered good practice when conducting such a study and would have informed any recommendations for wider implementation (Burgard & Chen, 2014).

Data collection via the online system enabled this research to be possible with the limited resources, however, there were some weaknesses with the system. For example, a small number of data points were not correctly stored in the main database. This required a manual intervention to obtain the data from the raw data. Whilst this was possible, it took valuable time and resources to back-track through data.

The **follow-up time-point was limited to 12-months**. Whilst this is a time period which allows for effects of a Mindfulness intervention to observed, this does not reflect the potential life-long benefits of a Mindfulness practice.

In acknowledging this follow-up period limitation, there is an acceptance that 'perfect' trial follow-ups are scarce and the longer the duration of follow-up the increase in opportunity for missing data and lack of engagement (Herbert et al., 2018).

3.10 Challenge of measuring a complex healthcare intervention

When measuring a healthcare intervention, RCTs are generally considered the most appropriate method (Hill & Hill, 1991). However, many health care interventions are considered as complex in nature, resulting in research design and evaluation challenges (Campbell et al., 2007). Complex healthcare interventions are described as interventions that do not typically involve drugs or a surgical procedure as the sole intervention (Akobeng, 2005). They have a number of components involved, with a number of behaviours evaluated. There could be a varying level of skill or expertise in the delivery of the intervention and / or a flexibility in the intervention delivery permitted. A variance may also be present in the participants engaging in the trial and the locations of delivery (Skivington et al., 2021).

Fundamentally, the challenges arise as complex interventions include a number of elements which may respond to the intervention. These may be independent or interdependent (Campbell et al., 2000, Mason et al., 2002). Factors such as individual circumstances (cultural, economic, beliefs, willingness to engage), environment, quality of intervention variables can all impact on outcomes and therefore co-founding factors need to be mitigated. Additionally, the varying factors in a complex health intervention make the replication of a study difficult (Campbell et al., 2000), which is problematic as one way researchers and scientists build confidence in validity of research findings is via replication of studies (Popper, 2005). Another factor to consider in complex healthcare interventions is the commonly observed inability to keep the group status information from participants, known as unblinding (i.e they will be aware if they are engaging in an intervention or in a control group). Bias from unblinding has the potential to exaggerate effect sizes (Akobeng, 2005).

Shiell et al. (2008) offered clarity in defining complexity in research trials, defining complex ‘interventions’ and complex ‘systems’. A complex intervention, by definition from the Medical Research Council, is made up of a number of components which may act interdependently or independently (i.e the intervention and results are variable depending on the person delivering and receiving the intervention) (Shahsavari et al., 2020). A complex system focuses on local environment, such as hospitals, schools and workplaces where the environments alter and delivery of interventions in each of the settings will vary thus impact is not strictly proportional to the intervention. When delivering complex interventions in complex systems, true impact can be missed in the data gathering and reporting processes, if monitored, impact could be observed in a wider

context than with just the participant and could take longer than the follow-up period to take effect (Shiell et al., 2008).

Another area of challenge with RCTs in public health is 'confounding' (Figure 3.42), where age, diet, lifestyle choices and other factors might be unevenly distributed between the groups which have been randomised (Boston University School of Public Health, 2013). One method to mitigate the confounding factors would be to use observational findings to introduce a 'probability' statement to enhance the plausibility of the findings. This is particularly relevant when considering the wider dissemination recommendations of an RCT. An example would be a successful Mindfulness trial which had a series of pathways, for example teacher training, access to the intervention, recruitment from willing participants, all of which would need to be replicated alongside the actual intervention to achieve the same results. Good practice would include the probability of replicating the pathways to repeat the intervention being considered along with the RCT evaluation discussion.

Generalisability is another area which adds complexity when delivering and researching public health interventions. For example, if administering a vaccine, there may be some certainty of the biological response; however, when delivering an intervention such as a mental health programme there are a number of individual and environmental factors which may impact on the participants response (to the intervention) and results are less predictable and replicable. One way to address the generalisability challenge is to consider the dose and how that affects the outcome, epidemiologists refer to this as "*effect modification*" (Corraini et al., 2017). The level of intervention (dose) offered to populations which is varied in consideration of environmental factors is also referred to as "*behavioral effect modification*" (Table 3.6) (Victora et al., 2004).

There are various frameworks available to support researchers and scientists when developing complex interventions: the Context and Implementation of Complex Interventions (CICI) framework (Pfadenhauer et al., 2017), sequential phases (Campbell et al., 2000), and the framework from the Medical Research Council (Skivington et al. 2021). The CICI framework (as detailed by Pfadenhauer et al., 2017), comprises of three sections focusing on context, implementation and setting with a checklist supporting researchers to review each of these areas and consider their impact on the findings (Figure 3.44). The sequential phasing approach (as detailed by Campbell et al., 2000), guides researchers thorough a systematic process of considering and developing the

intervention and trial requiring each question posed to be considered separately and carefully evaluated (Figure 3.44).

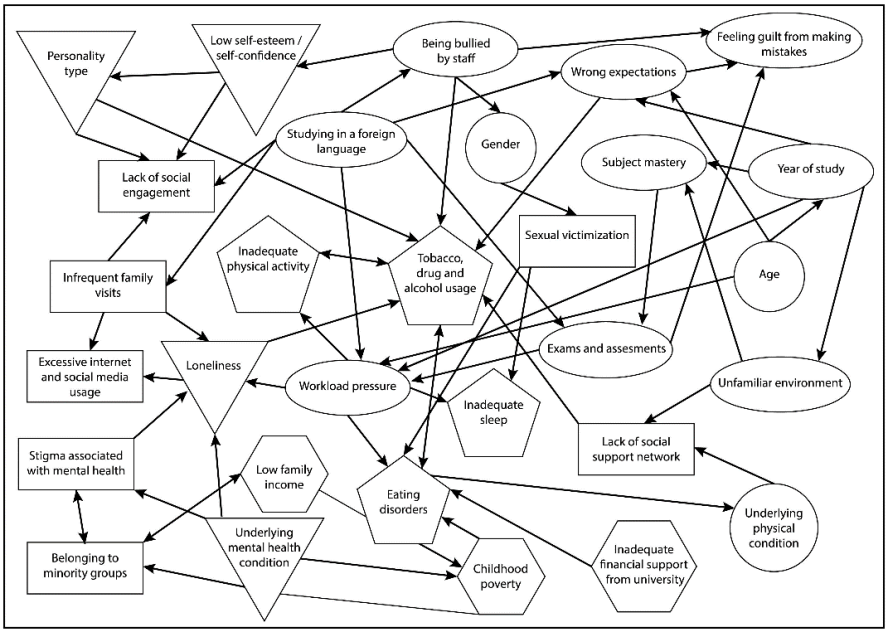
Table 3.6

Example of effect modification (Victora et al., 2004)

Types of Biological Effect Modification Affecting the Generalizability of Findings From Randomized Controlled Trials		
Category of Effect Modification	Description	Examples
A. Presence of other factors reduces the dose–response slope (antagonism)	Other factors are present in the target population that reduce the extent to which the intervention affects the outcome.	Iron and zinc supplementation will be less effective in places where the local diet contains substances that reduce their absorption (e.g., phytates and polyphenols).
B. Presence of other factors increases the dose–response slope (synergism)	Other factors are present in the target population that enhance the extent to which the intervention affects the outcome.	Iron supplementation will be more effective if the local diet is rich in meat and ascorbic acid, which enhance iron absorption.
C. Curvilinear dose–response association	Many biological responses are curvilinear; the same dose will have less effect if there is less need for it.	Iron supplementation will have different effects on hemoglobin according to baseline iron stores. Also, iron absorption is inversely related to iron status.
D. Limited scope for improvement in the impact (outcome) indicator because other interventions already provide protection	The intervention that is already in place acts on another link in the causal chain. The intervention acts on the same causal link.	Use of insecticide-treated bed nets will have a limited effect on malaria mortality if case-management is already appropriate. Improved breastfeeding will have less effect if water supply and sanitation are adequate.
E. Intervention is inappropriate because a critical cofactor is missing	The intervention only works in the presence of another factor that is absent in the population in question.	Improving water quality will have an impact on diarrheal diseases only if water quantity is adequate.
F. Intervention is addressing a determinant that is not important	The intervention is being applied in a setting where it is not needed because the outcome it addresses has other causes.	Energy supplementation in pregnancy will have limited impact on low birthweight if the latter is mostly due to maternal smoking and to preterm deliveries caused by infections. The impact of improved breastfeeding on infant mortality will be lower in populations where infectious diseases account for a small proportion of deaths.

Figure 3.42

Example of effect confounding factors (Mofatteh, 2021)



The Complex interventions framework from the Research Council (as detailed by Skivington et al. 2021), sections complex interventions into four stages, development or identification, feasibility, evaluation and then implementation (Figure 3.45).

Figure 3.43

Complex Interventions CICI framework (Pfadenhauer et al., 2017)

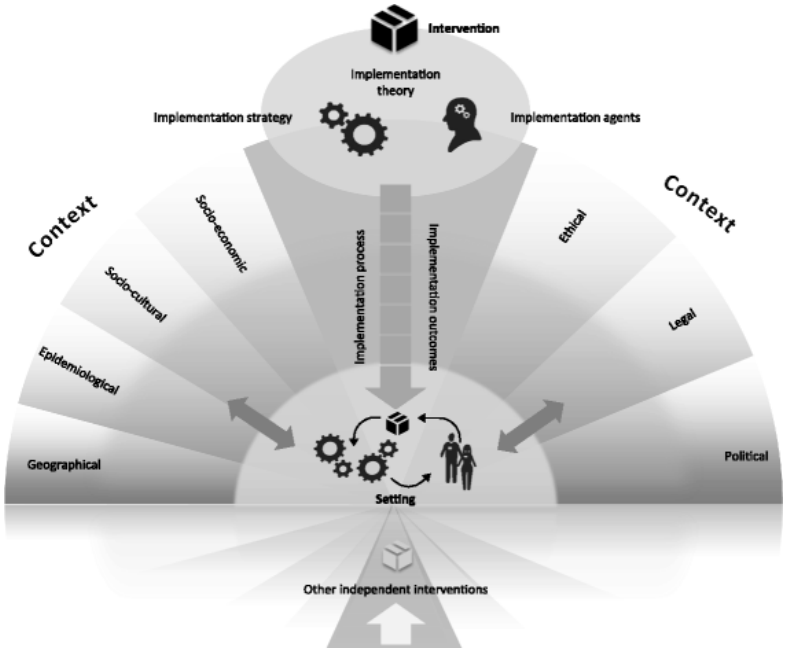


Figure 3.44

Complex Interventions Sequential phases framework (Campbell et al., 2000)

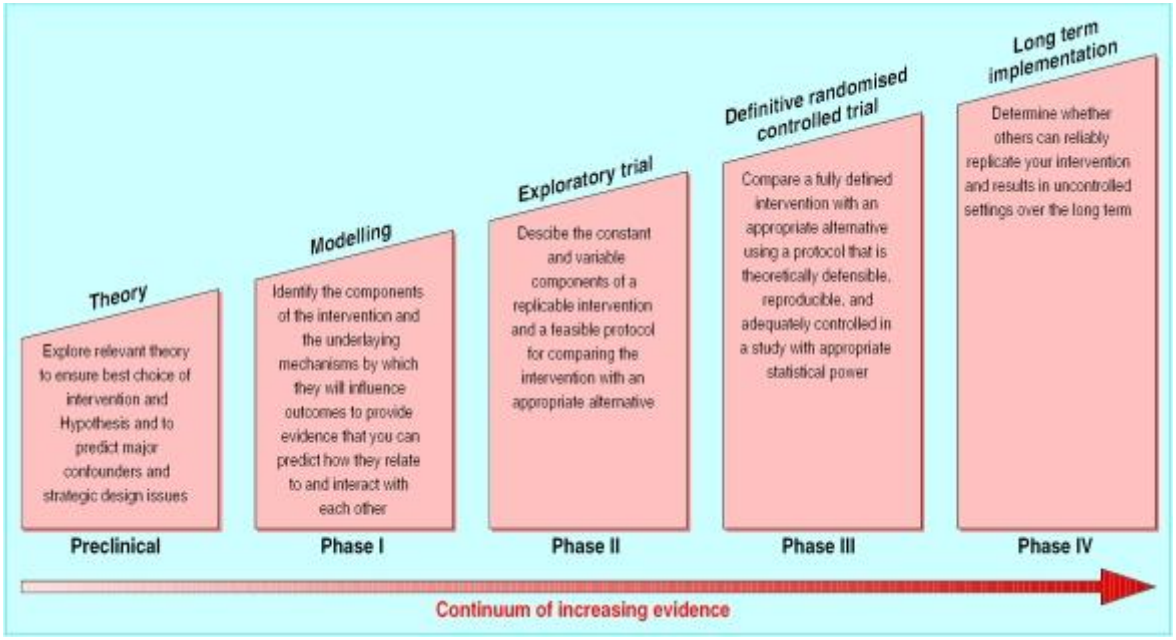
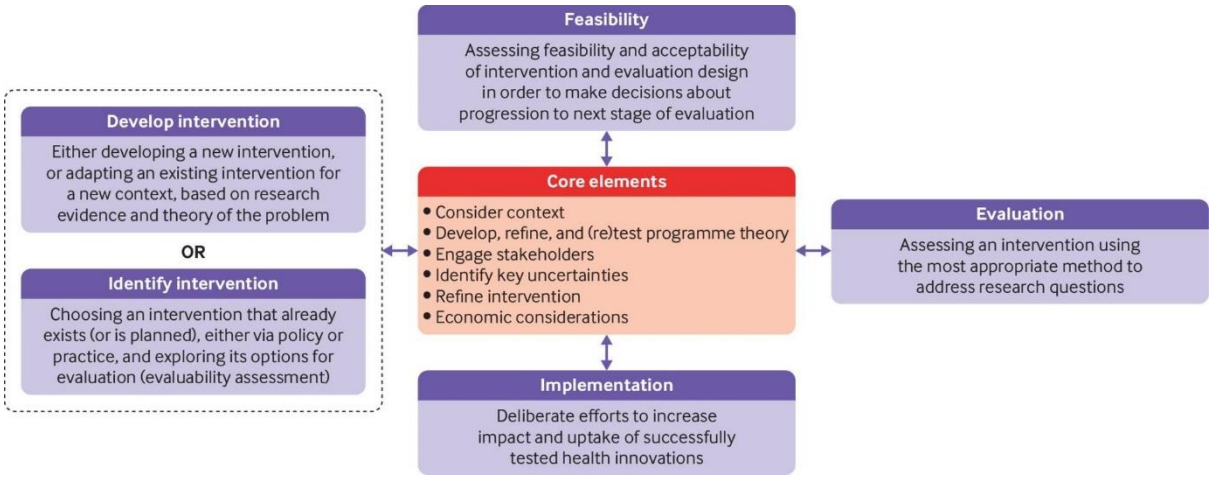


Figure 3.45

Complex interventions framework -The Medical Research Council (Skivington et al., 2021)



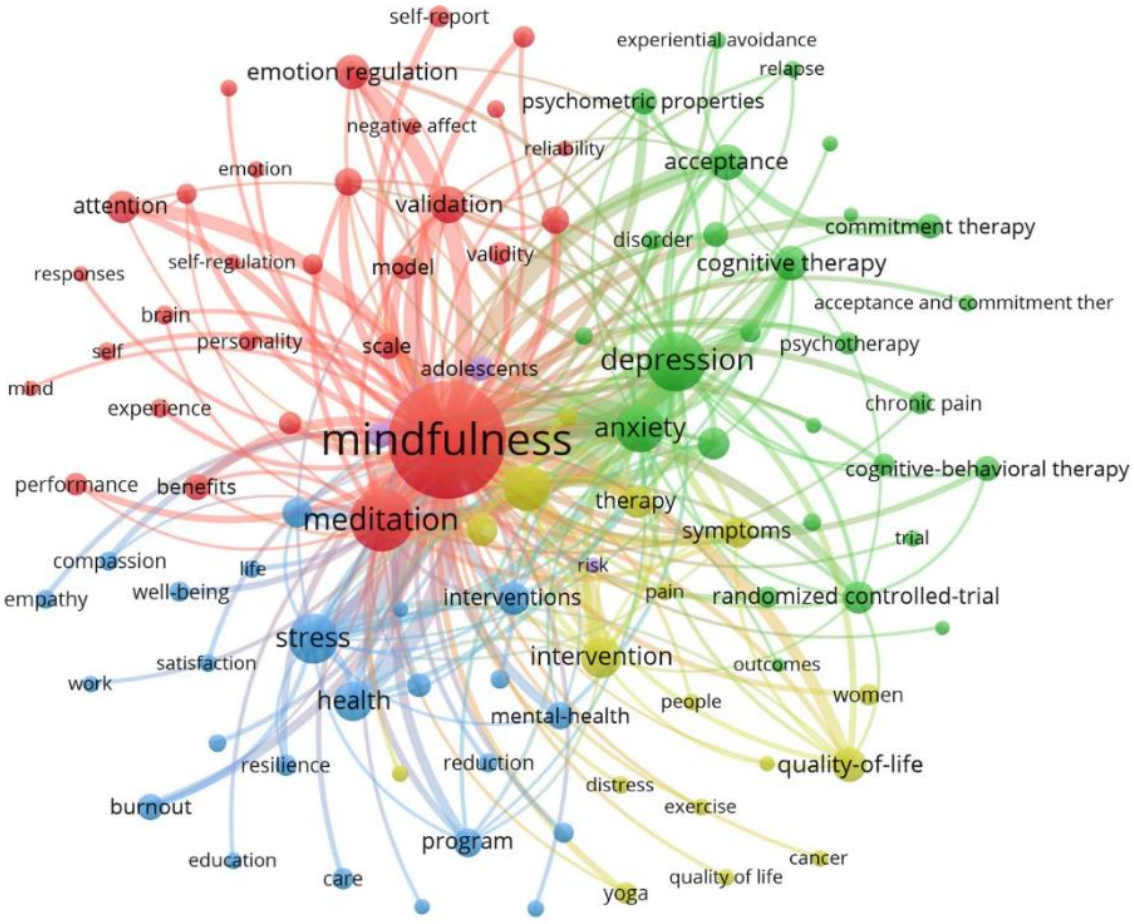
Mindfulness is considered a complex intervention and delivered in a complex setting as research in this area consists of all the challenges detailed above alongside the challenges in standardising the design, tutors and model for application in the wide range of settings where it is being implemented (Demarzo et al., 2015). To account for this complex nature, consideration of the structure and context where the research, delivery and application will be undertaken.

Mindfulness has the potential to impact on a range of wellbeing areas such as a reduction in stress or depression, life satisfaction, performance and a general improvement in quality of life, this is evidenced in range of research in the area (Figure 3.47) (Baminiwatta & Solangaarachchi, 2021). The broad impact of Mindfulness and other complex interventions increase the need to be clear on scope when defining research for a complex intervention, not just reviewing *if* the intervention works but considering *when, why and how* an intervention impacts on outcomes (Butler et al., 2017).

The complex interventions framework from the Research Council is the model adopted for this trial. Stage one: an existing product from within the Mindfulness field was identified as the intervention to be used it has already been adapted for delivery in the workplace. However, at the time of research commencement, the research into its effectiveness to be rolled out as a broadscale offerings was limited.

Figure 3.46

Keywords affiliated to Mindfulness research – (Baminiwatta & Solangaarachchi, 2021)



Stage two: feasibility was considered based on past research into the area, effectiveness of the programme with gaps identified in the outcomes measured, meaning the intervention had previously been considered in some research as an effective with the adult population but the workplace as a location for delivery and the effectiveness and cost effectiveness of such under evaluated. Stakeholders including the employers, teachers, supervisors, curriculum designers and researchers were consulted during the planning stage to establish willingness to engage and support the research. Costs and economic considerations were made both in relation to the trial costs to the research team and also in relation to the participants, costs to the employer for participation. There was a high willingness to engage and support which resulted in teachers time, venues, materials gifted to the research project.

Stage three: whilst implementation was considered at time of trial design, i.e access to intervention was considered, minimising the impact on the employer and employees engaging etc was also considered, there were many implementation lessons learned during the trial which have been discussed later in this chapter and further in Chapter six.

Stage four: outcome measures were designed to be inclusive of stakeholders priorities i.e employers with limited resources are looking not only for effective workplace mental health interventions but those which are cost-effective too. Employees are looking for interventions to be offered in their workplace which address their personal mental health, and policy / decision makers are looking for further data to enable them to make recommendations on a national level addressing societal needs. A qualitative evaluation was adopted with the added element of a process evaluation to meet the good practice guidance within the complex interventions framework from the Research Council. The process evaluation ensured that the services, implementation methods, challenges during implementation etc are all reviewed during write-up.

3.11 Summary and conclusions of the effectiveness analysis

Two of the outcome measures returned statistically significant findings at the 12-MONTH time point. Five of the measures showed a positive effect on outcome POST intervention, three outcomes retained their impact (in comparison to the control group) at the 12-MONTHS data collection point, none of these were statistically significant. No harmful effects were reported or identified from introducing Mindfulness into the workplace.

The results, and previous similar studies (outlined in this and earlier chapters), suggest that there is potential for Mindfulness interventions to be introduced into the workplace to pro-actively support employee wellbeing. However, this particular trial structure did not see levels of impact which fully support implementation of this design. Further research is recommended with a full review of the most appropriate structure of Mindfulness in the workplace. Future research would benefit from reviewing the learning in this trial (detailed above and in Chapter six), particularly considering the communication of the trial and the programme design to avoid any concerns regarding the intention of the intervention alongside ensuring that suitable locations are dedicated to the programme delivery. Gathering data on the level of practice undertaken in-between sessions and the number of sessions attended to establish if there is a link between attendance, practice and outcomes in this environment would also strengthen the understanding in future studies.

Furthermore, the evidence-base would benefit by reviewing the teacher experience, not simply in teaching Mindfulness but the level of sector knowledge in which the intervention is being taught (i.e the impact of teacher relatability to participant challenges which may be impacting on mental health). This would be important for the field to understand as it progresses to implement Mindfulness in a range of settings. Further discussion and recommendations are detailed in Chapter six.

3.12 Research questions and findings summary

Key questions:

1. How does Mindfulness influence perceived stress and related outcomes in the workplace?

Of the eight outcome measures used, Mindfulness – Finding Peace in the Frantic World Programme returned a positive effect on six of the outcomes at post intervention time point (12-MONTHS): Perceived Stress Scale, Five Factors Mindfulness Questionnaire, World Health Organisation – Quality of Life, World Health Organisation – Satisfaction with Health, Cognitive Failures Questionnaire and ICECAP-A. At the 12-MONTH time point, both the World Health Organisation measures had lost their effect leaving Perceived Stress Scale, Five Factors Mindfulness Questionnaire, Cognitive Failures Questionnaire and ICECAP-A with small – medium effects. Of these measures, only the Five Factors Mindfulness Questionnaire and the Cognitive Failures results were statistically significant at the 12-MONTH time point.

2. Is a Mindfulness programme, which was originally designed to address specific health challenges, transferable into the workplace?

As detailed in Chapter two, there are mixed findings in the field about the effectiveness of Mindfulness programmes in the workplace. This RCT contributed to the field by conducting an evaluation of Mindfulness in the workplace specifically offering the intervention to office-based staff in the public sector in the UK. This trial did not find the intervention to be effective when reviewing the primary outcome of stress. Therefore, it does not support the theory that a Mindfulness programme, which was originally designed to address specific health challenges, is transferable into the workplace without some element of adaptation or tailoring.

Having reviewed the effectiveness of the Mindfulness programme via a RCT, the next chapter considers the economic evaluation of the Mindfulness programme.

Chapter Four

Economic evaluation of a workplace Mindfulness programme as compared with usual practice

4.0 Chapter preface

In Chapter three, the effectiveness of a Mindfulness RCT in the workplace was reported. The findings determined the intervention not to be effective (when considering the primary outcome of perceived stress); there were, however, some effects observed (detailed in Chapter three). Therefore, to enable employers to make informed decisions based on their specific priorities, the aim of this chapter is to carry out an economic evaluation of the workplace Mindfulness programme. This chapter will detail costs to the employer to enable decisions to be informed by both the effectiveness and costs associated with delivering Mindfulness in the workplace. This chapter also references the prevalence of poor mental health with the economic implications and the challenges of meeting healthcare needs which were reported in Chapter one.

4.1 Introduction to NICE and economic evaluations

Health economics as a discipline is widely credited to an American economist Kenneth Arrow (Arrow, 1978). In 1963, Arrow published an article "*Uncertainty and the welfare economics of medical care*" in The American Economic Review which is now widely considered the seminal moment in the creation of health economics (Savedoff, 2004, Watts, 2017). Arrow detailed some specific characteristics of economic evaluation in healthcare, such as:

- *demand,* in that healthcare is only required when patients are ill and this is not easy to predict;
- *criticality*, highlighting that illness can be fatal or have major life consequences therefore to be well is of critical importance;
- *moral provision*, whereby the provider of healthcare is required to act in the best interests of patient and not for financial or personal gain;
- *product uncertainty,* which Arrow explains how the medical team typically know more than the patient about the services and therefore there is a reliance on the 'professional' to lead on the services;
- *supply conditions*; typically a supply of services is linked to demand, in health care with the demand being unpredictable this was considered an element to be considered such as training and licencing fees with an uncertain supply need at a later date;

- *pricing practices*; the varying prices chargeable in the states particularly where healthcare is paid for was a factor included in Arrow's work, this would impact on evaluations.

Arrow's work followed economic evaluations gaining popularity in the 1960's as researchers and those interested in associated costs began to measure the value of interventions / medicine vs the costs to implement / administer. The results supported decision making in by enabling a comparison of impact to costs and the ability to consider sustainability and scalability (Blumenschein & Johannesson, 1996).

The purpose of an economic evaluation in healthcare is to calculate the value gained from resources invested. By measuring the identified outcomes, economic evaluation enables the value or the effectiveness of a health care intervention to be determined (Goodacre & McCabe, 2002). As resources are limited, effectiveness findings and economic evaluations are vital to inform decision makers, shape public policy and guide funders and individuals. Benefits are assigned values for comparison with other types of interventions or an active control group to aid resource allocation.

In UK, prior to 1999, it was the responsibility of local authorities to consider economic evaluations and allocate their healthcare resources. This led to a country where access to healthcare was dependent on your geographical location and became known as the 'postcode lottery' (Butler, 2000). In April 1999 the National Institute for Clinical Excellence (NICE) was established by the new Labour government with a vision improve the quality and delivery of healthcare and review the effectiveness and cost-effectiveness of interventions for the treatment of health disorders. NICE would also take a central government lead providing guidelines on clinical and cost effectiveness (Rawlins, 2015). With the intention for the UK to provide equitable healthcare and end the postcode lottery, NICE was formalised as a 'Special Health Authority' meaning it had national level powers (Department of Health, 2012).

In 2005 the Health Development Agency joined the National Institute for Clinical Excellence and was renamed to National Institute for Health and Clinical Excellence although it remained abbreviated as NICE (Office of Public Sector Information, 2005).

Between 1997 and 2005, NICE was an advisory body, reviewing effectiveness and cost-effectiveness of healthcare and providing guidance. Since 2005, the NHS in the UK were legally required to provide funding for medicines and treatments which the NICE appraisal

board had approved (Sorenson et al., 2008), this move embedded economic evaluations into the UK healthcare as NICE include a costing analyst and health economist as members of their Guideline Development Groups responsible for recommending healthcare (NICE, 2012).

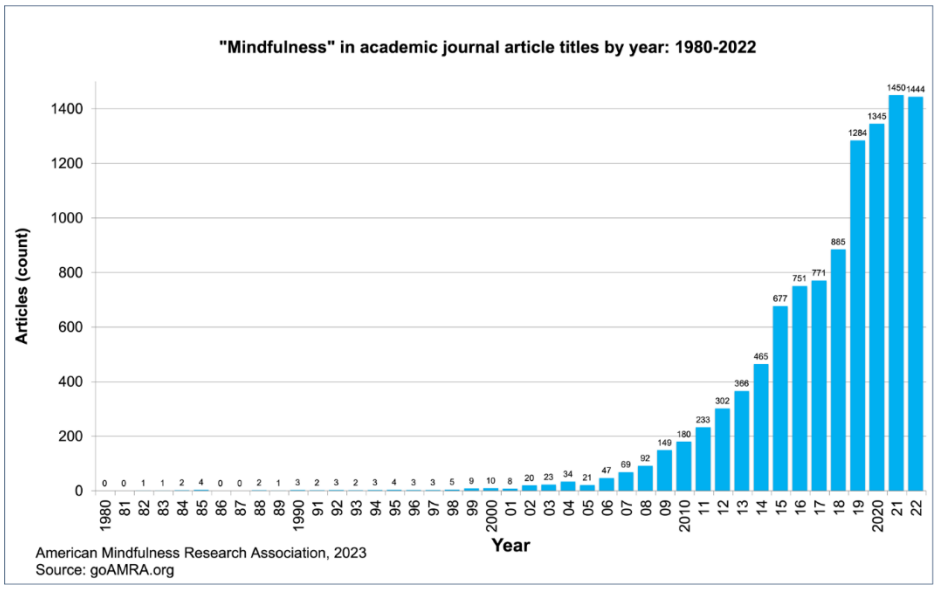
The perspective of an economic evaluation determines the costs and benefits included in calculations therefore economic evaluations can differ depending on their scope and intent (Public Health England, 2018), this is reflected in NICE's guidelines manual for assessing health interventions (NICE, 2012). As a comparator is required for an economic evaluation (NICE 2008; Edwards et. al, 2013), NICE's guidelines stipulate that economic evaluations are modelled around a 'well-conducted' randomised controlled trial or using a using decision-analytic technique which includes data from a variety of published sources required to make a robust calculation (NICE, 2012).

In April 2013, NICE was renamed from the National Institute for Health and Clinical Excellence to The National Institute for Health and Care Excellence (again retaining its NICE abbreviation), at this point NICE also transitioned from a special health authority to an executive non-departmental public body (Wyatt, 2004) meaning that NICE is now accountable to the public via parliament and are independent from government ministers (Cabinet Office - UK Government, 2006).

Mindfulness-Based interventions have become increasingly popular as an intervention to support mental health with the research evidence-base growing over the years, Figure 4.1 (AMRA, 2023) (O'Reilly et al., 2014; Simpson et al., 2014; Zenner et al., 2014). Effectiveness of Mindfulness has been reported when addressing a range of health issues such as depression, anxiety (Blanck et al., 2018), stress (Sandra et al., 2016), insomnia (Boeve, 2008), addiction (Sancho et al., 2018), pain (Hilton et al., 2017, Khoo et al. 2019) and weight management (Fuentes Artiles et al., 2019, Zhang et al., 2021). This increase in the scientific evidence-base supports Mindfulness as a credible intervention for this study however this study goes beyond reviewing effectiveness and offers an economic evaluation to calculate if a Mindfulness-based intervention (Frantic World) is cost-effective in the workplace when offered to employees for general mental health management.

Figure 4.1

Mindfulness journal publications by year, 1980-2022 (AMRA, 2023)



4.2 Challenges of economic evaluation in complex healthcare interventions

The challenges of complex interventions and complex settings in healthcare are discussed in Chapter three, in addition to those listed are specific challenges to economic evaluations of complex interventions in healthcare. RCT's also gained popularity in public health interventions as those in the field moved to increase the validity of their work, this led to The Cochrane Collaboration producing guidance for the field in 1993 (Chalmers, 1993).

Evaluating a public health intervention is challenging with the effects of a complex intervention largely being dependent on context (Skivington et al. 2021) i.e what has proven to be effective in one context may not transfer over to another. Further challenges relating to complex interventions are discussed in Chapter three.

Within public health, evaluating the cost-effectiveness of interventions also poses challenges (Edwards, et al., 2013), information on resources and costs is often difficult to obtain. In addition, resources spent in one area may result in savings to be made in another area (e.g. providing proactive mental health interventions may reduce admissions to mental health units however these savings will be apparent in acute care rather than in public health). There may be a long period before benefits are realised and measuring may not be in place to capture and evaluate impact. Due to these challenges, arguments

exist against RCT's being the gold standard in research of public health interventions (Grossman & Mackenzie, 2005).

Evaluating the effectiveness and cost-effectiveness of preventative health programmes is an increasing priority, even more so following the Covid-19 pandemic and the increased burden this has placed on the limited health resources (Richards et al., 2022).

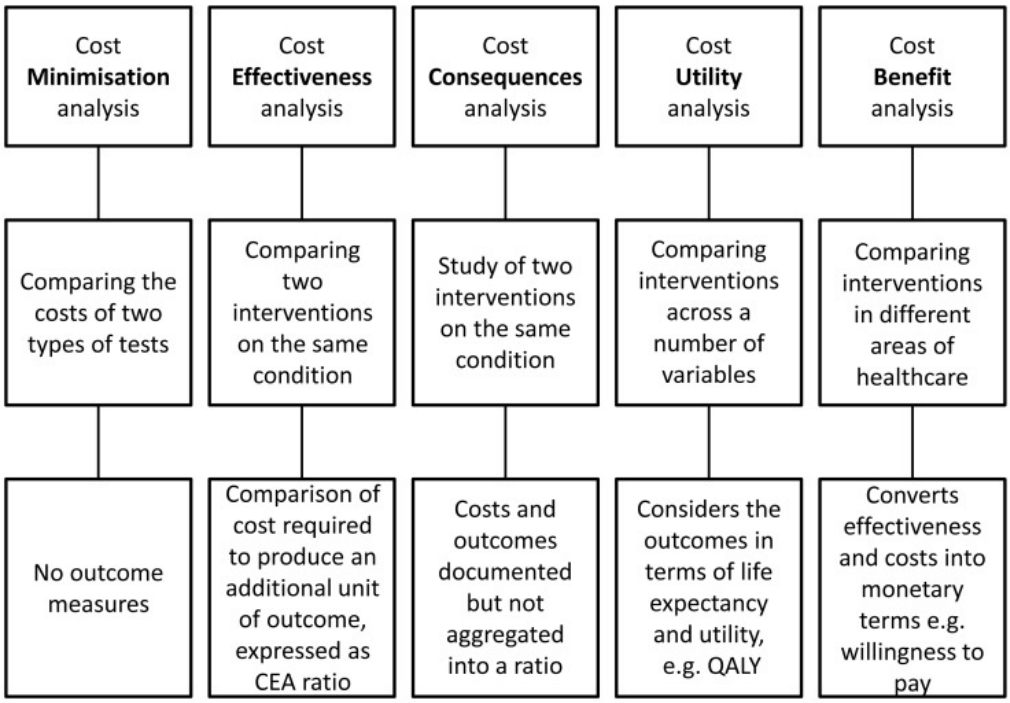
4.3 Types of economic evaluation

With limited resources and interventions bearing a cost, it is necessary to evaluate cost-effectiveness using of health interventions via economic evaluations to consider feasibility of all interventions offered.

There are five widely cited models for economic evaluation, Figure 4.2 (Goodacre & McCabe, 2002; St John & Price, 2013; Turner et al., 2021). Cost-effectiveness / cost-utility analyses / cost-benefit analyses / cost-minimisation analysis and cost-consequence analysis. The suitability of the model chosen depends on the effectiveness evaluation plus what values have been gathered in the trial to enable the full economic evaluation to be conducted.

Figure 4.2

Summary of 5 key economic evaluation methods (John & Price, 2013)



4.4 Levels of economic evaluation

In addition to the economic evaluation types and models, there are two levels of economic evaluation available for health economists to utilise (Turner et al., 2021) - full or partial economic evaluations (Figure 4.3). Partial economic evaluations do not include a comparator i.e a control group and therefore do not enable decision makers to understand the cost of the intervention vs treatment as usual / control. (Rabarison et al., 2015; Turner et al., 2021) (Table 4.1) As the value for money is not possible to conclude from a partial economic evaluation, a full economic evaluation method was used for this trial.

4.5 Effectiveness results

When evaluating cost-effectiveness in health economics, the primary goal is to find an intervention which is more effective and either less expensive than an alternative (such as treatment as usual), or more effective, even if more expensive, with a willingness to pay, if either were the case the intervention would be recommended. Where the effect of a new intervention is less effective than the alternative, that intervention would not normally be recommended as there are no additional benefits, even if it is cheaper, recommending in this situation could be considered unethical (Williams, 1974).

A full summary of the effectiveness results of this study can be found in Chapter three with a summary below (Table 4.2)

Figure 4.3

The difference between full and partial economic evaluations (Turner et al., 2021)

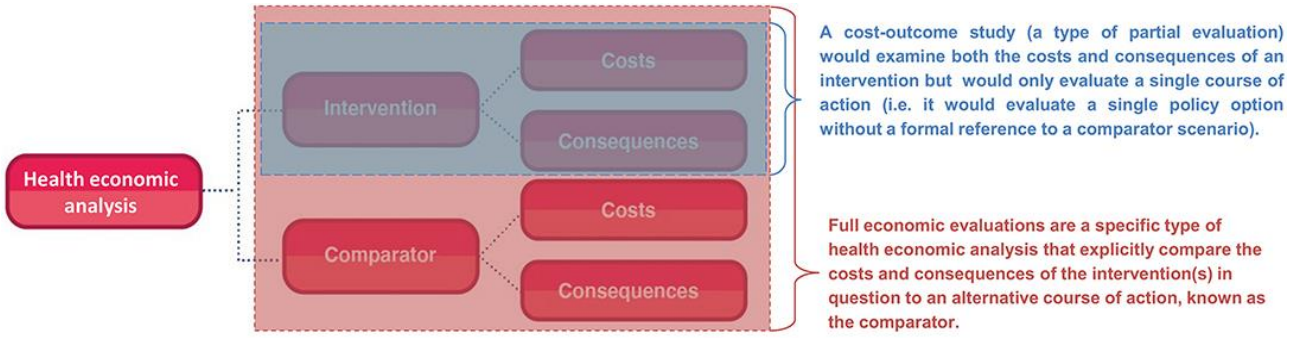


Table 4.1

Types of Economic Evaluation and Decision Levels (Rabarison et al., 2015)

Type	Description	Measures	Decision level
PARTIAL ECONOMIC EVALUATION			
Cost of illness analysis	Disease economic burden	Net cost ($)	Public health decision-makers at the local, state, and national levels
Program cost analysis	Net program cost	Net cost ($)	Public health decision-makers at the local, state, and national levels First step to CEA, CUA, and CBA
FULL ECONOMIC EVALUATION			
Cost-benefit analysis (CBA)	Compares different programs with different outcomes (e.g., health vs. other area)	Benefit-cost ratio ($benefit: $cost)	National level and broader perspective, such as the President and Congress (e.g.,: Congress needs to decide between investments in health or investments for another program)
Cost-effectiveness analysis (CEA)	Compares interventions with the same outcomes (ex: between two cervical cancer interventions)	Cost-effectiveness ratio ($per case averted)	Program level (ex: a cancer program director decides to fund one of two possible cervical cancer prevention interventions)
Cost utility analysis (CUA)	Compares interventions with different health outcomes (ex: cervical cancer vs. Alzheimer's disease)	Cost-utility ratio ($per QALY saved)	Agency level (ex: the CDC or a local health agency director decides between funding cervical cancer or Alzheimer's disease interventions)

Table 4.2

Summary of all Measures Statistical Significance and Effect sizes

	Statistical Significance		Effect size	
Outcome	POST	12-MONTHS	POST	12-MONTHS
Perceived Stress Scale	No	No	Medium	Small
Five Factor Mindfulness Questionnaire	Yes	Yes	Large	Medium
World Health Organisation – Summary Quality of Life	No	No	Small	No
World Health Organisation – Satisfaction with Health	No	No	Small	No
Cognitive Failures Questionnaire	No	Yes	Medium	Medium
ICECAP-A	No	No	Medium	Small
EQ5D-3L	No	No	No	No
EQ5D-VAS	No	No	No	No
Leadership Style	No	No	No	No
Service Use Sickness	No	No	Small	Small

This economic evaluation reviews the trial where study design, population, effect measures, data collection and control, sample size etc are reported in Chapter three. In this trial, only the Mindfulness traits and reduction in cognitive failures returned a statistical significance in effects. The effectiveness evaluation (in Chapter three and

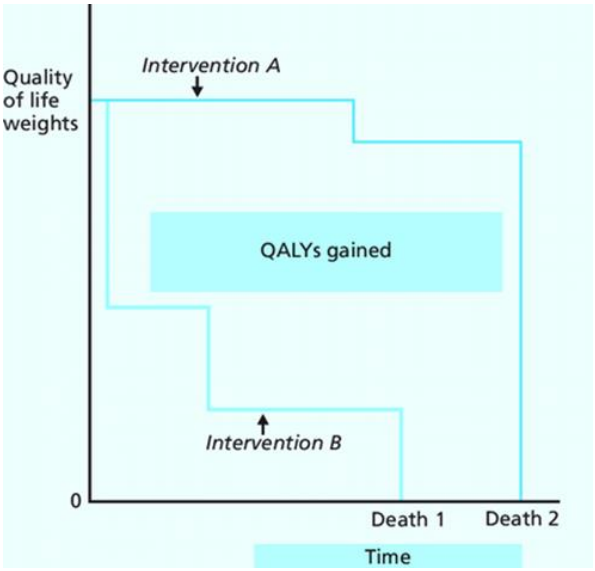
summary above) shows no statistically significant results on the measures required for health economic calculations.

4.6 Health economics evaluation method used

The model of evaluation originally planned for use in this economic evaluation was a cost-effectiveness analysis using a 'Quality Adjusted Life Year' (QALY) formula, this is utilised when there is a choice to be made from multiple effective interventions. The QALY enables a conversion of treatment effects into a unit format (Phillips, 2001). This format allows a comparison of different healthcare treatments to measure the benefit of an intervention, in terms of quality of life, over a patient's lifetime. The QALY calculation provides decision makers with comparable measures a trial participant may gain by using a specific intervention / treatment (Figure 4.4). Mechanisms such as this are crucial for the allocation and distribution of limited funds when the demand exceeds resources.

Figure 4.4

Description of Quality Adjusted Life Year (QALY) model (Phillips, 2001)



As the intervention in this study was not found to be effective (when reviewing the primary Perceived Stress outcome) (as detailed in Chapter three), a decision was made to defer to a cost-consequence analysis, this approach would provide additional narrative for the workplaces to review the economic evaluation in a way deemed most helpful to them i.e

detailing costs and resources required from an organisational perspective to enable informed decision making.

Cost-consequence analysis (CAA) as an evaluation approach is considered appropriate and relevant when undertaken alongside public health interventions (Charles et al., 2019). Therefore, due to the lack of proven effectiveness and the appropriateness of this method, a CCA approach was adopted to enable employers to make an informed decision on investment in this intervention in their workplace. As this trial had a range of outcome measures, a CCA will enable a review of all the outcomes which can be difficult to combine into a common unit for measurement (Burgard & Chen, 2014).

4.7 Cost-consequence analysis

Accurate information regarding the cost-effectiveness of interventions is crucial to decision making and to inform policy, it is also a fundamental when assessing the cost-effectiveness of resource allocation. To enable a cost-consequence analysis of the trial, the effects have been evaluated (Chapter three) and costings have been broken down using a micro-costing approach. In this cost-consequence analysis, only the costs of the staff attendance / time off work, delivery, materials, venue hire, and staff time were included. Other costs such as stationary, contribution to utility services (when in-person), I.T equipment and server costs (when online) etc were not included.

There are two approaches to micro-costing (micro-costing and gross costing). When processing a micro-costing calculation for healthcare resources the market price is not used to calculate costs as this would leave to an overestimate due to influences of market power. Therefore, costs are measured by the 'opportunity cost' i.e the value of the next-best alternative (Frick, 2010). Accurate costs of interventions are required if further economic evaluations are planned such as cost-effectiveness or cost-benefit analysis (Charles et al. 2013).

Micro-costing (sometimes referred to as bottom-up micro-costing) includes the identification of participant-specific resource use and site / location specific unit costs, calculating them to reach a total cost per participant. This method has been cited as the gold standard in costing methodology (Parkinson et al., 2014) however it is resource heavy and not always possible with assumptions of costs often required and practical feasibility overlooked (Špacírová et al., 2020). Gross costing (sometimes referred to as top-down micro-costing) is defined by the identification of participant specific resource use and national tariffs as unit costs. This methodology is more widely used as national

tariffs are more accessible site / location unit costs (Ridyard et al., 2010). Both methods have their benefits and criticisms with bottom-up micro-costing being suspectable to overestimating assessed costs and top-down micro-costing suspectable to underestimating costs (Hrifach et al., 2016).

Perspective

The perspective of the micro-costing is crucial to determining the inclusion and exclusion criteria for the costing calculation with perspectives ranging from employer, healthcare and public sector (Charles et al., 2013). Previous recommendations advise that the perspective should take into account the costs and benefits of the intervention, irrelevant of who the funder might be and as such this holistic perspective is by definition a societal one (Ridyard et al. 2010). As this micro-costing and wider economic evaluation will be advising employers and policy makers, the employer approach is deemed appropriate and most beneficial and has therefore been adopted. It was not necessary to apply any discounting as all costs are within a one-year time frame.

This economic evaluation will be considered from the employer perspective given that the costs associated to employee mental health in the workplace are one of the main threats to the working environment (discussed in Chapter one). The intention is that employers and decision-makers in workplaces can utilise the guidance offered in this thesis to consider the healthcare interventions offered in the workplace with an increased understanding of both the effectiveness and cost-effectiveness following a trial.

Measures

Intervention costs included the teacher training time and course materials were calculated from researcher knowledge of the industry and fees payable to teachers at the Centre for Mindfulness Research and Practice at Bangor University, Bangor UK (CMRP, 2023) and the Oxford Mindfulness Foundation, Oxford, UK (OMF, 2023). For in-person delivery, room hire average costs were calculate based on information from a central NHS room hire service NHS (NHS Open Space NHS, 2023) with online costs calculated using the Zoom online platform costs (Zoom, 2023). Participant attendance / labour costs and trainer development time were calculated using Personal Social Services Research Unit (PSSRU) Costs of Health and Social Care Staff (Curtis & Burns, 2020) at Band 4 ‘Professional Staff’. All PSSRU costs throughout the analysis are taken from the 2020 PSSRU rather than the latest 2022 report to avoid impacts of Covid-19 influencing the

outcome. Staff development costs were calculated using an estimate of the hours involved (informed by researcher knowledge of the field) and using PSSRU salary calculations.

Costs

Two types of micro-costing have been carried out to support employers with information from a cost-consequence analysis. In both micro-costings there are no costs shown for the control group as the 'treatment as usual' design incurred no additional costs due to the waitlist design. The first evaluation used the format of delivery used in this trial i.e an external Mindfulness professional was brought into the workplace to deliver the programme. Whilst the costs for teachers and materials were waivered to support this research, the full costs (had they been paid) have been included in the micro-costings. The second evaluation method considers the costs for delivery if the employer were to train up an existing employee to deliver the courses in-house i.e not buying in external Mindfulness professionals. This dual analysis provides two scenarios for employers to evaluate and inform their decisions. Both versions of the analysis also break down the costs into in-person and online modes of delivery for additional information.

Micro-costing using this trial method of commissioning in the Mindfulness teacher does not have any 'front-loaded' teacher training costs, each course cost includes external teacher fees, which would be subject to external market fluctuations. The costs for this approach total £21,769 per group / £907.04 per participant when delivered **in-person** to a group of 24 participants. The costs for this approach total £20,144 per course / £839.31 per participant when delivered **online** to a group of 24 participants. Both the in-person and online costs include staff attendance time and a level of staff coordination time (liaison with the external teacher, internal promotion and gathering of feedback post event). The in-person costs include the venue hire, the online include the Zoom platform fees (summary Table 4.3, full costing Appendix 7). Both costing models have the same ratio for face-to-face time costings, irrelevant if online or in-person.

Table 4.3

Micro-costing – Mindfulness course delivery – with an external Mindfulness teacher

Mindfulness courses costs if delivered by an external Mindfulness teacher – based on 24 participants per course

Method of delivery	Intervention costs per group	Intervention costs per participant
In-person		
In-person course delivered by externally trained Mindfulness teacher commissioned to deliver	£21,769	£907.04
Online		
Online course delivered by externally trained Mindfulness teacher commissioned to deliver	£20,144	£839.31

The micro-costing when investing in training an employee to deliver in-house include a 'front-loaded' cost of teacher training fees and employee hours to addend the training which is added to the first course. As there is no regulatory body for Mindfulness the level of training required (and associated costs) have been modelled on the Good Practice Guidelines for Teachers from the British Association of Mindfulness-Based Approaches (BAMBA 2023). Subsequent course costs are included for comparison where the initial teacher training is removed. Supervision costs are included for the first course taught as part of the initial teacher training, ongoing supervision costs (to meet good practice guidance for Mindfulness teachers) is included as costs for the second (and subsequent) course costs. Using this method, total costs are £32,990 per group / £1,374.58 per participant (for the first course) when delivered **in-person** to a group of 24 participants. The costs for this method total £31,395 per course / £1,308.13 per participant (for the first course) when delivered **online** to a group of 24 participants. These costs include staff attendance time and employee costs for time spent coordinating, internal promotion, liaising with participants between courses (in the Mindfulness teacher role) and gathering of feedback post event, the in-person costs include the venue hire and the online include the Zoom platform fees (Tables 4.2 & 4.3).

The second course costings follow the same principles for the first course, delivered by an employee in-person, however, the seconds course costing does not include the initial teacher training element. With the initial Mindfulness teacher training costs removed, the

second and subsequent course delivery costs are £19,605 per group / £816.88 per participant when delivered **in-person** to a group of 24 participants. The costs for this method i.e with the initial teacher training costs removed, total £18,010 per course / £750.42 per participant when delivered **online** to a group of 24 participants (Table 4.4 & 4.5).

Table 4.4

Micro-costing – In-person Mindfulness course delivery – employee as Mindfulness teacher

<u>In-person</u> Mindfulness course via training an employee to deliver in the workplace – based on 24 participants per course

First course plus second (and subsequent) course costs	Intervention costs per group	Intervention costs per participant
First in-person course delivered by employee to include teacher training costs absorbed into first course costs	£32,990 *Breakdown:* £13,385 (initial training) & £19,605 (all costs)	£1,374.58
Second and subsequent in-person courses delivered by employee initial teacher training costs have been accounted for previously	£19,605	£816.88

Table 4.5

Micro-costing – Online Mindfulness course delivery – employee as Mindfulness teacher

<u>Online</u> Mindfulness course via training an employee to deliver in the workplace – based on 24 participants per course

First course plus second (and subsequent) course costs	Intervention costs per group	Intervention costs per participant
First online course delivered by employee to include teacher training costs absorbed into first course costs	£31,395 *Breakdown* £13,385 (initial training) & £18,010 (all costs)	£1,308.13
Second and subsequent online courses delivered by employee initial teacher training costs have been accounted for previously	£18,010	£750.42

Excluding the investment in employee teacher training, the difference between buying in an external Mindfulness teacher for each course and offering in-house delivery (excluding

the employee teacher training costs) for an in-person course is a saving to the employer of £2,164 per group or £90.17 per participant (based on 24 participants). Buying in an external provider for in-person teaching would average £21,769 per course (see appendix 4 – commissioning costs). The teacher training front loaded costs are £13,385, meaning the employee would need to offer 6.19 courses to accumulate a combined saving of £13,395 and move to a net zero position of investment. Therefore, one investment in an employee to train to teach Mindfulness would need the employee to deliver seven courses to provide efficiencies to the employer (verses buying in an external teacher). Subsequent courses will only remain cheaper so long as the trained employee does not leave the organisation.

An alternative costing approach would be to include the cost of training, allocating that cost over the expected number of participants over time (i.e., number of courses expected to be delivered per year and lifetime of the course, given staff turnover/life of the intervention), this approach was not used and is noted as a limitation of the costing method.

The BAMBA Good Practice Guidance advises that Mindfulness teachers understand the sector where they are teaching, there could be added benefits to an employee delivering in the workplace who fully understands the context (in comparison to an external teachers). However there also needs to be a consideration of the internal dynamics of a fellow colleague delivering such an experiential intervention which relies on personal sharing in a group setting, group dynamics and course effectiveness are discussed further in Chapter three.

As an employer, the financial impact of delivery could also include consideration to a change in sickness absence (for which a financial calculation can also be derived). Levels of sickness absence were monitored in this trial, the results reported no statistically significant impact in the sickness reporting between groups, thus a financial evaluation of the sickness impact has not been calculated.

The impact on leadership style does not have a financial calculation attached, although it may be possible to explore impact on leadership styles to production and a financial impact in the workplace, this would be a sperate costing exercise. As the leadership measures did not return a statistically significant result not an effect this calculation has not been made however the impact on leadership is discussed further in Chapter five.

4.8 Strengths and limitations of the cost-consequence (CCA) review

There are acknowledged general strengths and limitations of CCA as an evaluation method (National Institute for Health Research, 2018) (Table 4.6). In addition to these further strengths and limitations are documented below:

Table 4.6

Cost-consequence analysis strengths and limitations – National Institute for Health Research, 2018

Disadvantages	Advantages
No specific or definitive guidance on cost-effectiveness thresholds	Easily understood and applied by decision makers
Limited generalisability	Able to present a broader range of health and non-health costs and benefits
Decisions based on CCA may not be transparent or run the risk of cherry picking positive results	Alternative approaches to measuring costs and outcomes

4.8.1 Strengths of the cost-consequence (CCA) review

A strength of a cost-consequence analysis is the ability to consider the varying outcomes of a complex intervention in a complex setting which would be difficult to consider in just one measure. This approach has previously been reported as a suitable method of evaluation to encapsulate the challenges of reviewing complex public health interventions which include the full range of benefits for consideration (Edwards et al., 2015; Kelly et al., 2005; Weatherly et al., 2009). 'Externalities', as described by Weatherly (2009) outlines the benefit of considering the additional effects of an intervention. As an example, in this intervention, there is a statistically significant impact on Mindfulness traits, two of which are nonjudging and nonreactivity. Increasing ones capacity to be less judgemental and less reactive would have benefits beyond the primary outcome of stress and would 'spill out' to other areas of ones life such as with colleagues, family and friends etc. From an employer perspective these traits could be beneficial in the workplace in a range of other unmeasured areas. These 'externalities' are extremely complex to measure, this cost-consequence analysis provides an opportunity for employers to consider all the effects and sizes of such and make informed decisions based on the value they place on the shift in outcomes.

4.8.2 Limitations of the cost-consequence (CCA) review

A limitation of a cost-consequence analysis is that it does not provide a clear measurement for comparison with another intervention which you could achieve via a cost-effectiveness analysis utilising a QALY calculation (Edwards et al., 2015). For the purpose of this research this is potentially less of a concern but a consideration when allocating finite healthcare resources i.e with The National Institute for Health and Care Excellence, UK (NICE, 2008).

This economic review was impacted by all the previous limitations detailed in Chapter three, some of these include: weak monitoring of personal practice, loss of contact with participants, lack of qualitative analysis, using only self-report measures, limited follow up time.

Another limitation was using estimates for salaries and venue hire, whilst these were based on robust government guidance documents, they remain an estimate, within a workplace it is possible that only senior leaders may be offered this intervention or trained to teach, in which case the costs would be higher, this cost-consequence analysis assumes middle grade government salaries and this will vary with sector and roles / grades of employees engaging with the intervention.

4.9 Summary and conclusions of the cost-consequence analysis

Main findings from this analysis show that (excluding teacher training fees) there is a cost between £907.04 - £816.88 per employee for in-person courses and £839.31 - £750.42 for online courses. These costs include the staff time to attend, teacher time (either external fees or employee salary) plus materials venue (or online platform fees). To deliver the course in-house a staff member would need to undergo Mindfulness teacher training (if not trained already), this would add an additional £13,385 to the initial costs for the employer and only see a return on investment after six courses have been taught.

Online Mindfulness training has increased in popularity since the Covid-19 pandemic with recent literature supporting the suitability of online programmes with positive effects using similar measures to this trial including a health questionnaire, general anxiety disorder evaluation and the Five-Facets Mindfulness Questionnaire (Al Ozairi et al., 2022). Therefore, whilst this study was not conducted online, employers can use this costing exercise to make decisions based on either online or in-person delivery with some

reassurance that the online format is capable of returning effects (if a suitable intervention was used).

As detailed in Chapter three, the effectiveness analysis from this trial produced mixed results. An employer considering the cost-consequences of implementing Mindfulness in this way in future would need to assess the value to the organisation and their employees of the small to medium reductions in perceived stress, small initial quality of life improvements which do not present after 12-months, medium effects on cognitive failures and large to medium increase in Mindfulness traits. Bearing in mind only the cognitive failures and Mindfulness traits are statistically significant.

To support decision making it is helpful to review each of the measures where there was an effect shown. When considering the medium to small effects of the Perceived Stress measure; research shows that stress, and in some cases job stress (Fink, 2016) is linked to various other negative health factors such as depression (Bakunina et al., 2015) sleep problems (Wallace et al., 2017), eating disorders (Smith et al., 2021), substance misuse (Linsky et al., 1985) higher divorce rates (Colby et al. 1994) and heart attacks (Fink, 2016). An employer deciding on investment in Mindfulness in the workplace may wish to consider the potential additional benefits of reducing stress in the workplace, particularly if any of the associated negative symptoms of stress are prevalent in the workplace. This particular intervention structure in the workplace returned non statistically significant improvements in perceived stress levels however a positive impact of Mindfulness and the reduction on stress levels is well reported following engagement with Mindfulness (Chiesa & Serretti, 2009; Felton et al., 2015; Yang et al., 2018; Zollars et al., 2019) and further exploration to establish a more suitable and impactful Mindfulness programme in the workplace may be beneficial to reduce stress and further increase the effectiveness.

The World Health Organisation Quality of Life Brief (WHOQOL-BREF) measure requires the participant to rate four domains related to quality of life: physical health, psychological, social relationships and environment measures. Employees who are suffering with physical health issues can find their job performance reduced as they are distracted or their capacity to perform is marred by their handling of issues such as pain or discomfort (Ford et al., 2011). Improved psychological health (such as depression) of employees can financially benefit employers (Stewart et al., 2003) as work performance is reduced when employees are suffering with poor psychological health. The 2003 Stewart et al. study reported an estimated $44 billion per year was lost to poor productivity linked to

employees with psychosocial health problems. Additional research also reports that improved psychological health impacts on self-reported levels of performance with psychological health being a higher predictor of improved work performance than positive roles or work attitudes and (Robertson et al., 2012).

To best utilise the CCA data provided in this trial, employers would benefit from first establishing their desired outcomes i.e the changes they would like to see in their workplace following an intervention, calculating the various negative costs (monetary or otherwise) the challenges are currently costing their organisation. With outcomes clarified, employers could then review the impact and effects established in this trial along with the costs detailed in the micro-costing, deciding if the consequences of investment in Mindfulness (as delivered in this trial) outweigh the financial costs to deliver / implement.

4.10 Research question and findings summary

Key question - What are the financial implications for employers when offering Mindfulness in the workplace?

Chapter three details the lack of effectiveness found when implementing Mindfulness in the workplace and evaluating the primary measure of Perceived Stress during this trial. As an intervention cannot be cost-effective if it is not first found to be effective (Edwards, et al., 2015) then it would not be cost-effective to introduce Mindfulness (to reduce Perceived Stress) using the programme and method adopted in this trial. To enable an economic evaluation in this circumstance, a cost-consequence analysis has been conducted thus providing decision makers in the workplace with information to review the findings and form their own opinions on the potential outcomes and the financial consequences of investing in the intervention.

If, after reviewing the potential effectiveness, employers then decide to proceed and offer the intervention, the evaluation in this chapter supports the financial modelling required for implementation. This chapter details the upfront investment in Mindfulness teacher training and the on-going deliver costs and compares this with the alternative of commissioning external Mindfulness teachers. The micro-costing shows that (excluding teacher training fees) there is a cost between £907.04 - £816.88 per employee for in-person courses and £839.31 - £750.42 for online courses, when compared to the average cost of a similar course from the Oxford Mindfulness Foundation of £300 per person (on-line courses) (OMF, 2023), it is more costly to deliver Mindfulness courses in-house when

employees are delivering the training, utilizing the workplace premises and with staff members taking time off work to attend. Organisations with a sufficient budget and a desire to have a bespoke course may be willing to pay the premium to invest in this approach, however, for many, the lack of statistically significant effectiveness outcomes and increased financial investment (of in-house delivery) will not be attractive.

Having reviewed the cost-effectiveness of the Mindfulness programme, the next chapter considers how mindfulness could impact more commonly reviewed workplace outcomes.

Chapter Five
Mindfulness In The Workplace
Business Case Analysis

5.0 Chapter preface

After reviewing the effectiveness in Chapter three and the cost-consequences in Chapter four, the aim of this chapter is to review the effectiveness measures used in this trial which are more commonly considered in the workplace.

This chapter pulls together the results from Chapters three and four, whilst this might initially appear to be repetitive, the intention is to consider the results specifically through the lens of the employer. This chapter offers space to explore in more detail the measures and outcomes relevant to the workplace. This will enable employers to consider additional impact from the Mindfulness course which could prove useful in managing culture and leadership. Using the data gathered from the RCT (detailed in Chapter three) the business variables e.g impact on sickness levels, leadership style and cognitive failures are evaluated.

5.1 Introduction to business case analysis

In 2015, the UK Mindfulness All Party Parliamentary Group (APPG) collaborated with the Mindfulness initiative to publish a report recommending further research into the use of Mindfulness as an intervention to address occupational mental health issues such as stress in the workplace (Mindfulness Initiative, 2015),since then, many research projects have pursued and contributed to the field (see Chapter two for further detail). The evidence-base remains varied with complexity in comparisons due to differing interventions, with a range of trial structures, outcomes and settings researched (Jamieson & Tuckey, 2017). There is some evidence that Mindfulness is not helpful in the workplace e.g impairing motivation (Hafenbrack & Vohs, 2018), no increase in critical thinking (Noone & Hogan, 2018) conflicting information linked to motivation and Mindfulness in the workplace (Hafenbrack, 2021; Hafenbrack et al., 2020) (see Chapter six for more information). Where evidence supports Mindfulness, an ongoing challenge is presented in the implementation, suitability of intervention and context and sustainability of the intervention, with leadership driven implementation identified as one key success factor to promote Mindfulness (Crane & Kuyken, 2013).

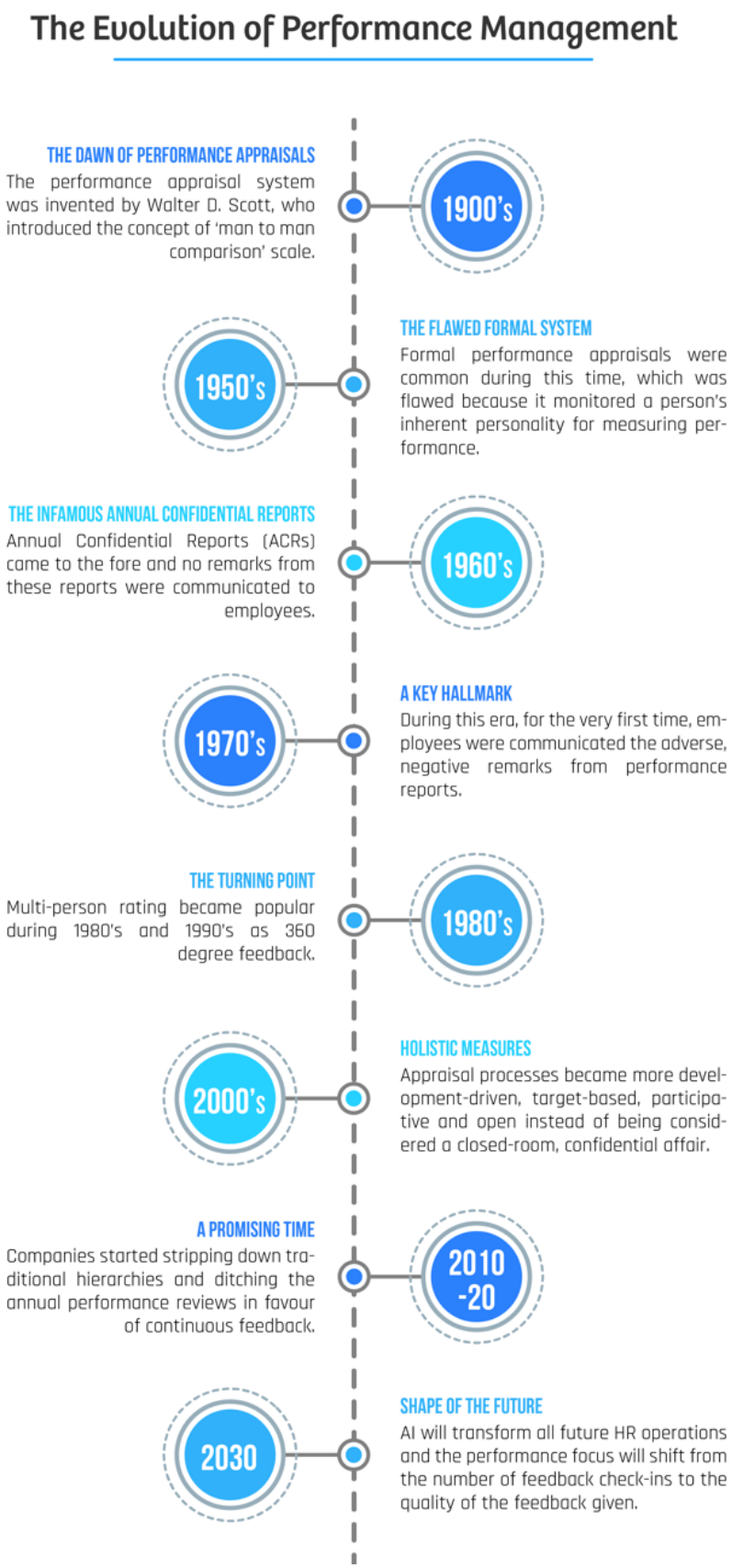
Despite the challenges in reviewing the effectiveness of Mindfulness in the workplace, NICE cited Mindfulness as one of the most effective interventions to improve general wellbeing, reduce job stress and poor mental wellbeing in the workplace (The National Institute for Health and Care Excellence, 2022).

Since the 1760's (industrial revolution) workplaces have been measuring employee and organisational performance, originally with a focus on efficiency, control and monitoring (Radnor & Barnes, 2007). Performance management is regularly researched area in the corporate world, with the evolution of management approaches well documented (Chatterjee, 2020) (Figure 5.1). (DeNisi & Murphy, 2017; Pulakos et al., 2019; Wiese & Buckley, 1998) Whilst performance management styles and intentions have evolved over the years, from being a management and control initiative to a more supportive and growth model, there was some concern about the perceived intentions of monitoring performance when designing this study. The conscious decision not to measure performance was to alleviate the perception that Mindfulness could be used with the intention to cultivate more productive employees (when this study was designed in 2013 Mindfulness in the workplace was not as commonplace as it is in 2023), therefore 'performance' as a distinct measure was not used, however the workplace measures explored are linked to performance in differing ways.

Considering three areas, 1) sickness absence, 2) leadership style and 3) cognitive failures provides a structure for this review of Mindfulness interventions in the workplace. These measures step outside of the wellbeing variables typically researched and considers outcomes which are more commonly discussed and reviewed in a workplace. Specifically, evaluating the impact on leadership style (following a Mindfulness intervention) presents an opportunity to explore not only the personal impact of Mindfulness but the potential to shape organisational culture and permeate mindful approaches into the wider organisation.

Figure 5.1

Infographic - The Evolution of Performance Management (Chatterjee, 2020)



5.2 Sickness levels as a measurement

Workplace sickness is linked to employee wellbeing with implications of employee sick leave going beyond directly associated costs. Additional implications of sick leave range from declining morale among the wider team, additional pressure when readjusting workloads to missing deadlines and dissatisfied clients (Department for Work and Pensions, 2021). With this understanding and a broader acceptance to talk about mental health, many workplaces are now offering pro-active interventions to support the mental health of their employees and reduce sickness levels (Hesketh et al., 2020).

There are many measurements of employee wellbeing which can be utilised, job satisfaction, team cultures, physical health etc. However, if an employee's wellbeing deteriorates to the point where they are absent from work with sick leave, this provides a clear numeric tracking mechanism which can be seen as an indicator of poor levels of employee wellbeing. For this reason, monitoring sickness levels is a common strategy in reviewing employee wellbeing. Sickness absence monitoring can also enable a return-on-investment calculation of a health intervention as the numerical values can be translated into monetary terms.

Whilst calculating days off sick can provide a numerical value for comparisons and allude to general wellbeing, using sickness measurements alone is complex (Reidy, 1990). Considerations need to be given to cofounding (the requirement to consider other factors and not assume a direct correlation to the intervention) (Skelly et al., 2012) and effect modification (where the effect of the intervention will differ depending on the participants characteristics) (Corraini et al., 2017) both requiring attention when designing evaluation models and adopting sickness reporting as an informer to monitor impact of interventions (Reidy, 1990). Where data analysis can use appropriate statistical calculation methods (to account for the possible cofounding and effect modification effects) sickness absence could provide a useful insight into the impact of an intervention from an organisational perspective.

Data shows the cost of sickness absence for employers is an ongoing challenge, (Chapter one details the costs connected to sickness absence in workplaces) and whilst employee wellbeing is one driving force for workplace interventions, employers are also looking to evaluate the costs associated with wellbeing interventions to inform future financial decisions (Clarke et al., 2019), sickness absence provides one method of evaluation for workplace interventions.

5.3 Leadership as a measurement

Attempts to understand what makes a good leader can be traced back centuries (Evans, 2012), monitoring or measurement of leadership style has many functions in an organisation such as planning growth, measuring attitudes and alignment to overall vision engaging employees (Expert Panel, Forbes Councils Member, 2021). Good management in organisations results in staff with increased motivation and attunement to organisational objectives (Asaria et al., 2022). Specifically in relation to personal leadership style, there are four areas commonly recognised as key when successfully running an organisation; leading, planning, controlling and organising (Gopal, 2008). Within these areas, leadership is possibly the element with most potential to shape the organisation (Ciulla, 2020) as it's the leaders from where culture, alignment to vision and clarity of purpose often permeates.

There is an existing body of literature focusing on leadership, acknowledging the impact leaders can have on the wider teams (Boal & Hooijberg, 2000) e.g job satisfaction (Specchia et al., 2021), work-related wellbeing (Niinihuhta & Häggman-Laitila, 2022), the success or shape of an organisation e.g innovation (Sethibe & Steyn, 2015) and organisational commitment (Yahaya & Ebrahim, 2016). This chapter does not seek to add to the literature on leader impact but review variances in style following a Mindfulness intervention.

Over the last 20 years the types of leadership have been much debated with new leadership styles being articulated and researched (Banks et al., 2018) such as 'Servant Leadership' (Eva et al., 2019) where a leader puts employee and organisational needs before their own and 'Agile Leadership' (Attar & Abdul-Kareem, 2020) where the leader seeks to model and *be* the change, rather than simply promote it. With over 25 varying styles of leadership documented and available to evaluate (Hassan et al., 2016) (Table 5.1) employers are able to review leadership traits and determine which leadership style(s) work best in varying roles within their organisation.

Existing literature also reports where Mindfulness has positively impacted on leadership style resulting in improved; employee performance (Weick & Sutcliffe, 2006; Dane, 2011), job satisfaction (Reb et al. 2014) and employee wellbeing (Skakon et al., 2010). There are challenges surmising the full extent of Mindfulness courses in these various studies as the type of Mindfulness used is inconsistent e.g in some studies Mindfulness traits were evaluated rather than a dedicated Mindfulness intervention to evaluate.

With some evidence that Mindfulness impacts on leadership, and leadership style influencing both organisational performance and employee wellbeing (Dane, 2011; Reb et al., 2014; Skakon et al., 2010; Weick & Sutcliffe, 2006), this research uses a widely known leadership styles measure (The Multifactor Leadership Questionnaire (MLQ), to explore how a structured Mindfulness course impacts on leadership style. Knowledge gained could inform employers and aid strategic planning in the workplace.

To enable a comparison of leadership style variances to existing literature (following a Mindfulness intervention), this research utilised a measure which included a review of three of the common leadership styles, Passive Avoidant Leadership; Transactional Leadership; Transformational Leadership. The MLQ measure has strong evidence for validity, gathering data on various leadership styles in one measure with nine scales: five transformational, three transactional, one laissez-faire (Bajcar & Babiak, 2022).

Table 5.1

List of leadership style examples adapted from 'Determinants of Leadership Style in Big Five Personality Dimensions' (Hassan et al., 2016)

#	Leadership style	Key Characteristics
1	Autocratic	Punitive, dominating, dictatorial, unilateral decision making.
2	Democratic	Considerate, participative, group decision making.
3	Laissez-Faire	Lack of involvement, avoidance of responsibilities.
4	Transactional	Clarification of subordinate responsibilities, contingent rewards.
5	Task Oriented	Planning and organizing work activities, clarification of roles.
6	Interpersonal	Tactful, enthusiastic, encouraging, confidence builder.
7	Transformational	High performance expectations, inspirational, influential.
8	Charismatic	Strategic vision, unconventional behavior, agents of change.
9	Distributed	Collaborative, intuitive working relations, institutionalized practices
10	Participative	Shared decision making, values others' input, seek consensus.
11	Directive	Issuing instructions and commands, assigning goals
12	Ethical	Considerate, honest, caring, principled, proactive, co-operative
13	Authoritative	Assertive, supportive, demanding, responsive, manipulative
14	Authoritarian	Self-oriented, rigid, defensive, apathetic, assertive, task-oriented
15	Intellectual	Clear vision, higher level of cognitive ability, conscientious.
16	Instrumental	Neurotic, require high commitment from followers, task oriented.
17	Coercive	Conformity, repressed creativity, inflexible, authoritarian.
18	Team-oriented	Collaborative, team integrator, encourage diversity, democratic.
19	Delegative	Procedural fairness, low need for dominance, shared power.
20	Autonomous	Individualistic, disrupts existing policies, facilitates knowledge.
21	Coaching	Facilitator, authentic, compassionate, interpersonally sensitive.
22	Affiliative	Motivator, creates harmony, empathetic, conflict reducer, visionary.
23	Supportive	Interpersonal trust, employee empowerment, caring.
24	Relationship-Oriented	Concern and respect for followers, supportive.
25	Consultative/Advisory	Guidance to followers, low external and high internal locus control.
26	Humane-oriented	Fair, compassionate, modest, social welfare, motivational.

5.4 Cognitive failures as a measurement

A cognitive failure is defined as an error or difficulty processing a simple task that can usually be completed without any problem (Allahyari et al., 2014) or problems in carrying out routine tasks in daily life (Carrigan & Barkus, 2016). Measuring cognitive failures could provide valuable information to organisations alongside establishing an intervention to reduce cognitive failures in the workplace.

Much of the literature in this area is centred around workplace accidents (Allahyari et al., 2014; Petitta et al., 2019; Simpson et al., 2005; Wadsworth et al., 2003) such as industrial accidents (O'Hare et al., 1994), and traffic accidents (Larson & Merritt, 1991). Generally studies agree that a reduction in cognitive failures is linked to fewer workplace accidents. Literature which reports on cognitive failures in the workplace which includes measures of job performance, again focuses primarily on workplace safety and performance linked to accidents (Park & Kim, 2013; Wallace & Chen, 2005; Wallace & Vodanovich, 2003a).

Some literature focuses on the link between cognitive failures and employee burnout with multiple studies finding a positive correlation between reduced burnout and fewer cognitive failures (Athar et al., 2020; Linden et al., 2005). When looking specifically at improvements in employee performance, a correlation has been established with employees reporting they are quicker to acquire job knowledge and implement knowledge to their roles where they have reduced cognitive failures. (Hunter, 1986; Schmidt, 2002). A correlation has also been identified between a reduction in cognitive failures (achieved by improved sleep quality) and improved work performance (Rostampour et al., 2022), with improved performance and conscientiousness observed when cognitive failures were reduced (Wallace & Vodanovich, 2003b).

There are challenges to the theory that increased cognitive ability *alone* increases job performance (Van Iddekinge, et al., 2018) with ‘motivation’ and ‘ability’ cited as additional critical factors. As Mindfulness traits are linked to increased motivation (Donald et al, 2020) and ability to deliver performance (Röthlin, et al., 2016). In theory this could imply if a Mindfulness intervention was proven to increase Mindfulness traits, and potentially motivation, plus reduce cognitive failures, this could translate into a positive effect on employee performance, further research in this area is required.

5.5 Evaluation perspective

This business review was conducted from the employer perspective with the intention to provide knowledge and insights to organisations to enable them to make informed decisions on their wellbeing offerings. This research is intended to link measures which are valuable in a leadership context alongside an employee wellbeing intervention.

Impact on leadership style and cognitive failures were both analysed (see full details of statistical analysis process in Chapter three) as they were considered outcomes which would be provide valuable organisational insights. As discussed in Chapter one, sickness absence costs are a significant financial burden on workplaces and any method to reduce sickness absence costs would likely be welcomed. In addition, cognitive failures was considered (when designing the research) a lesser explored outcome of mindfulness interventions with the potential to translate impact into a organisational measure with workplace value to employers.

5.6 Methods

5.6.1 Sickness absence

The Service Use Measure gathered information on self-reported sickness absence, asking the participants at each time point to detail any sickness absence they had taken from work in the two months prior to the data point. An ANCOVA analysis enabled the potential confounding factors and effect modification of age and gender to be mitigated. The data was analysed firstly looking at all sickness data (irrespective of reason) and then subsequently analysed the data looking specifically at mental health related absences reported which may have benefited from the Mindfulness intervention. The mental health absences included were classified as 'Depression or Anxiety' on the monitoring form with other absences categorised as; minor illnesses which cover sickness such as cough and colds stress; musculoskeletal – back and neck problems; other.

5.6.2 Leadership style

The MLQ leadership measure utilised in this trial consists of nine scales which measure three leadership styles, five scales measure transformational leadership style, two scales measure transactional leadership style and two scales measure passive/avoidant leadership behaviour. In addition, there are three scales that measure the outcomes of leadership style, these are not calculated from respondent's answers but calculated by

the researcher using the measure's criteria for scoring. Scales, styles and outcomes are reported separately.

With all the attributes, the higher the score, the higher presence of that trait in the leadership behaviour.

Leadership style descriptors and summaries

The leadership style descriptors used in the measure used in this research are common in the field, although there are variances on how they are presented (Drew, 2022) (Figure 5.2). From the MLQ measure:

5.6.2.1 - Passive Avoidant Leadership – a style often described as the least satisfactory leadership style for employees looking for leadership. Under a Passive Avoidant or Laissez-faire leader, employees are left to motivate themselves and make their own decisions. This can work well for motivated and very skilled employees, however this approach doesn't work so well for those looking for guidance and leadership inspirations (Bass & Bass, 2009).

5.6.2.2 - Transactional Leadership - a style based on a rewards and punishment model with leaders rewarding positive and punishing poor work performances and behaviour (Bass, 1997). This style is considered more 'management' than 'leadership' (Hargis et al., 2001).

5.6.2.3 - Transformational Leadership – a style seen in leaders who adopt an open-minded approach, leading with motivation and are often viewed as inspirational and role models (Thanh & Quang, 2022). Transformational leaders most value honest, integrity, respect and fairness in their workforce (Korejan & Shahbazi, 2016).

The leadership measure used in this research evaluation has strong evidence for validity and gathers information on various leadership styles in one measure with nine scales: five transformational, three transactional, one laissez-faire (Bajcar & Babiak, 2022)

5.7 Results

5.7.1 Descriptive statistics

273 participants commenced the trial, (intervention n=139, control n = 134). Whilst nine participants formally withdrew after trial commencement, all randomised participants have been included in this business case review with two exclusions due to missing baseline

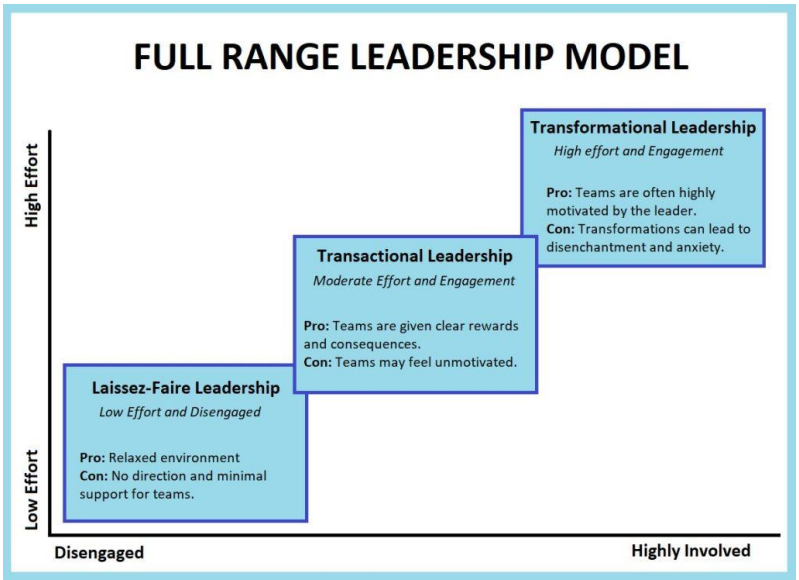
demographic data. Resulting in an analysis of n=138 intervention, n=133 control, total number 271. Full details of the descriptive statistics are discussed in Chapter three.

5.7.2 Sickness absence

Neither the full sickness analysis nor the mental health sickness analysis returned a statistically significant impact following the intervention (see Chapter three for full results). This finding is consistent with that from an earlier trial which also found no significant difference in sickness reporting absence following teachers engaging in a Mindfulness trial (Roeser et al., 2013).

Figure 5.2

Full Range Leadership Model: Definition & Example (Drew, 2022) Laissez-Faire = Passive Avoidant in MLQ Leadership measurement terminology

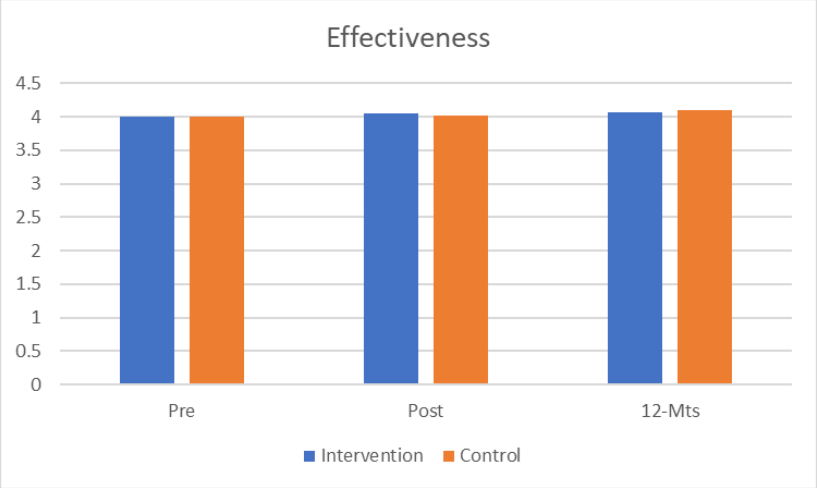


5.7.3 Leadership style

Leaders with strong 'effectiveness' attributes demonstrate skills in a range of areas specifically in leading effective groups and meeting organisational requirements. Both the intervention and control group reported an increase in these attributes with the control group reporting a higher increase (Intervention Pre=4.002, Post=4.042, 12-MONTHS=4.058; Control Pre=3.996, Post=4.017, 12-MONTHS=4.922). (Figure 3.27).

Figure 3.27 (from page 111)

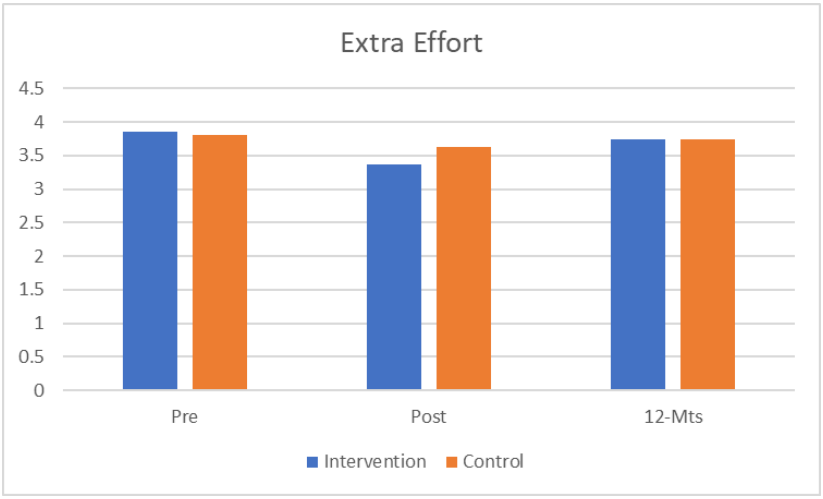
Leadership Effectiveness results PRE, POST and 12-MONTHS data points



Leaders with strong **'extra-effort'** attributes demonstrate elevated skills in fostering a productive team attitude, often encouraging others to go 'above and beyond' in their roles. Both the intervention and control group reported a decrease in these attributes with the intervention group reporting a higher decrease (Intervention Pre=3.859, Post=3.636, 12-MONTHS=3.736; Control Pre=3.800, Post=3.626, 12-MONTHS=3.736). (Figure 3.28).

Figure 3.28 (from page 113)

Leadership Extra Effort results PRE, POST and 12-MONTHS data points by group



Leaders with strong '**satisfaction'** attributes engage with colleagues in a way which is deemed satisfactory by team members. Both the intervention and control group reported a decrease in these attributes with the control group reporting a higher decrease (Intervention Pre=4.020, Post=4.112, 12-MONTHS=3.992; Control Pre=4.236,

Post=4.057, 12-MONTHS=4.081). The changes within groups nor vs groups were statistically significant. (Figure 3.29).

Leaders with strong 'Laissez-Faire' traits avoid making decisions and getting involved with challenging situations at work, they limit their contribution as a manager and allow things to unfold without guidance. Both the intervention and control group reported an increase in these attributes with the control group reporting a higher increase (Intervention Pre=1.929, Post=1.905, 12-MONTHS=2.012; Control Pre=1.750, Post=1.856, 12-MONTHS=1.928). (Figure 3.30).

Figure 3.29 (from page 114)

Leadership Satisfaction results PRE, POST and 12-MONTHS data points

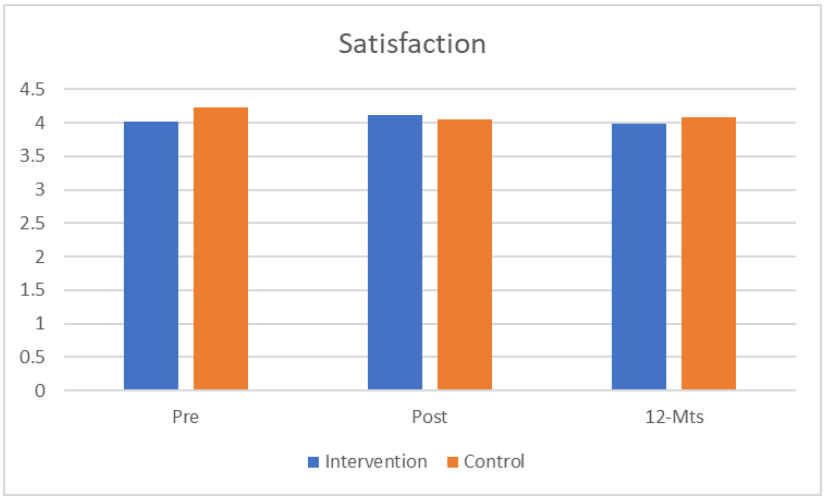
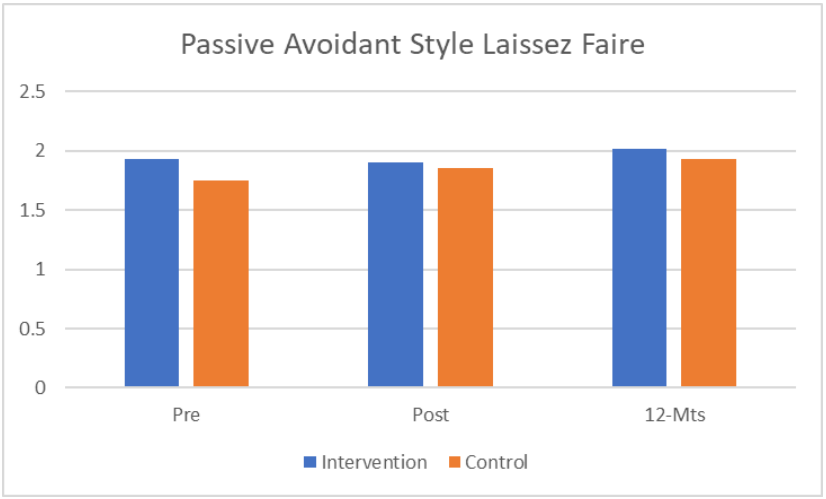


Figure 3.30 (from page 115)

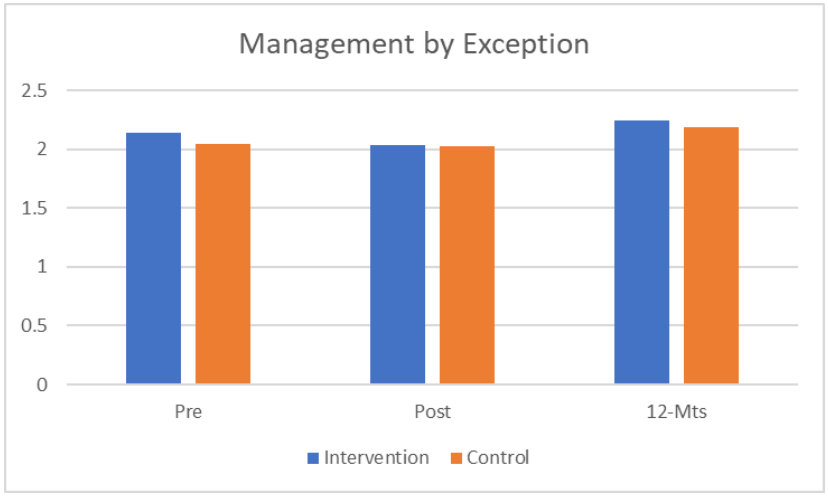
Leadership Laissez-Faire results PRE, POST and 12-MONTHS data points



Leaders with strong '**Management-by-Exception:Passive'** traits take a distanced approach to leadership, only stepping in when issues become problematic, they are not proactive in problem solving. Both the intervention and control group reported an increase in these attributes with the control group reporting a higher increase (Intervention Pre=2.145, Post=2.040, 12-MONTHS=2.248; Control Pre=2.042, Post=2.022, 12-MONTHS=2.190). (Figure 3.31).

Figure 3.31 (from page 117)

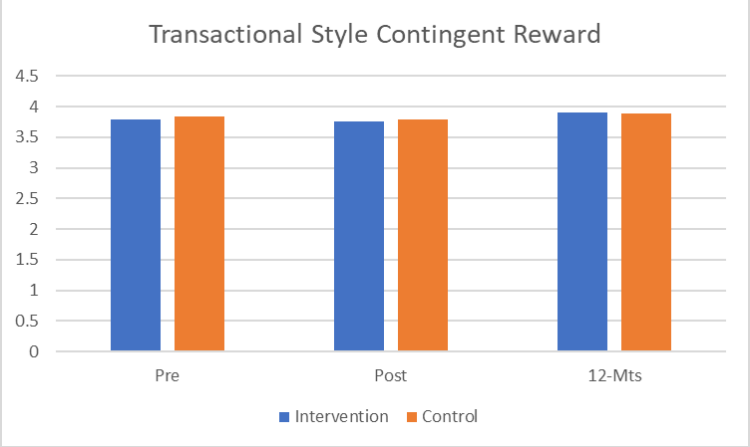
Management-by-Exception: Passive results PRE, POST and 12-MONTHS data points



Leaders with strong '**Contingent Reward'** traits set out goal clearly, monitoring workloads, tasks and achievements, rewarding those who meet targets. Both the intervention and control group reported an increase in these attributes with the intervention group reporting a higher increase (Intervention Pre=3.787, Post=3.760, 12-MONTHS=3.906; Control Pre=3.844, Post=3.781, 12-MONTHS=3.885). (Figure 3.32).

Figure 3.32 (from page 118)

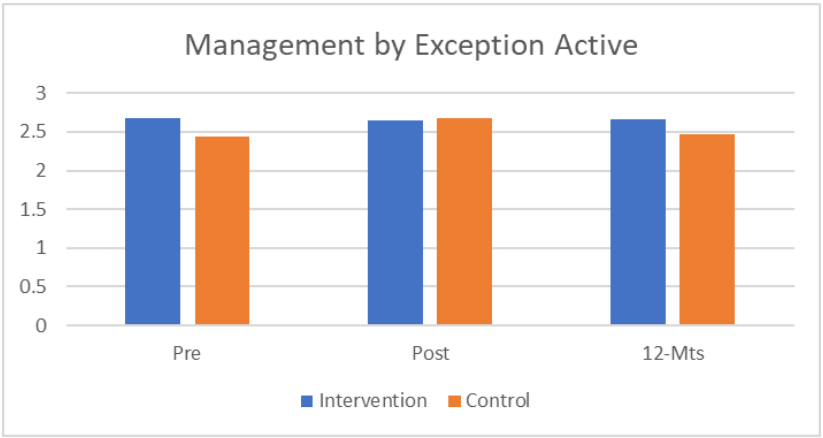
Contingent Reward results PRE, POST and 12-MONTHS data points



Leaders with strong '**Management-by-Exception: Active'** traits actively monitor mistakes and monitor behaviours which deviate from the policies and procedures they set in place. Such leaders spend a lot of time tracking and attempting to eliminate errors. The intervention group reported a slight decrease in these attributes whilst the control group reported a slight increase (Intervention Pre=2.675, Post=2.640, 12-MONTHS=2.662; Control Pre=2.438, Post=2.675, 12-MONTHS=2.474). (Figure 3.33).

Figure 3.33 (from page 119)

Management-by-Exception: Active results PRE, POST and 12-MONTHS data points



Leaders with strong '**Idealied Attributes'** traits consider the whole group / organisation in their leadership, they foster a culture of respect, power and confidence in the leader. The intervention and control group reported an increase in these attributes with the control

group reporting a decrease (Intervention Pre=3.452, Post=3.648, 12-MONTHS=3.589; Control Pre=3.767, Post=3.651, 12-MONTHS=3.625). (Figure 3.34).

Leaders with strong '**Idealized Behaviors'** traits are strong advocates for the importance of values, morals and ethical behavious with clear consideration of the consequences of decisions. The intervention group reported an increase in this leadership trait with the control group reporting a slight decrease (Intervention Pre=3.431, Post=3.851, 12-MONTHS=3.880; Control Pre=3.941, Post=3.853, 12-MONTHS=3.919). (Figure 3.35).

Figure 3.34 (from page 121)

Idealized Attributes results PRE, POST and 12-MONTHS data points

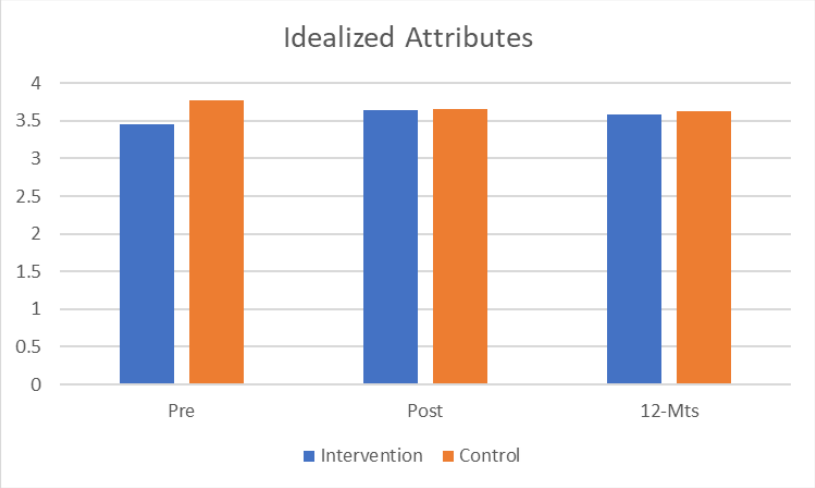
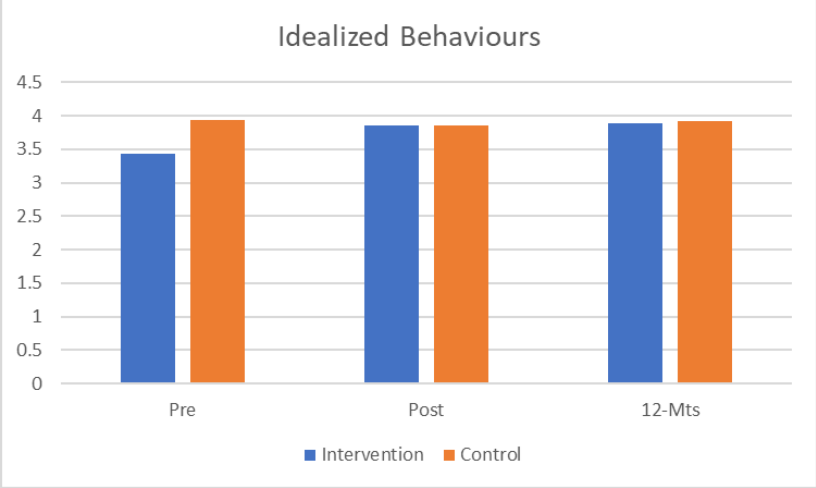


Figure 3.35 (from page 122)

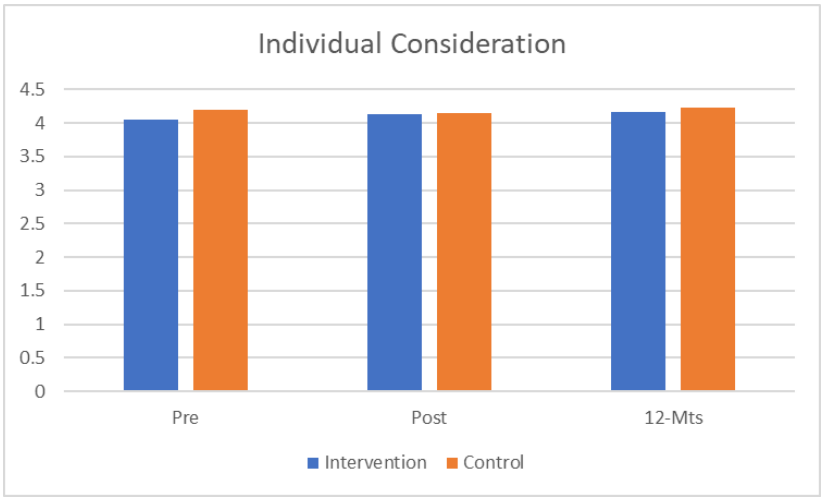
Idealized Behaviors results PRE, POST and 12-MONTHS data points



Leaders with strong '**Individual Consideration'** traits consider their team and colleagues as individuals, spending time with them to support personal development and understanding colleagues individuality and unique contributions to the team. The intervention group reported an increase in these attributes with the control group reporting a slight decrease (Intervention Pre=4.051, Post=4.131, 12-MONTHS=4.171; Control Pre=4.154, Post=4.222, 12-MONTHS=4.222). (Figure 3.36)

Figure 3.36 (from page 123)

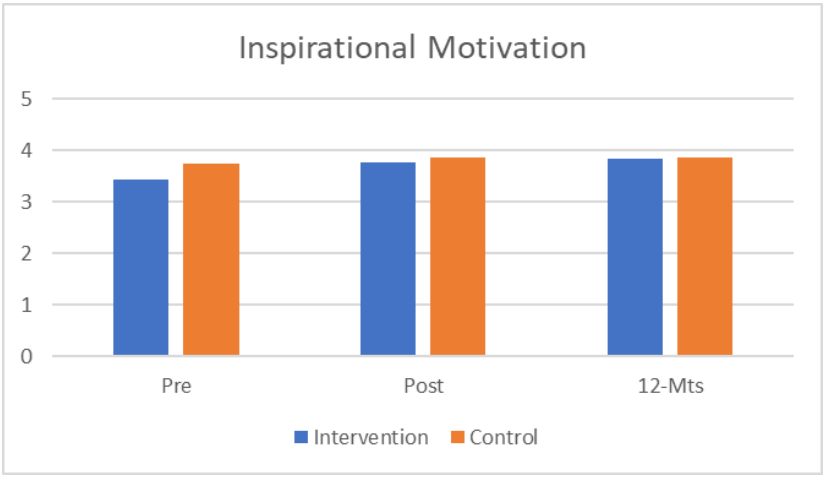
Individual Consideration results PRE, POST and 12-MONTHS data points



Leaders with strong '**Inspirational Motivation'** traits are optimistic about the future, offer enthusiastic and encouraging guidance and vision about the future. Both the intervention and control group reported an increase in these attributes with the intervention group reporting a higher increase (Intervention Pre=3.427, Post=3.777, 12-MONTHS=3.830; Control Pre=3.735, Post=3.858, 12-MONTHS=3.865). (Figure 3.37)

Figure 3.37 (from page 125)

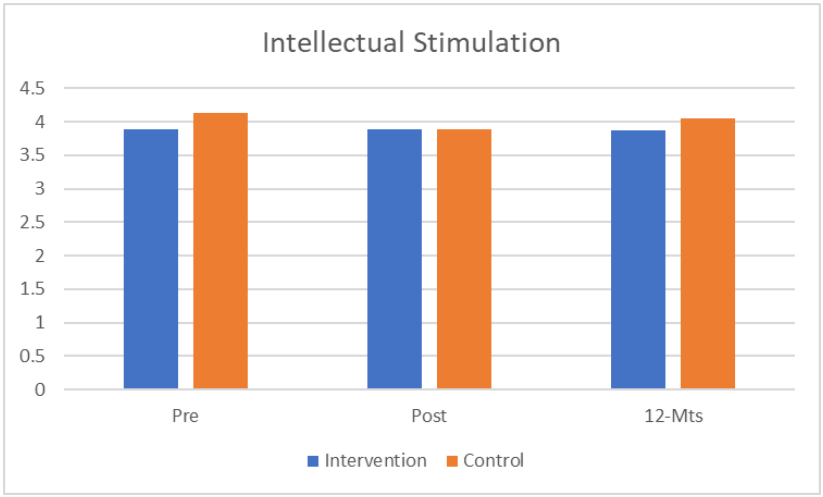
Inspirational Motivation results PRE, POST and 12-MONTHS data points



Leaders with strong '**Intellectual Stimulation'** traits looks for different opinions and perspectives and encourage others to do so. Leaders strong in this area take time to re-evaluate ways of working and past assumptions to determine how relevant they remain as organisations and situations evolve. Both the intervention and control group reported a decrease in these attributes with the control group reporting a higher decrease (Intervention Pre=3.885, Post=3.891, 12-MONTHS=3.863; Control Pre=4.126, Post=3.887, 12-MONTHS=4.047). (Figure 3.38)

Figure 3.38 (from page 126)

Intellectual Stimulation results PRE, POST and 12-MONTHS data points



Scales and styles summaries

A leader who scores higher in the Passive Avoidant domain shows more frequent passive or avoidant behavours as they carry out their leadership duties (Table 5.2). Both the intervention and control group reported an increase in these attributes with the control group reporting a higher increase in both areas. The changes across all the leadership areas were small, with no effect sizes and none of the variances were statistically significant.

Table 5.2

Passive Avoidant Leadership summary descriptions

Trait	Domain	Comparisons
Laissez-Faire	Passive Avoidant	Both the intervention and control group reported an increase in these attributes with the control group reporting a higher increase
Management-by-Exception: Passive	Passive Avoidant	Both the intervention and control group reported an increase in these attributes with the control group reporting a higher increase

A leader who scores higher in the Transactional domain shows a preference for transactional styles of leadership (Table 5.3). There was mixed reporting in this domain with an increase for both groups in one attribute (Contingent Reward) and a decrease reported by the intervention group and increase in the control group in the second domain (Management-by-Exception: Active).

Table 5.3

Transactional Leadership summary descriptions

Trait	Domain	Comparisons
Contingent Reward	Transactional	Both the intervention and control group reported an increase in these attributes with the intervention group reporting a higher increase
Management-by-Exception: Active	Transactional	The intervention group reported a slight decrease in these attributes whilst the control group reported a slight increase

A leader who scores higher in the Transformational domain shows a preference for Transformational styles of leadership (Table 5.4). The intervention group reported an

increase in all but one area of Transformational leadership with the control group reporting a decrease in all areas bar one.

Table 5.4

Transformational Leadership summary descriptions

Trait	Domain	Comparisons
Idealized Attributes	Transformational	The intervention group reported an increase in these attributes with the control group reporting a decrease
Idealized Behaviors	Transformational	The intervention group reported an increase in this leadership trait with the control group reporting a slight decrease
Individual Consideration	Transformational	The intervention group reported an increase in these attributes with the control group reporting a slight decrease
Inspirational Motivation	Transformational	Both the intervention and control group reported an increase in these attributes with the intervention group reporting a higher increase
Intellectual Stimulation	Transformational	Both the intervention and control group reported a decrease in these attributes with the control group reporting a higher decrease

Outcomes of leadership Summary

Outcomes of leadership style are defined by the rating scales when the researcher analyses the data and not from directly linked questions asked of the leaders. Following the intervention, both the intervention and control groups reported an increase in the effectiveness ratings which indicate their ability to influence their teams and increase productivity. However, a decrease was reported in both groups for extra effort and Satisfaction scales, indicating a reduction in their abilities to be effective and satisfactorily work with others. None of the variances were statistically significant. (Table 5.5).

Table 5.5

Outcomes of Leadership summary descriptions

Trait	Domain	Comparisons
Effectiveness	Outcomes of leadership	Both the intervention and control group reported an increase in these attributes with the control group reporting a higher increase
Extra Effort	Outcomes of leadership	Both the intervention and control group reported a decrease in these attributes with the intervention group reporting a higher decrease

Satisfaction with the Leadership	Outcomes of leadership	Both the intervention and control group reported a decrease in these attributes with the control group reporting a higher decrease

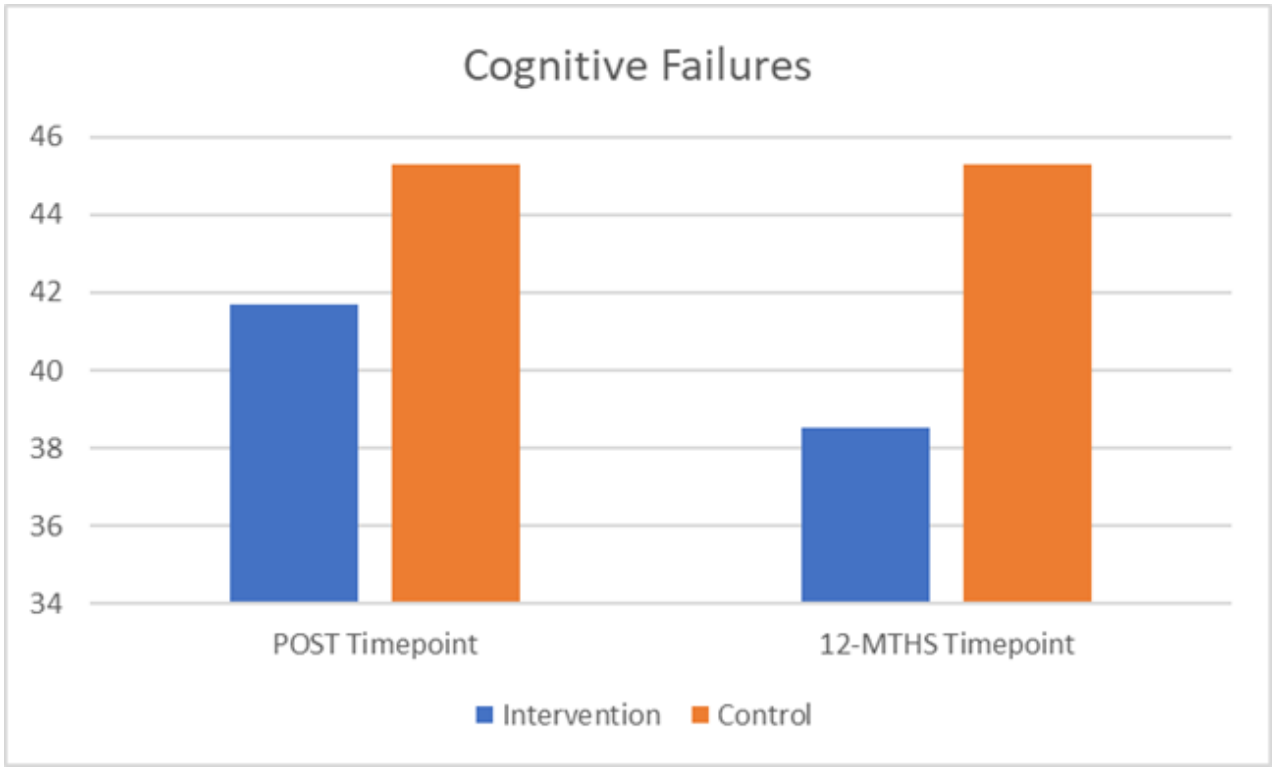
5.7.4 Cognitive Failures

Outcomes from the CFQ analysis showed that there was no statistically significant difference between groups at POST, a statistically significant difference was identified at 12-MONTHS. A medium effect size was observed at POST which remained at 12-MONTHS. Full analysis of the cognitive failures data can be found in Chapter three.

The results show those who participated in the Mindfulness course were less likely to suffer from cognitive failures vs their colleagues who did not participate in the Mindfulness course (Figure 5.3). Importantly this effect remained at the 12-month follow-up stage indicating long-term change and potential benefits to the individual and the organisation.

Figure 5.3

Comparison of Cognitive Failures results - POST and 12-MONTHS time points



5.8 Strengths and limitations of the business case analysis

This economic analysis evaluation does have some limitations; on a high level the economic evaluation was limited in design options as the intervention was not found to

be effective (as reported in Chapter three), therefore an adaptation to original economic evaluation was required. A transition from a cost-effectiveness analysis to cost-consequence analysis for the health effectiveness review and a similar approach was then made for the business review i.e to present the findings and enable the employer to evaluate the cost consequence based on the results.

5.8.1 Strengths

Overall trial strengths include those detailed in Chapter three, in addition, in the business management review the strengths were:

The novel approach of br**inging the health, Mindfulness and business considerations into one trial** and considering workplace outcomes alongside the health outcomes. As is detailed in Chapter two, there is minimal literature published which includes and economic evaluation alongside the health and workplace considerations.

The **close working and engagement with the businesses and teachers** enabled an exploration into a real-life context and provided feedback on the potential challenges if this were to be rolled out on a wider scale. Four particular areas of feedback which would be supportive for consideration in future studies were 1) the challenges and suitability of room allocation, 2) the level of detail shared by participants during the course i.e learning that there is a possible risk of oversharing plus the unwillingness to share at all with colleagues, 3) the dynamics of leaders and subordinates in the same class with some feedback that this was potentially restrictive of full engagement due to the nature of the relationships with fellow colleagues, 4) the concern expressed by some participants that they had been 'nominated' for the course by their line managers as they were presenting as stressed, anxious or depressed in the workplace.

Informal feedback from the teachers and employees during the trial contributed further to understanding the challenges and considerations required when delivering in the workplace.

5.8.2 Limitations

Overall trial limitations include those detailed in Chapter three, in addition, in the business review the limitations were:

No monitoring of staff turnover meant that it was not possible to determine if absences in data returns were due to employees having left their positions or if the Mindfulness programme had an impact on staff retention.

Being asked to leave training rooms was a challenge reported by several of the teachers. Whilst having the organisations support with the gifting of the rooms was mainly beneficial, it did, on some occasions result in the gift being revoked at last minute and on a few occasions during an actual Mindfulness session. It is unclear who made the decisions to revoke the rooms, and this was not further explored however this does provide a cautionary learning note for future trials to obtain sufficient support from organisations to commit to all that is required when offering Mindfulness in the workplace.

The **pressures of work** on participants and their ability to take time for the Mindfulness course was a reported problem in many of the classes. It is unclear if being in the same workplace with colleagues and management and the Mindfulness class impacted on the difficulties to step away or the convenience of being in the same space enabled participation – both were informally reported. Not knowing the impact of this is a limitation in this study.

This trial was **only offered to public sector employees** and how transferable the trial would be into the different culture of the private sector is unknown. It is difficult to generalise the widespread implementation of an intervention which has only been trialled in the public sector.

It is unknown if **time off was given or if annual leave / employees own time** was required to attend, it is possible that variances occurred across sites and may have impacted on recruitment and attendance.

The impact of **mixed groups** is unknown, employees and their line managers attending the same course. Where there are good working relationships this may not have been an issue. However, for some, discussing emotions, challenges in daily left etc may be uncomfortable with line mangers and peers. The impact of the group dynamics was not measured and is unknown. This is a limitation when reviewing as group engagement is an essential part of a Mindfulness programme. If group dynamics may have impacted on engagement, learning and attendance, however this was not monitored during this trial.

5.9 Summary and conclusions of the business case analysis

There were multiple objectives for this research and business review: to evaluate the impact and more commonly recognised work-related variables in the workplace and to consider implementation of the Mindfulness programme in the workplace from the employer perspective. These considerations were split into three areas; sickness, leadership and cognitive failures.

Sickness summary

As no statistically different sickness reporting was identified between the intervention and control groups, no evidence was found during this trial to support the theory that staff who attend a Mindfulness course are less likely to take sickness absence. One possible explanation for reduction in sickness reporting could be the practice of 'self-care' which is taught in Mindfulness courses (Halm, 2017; Newsome et al., 2006; Rudaz et al., 2017). Self-care strategies may actively encourage course participants to take time out from work when unwell which would increase sickness, whilst we see no increases in sickness from the intervention group, this could be a contributing factor to also not seeing a decline in sickness reporting. Further research into this area is recommended.

Leadership summary

Although there were some small movements in the data which show potentially a change in leadership style, there were no statistically significant changes in leadership style found following the Mindfulness intervention. The variances seen in the data could be due to many factors such as 'in the moment' circumstances when the returns were submitted i.e a good day or bad day at work may shape the decisions given which may have differed if the day went differently.

Whilst the strongest impact overall in the study was found was in trait Mindfulness (via the FFMQ) this did not yield a significant impact on reported leadership style. This lack of significant effect differs to variances found in leadership style (when Mindfulness traits are increased) as identified by a previous study which specifically linked positive effects on transformational leadership behaviours with increased trait Mindfulness (Carleton et al., 2018). It is not clear why the impact was not greater in this area during this study and further research in this area is recommended.

Employees report higher levels of stress if their line managers have an autocratic leadership style (Studenski & Barczyk, 1987) (which is an extreme form of transactional

leadership, (Informa Insights, 2015). As there was a slight reduction in Management-by-Exception: Active - transactional leadership, in the intervention group (not statistically significant), higher reporting of reduced levels of employee stress could have been expected. The small effect in leadership change may have impacted on the correlation across the to the stress levels. This presents a promising area for future study to further understand the small changes observed and consider additional research in this area.

Cognitive failures summary

There was no statistically significant difference between groups at POST although a statistically significant difference was identified at the 12-MONTHS data collection point. A medium effect size was observed at POST which remained at 12-MONTHS. The results show those who participated in the Mindfulness course were less likely to suffer from cognitive failures vs their colleagues who did not participate in the Mindfulness course.

Cognitive failures were included as a measure in this trial as an attribute which could be universally considered as helpful if a correlation to reduced cognitive failures were to be found following a Mindfulness course. The intention was to support businesses during this trial with measures which were familiar to organisational monitoring, whilst cognitive failures may be less common to measure (vs sickness etc) it's impacts will likely be of interest to a wide number of organisations, combined with an area commonly discussed or supported – leadership. By including a review of cognitive failures, a limitation was present in terms of attributing a financial calculation to the analysis (as each workplace and sector differs and a reduction in cognitive failures measures could be applied to a range of workplace tasks) however, by including this measure there is the potential to more generally review cognitive failures impact following a Mindfulness course. Thus, opening the door for further specific research should employers wish to explore this area further.

5.10 Research questions and findings summary

Key question - What are the business considerations and the challenges of measuring Mindfulness in the workplace?

1. **Is there an impact on levels of sickness absence following a Mindfulness course in the workplace?**

   When compared with a control group, there is no statistically significant impact on workplace sickness reporting following attendance at a Mindfulness course in the workplace. Two approaches were adopted for the analysis of sickness data, 1)

reviewing all sickness absence, 2) reviewing only mental health related sickness. Neither of the analysis approaches calculated any statistically significant impact.

2. **Is there an impact on leadership style following a Mindfulness intervention in the workplace?**

   When compared with a control group no statistically significant impact on Leadership style was observed following a Mindfulness course in the workplace.

3. **Is there an impact on cognitive failures following a Mindfulness intervention in the workplace?**

   The Cognitive Failures measure reported no statistically significant changes immediately following the course, however at the 12-month follow up there were statistically significant changes indicating the intervention group reported less cognitive failures following the Mindfulness course vs their control group colleagues.

4. **Is it cost-effective to deliver Mindfulness in the workplace when considering the employee wellbeing variables?**

   Mindfulness was not proven to have a statistically significant impact on the primary outcome measure in this trial (Perceived Stress). As result, a cost-consequence analysis has been conducted (Chapter four). It is therefore an individual organisation / employer decision of the value they attribute to the variances shown in the measures reported and, the potential impact the effects might have in the organisation.

Having reviewed the rationale for a workplace mental health intervention and considerations of the evidence-base of Mindfulness in various settings (Chapter one); detailed a systematic review of the impact on job performance and the cost-effectiveness of Mindfulness interventions in the workplace (Chapter two); reported on the RCT which was conducted for this PhD project (Chapter three); presented a cost-consequence analysis (Chapter four); then considered the employer perspective of outcomes relevant to the workplace, the next chapter details the whole thesis findings in a discussion and makes future recommendations.

Chapter Six
Discussion and Recommendations

6.0 Chapter preface

Chapter one of this thesis discussed the potential of Mindfulness and the possible wellbeing benefits of this intervention being offered in the workplace. After establishing that Mindfulness could be a possible intervention to tackle workplace sickness challenges, Chapter two progressed to a systematic evidence review of the field. The literature review explored the existing knowledgebase of Mindfulness in the workplace. To increase the usefulness of this research to the business sector, the review specifically looked at cost-effectiveness and the impact on job performance. The literature review in Chapter two indicated there was not a clear consensus in the field on the effectiveness or cost-effectiveness of Mindfulness in the workplace, therefore Chapter three progresses on to a full RCT to explore these areas. Chapters three, four and five report on the outcomes of a novel trial which was designed and conducted as part of this Ph.D. study. The trial was conducted from the perspective of the 'payer' (in this instance the employer). Each chapter includes specific strengths, limitations and challenges of the areas addressed in that section. This final discussion chapter considers the wider thesis findings and their implications when considering Mindfulness in the workplace.

Developing on the summaries in the individual chapters, this discussion chapter will address the key themes identified at thesis commencement and those that developed throughout the research and thesis writing, namely, effectiveness of the intervention, suitability of the intervention, financial implications of introducing the intervention and measurement challenges of the research described in this thesis. This chapter will also consider the limitations addressed across the thesis and from these, make recommendations for future implementation and research. Finally, ending with a response to the guidance made by NICE that Mindfulness is recommended in the workplace (detailed in Chapter five) and respond to the recommendations made by the Mindfulness Initiative to further research Mindfulness in the workplace (detailed in Chapter five).

The trial reported in this thesis commenced in 2014, since then, the acceptance of Mindfulness and the field itself has advanced with research into Mindfulness in the workplace increasing. To offer the most support to the workplace, health sector and Mindfulness fields knowledge, this chapter will mainly focus on the novel elements and potential new learning, specifically implementation considerations, transferability and cost-effectiveness from employer perspective.

6.1 Introduction

Those working in the Mindfulness field continue to research and explore how to benefit from the Buddha's teachings, translating the core concepts of his work into secular programmes with sector and population specific adaptability (Crane et al., 2023). This thesis considers these explorations with a focus on workplace and key themes intended to contribute towards an improved understanding and offer further guidance to the developing field.

The themes shaping this thesis enable a novel contribution, reviewing suitability of a previously evidenced-based Mindfulness programme, now being implemented into the workplace sector. Offering a multi-disciplinary approach, the trial, results and explorations bring together the fields of Mindfulness, business and health economics.

Mindfulness has the benefit of being an intervention which can be broadly implemented and therefore discussing its possible impact whilst remaining within the scope of the original research can be challenging. To support focus, the seven key questions from Chapter One will provide structure for this discussion:

1. *What do we already know about the effectiveness of Mindfulness in the workplace?*
2. *Is Mindfulness effective in the workplace?*
   Chapter three detailed the trial results and concluded that the Mindfulness intervention used in this study was not effective in the workplace (primary outcome of perceived stress), therefore this chapter will explore:
3. *Why was the Mindfulness intervention not effective in this specific workplace?*
4. *How does Mindfulness influence perceived stress and related outcomes in the workplace?*
5. *Is a Mindfulness programme, which was originally designed to address specific health challenges, effective and transferable into the workplace?*
6. *Is Mindfulness in the workplace cost-effective? What are the financial implications for employers when offering Mindfulness?*
7. *What are the business considerations and the challenges of measuring Mindfulness in the workplace?*
8. *Should workplace Mindfulness research findings influence existing guidance and policy recommendations?*

This thesis will conclude by considering future research, making recommendations and final closing comments.

6.2 Answering the questions

6.2.1 What do we already know about the effectiveness of Mindfulness in the workplace?

One challenge of writing this thesis over a period of 10 years has been the fast pace of the field, a simple Google search in September 2023 returned over 22,700,000 results, the same search on 1st January 2014 (the year this research began) returned just 5,280,000 results. The same search in Google Scholar found 19,700 from 2014 – 2023 and just 20,400 results in the 19 years prior - from 1995 to 2014. Therefore, it is evident the interest in Mindfulness in the workplace is increasing, however there is no apparent consensus on the impact and effectiveness. This specific question was posed at the start of the thesis and Chapter one highlights some of the research published before 2014. Some research reported positively on Mindfulness in the workplace with findings of reduced stress, anxiety, depression and burnout, improved mood and work productivity (Klatt et al., 2009; Rössler, 2012). At the same time, there were also criticisms of Mindfulness (Chiesa, 2013) and Mindfulness in the workplace such as 'cherry-picking' teachings from Buddhism (Purser, 2019) and misrepresentation of findings (Rapgay & Bystrisky, 2009). Finally, at the point of thesis commencement, there were challenges in the way Mindfulness was reported and understood (Chambers et al., 2009).

The literature review in Chapter two found over 600 studies specifically looking at Mindfulness in the workplace since 2017, due to the limitations on the entry criteria in this review they were not all analysed, however the volume indicates the interest and intentions to introduce Mindfulness into a corporate context.

A recent meta-analysis of randomized controlled trials of Mindfulness in the workplace concluded that Mindfulness *"effectively reduce stress, burnout, mental distress, and somatic complaints, while improving mindfulness, well-being, compassion, and job satisfaction"* (Vonderlin et al., 2020). In 2018, an average of 60% of mid- to large-sized US companies reported offering Mindfulness, yoga, or meditation courses to their employees however this increase in demand and implementation has developed without the empirical evidence of Mindfulness in the workplace (Jamieson and Tuckey 2017, Vonderlin et al., 2020). Therefore, what we know, is the demand is increasing, with an

increase in general public and scientific interest however the evidence-base of effectiveness and consensus of appropriateness is lagging behind the pace of implementation.

6.2.2 Is Mindfulness effective in the workplace – now reframed to - why was the Mindfulness intervention not effective in this specific workplace?

Mindfulness is a complex intervention (more detail below) with a number of variable factors; age, gender, individual experience and engagement (dosage) with the intervention, in this trial there was also the added 'setting' complexity, delivery location differences, teacher knowledge / style differences and likely slight variances in the programme taught (as teachers are encouraged to teach from a personal place and some variances in programme are commonplace). All of which may have impacted on the results concluding the intervention was not effective (see Chapter three). There has been rich learning in conducing this research which will aid the broader understanding of Mindfulness as a workplace intervention. Therefore, irrespective of the results, it is important to report findings of all trials and studies, even those that turn out not to be cost-effective (Rafferty et al., 2020). There are a number of factors which may have influenced the outcome:

Factor 1 – Participant engagement

This research trial was conducted to specifically review employees who are present in the workplace and was offered to 'back-of-house' staff i.e not front-line clinicians or health care workers (see Chapter three for inclusion criteria). Participants self-referred to a freely offered 8-week Mindfulness course delivered in their workplace.

Concerns around engagement: Feedback from teachers and pre-course contact from participants (to the research coordinator) provided some insight into how the intervention was being perceived at point of recruitment; some employees were unsure if the intervention was specifically intended for stressed employees and expressed concern around the stigma attached to mental health issues. A few participants informed the research team they had been asked to attend the course by their superiors and queried the rationale for their employer's 'nomination' onto the trial.

Levels of engagement: The number of sessions attended was not carefully monitored which was a weakness of this study, reports from teachers at the time were that attendance was not as high as a typical 8-week course offered to the general public.

One reason for lower attendance could be the free enrolment, drop-out rates for free events is estimated to be 50-60% in comparison to an average of 10% dropout for fee paying events, this is attributed to perceived value when making a payment (Balit, 2023).

Commitment to practice in-between sessions: Home practice was also not monitored and therefore the level of engagement with the intervention is unknown.

Based on teacher feedback, a reliable assumption can be made that the levels of engagement were generally lower than seen at public Mindfulness courses and possibly lower than levels observed in similar research. The 8-week course is designed to build knowledge from week-to-week, deepening a participant's understanding and adoption of Mindfulness and mindful approaches through teaching and practice. Where attendance is sporadic and sessions are missed, the intervention structure, and potential mechanisms of change are weakened. Lack of monitoring data in this area, adds to the challenges when making comparisons to previous research, it also presents difficulties in understanding why the intervention did not work as the 'dosage' is unknown.

Factor 2 - Location

Further research is required to determine if the workplace is appropriate / optimal for the delivery of a mental health intervention. Benefits include physical accessibility, increased possibility of employer support (in the form of time off or finances), raising the awareness, understanding and normalising the practice of taking care of mental health in the workplace. In contrast, possible challenges which might have impacted the outcome include:

Privacy concerns / peers: With group-based interventions such as Mindfulness, engagement alongside peers and senior staff has the potential to limit true engagement. The level of individual participation could be stifled for fear of over-sharing in the workplace or a caution that what is shared is then 'on record' and somehow disadvantages employees.

Setting: The workplace setting could provide a convenient and cost-effective location for delivery of staff Mindfulness courses, there is also the risk that dedicated space is commandeered by other team members. Disruption to room bookings or the provision

of unsuitable rooms have both been reported during this trial with the impact not measurable, although likely to have had a negative impact on teaching, learning and engagement.

Factor 3 – Mindfulness teacher variances

Knowledge of the population: All teachers who delivered the intervention were supervised and trained to teach Mindfulness; the teaching team had a mix of professional backgrounds; from corporate; yoga teaching; counsellor; clinician; researcher to public sector management. The broad range of backgrounds enabled varying styles and personal knowledge to influence teaching and engagement within the groups. However, the diversity in the teaching team meant that there were limitations in some of the teacher's knowledge of the population and context where the intervention was offered. Good Practice Guidance from the British Association of Mindfulness Based Approaches (BAMBA), details teacher knowledge and experience of the population as an essential element of Mindfulness teaching (BAMBA, 2023). In addition, some training centres list 'knowledge of context / population where you wish to teach' as part of their entry criteria to join teacher training (Oxford Mindfulness Foundation, 2023). One of the benefits of a teacher being familiar with the context or participant population is the ability to engage with the group, often with relatable metaphors which can increase participant engagement (Van Aalderen et al., 2014). Teacher knowledge of the population and how this may have impacted on outcomes was not measured in this trial. It is possible that a lack of sector knowledge impacted on engagement in the sessions, thus contributing to Mindfulness not being effective in this trial.

Teacher embodiment and experience: Mindfulness teaching is not simply conveying a set of principles in a typical lecture style but requires teachers to embody Mindfulness themselves, to teach from a place of personal practice (Crane et al., 2012; McCown et al., 2010), with evidence that embodiment impacts on participant engagement (Van Aalderen et al., 2014) and thus impacting on outcomes. Teacher experience varied with a range of experienced and new teachers contributing to the trial, neither teacher experience or embodiment was measured during the trial and therefore the impact of these factors on the outcomes is unknown.

Factor 4 – Intervention contamination

Due to the design of this trial, there is a risk of contamination to the control groups with the intervention groups being in the same location. It is possible that close co-workers were randomised into separate groups and the control participant was inadvertently exposed to mindful practices or approaches which had been learnt by the intervention group co-worker. It is also possible that active sharing of information, materials or teaching was happening between colleagues in separate groups, particularly enabled by the close proximity of the participants. The impact of such a situation is that the intervention effect sizes may have been reduced as the control groups responses were impacted by intervention group sharing information (Torgerson, 2001). One theory is that contamination can be sustained up to approximately 30% after which point the sample size would need to be doubled to account for the reduction in effect size (Torgerson, 2001). It is very difficult to measure intervention contamination with one option proposed to consider cluster trials as a way to avoid this potential risk with complex interventions (Skivington et al., 2021; Watson et al., 2005). This trial did not make adjustments for intervention contamination which may have had an impact on the outcome.

Factor 5 - Perceived study-induced influence

Participants in this trial were given information about the intervention, applied, and completed pre-screening questionnaires, all before they were randomised. This process of recruitment assisted with the RCT design and reduced sampling bias, however it introduced both the control and intervention group participants to Mindfulness before the trial commenced. This profiling raising of Mindfulness, the potential benefits of the intervention and what the study was looking to explore, may have influenced the control group responses (Mangset et al., 2021). Thus 'treatment as usual' approach is not quite 'as usual' as the control group are now informed about Mindfulness and potentially, could be researching Mindfulness to educate themselves after the disappointment of being allocated to the control group. No adjustments were made for perceived study-induced influence in the data analysis.

6.2.3 How does Mindfulness influence perceived stress and related outcomes in the workplace?

Unhealthy stress levels are often linked to high work or life pressures and unexpected changes in our lives (Lundberg, 2006), with stress levels increasing and impacting on workplaces and organisational finances (see Chapter one). Additionally, a reduction in stress levels is linked to lower levels of accidents in the workplace (Simpson et al., 2005). It was therefore a topic of high interest to in this research to explore if Mindfulness could provide a scalable solution to employers looking to reduce employee stress in a way which was effective and cost-effective in the workplace.

The Mindfulness programme used in this trial was a Bangor University adapted version of the Finding Peace in a Frantic World (Frantic World) 8-week course curriculum (see Appendix 8 for full programme delivered). The Frantic World curriculum was developed Mark Williams and Danny Penman in 2011, originally as a self-help / self-guided programme for the general population (Montero-Marin et al., 2021). The Frantic World curriculum has been since widely recognised as an accessible, low-dose programme for busy individuals being offered with teacher guidance in a range of setting including education (Medlicott et al., 2021; Montero-Marin et al., 2021) and workplaces (de Bruin et al., 2020).

This particular adapted version of the Finding Peace in a Frantic World programme delivered in this trial was not found to be statistically significant in reducing perceived stress in the workplace. There were however effect sizes observed during the trial (medium at POST and small at 12-MONTHS), therefore Mindfulness did influence perceived stress and reduce the levels for stress perceived for the intervention groups. How that impacted on daily personal and work lives was not information gathered in this study thus the implications of the medium and small effects size reductions for the employee and employer are unknown.

6.2.4 Is a Mindfulness programme, which was originally designed to address specific health challenges, transferable into the workplace?

The focus on transferability when this research began was to review the impact of delivering a programme, originally designed to address health challenges a busy general population, into the workplace setting. Primarily, exploring if an existing Mindfulness programme had the potential to reduce employee stress and improve wellbeing when

offered in a workplace context. Ten years after this research began, this conundrum is still relevant and continues to be explored by practitioners and academics in the field (Tobias Mortlock, 2023; Wolever et al., 2018).

The programme delivered in this research trial was like many other Mindfulness workplace programmes, it had been adapted for the workplace context with a variation from the original 8-week programme from which is derived. As with the programme used in this trial, Mindfulness programme workplace adaptations typically focus on reductions in teaching session length and home-practice length requirements. Adaptations pose research challenges as they vary from the training structure and assessments from which most scientific evidence is based (Bartlett et al., 2019) posing a risk that any results cannot be directly compared to previous trials as the intervention has been altered.

Since this research commenced in 2014, some literature from others in the field has shown adapted Mindfulness programmes (such as the Frantic World curriculum) to be effective for stress reduction and general improvements in employee wellbeing in the workplace (Lomas et al., 2017, Good et al., 2016, Hyland et al., 2015). However, also since this research began, there have been a number of additions to the scientific and academic literature which challenge the implementation of a secular Mindfulness programme (designed for public health challenges) into the workplace setting (Tobias Mortlock, 2023).

Tobias Mortlock (2023) outlines in her paper the challenges of simply transferring an evidenced-based Mindfulness intervention (researched and delivered primarily outside of the workplace), into a corporate environment. In 2018 Hafenbrack & Vosh. concluded employees felt less motivated after 15 minutes of Mindfulness at work (Hafenbrack & Vosh, 2018), in the same year Noone & Hogan reported on the Headspace app, concluding that after six weeks of customers using Headspace to meditate, they reported no increase in critical thinking (Noone & Hogan, 2018). In 2021 and in 2021, Hafenbrack et al., and Hafenbrack & Vohs published findings reporting information which disputed the effects of Mindfulness being linked to motivation and Mindfulness in the workplace (Hafenbrack & Vohs, 2018; Hafenbrack et al. 2020).

There is an increasing awareness of the need to consider not simply the structure of Mindfulness programmes but the diversity amongst participants and how differing demographics affect the outcomes observed following a Mindfulness intervention.

Academics and practitioners in the field are considering why, when and how to adapt Mindfulness to truly achieve universal acceptability (Loucks et al., 2022).

When the original Mindfulness-Based Stress Reduction and Mindfulness-Based Cognitive Therapy programmes were created, they were designed by clinicians (Jon Kabat-Zinn, Mark Williams, Zindel Segal and John Teasdale), for a clinical context, considering what would be most practical and beneficial for their patients. Therefore, it seems logical and appropriate that those working in the research or workplace sector would contribute to any adaptations and not rely on those in the Mindfulness field who may not have the necessary knowledge or skills to appropriately adapt a curriculum. Pushing the concept of adaptations further, considerations of a total redesign for the workplace might provide the most benefit to the workplace. It may be helpful to return to the key intentions, review the ideal outcomes, the audience, context, settings, practicalities, group dynamics, teacher competencies, communication etc and draw on the success in the Mindfulness field to date, review with a 'realist' lens and collaborate with health economists and behavioural psychologists to design a workplace intervention fit for purpose rather than the adapt and conduct incomparable research.

6.2.5 Is Mindfulness in the workplace cost-effective? What are the financial implications for employers when offering Mindfulness in the workplace?

Monitoring finances and productivity has long been an established practice in the organisations with some workplaces now monitoring wellbeing (see Chapters one and two). The financial implications of not paying attention to staff wellbeing are detailed in Chapter one, with evidence that the sickness levels and costs of sickness can be extremely burdensome to employers. The challenge for workplaces with finite budgets is to understand and balance the return on investment when tackling workplace wellbeing. Some return-on-investment calculations are purely financial, figures for easy comparison, others are more nuanced such as tracking the financial implications of a more skilled leader. The micro-costing in this thesis provides an opportunity for the more nuanced approach to calculating investment into employee wellbeing using Mindfulness as an intervention. The purely financial viewpoint does not support the investment, if the sole intention is to reduce stress (the primary outcome in this trial), however, if the employer is looking to increase Mindfulness traits or to reduce cognitive failures (the measures which did return statistically significant improvements) then it could be worthwhile considering Mindfulness in the form it was delivered in this trial. If either of the FFMQ or

CFQ measures were the primary outcome in this trial, a full economic costing could have pursued and am alternative exploration of the financial costs would have been taken (via a QALY). The recommendations made from this trial are to pay closer attention to the intervention suitability and the implementation needs and therefore the financial implications for an employer investing right now in Mindfulness are uncertain. Each employer would need to consider their primary objectives and consider the proven impact in those respective areas and use the cost-consequence analysis to determine impact in their organisation vs value for money.

Reducing sickness absence was classified as the primary measure in this trial due to the serious financial implications of staff absence has for employers, alongside the personal suffering for the individual and the challenges absences raise for colleagues and peers. Investigations into the causes of sickness absence, and evaluation of interventions to manage it, cannot be isolated from the cultural, political and organisational contexts in which sickness absence occurs. (Higgins et al., 2012). Enabling and encouraging employees to bring their whole self into the workplace and be supported not judged by peers and employers will facilitate the best relationships with the work and the workplace (Robbins, 2018). A way to facilitate measuring welling in the workplace could be to break the wellbeing focus into three areas; subjective (active engagement of listening and understanding employee needs to enable them to work and be well), workplace (where cultural, political and organisational contexts can be considered) and psychological (considering the mental health of the workforce). Addressing all three areas would provide a holistic approach to attending to the workplace, personal and health factors (Page & Vella-Brodrick, 2009).

Leadership was also considered an important measure in this trial as a key component to any organisation is to have the right leadership team in place. Whilst Hougaard et al. (2016) described Mindfulness as a potential tool which could provide a foundation for leadership, it is not fully known how Mindfulness impacts on leaders. Recent research in this area has concluded with similar challenges (as identified in this trial); to measure the impact of Mindfulness in leadership, i.e implementation, culture, teacher knowledge and stigma challenges (Dix et al., 2022).

One area for exploration within leadership requirements which could be focused on in research with a link to financial impact is decision making. Decision making is a core aspect of being a leader, not just what we do but how we do it both require decisions to

be made which will draw on a range of facets such as training, experience, of the task in hand but also knowledge of the field and the capabilities of the team available to operationalise any vision. Robinson et al., (2017), explore this concept further, where the notion of 'multifaceted' decision making approaches is reported, outlining five perspectives of this multifaceted approach which may support leaders to be more skilful decision makers:

1. Mindfulness - able to pause, respond and not react
2. Intuition - know something without knowing how they know (Sinclair et al., 2010)
3. Wisdom - applying knowledge to life situations with humility and a mode of thinking which recognises uncertainty and change (Grossmann, 2017)
4. Organisational space
5. Social improvisation

Robinson et al., (2017) reported that whilst the above five aspects impact on decision making for leaders, they are all variable facets e.g ones ability to be mindful or wise in a moment is depending on a range of factors and thus decision making is variable from person to person and can differ (depending on external factors) for the same person.

This insight into the volatility of decision-making links to the complex nature of reviewing and analysing complex interventions. The same principle can be applied to self-report measures on wellbeing scales, the collective, individual and interpersonal state of that participant at that moment in time will impact the scores given e.g a participant completing the measures straight out of a difficult meeting, may not be in a position to think clearly, wisely analyse the question and a give fair response however completing the measures 30 minutes later or before the difficult meeting might seriously change the responses given.

When measures are asking for an evaluation of wellbeing over a period of time e.g over the last week, then responses could be heavily distorted by the ability to make decisions from a consistent mental state.

6.2.6 What are the business considerations and the challenges of measuring Mindfulness in the workplace?

As detailed throughout this thesis, Mindfulness has the potential to positively impact on a range of areas such as reduced stress, burnout, anxiety, improve sleep, support eating disorders etc, how these changes impact on employees in the workplace is complex and

can be difficult to track with typical business metrics. The business considerations are complex and not simply financial, e.g how much an organisation invests into staff wellbeing will vary from organisation to organisation and therefore each businesses considerations will vary depending on their specific needs, values and priorities. However to address the question, in a simple terms, businesses would need to consider accessibility, implementation, appropriate interventions, costs and desired outcomes of a Mindfulness intervention in the workplace.

Mindfulness is considered a complex intervention (Demarzo et al., 2015) Complex interventions are defined as such due to the number of factors involved which are variable; i.e the setting, the population, the level of experience and skills of the person delivering the intervention and the flexibility or variations possible within the intervention or programme itself (Skivington et al., 2021). Due to this, the analysis of data was correctly interpreted as a complex intervention and took guidance from The UK Medical Research Council Complex Interventions Framework for Researchers during this trial (Skivington et al., 2021; Watson et al., 2005).

Mindfulness is being delivered and researched in many settings (see Chapters one and two), in this study the locations (Liverpool, Leeds, Manchester and London) and with two employers (NICE, Cabinet Office and NHS England). Where participant surroundings such as location and employee environment differ, comparisons for research purposes and potential impact of an intervention are therefore also subject to variance. In addition, where participant personal circumstance (age, sex, past engagement with health care etc) and attitudes towards interventions differ, these factors will impact on how each participant engages with and perceives the intervention.

The populations within previous studies also differ (see Chapter two), in this trial there were a range of ages, genders, marital status, education levels, and workplace seniority levels within the population engaging (see Chapter three). All these factors may impact on how much each participant engages, i.e their own personal circumstances and how much they are able or indeed choose to participate will contribute to variable outcomes. Consider a senior manager who may also have demanding caring responsibilities at home, it is not unreasonable to conclude this participant may have less time to commit to the programme vs a participant who had no additional demands on their time and had more space in their working day to engage with the programme, their level of attendance and engagement would vary.

Levels of teacher training has previously been found to impact on outcomes in Mindfulness courses (Ruijgrok-Lupton et al., 2018) with improved perceived stress levels observed by participants who had been taught by teachers who had completed an additional year of Mindfulness-based teacher training. However, no correlation was found between course participants' outcomes when the teachers personal meditation experience was varied. In this study there were a number of teachers who engaged in the trial, the range of teacher competency, level of training and personal Mindfulness experience was not collated but the research team is aware that some of the teachers were new to teaching Mindfulness and others much more experienced. Based on the study by Ruijgrok-Lupton this will have impacted on outcomes and provides a challenge in measurement.

Flexibility in intervention delivery is commonplace in the Mindfulness world with many programmes tailored for the population and contexts (see Chapter one and two), this makes comparisons very difficult in research. This is a particularly important point to consider as it is not always apparent (when adaptations are made) what has been changed, often this is a tailoring to a specific populations culture or language, however there is little evidence of considerations to the mechanisms of change (Shapiro et al., 2006). In addition to research difficulties that adaptations pose, when making adaptations, the adaptation may render the intervention non-beneficial and could cause harm. Adaptations require knowledge about the curricula, rationale for each element and changes to be systematically made and evaluated (Jamieson & Tuckey, 2017).

To directly answer the question; *What are the measurement challenges of Mindfulness in the workplace?* They are complex by nature of it being a complex intervention. Consideration to human subjective reporting, differing settings, contamination, perceived believes is required with advanced analysis via ANCOVA's or ANOVA's is required to mitigate confounding factors. Sampling bias should be considered in relation to who is recruited and in addition how a wider roll-out how does the trial population and context reflect true life. The programmes terms Mindfulness have some fluidity in terms of teaching and teachers adapting to their style and the engagement in the room, whilst there is a structure and a curriculum followed this is the same as a controlled dose of a medication. Good supervision should be offered, and teacher's competency levels reported, along with teaching experience to provide detailed reporting for higher likelihood or replicability in future studies or implementation.

6.2.7 Should workplace Mindfulness research findings influence existing guidance and policy recommendations?

This research originally set out to determine if a Mindfulness intervention was effective and cost-effective in the workplace. What has transpired is a lack of effectiveness, however rich learning has followed as to the potential reasons 'why not'. In some sense, this is more beneficial to the field than evidencing effectiveness as the 'why' it was effective may not have been explored as much as the 'why not' has been. From this learning there is a policy recommendation is to heed caution when recommending Mindfulness. Recommendations should be clear that 'Mindfulness' is a term which acts as an umbrella for many Mindfulness-based interventions and to simply recommend Mindfulness is not suitably informative for those purchasing the programmes. Such lack of clarity opens the door for any variation of Mindfulness to be given credibility as an effective and recommended intervention.

The debate around the transferability of Mindfulness into the workplace has been around for some time, one study in this thesis literature review was dated 2016 and found Mindfulness to be not effective nor cost effective, still, in 2022, NICE recommended all workplaces provide access to Mindfulness to their employees (NICE Guideline, 2022). The NICE report claimed that Mindfulness (along with meditation and yoga) were the most beneficial interventions that could be offered in the workplace to support employee mental health and reduce stress, citing these recommendations as evidence-based. Mixed results in evaluating complex intervention is to be expected, however based on this thesis, strong evidence for such universal recommendation in the workplace is lacking.

Whilst recommending access to Mindfulness indicates a positive intention for organisations to tackle mental health challenges, the NICE report could have gone further to explore and explain the literature which questions the appropriateness and effectiveness of some Mindfulness interventions. It would also have been beneficial to have offered guidance to employers to advise them to research the most appropriate intervention for them. There are strong recommendations for research in the NICE

Guideline report however these are separate from the recommendations and are often overlooked when sections of the report are highlighted to promote the recommendations.

Fundamental sector knowledge is required to make adaptations, not only from the organisational sector but of the Mindfulness intervention itself. Crane et al., (2017) report on the 'warp and weft' of Mindfulness which outlines the essential core component required in any Mindfulness-based programme (MBP) with the 'weft' being areas which can be tailored to be sector or population specific (Table 6.1).

Table 6.1

The Warp and Weft of Mindfulness Interventions – (Crane et al., 2017)

Warp	Weft
MBP	
1. Is informed by theories and practices that draw from a confluence of contemplative traditions, science, and the major disciplines of medicine, psychology and education	1. The core essential curriculum elements are integrated with adapted curriculum elements, and tailored to specific contexts and populations
2. Is underpinned by a model of human experience which addresses the causes of human distress and the pathways to relieving it	2. Variations in program structure, length and delivery are formatted to fit the population and context
3. Develops a new relationship with experience characterized by present moment focus, decentering and an approach orientation	
4. Supports the development of greater attentional, emotional and behavioral self-regulation, as well as positive qualities such as compassion, wisdom, equanimity.	
5. Engages the participant in a sustained intensive training in mindfulness meditation practice, in an experiential inquiry-based learning process and in exercises to develop insight and understanding	
MBP teacher	
1. Has particular competencies which enable the effective delivery of the MBP	1. Has knowledge, experience and professional training related to the specialist populations that the mindfulness-based course will be delivered to
2. Has the capacity to embody the qualities and attitudes of mindfulness within the process of the teaching	2. Has knowledge of relevant underlying theoretical processes which underpin the teaching for particular contexts or populations
3. Has engaged in appropriate training and commits to ongoing good practice	
4. Is part of a participatory learning process with their students, clients or patients	

6.3 Recommendations

Recommendations can be concluded from the weaknesses addressed throughout this thesis and the learning from the trial. To best support the field, the recommendations in this chapter have been contained to a high level and are broken down into five key areas:

6.3.1 Recommendations for the Mindfulness field

6.3.2 Recommendations for future research

6.3.3 Recommendations for the workplace

6.3.4 Recommendations for policy makers and response to the guidance From NHS England

6.3.5 Recommendations and response to the recommendations made by the Mindfulness All-Party Parliamentary Group recommendations via the Mindfulness Initiative 2015 report.

6.3.1 Recommendations for the Mindfulness field

The recommendations for the Mindfulness field are mainly addressed to the teachers, trainers and curriculum developers working in the Mindfulness field. Mindfulness has become a mainstream word, for those engaging with Mindfulness it is difficult to understand what exactly it means especially when content under the banner of 'Mindfulness' varies. The British Association of Mindfulness-Based Approaches has nine (at time of writing thesis in 2023) recognised Mindfulness-based approaches all under the banner of Mindfulness – each varying in terms of their intended context, population and evidence-base. The recommendation is to be clear when promoting, delivering and communicating about the intervention you are teaching to ensure the participants and any potential commissioners know they intervention they are engaging with and what sections of the evidence-base and literature refers to the intervention they deliver.

It would be helpful to carefully consider language when talking about Mindfulness, as an example referring to 'Mindfulness based on' then citing the specific curriculum in question. This level of clarity is not so crucial when engaging with general public and when delivering courses so long as the promotional materials are clear about the intentions, possible outcomes and the target audience. There is a fine line between over complicating general public communication and being transparent with those who are commissioning courses (such as the workplace).

It is also recommended that Mindfulness teachers actively engage in continuing professional development to ensure they are up to date with the latest research developments, and good practices particularly with the intervention in which they are trained. There is a responsibility for training organisations to ensure their alumni

teachers are provided with updated when adaptations or developments are made to curriculums based on good practice and learning from published research.

Training centres should ensure that they have dedicated team members monitoring the field of research, updating curriculum as necessary and advising those who have engaged with them if good practice recommendations alter. Training centres should also play an active role in translating policy recommendations and other high-profile communications into best practices to ensure teachers are not mis-representing themselves or the programmes they deliver.

When considering recommendations such as the NICE Guidelines for integration of Mindfulness in the workplace, it is the Mindfulness field's responsibility to respond to that with cautious optimism. Offering Mindfulness in isolation in the workplace to reduce stress and promote wellbeing does not suffice, as detailed in this thesis and the recommendation sections in Chapters four and five, a supportive environment is also required for the programme to be effective (Micklitz et al., 2021). Over delivery with ineffective programmes could harm the field and the reputation of Mindfulness.

6.3.2 Recommendations for future research

There is a vast array of research happening in relation to Mindfulness-based approaches in a range of contexts and with varying populations, however there is much disparity in the quality of reporting and the measures used (see Chapters one and two). In Chapter two, the literature review reported only two quality RCT studies were found which reported the health and the workplace (job performance) impact of Mindfulness and included a full economic costing.

It would be prudent to consider that participants volunteering for a Mindfulness course in the workplace would be interested in reducing their stress levels and improving their wellbeing and lifestyles, and therefore may generally have healthy behaviours. Researchers should consider the potential sampling biases in recruitment which could reduce the ability for the results to be generalised to the wider population, researchers should consider these factors and the complex nature of Mindfulness when conducting research.

Discussions with those who would translate research findings into impact could be undertaken at trial design stage to fully understand the potential challenges of wide roll-

out should an intervention be found to be effective. There is little point in establishing effectiveness of an intervention which cannot realistically be translated into impact outside of trial conditions.

Researchers should fully understand the intervention and any adaptations made for the research, including how the adaptation may impact on comparison to previous research findings i.e what was removed or adjusted and how crucial was that element for any previous success in trials. Any adaptations and their potential impact should be reported in any literature to support future research replication and Mindfulness field understanding. To help ease the transition from academic knowledge into successful impact, it is important for researchers to clearly report on the implementation challenges. Transferability of the trial conditions into real-life situations should be considered.

Researchers could consider the flux of adaptations to Mindfulness into various settings and if an adaptation is truly the best approach, considering how much of what is being explored as outcomes in their new trial is linked to the original intentions of the Mindfulness programme being used. What are the hypotheses that there would be an impact on this new area of interest? Whilst new explorations in the scientific field are necessary and advance knowledge in a crucial and meaningful way, it would also support the Mindfulness field and specific populations to consider designing and researching new curricula (rather than adaptations) with the population, context and outcomes desired carefully considered. Combining multidisciplinary teams to co-create could have a greater impact than adapting interventions originally designed for health challenges outside of the workplace context. Researcher collaborations with the workplace go beyond the trial curriculum and outcomes for exploration into the implementation challenges discussed in this thesis, particular attention should be given to environmental factors to support the delivery and acknowledging that the perceived benefits from engaging in a preventive intervention (and willingness to engage) arise from the potential wellbeing benefits that the intervention would instil (Edwards & MacIntosh, 2019). Thus, skilful communication re the intervention is therefore crucial.

Whilst the above recommendations aim to support improved quality in implementation and research design, another consideration could be that that the failure to find hypothesised differences may in fact be because the intervention is not effective or / nor cost-effective in the workplace. The reasons for this may be similar to the research

considerations listed above i.e, the intervention may or may not be amenable to change, due to a variety of reasons; intention of intervention offering, location and / or group dynamics might simply not be conducive to this type of intervention, contamination between colleagues (as discussed previously) might impact research findings and experience of mindfulness teachers is crucial to successful implementation, recruiting or training the right teacher could be a challange or financial barrier to successful implementation and impact on research.

In addition to the above, researchers should include economic evaluations (where possible) into Mindfulness trials to increase the evidence-base from an economic standpoint and support decision makers who are responsible for allocating funds and selecting interventions.

6.3.3 Recommendations for the workplace

Sickness absence in the workplace can be a considerable financial burden on the workplace (see Chapter one), in addition to the sick pay, costs to recruit, train and cover the absence is the increased pressure it puts on immediate colleagues and potential risk to external client management and reputational risk etc. Simply having contingency funds for sickness absence does not account for all the impacts of sickness absence. From a purely financial perspective there is a strong case to minimise sickness and improve employee wellbeing.

Exploring proactive interventions to prevent sickness and promote wellness in the workplace is now commonplace and encouraged by government (NICE guidance 2022). Recommendations for the employer are centred around understanding the interventions and their evidence-base and their linkage to organisational needs. In particular reference to Mindfulness, the recommendation is to use a directory listing service such as BAMBA to engage with an organisation or an individual who has been appropriately trained in Mindfulness. Developing a good relationship and collaborating with Mindfulness teachers who have a knowledge of the workplace sector is recommended to ensure that teaching and group discussions are relatable and relevant to the challenges the employees are facing.

Understanding the range of Mindfulness interventions can be complex, however some are very specifically tailored, e.g. to manage pain or reduce depression etc therefore

the teaching materials and languages used will be focused on those primary areas. Employers are encouraged to research the intervention offered to ensure it is fit for purpose and will have the best chance of implementation success in their workplace.

Mindfulness is an experiential intervention and participation should be voluntary, therefore willingness to engage is crucial. Employers would benefit from canvasing staff before introducing Mindfulness to establish their workforce's interest in such an intervention and their willingness to engage and commit to the required practice elements.

A simple checklist could be supportive for workplaces to make decisions on interventions to support wellbeing, core elements could include; main challenge to be addressed; evidence-base of intervention; finances; sourcing reputable provider; designating space for in-person deliver (if appropriate); agreeing staff attendance i.e time off work, out of hours etc; discussing and agreeing on group dynamics e.g managers and staff together or separate; how it will be evaluated / measured; sustainability of learning and practices beyond the teaching.

6.3.4 Recommendations for policy makers and response to the guidance from NICE

Policy makers in government departments could go further to evidence a link from various initiatives mentioned in this thesis e.g it is not apparent if / how the intention to move towards preventative interventions is linked to development of new programmes or engagement with those already working in the field. It is unclear if the increased funding detailed in the 'NHS Five Year Forward View' and "*Build Back Better*" pledge (Chapter one) is available to support proactive interventions such as Mindfulness. It is possible that these linkages have been made or the guidance is produced, however as identified in Chapter one, with a range of departments and conflicting reports involved in healthcare reporting (including NHS localised differences), finding information is challenging. To support the public and the field, a dedicated contact point for preventative interventions would support the progress of the government vision and provide some authoritative guidance specifying quality and replicable research criteria and implementation guidelines.

Mindfulness has moved into the mainstream with recommendations from NICE validating its credibility. The government could consider regulating Mindfulness and

working with the field to provide a robust framework for interventions to be delivered. It may be time to consider recognising (at least some of the) Mindfulness interventions as a healthcare profession and implement a level of monitoring for public safety which is seen in other healthcare professions. Regulation is a complex and a debated topic in the Mindfulness field, however my recommendation would be, that where it is used in a clinical setting or specifically offered to support health challenges, that regulation would enhance the quality of the intervention and protect the field.

In response to the NICE guidance to offer Mindfulness in the workplace, this was a very positive step in normalising mental health challenges in the workplace and highlighting the potential benefits of Mindfulness. As with other recommendations in this chapter, I would recommend any future updates clarify the need to source appropriate Mindfulness and trained teachers, carefully communicate and carry out evaluations to ensure the correct version of Mindfulness is being implemented with integrity and the necessary professional standards for the setting.

6.3.5 Response to the recommendations made by the Mindfulness All-Party Parliamentary Group recommendations via the Mindfulness Initiative 2015 report.

In 2015 the All-Party Parliamentary Group (via the Mindfulness Initiative) recommended government departments encourage the research and development of Mindfulness programmes for staff in the public sector to improve organisational effectiveness. This guidance was well received in the Mindfulness field, and whilst the guidance was clear in recommending *research and development,* it is not clear how much development has taken place. Rather than from government departments themselves, the research appears to be predominantly from researchers interested in Mindfulness and within the Mindfulness sector, this is potentially problematic as conflicts of interest are unclear. Whilst is it not necessarily bad practice for those working in sectors to research their own interventions, without robust research frameworks, independent oversight and clear declarations of conflicts of interest, there will always be some concern about the credibility of the results. In 2016 the Mindfulness Initiative (in collaboration with the All-Party Parliamentary Group) published a second report *Building the Case for Mindfulness* (The Mindfulness Initiative, 2016), looking specifically at Mindfulness in the workplace. In this report they summarised some of the concerns raised in this

thesis i.e there is an enthusiasm for Mindfulness and potentially teachers engaging with limited or no experience in the workplace sector and lack of regulation or system for 'approving' Mindfulness professionals. The report also confirmed this is still much research to be done.

The 2016 Mindfulness Initiative report cited research and positive effects found when implementing Mindfulness in the workplace, with positive effects reported ranging from: less burnout, lower stress levels during multi-tasking, increased concentration, less emotional exhaustion, job performance and cognitive capacity improvements, improved relationships and performance to enhanced leadership qualities (Hoeve et al., 2021; Karing & Beelmann, 2021; Klatt et al., 2009, Montero-Marin et al., 2021; Moynihan et al., 2013). Whilst all these cited benefits have indeed been researched and reported, they mainly lack financial information for organisations to consider the costs of implementation. There are clear recommendations to carry out financial evaluations (and reference to the lack of them) however a full RCT and economic evaluation is likely unaffordable for most organisations and guidance on average costs could be provided.

The 2016 Mindfulness Initiative report does offer implementation guidance which covers many of the points raised in this thesis e.g context, employee willingness to engage, careful communications, sourcing reputable teachers etc but falls short on recommending co-creation, simply referencing currently available Mindfulness programmes and options. The report recommends workplaces source a 'qualified Mindfulness teacher', however with many training organisations in the UK field offering non-academic training, formal 'qualifications' are not necessarily commonplace and without a regulatory body this can be confusing.

Both Mindfulness Initiative reports highlight the benefits of Mindfulness and support the broader implementation however, as found when conducting this research, there are many hidden challenges and misconceptions of Mindfulness in the workplace. The Mindfulness Initiative recommendations are high level which indicate the intention to reach a vast audience however the challenges and reality of implementation, particularly for SME's appear to be overlooked or omitted. The research quoted cites the benefits and positive impacts reported in the literature but does not include the

studies which found nil effect, this could be perceived as bias reporting and leave the Mindfulness Initiative and the All-Party Parliamentary Group open for criticism.

To provide organisations of all sizes with further information to make informed decisions and increase the likelihood of successful roll-out of Mindfulness in the workplace, it is recommended that the Mindfulness Initiative produce a second workplace report which focuses on implementation challenges and costs. This second report could include literature of trials which reported nil or negative effects and the possible reasons why, clearer guidance on actual costs (to include various options for implementation such as in-house training vs buying in a Mindfulness teacher). The report could also share the outcomes reported in earlier trials with improved links to the actual interventions used and not over-simplify with the term 'Mindfulness'. Finally, the Mindfulness Initiative could pose the question of proven transferability, highlighting the need to consider the workplace desired outcomes and matching to the evidence-base of a particular Mindfulness intervention, co-creation and research of a new intervention could be offered as an alternative.

6.4 Research questions and summary findings

Returning to the original questions at the start of this thesis, responses have been summarised, taking into account all the findings gathered (Table 6.2)

Table 6.2

Research questions & quick responses

Research question	Summary findings
What do we already know about the effectiveness of Mindfulness in the workplace?	There is a mix of reporting in the field with lack of clarity on effectiveness, cost-effectiveness and the actual interventions used.
Is Mindfulness effective in the workplace	Again, the evidence-base is mixed. Where it is shown to be effective, the intervention curricula is not always provided and it is unclear if any adaptations have been made.
How does Mindfulness influence perceived stress and related outcomes in the workplace?	Whilst there is some evidence in the field that Mindfulness is effective in reducing perceived stress, this trial did not see any statistically significant outcomes. In terms of leadership there was also no effectiveness observed. There was a statistically significant impact with a reduction in cognitive failures.
Is a Mindfulness programme, which originally designed to address specific health challenges, effective and transferable into the workplace?	The need for adaptations for population and setting is becoming more apparent alongside the challenges of delivering an 8-week programme in the workplace. In some circumstances, it is possible that the original versions of Mindfulness i.e 8-week programmes are acceptable in the workplace. However, a programme designed for the workplace is likely to be more effective.
Is Mindfulness in the workplace cost-effective? What are the financial implications for employers when offering Mindfulness?	The programme offered as part of this trial was not cost-effective, existing research in the field has mixed views. Financially is it more costly to deliver in-house than it is to finance employees to access Mindfulness from an external centre.
What are the business leadership considerations and the challenges of measuring Mindfulness in the workplace?	According to this trial, leadership style is not impacted in any significant way following Mindfulness in the workplace, nor is sickness reduced (in comparison to the control group). Those who participate in Mindfulness in the workplace do report significantly less cognitive failures. This could be particularly helpful for organisations where reducing cognitive failures is a priority.
Should workplace Mindfulness research findings influence existing guidance and policy recommendations?	Yes. Current guidance lacks clarity. Those issuing guidance and making recommendations should consider being more specific in their language in terms of Mindfulness approaches and offer greater clarity on their evidence-base and appropriateness in relation to the guidance being offered. The challenges of delivering Mindfulness in the workplace could be better communicated with more balanced reporting on the benefits and challenges of implementing Mindfulness in the workplace.

6.5 Unanswered questions and further research

Whilst the field has developed since the commencement of this research, there remains areas which require further exploration when introducing a mental health intervention into the workplace and specifically when considering Mindfulness as an approach. Namely:

- Is the workplace an appropriate location to introduce Mindfulness interventions with a broader society objective for improved mental health?
- What Mindfulness curriculum is most appropriate for the workplace setting and population? Does this differ in different contexts and if so, how?
- What are the challenges and aspects to be observed when delivering Mindfulness as a mental health intervention in the workplace?
- What makes delivery and measurement of Mindfulness when offered as a proactive intervention in the workplace complex and how do we mitigate for these complexities?
- Who are the appropriate people to deliver Mindfulness in the workplace, e.g internal or external teachers and what skills and competencies do they need?

All the above questions are offered from a baseline of optimism that Mindfulness has a potential to be impactful in the workplace. Whilst the findings from this research have not proven effectiveness, there are published findings available which does demonstrate effectiveness in similar research conditions (Chapter two). Therefore, the results of this study have not disproven the value of Mindfulness in the workplace but raised questions regarding design and implementation.

6.6 Conclusion

This thesis reviews the impact and evaluates the outcomes of a Mindfulness intervention in the workplace, detailing the findings from a multidisciplinary perspective bringing together health economics, leadership and psychology viewpoints. The intervention used in this trial was not found to be effective nor cost-effective when delivered into a public sector workplace in the United Kingdom. Whilst not effective, the trial provided valuable insights and learning when delivering Mindfulness in a workplace. Mainly, it is imperative to consider curricula, population and setting when offering Mindfulness courses, locations

need to be suitable for Mindfulness programme delivery, teachers should be familiar with the populations they are teaching and the curricula needs to be relevant and relatable to the population. This conclusion aligns with a recent recommendation from the Care Policy and Evaluation Centre, Department of Health Policy, London School of Economics and Political Science who recommended that *"more could be done to evaluate the impact of addressing some of the social determinants of health that impact on mental health, such as poverty, job insecurity and macro-economic shocks"* (McDaid et al., 2022).

Mindfulness programmes which were originally designed to alleviate health conditions attract participants with different motivations (for engagement) from those in the workplace who may be more generally looking for less stressful lives but are not identifying as mentally unwell. This difference in motivation for enrolment will likely impact on engagement and this requires careful consideration when selecting the appropriateness of the Mindfulness intervention. Over generalization of the term 'Mindfulness' should be avoided by teachers and those in a position to make wide-ranging recommendations such as NICE etc) should take a more nuanced approach given the mixed nature of the current and emerging evidence. More clarity on the intervention, population and evidence-based outcomes is required from those designing, researching and teaching Mindfulness. Health economists in the field should consider the method of evaluation, operating in a multi-disciplinary way acknowledging the intricacies in evaluating Mindfulness interventions.

6.7 Closing comments

In closing, the ambition for this research was to combine Mindfulness, psychology and health economic disciplines to further understand how Mindfulness transferred into the workplace. The aspiration was to provide workplaces with financial costings and to provide a contribution to, and later a response, to the All-Party Parliamentary Group recommendations to research and develop Mindfulness programmes for staff in the public sector. Due to the lack of effectiveness, the economic analysis was restricted to a cost-consequence analysis which is narrower in scope than a full economic analysis. Whilst it has been possible to increase understanding of full costs for implementation in the workplace, the information available for financial decisions makers remains inconclusive and dependent on their particular desired outcomes and the financial weight they put on achieving the potential effects.

Overall, the recommendations are that the field avoids generalisation such as ‘Mindfulness works’ or ‘Mindfulness reduces stress and anxiety’ etc, these might be catchy headlines, but they are too simplistic and have contributed to the justified criticism of Mindfulness being positioned as a panacea for all.

Mindfulness itself is being used as a term for many interventions, MBCT, MBSR, MSC, MBCT-L, Frantic World etc (even throughout this thesis the overarching term ‘Mindfulness’ has been used when referring to the intervention used in this study), not all these interventions are effective in all settings. Mindfulness should be recognised as a complex intervention, the variances in programmes, context, populations, trainer ability and participants make participant outcomes and research replication of findings difficult and not guaranteed, there should be transparency around these nuances. In this study, the Frantic World programme was not effective however previous research (in education settings for example finds positive results (Medlicott et al., 2021; Montero-Marin et al., 2021), therefore recommendations are for those researching in the field to report increased detail and teachers and training centres to be clearer in their communications and more reserved in their promises.

Additionally, there is a recommendation that practitioners, provide clarity on what exactly is being delivered and when discussing potential outcomes link to relevant research which has comparable contexts and populations. Furthermore, teachers should be clear on the complex nature of Mindfulness, transparent regarding their teacher skill and knowledge of a context and ensure the requirement of lifestyle changes and commitment to the programme is clear from the beginning.

Researcher should provide increased clarity on the programme content, populations, outcomes, measures and carefully track the variable factors to enable replication of study. Economic evaluations should accompany the effectiveness analysis of Mindfulness, particularly in the workplace which has many hidden costs. Maybe more importantly for field wide impact, the recommendation is for researchers to provide clarity to practitioners on what isn’t effective and when a Mindfulness programme does look to be effective, be clearer with details such as the populations and the wide-ranging variables such as implementation factors.

Whilst this trial found limited effects and no cost-effectiveness of this particular intervention in the workplace, these findings have contributed an understanding which will help shape the workplace offering to move towards effectiveness. Effective

curriculums are possible, and the workplace remains a useful location for population-wide introduction to Mindfulness. The range of Mindfulness interventions available provides opportunities for a promising future for a proactive mental health intervention however engagement with the workplace sector is required to determine the key challenges which are to be addressed with Mindfulness. There would be benefits to designing a specific workplace intervention, taking the learning from the Mindfulness field, and working across disciplines to consider 'new or informed by' rather than 'adapted' programmes.

The findings in this research and thesis are significant in that they have brought the workplace and health sectors together into one trial which considered the employer perspective with an economic evaluation. Whilst the health outcomes are important and crucial to achieve effectiveness, to truly have successful implementation, any workplace intervention needs to also make commercial sense. Not finding effectiveness in this study opened the door for a deeper exploration into the real-life challenges and offered a realistic exploration of how a broader roll-out of such an intervention might be met with challenges. These findings are important to academic and healthcare communities as they highlight the need to replicate real-life scenarios and work in a collaborative way when designing and researching such complex interventions. All too often research is not translated into impact as it's simply not feasible or practical, this research highlights this and encourages researchers, Mindfulness practioners and workplaces to collaborate, co-create and research for quality development of an intervention and further research.

Although concluding with a cautionary note to avoid over generalising and over promising the effects of Mindfulness, a global population which is more mindful and compassionate could lead to lifestyle choices which not only improve mental health but support living with increased consciousness of surroundings and the planet. Based on this research, and the growing evidence base, it is plausible that Mindfulness programmes in the workplace could support with this endeavour and continued exploration is encouraged.

References

Akobeng, A. K. (2005). Understanding randomised controlled trials. *Archives of Disease in Childhood, 90*, 840-844. https://adc.bmj.com/content/90/8/840

Al-Janabi, H., N Flynn T, & Coast, J. (2012). Development of a self-report measure of capability wellbeing for adults: the ICECAP-A. Quality of Life Research, 21, 167-176 https://link.springer.com/article/10.1007/s11136-011-9927-2

Al Ozairi, A., Alsaeed, D., Al-Ozairi, E., Irshad, M., Crane, R. S., & Almoula, A. (2022). Effectiveness of virtual mindfulness-based interventions on perceived anxiety and depression of physicians during the COVID-19 pandemic: A pre-post experimental study. *Frontiers in Psychiatry, 13* https://www.ncbi.nlm.nih.gov/pmc/articles/PMC9868838/

Allahyari, T., Rangi, N. H., Khalkhali, H., & Khosravi, Y. (2014). Occupational cognitive failures and safety performance in the workplace. *International Journal of Occupational Safety and Ergonomics, 20*(1), 175-180. https://www.tandfonline.com/doi/pdf/10.1080/10803548.2014.11077037

American Psychological Association. (2023). Wait list Control Group. https://dictionary.apa.org/wait-list-control-group

AMRA. (2023, *Mindfulness journal publications by year, 1980-2022.* https://www.goamra.org/Library/

APA. (2022, *Active and Passive Voice.* www.apa.org. https://apastyle.apa.org/style-grammar-guidelines/grammar/active-passive-voice#:~:text=Both%20the%20active%20and%20the,about%20the%20actions%20of%20people.

Arango, C., Díaz-Caneja, C. M., McGorry, P. D., Rapoport, J., Sommer, I. E., Vorstman, J. A., McDaid, D., Marín, O., Serrano-Drozdowskyj, E., Freedman, R., & Carpenter, W. (2018).

Preventive strategies for mental health. The Lancet Psychiatry, 5(7), 591-604. https://eprints.lse.ac.uk/88090/1/McDaid_Preventative%20Strategies_Accepted.pdf

Arrow, K. J. (1978). Uncertainty and the welfare economics of medical care. In Uncertainty in economics. Academic Press, 345-375. http://economics-files.pomona.edu/marvasti/data/HealthCareClassArticles/Arrow,%201963.pdf

Asaria, M., McGuire, A., & Street, A. (2022). The impact of management on hospital performance. Fiscal Studies, 43(1), 79-95. https://onlinelibrary.wiley.com/doi/pdf/10.1111/1475-5890.12293

Athar, M., Abazari, M., Arefi, M. F., Karimi, A., Alinia, M., Hosseinzade, S., & Babaei-Pouya, A. (2020). The Relationship Between Job Burnout and Occupational Cognitive Failures in Nurses at Educational Hospitals of Ardabil University of Medical Sciences, Iran. *Malaysian Journal of Medicine & Health Sciences, 16*(2) https://medic.upm.edu.my/upload/dokumen/2020050421543305_MJMHS_0112_(1).pdf

Attar, M., & Abdul-Kareem, A. (2020). *The Role of Agile Leadership in Organisational Agility. Agile Business Leadership Methods for Industry 4.0*. Emerald Publishing Limited.

Avolio, J. B., & Bass, M. B. (2004). *Multifactor Leadership Questionnaire. Third Edition Manual and Sample Set.* Unpublished manuscript. https://www.worldcat.org/title/Multifactor-leadership-questionnaire-:-Manual-and-sample-set/oclc/1190934009

Baer, R. A., Smith, G. T., & Allen, K. B. (2004). Assessment of mindfulness by self-report: the Kentucky inventory of mindfulness skills. *Assessment, 3*, 191-206. https://pubmed.ncbi.nlm.nih.gov/15358875/

Baer, R. A., Smith, G. Y., Lykins, E., Button, D., Krietemeyer, J., Sauer, S., Walsh, E., Duggan, D., & Williams, J. M. (2008). Construct validity of the five facet mindfulness questionnaire in meditating and nonmeditating samples. *Assessment, 15*(3), 329-

342. https://www.academia.edu/download/66921257/Construct_Validity_of_the_Five_Facet_Min20210504-4306-1yccfnj.pdf

Bajcar, B., & Babiak, J. (2022). Transformational and Transactional Leadership in the Polish Organizational Context: Validation of the Full and Short Forms of the Multifactor Leadership Questionnaire. *Front Psychol, 12*(13) https://www.ncbi.nlm.nih.gov/pmc/articles/PMC9133925/

Bakunina, N., Pariante, C. M., & Zunszain, P. A. (2015). Immune mechanisms linked to depression via oxidative stress and neuroprogression. *Immunology, 144*(3), 365-373. https://onlinelibrary.wiley.com/doi/pdfdirect/10.1111/imm.12443

Balestroni et al., (2012). EuroQol-5D (EQ-5D): an instrument for measuring quality of life. Monaldi Archives for Chest Disease, 78(3), 155-159. https://www.monaldi-archives.org/index.php/macd/article/view/121

Balit, F. R. (2023). *How to reduce no shows at free events?* The Events Cast. https://theeventscast.com/podcast/zoeperkins/

BAMBA. (2022). *BAMBA Affiliated Organisations.* www.bamba.org.uk. https://bamba.org.uk/affiliate-organisations/

BAMBA. (2023). *BAMBA. Good Practice Guidelines for Teaching Mindfulness-Based Courses.* www.bamba.org.uk. https://bamba.org.uk/teachers/good-practice-guidelines/

Baminiwatta, A., & Solangaarachchi, I. (2021). Trends and Developments in Mindfulness Research over 55 Years: A Bibliometric Analysis of Publications Indexed in Web of Science. *Mindfulness, 12*(1), 2099-2116 https://doi.org/10.1007/s12671-021-01681-x

Banks, G., Gooty, J., Ross, R. L., Williams, C. E., & Harrington, N. T. (2018). Construct redundancy in leader behaviors: A review and agenda for the future. *The Leadership Quartlery, 29*(1), 236-251 https://www.sciencedirect.com/science/article/pii/S1048984317300620

Banta, J. E. (1987). Sir William Petty: Modern epidemiologist (1623–1687). Journal of Community Health, 12, 185-198. https://link.springer.com/content/pdf/10.1007/BF01323480.pdf

Barbu, L. (2023). Global trends in the scientific research of the health economics: a bibliometric analysis from 1975 to 2022. Health Economics Review, 13(1), 1-20. https://healtheconomicsreview.biomedcentral.com/articles/10.1186/s13561-023-00446-7

Barbuit, C., Purgato, M., Abdulmalik, J., Acarturk, C., Eaton, J., Gastaldon, C., Gureje, O., Hanlon, C., Jordans, M., Lund, C., & Nose, M. (2020). Efficacy of psychosocial interventions for mental health outcomes in low-income and middle-income countries: an umbrella review. *The Lancet, 7*(2) https://www.thelancet.com/journals/lanpsy/article/PIIS2215-0366(19)30511-5/fulltext#:~:text=Psychosocial%20interventions%2C%20broadly%20defined%20as,people%20with%20mental%20health%20conditions.

Barlow, P. (1999). Health care is not a human right. *BMJ (Clinical Research Ed.), 319* https://www.bmj.com/content/319/7205/321.1.short

Bartlett, L., Martin, A., Neil, A. L., Memish, K., Otahal, P., Kilpatrick, M., & Sanderson, K. (2019). A systematic review and meta-analysis of workplace mindfulness training randomized controlled trials. *J Occup Health Psychol, 24*(1), 108-126 https://pubmed.ncbi.nlm.nih.gov/30714811/

Bass, B. M. (1997). Does the transactional–transformational leadership paradigm transcend organizational and national boundaries? *American Psychologist, 52*(2), 130. https://citeseerx.ist.psu.edu/document?repid=rep1&type=pdf&doi=11a92e24e92695d2808268e76848d5c250797808

Bass, B. M., & Bass, R. (2009). *The Bass handbook of leadership: Theory, research, and managerial applications. Simon and Schuster* (4th ed.). Simon and Schuster, 2009.

Bate, P., Mandel, P., & Robert, G. (2007). *Organizing for quality: the improvement journeys of leading hospitals in Europe and the United States*. CRC Press.

Baxter, A. J., Scott, K. M., Ferrari, A. J., Norman, R. E., Vos, T., & Whiteford, H. A. (2014). Challenging the myth of an “epidemic” of common mental disorders: trends in the global prevalence of anxiety and depression between 1990 and 2010. *Depression and Anxiety, 31*(6), 506-516 https://www.academia.edu/download/45391176/Challenging_the_myth_of_an_epidemic_of_c20160505-9756-apwv08.pdf

Baxter, S., Sanderson, K., Venn, A. J., Blizzard, C. L., & Palmer, A. J. (2016). The Relationship between Return on Investment and Quality of Study Methodology in Workplace Health Promotion Programs. *American Journal of Health Promotion, 28*(6), 347-363 https://journals.sagepub.com/doi/epdf/10.4278/ajhp.130731-LIT-395

BBC. (2009, 17 Nov). *The Four Noble Truths.* BBC. https://www.bbc.co.uk/religion/religions/buddhism/beliefs/fournobletruths_1.shtml

Benmira, S., & Agboola, M. (2021). Evolution of leadership theory. BMJ Leader, 5, 3-5. https://bmjleader.bmj.com/content/leader/5/1/3.full.pdf

Broadbent, D. E., Cooper, P. F., FitzGerald, P., & Parkes, K. R. (1982). The cognitive failures questionnaire (CFQ) and its correlates. *British Journal of Clinical Psychology, 21(1), 1-16.*

Bero, L. A., Grilli, R., Grimshaw, J. M., Harvey, E., Oxman, A. D., & Thomson, M. A. (1998). Getting research findings into practice: closing the gap between research and practice: an overview of systematic reviews of interventions to promote the implementation of research findings. *BMJ: British Medical Journal, 317*(7156), 645. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1113716/

Blanck, P., Perleth, S., Heidenreich, T., Kröger, P., Ditzen, B., Bents, H., & Mander, J. (2018). Effects of mindfulness exercises as stand-alone intervention on symptoms of anxiety and depression: Systematic review and meta-analysis. *Behaviour Research and Therapy, 102*,

20-35. https://moseschikoti.com/wp-content/uploads/2019/07/Effects-of-mindfulness-exercises-as-stand-alone-intervention-on-symptoms-of-anxiety-and-depression-Systematic-review-and-meta-analysis.pdf

Blumenschein, K., & Johannesson, M. (1996). Economic evaluation in healthcare. A brief history and future directions. *Pharmacoeconomics, 10*(2) https://doi.org/10.2165/00019053-199610020-00003

Boal, K., & Hooijberg, R. (2000). Strategic leadership research: Moving on. *The Leadership Quarterly, 11*(4), 515-549 https://www.sciencedirect.com/science/article/pii/S1048984300000576

Boeve, B. F. (2008). Update on the diagnosis and management of sleep disturbances in dementia. *Sleep Medicine Clinics, 3*(3), 347-360 https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3170725/

Bogosian, A., Hughes, A., Norton, S., Silber, E., & Moss-Morris, R. (2016). Potential treatment mechanisms in a mindfulness-based intervention for people with progressive multiple sclerosis. *British Journal of Health Psychology, 21*(4), 859-880 https://kclpure.kcl.ac.uk/portal/files/52211252/MIMS_Process_mechansims_paper_BJHP_2016.pdf

Bolger, N., DeLongis, A., Kessler, R. C., & Schilling, E. A. (1989). Effects of daily stress on negative mood. *Journal of Personality and Social Psychology, 57*(5), 808 https://delongis-psych.sites.olt.ubc.ca/files/2018/03/Effects-of-daily-stress-on-negative-mood.pdf

Boston University School of Public Health. (2013), *Confounding* https://www.bumc.bu.edu/. https://sphweb.bumc.bu.edu/otlt/mph-modules/bs/bs704_multivariable/BS704_Multivariable2.html

British Medical Association. (2023, April). *NHS backlog data analysis.* British Medical Association. https://www.bma.org.uk/advice-and-support/nhs-delivery-and-workforce/pressures/nhs-backlog-data-analysis

Burgard, S. A., & Chen, P. V. (2014). Challenges of health measurement in studies of health disparities. *Soc Sci Med, 106*, 143-150 https://www.sciencedirect.com/science/article/abs/pii/S0277953614000720

Butler, M., Epstein, R. A., Totten, A., Whitlock, E. P., Ansari, M. T., Damschroder, L. J., Balk, E., Bass, E. B., Berkman, N. D., Hempel, S., & Iyer, S. (2017). AHRQ series on complex intervention systematic reviews—paper 3: adapting frameworks to develop protocols. *Journal of Clinical Epidemiology, 90*, 19-27 https://www.sciencedirect.com/science/article/pii/S0895435617306327

Butler, P. (2000). Q&A: Postcode lottery. *The Guardian* https://www.theguardian.com/society/2000/nov/09/NHS

Cabinet Office - UK Government. (2006, *Public bodies: a guide for departments.* www.gov.uk. https://www.gov.uk/government/publications/public-bodies-a-guide-for-departments

Campbell, M., Fitzpatrick, R., Haines, A., Kinmonth, A. L., Sandercock, P., Spiegelhalter, D., & Tyrer, P. (2000). Framework for design and evaluation of complex interventions to improve health. *BMJ, 321*(7262), 694-696 https://www.researchgate.net/profile/Peter-Sandercock-2/publication/12334239_Framework_for_Design_and_Evaluation_of_Complex_Interventions_to_Improve_Health/links/00b7d521372a968b38000000/Framework-for-Design-and-Evaluation-of-Complex-Interventions-to-Improve-Health.pdf

Campbell, M., McKenzie, J. E., Sowden, A., Katikireddi, S. V., Brennan, S. E., Ellis, S., Hartmann-Boyce, J., Ryan, R., Shepperd, S., Thomas, J., & Welch, V. (2020). Synthesis without meta-analysis (SWiM) in systematic reviews: reporting guideline. *BMJ, 368*, 368. https://www.bmj.com/content/bmj/368/bmj.l6890.full.pdf

Campbell, N. C., Murray, E., Darbyshire, J., Emery, J., Farmer, A., Griffiths, F., & Kinmonth, A. L. (2007). Designing and evaluating complex interventions to improve health care. *BMJ, 334*(7591), 455-459 https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1808182/

Carleton, E. L., Barling, J., & Trivisonno, M. (2018). Leaders' trait mindfulness and transformational leadership: The mediating roles of leaders' positive affect and leadership self-efficacy. *Canadian Journal of Behavioural Science, 50*(3), 185 https://hosted.smith.queensu.ca/faculty/julianbarling/Articles/Leaders%20Trait%20Mindfulness.pdf

Carmody, J., & Baer, R. A. (2008). Relationships between mindfulness practice and levels of mindfulness, medical and psychological symptoms and well-being in a mindfulness-based stress reduction program. *Journal of Behavioral Medicine, 31*, 23-33. https://asset-pdf.scinapse.io/prod/2002164056/2002164056.pdf

Caro, J. J., Möller, J., & Getsios, D. (2010). Discrete event simulation: the preferred technique for health economic evaluations? *Value in Health, 13*(8), 1056-1060. https://www.sciencedirect.com/science/article/pii/S1098301511718393/pdf?md5=ac832d2b99221b1503eff5b0a80c1317&pid=1-s2.0-S1098301511718393-main.pdf&_valck=1

Carpenter, J. K., Conroy, K., Gomez, A. F., Curren, L. C., & Hofmann, S. G. (2019). The Relationship Between Trait Mindfulness and Affective Symptoms: A Meta-analysis of the Five Facet Mindfulness Questionnaire (FFMQ). *Clinical Psychology Review, 74* https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6878205/

Carrigan, N., & Barkus, E. (2016). A systematic review of cognitive failures in daily life: Healthy populations. *Neuroscience & Biobehavioral Reviews, 63*, 29 -42 https://ro.uow.edu.au/cgi/viewcontent.cgi?article=3160&context=sspapers

Chalmers, I. (1993). The Cochrane collaboration: preparing, maintaining, and disseminating systematic reviews of the effects of health care. *The New York Academy of Sciences,* 163-165. https://pubmed.ncbi.nlm.nih.gov/8192293/

Chambers, R., Gullone, E., & Allen, N. B. (2009). Mindful emotion regulation: An integrative review.*29*(6), 560-572. https://www.researchgate.net/profile/Eleonora-

Gullone/publication/26695867_Mindful_emotion_regulation_An_integrative_review/links/5e54875a4585158f40ec554c/Mindful-emotion-regulation-An-integrative-review.pdf

Charles, J. M., Edwards, R. T., Bywater, T., & Hutchings, J. (2013). Micro-Costing in Public Health Economics: Steps Towards a Standardized Framework, Using the Incredible Years Toddler Parenting Program as a Worked Example. *Prevention Science, 14(4)*, 377-389. https://incredibleyears.com/wp-content/uploads/Charles-et-al-2013-Micro-costing-in-public-health-economics-steps-towards-a-standardized-framework1.pdf

Charles, J. M., Harrington, D. M., Davies, M. J., Edwardson, C. L., Gorely, T., Bodicoat, D. H., Khunti, K., Sherar, L. B., Yates, T., & Edwards, R. T. (2019). Micro-costing and a cost-consequence analysis of the 'Girls Active' programme: A cluster randomised controlled trial. *PLoS ONE, 14*(8) https://doi.org/10.1371/journal.pone.0221276

Chaskalson, M., & Hadley, S. (2015). *Mindfulness: historical and contemplative context and recent developments. Mindfulness in Organizations. Foundations, Research and Applications*. Cambridge University Press.

Chatterjee, S. (2020, *The evolution of performance management.* https://blog.darwinbox.com/evolution-of-performance-management-system

Chemers, M. (2014). An integrative theory of leadership. Psychology Press.

Cherkin, D. C., Sherman, K. J., Balderson, B. H., Cook, A. J., Anderson, M. L., Hawkes, R. J., Hansen, K. E., & Turner, J. A. (2016). Effect of mindfulness-based stress reduction vs cognitive behavioral therapy or usual care on back pain and functional limitations in adults with chronic low back pain. *Jama, 315*(12), 1240. https://doi.org/10.1001/jama.2016.2323

Chiesa, A. (2013). The difficulty of defining mindfulness: Current thought and critical issues. *Mindfulness, 4*(3), 255-268 http://www.radboudcentrumvoormindfulness.nl/media/Artikelen/Chiesa_2012_defining_mindfulness.pdf

Chiesa, A., & Serretti, A. (2009). Mindfulness-based stress reduction for stress management in healthy people: a review and meta-analysis. *The Journal of Alternative and Complementary Medicine, 15*(5), 593-600 https://www.ncbi.nlm.nih.gov/books/NBK77489/

Chmielewski, J., Łoś, K., & Łuczyński, W. (2020). Mindfulness in healthcare professionals and medical education. *International Journal of Occupational Medicine and Environmental Health, 34*(1), 1-14 https://bibliotekanauki.pl/articles/2086167.pdf

Ciulla, J. B. (2020). *The Importance of Leadership in Shaping Business Values. In: The Search for Ethics in Leadership, Business, and Beyond. Issues in Business Ethics*

Clarke, G. M., Conti, S., Wolters, A. T., & Steventon, A. (2019). Evaluating the impact of healthcare interventions using routine data. *BMJ, 365* https://www.bmj.com/content/365/bmj.l2239.full

CMRP (2023). *CMRP - Bangor.* www.bangor.ac.uk/centre-for-mindfulness. https://www.bangor.ac.uk/centre-for-mindfulness

Cohen, S., Kamarck, T., & Mermelstein, R. (1983). A global measure of perceived stress. Journal of Health and Social Behavior, 385-396. https://assets-eu-01.kc-usercontent.com/b8a917bd-b976-01eb-713f-cfc8b8104d0c/a7f40e9c-4541-47ae-b34f-8770d9497b57/Perceived%20Stress%20Scale%20%28PSS%29.pdf

Collins, J. A., & Fauser, B. C. (2005). Balancing the strengths of systematic and narrative reviews. *Human Reproduction Update, 11*(2), 103-104 https://academic.oup.com/humupd/article-pdf/11/2/103/2293862/dmh058.pdf

Cook, D. J., Mulrow, C. D., & Haynes, R. B. (1997). Systematic reviews: synthesis of best evidence for clinical decisions. *Annals of Internal Medicine, 126*(5), 376-380 http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.733.1479&rep=rep1&type=pdf

Corbière, M., Shen, J., Rouleau, M., & Dewa, C. S. (2009). A systematic review of preventive interventions regarding mental health issues in organizations. *Work, 33*, 81-11 https://www.researchgate.net/profile/Carolyn_Dewa/publication/26665964_A_systematic_r

eview_of_preventive_interventions_regarding_mental_health_issues_in_organizations/links/5761927408ae5c6f86da7d34.pdf

Corraini, P., Olsen, M., Pedersen, L., Dekkers, O. M., & Vandenbroucke, J. P. (2017). Effect modification, interaction and mediation: an overview of theoretical insights for clinical investigators. *Clin Epidemiol, 9*, 331-338 https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5476432/

COVID-19 Mental Disorders Collaborators. (2021). Global prevalence and burden of depressive and anxiety disorders in 204 countries and territories in 2020 due to the COVID-19 pandemic. *The Lancet, 398*(10392 https://www.thelancet.com/journals/lancet/article/PIIS0140-6736(21)02143-7/fulltext

Crane & Kuyken. (2013). The Implementation of Mindfulness-Based Cognitive Therapy: Learning From the UK Health Service Experience. *Mindfulness, 3*(4), 246-254 https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3742431/

Crane, C., Crane, R. S., Eames, C., Fennell, M., Silverton, S., Williams, J. M., & Barnhofer, T. (2014). The effects of amount of home meditation practice in Mindfulness Based Cognitive Therapy on hazard of relapse to depression in the Staying Well after Depression Trial. *Behaviour Research and Therapy, 63*, 17-24 https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4271738/

Crane, R. (2017). Implementing Mindfulness in the Mainstream: Making the Path by Walking It. *Mindfulness, 8*, 585 -594 https://link.springer.com/article/10.1007/s12671-016-0632-7#citeas

Crane, R. S., Callen-Davies, R., Francis, A., Francis, D., Gibbs, P., Mulligan, B., O'Neill, B., Pierce Williams, N. K., Waupoose, M., & Vallejo, Z. (2023). Mindfulness-Based Stress Reduction for Our Time: A Curriculum that is up to the Task. *Global Advances in Integrative Medicine and Health, 12* https://journals.sagepub.com/doi/10.1177/27536130231162604

Crane, R. S., & Kuyken, W. (2013). The implementation of mindfulness-based cognitive therapy: learning from the UK health service experience. *Mindfulness, 4*, 246 -254 https://link.springer.com/article/10.1007/s12671-012-0121-6

Crane, R. S., Kuyken, W., Williams, J. M., Hastings, R. P., Cooper, L., & Fennell, M. J. V. (2012). Competence in Teaching Mindfulness-Based Courses: Concepts, Development and Assessment. *Mindfulness, 3*, 76 -84 https://link.springer.com/article/10.1007/s12671-011-0073-2#citeas

Crane, R., Brewer, J., Feldman, C., Kabat-Zinn, J., Santorelli, S., Williams, M., & Kuyken, W. (2017). What defines mindfulness-based programs? The warp and the weft. *Psychological Medicine, 47*, 990 –999 https://www.oxfordmindfulness.org/wp-content/uploads/2017/04/16-What-defines-mindfulness-based-programs-the-warp-and-the-weft.pdf

Curtis, L., & Burns, A. (2020). *Unit Costs of Health and Social Care 2020* https://www.pssru.ac.uk/project-pages/unit-costs/unit-costs-2020/

Dalgren, G., & Whitehead, M. (1993). *Tackling inequalities in health: what can we learn from what has been tried?* Working paper prepared for the King's Fund International Seminar on Tackling Inequalities in Health, September 1993 https://www.gov.uk/government/publications/health-profile-for-england-2018/chapter-6-wider-determinants-of-health#fnref:5

Dane. (2011). Paying attention to mindfulness and its effects on task performance in the workplace. *Journal of Management, 4*, 997 -1018 https://www.researchgate.net/profile/Hamish-More/post/Is-there-any-impact-of-meditation-on-our-behavior/attachment/59d62a01c49f478072e9cc16/AS%3A272474229411845%401441974326780/download/Mindfulness+-+997.full.pdf

Dattani, S., Rodés-Guirao, L., Ritchie, H. & Roser, M. (2021). *Mental Health.* ourworldindata.org. https://ourworldindata.org/mental-health

Davies. (2014). *Chief Medical Officer annual report 2013: public mental health* https://www.gov.uk/government/publications/chief-medical-officer-cmo-annual-report-public-mental-health

De Boer, M. R., Waterlander, W. E., Kuijper, L. D., Steenhuis, I. H., & Twisk, J. W. (2015). Testing for baseline differences in randomized controlled trials: an unhealthy research behavior that is hard to eradicate. *International Journal of Behavioral Nutrition and Physical Activity, 12*(1), 1 -8 https://ijbnpa.biomedcentral.com/articles/10.1186/s12966-015-0162-z

de Bruin, E. I., van der Meulen, R. T., de Wandeler, J., Zijlstra, B. J., Formsma, A. R., & Bögels, S. M. (2020). The Unilever study: Positive effects on stress and risk for dropout from work after the finding peace in a frantic world training. *Mindfulness, 11*, 350-361. https://link.springer.com/article/10.1007/s12671-018-1029-6

de Vibe, M., Bjørndal, A., Fattah, S., Dyrdal, G. M., Halland, E., & Tanner-Smith, E. E. (2017). Mindfulness-based stress reduction (MBSR) for improving health, quality of life and social functioning in adults: a systematic review and meta-analysis. *Campbell Systematic Reviews, 13*(1), 1 -264 https://onlinelibrary.wiley.com/doi/pdf/10.4073/csr.2017.11

Deloitte. (2022). *Poor mental health costs UK employers up to £56 billion a year.* Deloitte. https://www2.deloitte.com/uk/en/pages/press-releases/articles/poor-mental-health-costs-uk-employers-up-to-pound-56-billion-a-year.html

Demarzo, M. M., Cebolla, A., & Garcia-Campayo, J. (2015). The implementation of mindfulness in healthcare systems: a theoretical analysis. *General Hospital Psychiatry, 37*(2), 166-171.

DeNisi, A., & Murphy, K. (2017). Performance appraisal and performance management: 100 years of progress? *Journal of Applied Psychology, 102*(3), 421 https://www.cbs.dk/files/cbs.dk/denisietal_jap2017.pdf

Department for Health and Social Care. (2021). *The NHS Constitution for England.* Department for Health and Social Care https://www.gov.uk/government/publications/the-nhs-constitution-for-england/the-nhs-constitution-for-england

Department for Health and Social Care. (2023). *Mental health services boosted by £150 million government funding.* UK Government https://www.gov.uk/government/news/mental-health-services-boosted-by-150-million-government-funding

Department for Work and Pensions. (2021). *Sickness absence and health in the workplace: understanding employer behaviour and practice*. UK https://www.gov.uk/government/publications/sickness-absence-and-health-in-the-workplace-understanding-employer-behaviour-and-practice/sickness-absence-and-health-in-the-workplace-understanding-employer-behaviour-and-practice-report

Department of Health. (2012, *Health and Social Care Act 2012 Explanatory Notes.* www.legislation.gov.uk. https://www.legislation.gov.uk/ukpga/2012/7/notes?view=plain

Dix, D., Norton, K., & Griffith, G. M. (2021). Leaders on a mindfulness-based program: experience, impact, and effect on leadership role. Human Arenas, 14, 1-9. https://link.springer.com/article/10.1007/s42087-021-00183-5

Dixon-Woods, M., Cavers, D., Agarwal, S., Annandale, E., Arthur, A., Harvey, J., Hsu, R., Katbamna, S., Olsen, R., Smith, L., & Riley, R. (2006). Conducting a critical interpretive synthesis of the literature on access to healthcare by vulnerable groups. *BMC Medical Research Methodology, 6*(35) https://doi.org/10.1186/1471-2288-6-35

Donald, J. N., Bradshaw, E. L., Ryan, R. M., Basarkod, G., Ciarrochi, J., Duineveld, J. J., Guo, J., & Sahdra, B. K. (2020). Mindfulness and its association with varied types of motivation: A systematic review and meta-analysis using self-determination theory. *Personality and Social Psychology Bulletin, 46*(7), 1121 -1138 https://josephciarrochi.com/wp-content/uploads/2021/12/donald-et-al-ciarrochi-mindfulness-and-motivation.pdf

Donald, J., Sahdra, B., Van Zanden, B., Duineveld, J., Atkins, P., Marshall, S., & Ciarrochi, J. (2018). Does your mindfulness benefit others? A systematic review and meta-analysis of the link between mindfulness and prosocial behaviour. *British Journal of Psychology, 110*, 101-125. https://pubmed.ncbi.nlm.nih.gov/30094812/

Doran. (2008). Economic Evaluation of Interventions to Treat Opiate Dependence. *Pharmacoeconomics, 26*, 371 -393 https://link.springer.com/article/10.2165/00019053-200826050-00003

Drew. (2022, July). *Full Range Leadership Model: Definition & Examples.* Helpful Professor. https://helpfulprofessor.com/full-range-leadership-model/

Drummond, M. F., Sculpher, M. J., Claxton, K., Stoddart, G. L., & Torrance, G. W. (2015). *Methods for the Economic Evaluation of Health Care Programmes* (4th ed.). Oxford University Press.

DunlapG, Hieneman, M., Knoster, T., Fox, L., Anderson, J., & Albin, R. W. (2020). Essential elements of inservice training in positive behavior support. *Journal of Positive Behavior Interventions, 2*(1), 22-32. http://polkcountypbsn.org/wp-content/uploads/2012/10/V.A.-Essential-Elements-of-In-Service-Training-in-PBS-Article.pdf

Eberth, J., & Sedlmeier, P. (2012). The effects of mindfulness meditation: a meta-analysis. *Mindfulness, 3*(3), 174 -189 https://www.mindfulness.swiss/assets/Studien-und-Artikel/2012-EberthSedlmeier-Mindfulness-Metaanalyse.pdf

Edwards, R. T. (2022). Well-being and well-becoming through the life-course in public health economics research and policy: A new infographic. Frontiers in Public Health, 10 https://www.frontiersin.org/articles/10.3389/fpubh.2022.1035260/full

Edwards, P., Clarke, M., DiGuiseppi, C., Pratap, S., Roberts, I., & Wentz, R. (2002). Identification of randomized controlled trials in systematic reviews: accuracy and reliability of screening records. *Statistics in Medicine, 21*(11), 1635 -1642 https://onlinelibrary.wiley.com/doi/abs/10.1002/sim.1190

Edwards, R. T., Bryning, L., & Crane, R. (2015). Design of Economic Evaluations of Mindfulness-Based Interventions: Ten Methodological Questions of Which to Be Mindful. *Mindfulness, 6*, 490-500. https://doi.org/10.1007/s12671-014-0282-6

Edwards, R. T., Charles, J. M., & Lloyd-Williams, H. (2013). Public health economics: a systematic review of guidance for the economic evaluation of public health interventions and discussion of key methodological issues. *BMC Public Health, 13*, 1001. https://link.springer.com/article/10.1186/1471-2458-13-1001#citeas

Edwards, R. T., & McIntosh E (Eds.). (2019). *Applied health economics for public health practice and research*. Oxford University Press.

Employment in the UK: December 2021. ONS. (2021). *Employment in the UK: December 2021* https://www.ons.gov.uk/employmentandlabourmarket/peopleinwork/employmentandemployeetypes/bulletins/employmentintheuk/december2021

Eskildsen, A., Dalgaard, V., Nielsen, K. J., Andersen, J. H., Zachariae, R., Olsen, L. R., Jørgensen, A., & Christiansen, D. H. (2015). Cross-cultural adaptation and validation of the Danish consensus version of the 10-item Perceived Stress Scale. Scandinavian Journal of Work, Environment & Health, 486-490. https://www.sjweh.fi/download.php?abstract_id=3510&file_nro=1

EuroQol. (2022, *EQ-5D-3L - About.* www.euroqol.org. https://euroqol.org/eq-5d-instruments/eq-5d-3l-about/

Eva, N., Robin, M., Sendjaya, S., Van Dierendonck, D., & Liden, R. C. (2019). Servant Leadership: A systematic review and call for future research. *The Leadership Quarterly, 30*(1), 111 -132 https://www.sciencedirect.com/science/article/pii/S1048984317307774

Evans. (2012). What can business leaders learn from ancient philosophers? *The Guardian* https://www.theguardian.com/sustainable-business/business-learn-from-ancient-philosophers

Evans. (2016). *Mindfulness-based cognitive therapy*. Springer, Cham.

Expert Panel® Forbes Councils Member. (2021, May 28). *How To Measure Leadership Effectiveness: 14 Essential Tips.* Forbes. https://www.forbes.com/sites/forbesbusinesscouncil/2021/05/28/how-to-measure-leadership-effectiveness-14-essential-tips/?sh=37ea79842823

Farb, N. A., Anderson, A. K., Mayberg, H., Bean, J., McKeon, D., & Segal, Z. (2010). Minding one's emotions: Mindfulness training alters the neural expression of sadness. *Emotion, 10*(1), 25 https://www.ncbi.nlm.nih.gov/pmc/articles/pmc5017873/

Farias, M. (2022). DEBATE: The inevitable decline of mindfulness. *Child and Adolescent Mental Health, 27*(4), 422 -423 https://acamh.onlinelibrary.wiley.com/doi/pdfdirect/10.1111/camh.12600

Farias, M., & Wikholm, C. (2016). Has the science of mindfulness lost its mind? *BJPsych Bulletin, 40*(6), 329 -332 https://www.cambridge.org/core/services/aop-cambridge-core/content/view/02C38F981BEBA5E4BA23D61BE492301A/S2056469400002540a.pdf/has-the-science-of-mindfulness-lost-its-mind.pdf

Feldman, C., & Kuyken, W. (2019). *Mindfulness: Ancient wisdom meets modern psychology*. Guilford Publications.

Felton, T. M., Coates, L., & Christopher, J. C. (2015). Impact of mindfulness training on counseling students' perceptions of stress. *Mindfulness, 6*, 159 -169 https://link.springer.com/article/10.1007/s12671-013-0240-8

Fernald, D. (2007). Psychology: six perspectives. Sage Publications.

Finckh, A., & Tramèr, M. (2008). Primer: strengths and weaknesses of meta-analysis. *Nature Clinical Practice Rheumatology, 4*(3), 146 -152 https://www.researchgate.net/profile/Axel-Finckh/publication/5623695_Primer_Strengths_and_weaknesses_of_meta-analysis/links/0912f510bca01cf0d9000000/Primer-Strengths-and-weaknesses-of-meta-analysis.pdf

Fink, G. (2016). Chapter 1 - Stress, Definitions, Mechanisms, and Effects Outlined: Lessons from Anxiety. In G. Fink (Ed.), *Academic Press* (pp. 3-11)

Ford, M. T., Cerasoli, C. P., Higgins, J. A., & Decesare, A. L. (2011). Relationships between psychological, physical, and behavioural health and work performance: A review and meta-analysis.*25*(3), 185 -204 https://www.tandfonline.com/doi/pdf/10.1080/02678373.2011.609035

Frederix. (2019). Check your checklist: the danger of over-and underestimating the quality of economic evaluations. *PharmacoEconomics, 3*(4), 433 -435 https://link.springer.com/article/10.1007/s41669-019-0118-3

Frick, K. (2010). Micro-Costing Quantity Data Collection Methods. *Medical Care, 47(7 Suppl 1)*, S76–S81. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2714580/

Fuentes Artiles, R., Staub, K., Aldakak, L., Eppenberger, P., Rühli, F., & Bender, N. (2019). Mindful eating and common diet programs lower body weight similarly: Systematic review and meta-analysis. *Obesity Reviews, 20*(11), 1619 -1627 https://onlinelibrary.wiley.com/doi/abs/10.1111/obr.12918

Gilboa, S., Shirom, A., Fried, Y., & Cooper, C. (2008). A meta-analysis of work demand stressors and job performance: examining main and moderating effects. *Personnel Psychology, 61*, 227-271. https://onlinelibrary.wiley.com/doi/10.1111/j.1744-6570.2008.00113.x

Giuliano, R., Kampelmann, S., Mahy, B., & Rycx, F. (2017). Short notice, big difference? The effect of temporary employment on firm competitiveness across sectors. British Journal of Industrial Relations, 55(2), 421-449. https://www.econstor.eu/bitstream/10419/161202/1/dp10579.pdf

Good, D. J., Lyddy, C. J., Glomb, T. M., Bono, J. E., Brown, K. W., Duffy, M. K., Baer, R. A., Brewer, J. A., & Lazar, S. W. (2016). Contemplating mindfulness at work: An integrative

review. *Journal of Managemen, 42*(1), 114 -142 https://journals.sagepub.com/doi/pdf/10.1177/0149206315617003

Goodacre. (2002). An introduction to economic evaluation. *Emergency Medicine Journal, 19*(3), 198-201. https://emj.bmj.com/content/19/3/198

Goodacre, S., & McCabe, C. (2002). An introduction to economic evaluation. *Emergency Medicine Journal, 19*(3), 198 https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1725884/pdf/v019p00198.pdf

Gopal. (2008). Leadership is prime: How do you measure Leadership Excellence? *Total Quality Management & Business Excellence, 19*(4), 417 -427 https://doi.org/10.1080/14783360802002834

Gopalakrishnan, S., & Ganeshkumar, P. (2013). Systematic Reviews and Meta-analysis: Understanding the Best Evidence in Primary Healthcare. *Family Med Prim Care, 2*(1), 9-14. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3894019/

Grace-Martin, K. (2020). *Missing data: two big problems with mean imputation.* https://www.theanalysisfactor.com/mean-imputation/#:~:text=True%2C%20imputing%20the%20mean%20preserves,to%20the%20full%20sample%20size.

Grad, F. P. (2002). The preamble of the constitution of the World Health Organization. *Bulletin of the World Health Organization, 80*, 981. https://www.scielosp.org/article/bwho/2002.v80n12/981-981/

Granlund, M., Imms, C., King, G., Andersson, A. K., Augustine, L., Brooks, R., Danielsson, H., Gothilander, J., Ivarsson, M., Lundqvist, L. O., & Lygnegård, F. (2021). Definitions and operationalization of mental health problems, wellbeing and participation constructs in children with ndd: distinctions and clarifications.

International Journal of Environmental Research and Public Health, 18(4), 1656. https://www.mdpi.com/1660-4601/18/4/1656

Green, S. (2005). Systematic reviews and meta-analysis. *Singapore Medical Journal, 46*(6), 270-274. https://pubmed.ncbi.nlm.nih.gov/15902354/

Greenhalgh, T., Thorne, S., & Malterud, K. (2019). Time to challenge the spurious hierarchy of systematic over narrative reviews? *European Journal of Clinical Investigation, 48*(6) https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6001568/

Grinza, E., & Rycx, F. (2020). The impact of sickness absenteeism on firm productivity: New evidence from Belgian matched employer–employee panel data. Industrial Relations: A Journal of Economy and Society, 59(1), 150-194. https://www.econstor.eu/bitstream/10419/180561/1/dp11543.pdf

Grosios, K., Gahan, P. B., & Burbidge, J. (2010). Overview of healthcare in the UK. *Epma, 1*, 529-534. https://pubmed.ncbi.nlm.nih.gov/23199107/

Grossmann, I. (2017). Wisdom in context. Perspectives on Psychological Science, 12(2), 233-257. https://cs.uwaterloo.ca/~jhoey/teaching/cogsci600/papers/Grossmann_PPS_2017.pdf

Grossman, J., & Mackenzie, F. J. (2005). The Randomized Controlled Trial: gold standard, or merely standard? *Perspectives in Biology and Medicine, 48*(4), 516-534. https://muse.jhu.edu/article/188201

Hafenbrack, A., & Vohs, K. (2018). Mindfulness meditation impairs task motivation but not performance. *Organizational Behavior and Human Decision Processes, 147*, 1 - 15. https://carlsonschool.umn.edu/sites/carlsonschool.umn.edu/files/2019-04/hafenbrack_vohs_2018_obhdp_mindfulness_impairs_motivation_0.pdf

Hafenbrack, A. C., Cameron, L. D., Spreitzer, G. M., Zhang, C., Noval, L. J., & Shaffakat, S. (2020). Helping people by being in the present: Mindfulness increases prosocial behavior. Organizational Behavior and Human Decision Processes, 1(159), 21-38. https://researchonline.ljmu.ac.uk/id/eprint/11384/1/Hafenbrack%20Cameron%20Spreitzer%

20Zhang%20Noval%20Shaffakat_mindfulness%20prosocial%20behavior_21%20August%202019_inpressOBHDP%20%281%29.pdf

Hakkaart-van Roijen, L., Tan, S. S. & Bouwmans, C. A. (2011). *Handleiding voor kostenonderzoek; methoden en standaard kostprijzen voor economische evaluaties in de gezondheidszorg. Geactualiseerde versie 2010 [Manual for costs research].* Researchgate. https://www.researchgate.net/publication/257785100_Handleiding_Voor_Kostenonderzoek_Methoden_En_Standaard_Kostprijzen_Voor_Economische_Evaluaties_in_de_Gezondheidszorg

Hargis, M. B., Watt, J. D., & Piotrowski, C. (2001). Developing leaders: Examining the role of transactional and transformational leadership across contexts business. *Organization Development Journal, 29*(3), 51 - 56. https://www.academia.edu/download/46450205/Leaders.pdf

Harrison, S. (2019, *The key to mindfulness at work is being in 3 places at once.* www.atlassian.com. https://www.atlassian.com/blog/teamwork/collaboration-mindfullness-at-work

Harvey M & Riggio R.E (Eds.). (2011). Is leadership studies a discipline? The dialogue of disciplines: Research companion to leadership studies. Edward Elgar.

Hassan, H., Asad, S., & Hoshino, Y. (2016). Determinants of leadership style in big five personality dimensions. *Universal Journal of Management, 4*(4), 161-179. https://researchmap.jp/read0066677/published_papers/14673710/attachment_file.pdf

Halm, M. (2017). The role of mindfulness in enhancing self-care for nurses. American Journal of Critical Care, 1(26), 344-8. https://www.thewellnurse.com/wp-content/uploads/2019/10/Am-J-Crit-Care-2017-Halm-344-8.pdf

Herbert, R. D., Kasza, J., & Bø, K. (2018). Analysis of randomised trials with long-term follow-up. *BMC Medical Research Methodology, 18*, 1-9. https://link.springer.com/article/10.1186/s12874-018-0499-5

Hesketh, R., Strang, L., Pollitt, A., & Wilkinson, B. (2020). *What do we know about the effectiveness of workplace mental health interventions.* https://www.kcl.ac.uk/policy-institute/assets/what-do-we-know-about-the-effectiveness-of-workplace-mental-health-interventions.pdf

Higgins, A., O'Halloran, P., & Porter, S. (2012). Management of long term sickness absence: A systematic realist review. *Journal of Occupational Rehabilitation, 22*, 322-332. https://www.researchgate.net/profile/Peter-Ohalloran/publication/221976028_Management_of_Long_Term_Sickness_Absence_A_Systematic_Realist_Review/links/546e286e0cf29806ec2e9b18/Management-of-Long-Term-Sickness-Absence-A-Systematic-Realist-Review.pdf

Hill, A. B., & Hill, I. D. (1991). *Principles of Medical Statistics, 12thedn*. Edward Arnold.

Hilton, L., Hempel, S., Ewing, B. A., Apaydin, E., Xenakis, L., Newberry, S., & Maglione, M. A. (2017). Mindfulness meditation for chronic pain: systematic review and meta-analysis. *Annals of Behavioral Medicine, 51*(2), 199-213. https://academic.oup.com/abm/article/51/2/199/4564147

Hiltona, L. G., Marshall, N. J., Motala, A., Taylor, S. L., Miake-Lye, I. M., Baxi, S., Shanman, R. M., Solloway, M. R., Beroesand, J. M., & Hempel, S. (2017). Mindfulness meditation for workplace wellness: An evidence map. *IOS Press.* https://content.iospress.com/articles/work/wor192922

Hoeve, M., de Bruin, E. I., van Rooij, F., & Bögels, S. M. (2021). Effects of a Mindfulness-Based Intervention for Police Officers. *Mindfulness, 12*, 1672-1684. https://doi.org/10.1007/s12671-021-01631-7

Hrifach, A., Brault, C., Couray-Targe, S., Badet, L., Guerre, P., Ganne, C., & Colin, C. (2016). Mixed method versus full top-down microcosting for organ recovery cost assessment in a French hospital group. *Health Economics Review, 6*, 1-7. https://link.springer.com/article/10.1186/s13561-016-0133-3

Hunter, J. E. (1986). Cognitive ability, cognitive aptitudes, job knowledge, and job performance. *Journal of Vocational Behavior, 29*(3), 340-362. https://doi.org/10.1016/0001-8791(86)90013-8

Husereau, D., Drummond, M., Augustovski, F., de Bekker-Grob, E., Briggs, A. H., Carswell, C., Caulley, L., Chaiyakunapruk, N., Greenberg, D., Loder, E., & Mauskopf, J. (2022a). Consolidated Health Economic Evaluation Reporting Standards (CHEERS) 2022 Explanation and Elaboration: A Report of the ISPOR CHEERS II Good Practices Task Force. *Value in Health, 25*(1), 10-31. https://www.sciencedirect.com/science/article/pii/S1098301521017952

Husereau, D., Drummond, M., Augustovski, F., de Bekker-Grob, E., Briggs, A. H., Carswell, C., Caulley, L., Chaiyakunapruk, N., Greenberg, D., Loder, E., Mauskopf, J., Mullins, C. D., Petrou, S., Pwu, R. F., & Staniszewska, S. (2022b). CHEERS 2022 ISPOR Good Research Practices Task Force. Consolidated Health Economic Evaluation Reporting Standards 2022 (CHEERS 2022) statement: updated reporting guidance for health economic evaluations. *BMC Health Serv Res., 1*, 114. https://pubmed.ncbi.nlm.nih.gov/35081957/

Hyland, P. K., Lee, R. A., & Mills, M. J. (2015). Mindfulness at Work: A New Approach to Improving Individual and Organizational Performance. Industrial and Organizational Psychology. *Ndustrial and Organizational Psychology: Perspectives on Science and Practice, 8*(4), 576-602. https://psycnet.apa.org/record/2016-05264-016

Imel, Z., Baldwin, S., Bonus, K., & MacCoon, D. (2008). Beyond the individual: Group effects in mindfulness-based stress reduction. *Psychotherapy Research, 18*(6), 735 - 742. https://www.tandfonline.com/doi/epdf/10.1080/10503300802326038?needAccess=true&role=button

Informa Insights. (2015). *Leadership styles: Understanding and using the right one for your situation.* https://www.informa.com.au/insight/leadership-styles-understanding-and-using-the-right-one-for-your-

situation/#:~:text=Autocratic%20leadership%20is%20an%20extreme,the%20team's%20or%20organization's%20interest.

Islam, G., Holm, M., & Karjalainen, M. (2022). Sign of the times: Workplace mindfulness as an empty signifier. *Organization, 2*+(1), 3-19. https://journals.sagepub.com/doi/pdf/10.1177/1350508417740643

Jacobsen, E., Boyers, D., & Avenell, A. (2020). Challenges of Systematic Reviews of Economic Evaluations: A Review of Recent Reviews and an Obesity Case Study. *Pharmacoeconomics, 38*(3), 259 - 267. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7045785/

Jamieson, S., & Tuckey, M. (2017). Mindfulness interventions in the workplace: A critique of the current state of the literature. *Journal of Occupational Health Psychology, 22*(2), 180-193. https://psycnet.apa.org/journals/ocp/22/2/180/

Janssen, D. F., & Hubbard, T. K. (2021). Psychology: Early print uses of the term by Pier Nicola Castellani (1525) and Gerhard Synellius (1525). History of Psychology, 24(4), 182. https://psycnet.apa.org/record/2021-50723-008

Janz, N. K., & Becker, M. H. (1984). The health belief model: A decade later. *Health Education Quarterly, 11*(1), 1-47. https://pubmed.ncbi.nlm.nih.gov/6392204/

Jha, A. P., Stanley, E. A., Kiyonaga, A., Wong, L., & Gelfand, L. (2010). Examining the protective effects of mindfulness training on working memory capacity and affective experience. *Emotion, 10*(1), 54. https://psycnet.apa.org/buy/2010-01983-011

Johns, G. (2010). Presenteeism in the workplace: A review and research agenda. *Journal of Organizational Behavior, 31*(4), 519 - 542. https://onlinelibrary.wiley.com/doi/pdf/10.1002/job.630

Johns, S. A., Brown, L. F., Beck-Coon, K., Monahan, P. O., Tong, Y., & Kroenke, K. (2015). Randomized controlled pilot study of mindfulness-based stress reduction for persistently

fatigued cancer survivors. *Psycho-Oncology, 24*(8), 885 - 893. https://doi.org/10.1002/pon.3648

Kabat-Zinn, J. (1994). *Wherever you go there you are: Mindfulness meditation in everyday life*. Hachette Books. ISBN 978-0-7868-8070-6.

Kabat-Zinn, J. (2011). Some reflections on the origins of MBSR, skillful means, and the trouble with maps. *Contemporary Buddhism, 12*(1), 281 - 306. https://www.tandfonline.com/doi/pdf/10.1080/14639947.2011.564844

Kabat-Zinn, J. (2023). *Full catastrophe living, revised edition: how to cope with stress, pain and illness using mindfulness meditation*. Piatkus.

Kalia, M. (2002). Assessing the economic impact of stress--the modern day hidden epidemic. *Metabolism, 51*, 49-53. https://pubmed.ncbi.nlm.nih.gov/12040542/

Karing, C., & Beelmann, A. (2021). Evaluating the implementation and effectiveness of a low-dose mindfulness-based intervention in a student sample: a randomized controlled trial. *Mindfulness, 12*, 1438 - 1450. https://link.springer.com/article/10.1007/s12671-021-01613-9

Karlsson, P., & Bergmark, A. (2014). Compared with what? An analysis of control-group types in Cochrane and Campbell reviews of psychosocial treatment efficacy with substance use disorders. *Addiction,* https://doi.org/10.1111/add.12799

Karon, J., & Brown, J. (1998). Selecting a decision model for economic evaluation: a case study and review. *Health Care Management Science, 1*(2), 133 - 140. https://www.researchgate.net/profile/Jonathan-Karnon/publication/12402507_Selecting_a_decision_model_for_economic_evaluation_A_case_study_and_review/links/55adde8a08aee079921e3c1f/Selecting-a-decision-model-for-economic-evaluation-A-case-study-and-review.pdf

Kellogg, R. T. (2003). Cognitive psychology (2nd ed.). Sage.

Kelly, M., McDaid, D., Ludbrook, A., & Powell, J. (2005). *Economic appraisal of public health interventions*. Health Development Agency.

Kenkel, D. (2006). The demand for preventive medical care.*26*(4), 313-325. https://www.tandfonline.com/doi/abs/10.1080/00036849400000078

Khoury, B., Lecomte, T., Fortin, G., Masse, M., Therien, P., Bouchard, V., & Hofmann, S. G. (2013). Mindfulness-based therapy: a comprehensive meta-analysis. *Clinical Psychology Review, 33*(6), 763 - 771. https://www.ncbi.nlm.nih.gov/books/NBK153338/

Kiken, L. G., Garland, E. L., Bluth, K., Palsson, O. S., & Gaylord, S. A. (2015). From a state to a trait: Trajectories of state mindfulness in meditation during intervention predict changes in trait mindfulness. *Personality and Individual Differences, 81*, 41-46. https://hosted.smith.queensu.ca/faculty/julianbarling/Articles/Leaders%20Trait%20Mindfulness.pdf

Klatt, M. D., Buckworth, J., & Malarkey, W. B. (2009). Effects of low-dose mindfulness-based stress reduction (MBSR-ld) on working adults. *Health Education & Behavior, 36*(3), 601 - 314. https://citeseerx.ist.psu.edu/document?repid=rep1&type=pdf&doi=3688cab1f0ad25989b260f20002c48bdf288ef5d

Klussman, K., Curtin, N., Langer, J., & Nichols, A. L. (2020). Examining the effect of mindfulness on well-being: self-connection as a mediator. *Journal of Pacific Rim Psychology, 14*(5) https://www.cambridge.org/core/services/aop-cambridge-core/content/view/EFC861E6E764E7FF745CAD02478FBDA7/S1834490919000291a.pdf/examining-the-effect-of-mindfulness-on-well-being-self-connection-as-a-mediator.pdf

Kluyver, T., Ragan-Kelley, B., Pérez, F., Granger, B. E., Bussonnier, M., Frederic, J., Kelley, K., Hamrick, J. B., Grout, J., Corlay, S., & Ivanov, P. (2016). *Jupyter Notebooks – a publishing format for reproducible computational workflows.* Positioning and Power in Academic Publishing: Players, Agents and Agendas.

Korejan, M. M., & Shahbazi, H. (2016). An analysis of the transformational leadership theory. *Journal of Fundamental and Applied Sciences, 8*(3), 452 - 461. https://www.ajol.info/index.php/jfas/article/view/142517/132251

Kumar, A., & Nayar, K. R. (2020). COVID 19 and its mental health consequences. *Journal of Mental Health,* 1-2. https://www.tandfonline.com/doi/full/10.1080/09638237.2020.1757052

Kuntz, K., Sainfort, F., Butler, M., Taylor, B., Kulasingam, S., Gregory, S., Mann, E., Anderson, J. M., & Kane, R. L. (2013). *Decision and Simulation Modeling in Systematic Reviews [Internet]*. Rockville (MD): Agency for Healthcare Research and Quality (US).

Kuyken, W., Ball, S., Crane, C., Ganguli, P., Jones, B., Montero-Marin, J., Nuthall, E., Raja, A., Taylor, L., Tudor, K., Viner, R. M., Allwood, M., Aukland, L., Dunning, D., Casey, T., Dalrymple, N., De Wilde, K., Farley, E. R., Harper, J., & .... Williams J.M.G. (2022). Effectiveness and cost-effectiveness of universal school-based mindfulness training compared with normal school provision in reducing risk of mental health problems and promoting well-being in adolescence: the MYRIAD cluster randomised controlled trial. *BMJ Ment Health, 25*(3), 99 - 109. https://mentalhealth.bmj.com/content/25/3/99.abstract

Kuyken, W., Warren, F. C., Taylor, R. S., Whalley, B., Crane, C., Bondolfi, G., Hayes, R., Huijbers, M., Ma, H., Schweizer, S., Segal, Z., Speckens, A., Teasdale, J. D., Van Heeringen, K., Williams, M., Byford, S., Byng, R., & Dalgleish, T. (2016). Efficacy of mindfulness-based cognitive therapy in prevention of depressive relapse: an individual patient data meta-analysis from randomized trials. *JAMA Psychiatry, 73*(6) https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6640038/

LaMontagne, A. D., Martin, A., Page, K. M., Reavley, N. J., Noblet, A. J., Milner, A. J., Keegel, T., & Smith, P. M. (2014). Workplace mental health: developing an integrated intervention approach. *BMC Psychiatry, 14*(1), 1 - 11. https://bmcpsychiatry.biomedcentral.com/articles/10.1186/1471-244X-14-131

Larson, G. E., & Merritt, C. R. (1991). Can accidents be predicted? An empirical test of the Cognitive Failures Questionnaire. *Applied Psychology, 40*(1), 37 - 45. https://iaap-journals.onlinelibrary.wiley.com/doi/abs/10.1111/j.1464-0597.1991.tb01356.x

Lau, F., & Holbrook, A. (2017). Methods for Comparative Studies. In Lau et al. (Ed.), *Handbook of eHealth Evaluation: An Evidence-based Approach* (). University of Victoria.

Lee, E. H. (2012). Review of the Psychometric Evidence of the Perceived Stress Scale. *Asian Nursing Research, 6*(4), 121 - 127. https://pubmed.ncbi.nlm.nih.gov/25031113/

Linden, D. V., Keijsers, G. P., Eling, P., & Schaijk, R. V. (2005). Work stress and attentional difficulties: An initial study on burnout and cognitive failures. *Work & Stress, 19*(1), 23-36. https://www.researchgate.net/profile/Paul-Eling/publication/247511192_Work_stress_and_attentional_difficulties_An_initial_study_on_burnout_and_cognitive_failures/links/0a85e531073038a270000000/Work-stress-and-attentional-difficulties-An-initial-study-on-burnout-and-cognitive-failures.pdf

Linsky, A. S., Straus, M. A., & Colby Jr, J. P. (1985). Stressful events, stressful conditions and alcohol problems in the United States: a partial test of Bales's theory. *Journal of Studies on Alcohol, 46*(1), 72 - 80. https://doi.org/10.15288/jsa.1985.46.72

Little M, B. V. L., Morpeth, L., Blower, S, Axford, N, Taylor, R., Bywater, T., Lehtonen, M., & Tobin, K. (2012). The impact of three evidence-based programmes delivered in public systems in Birmingham, UK. *International Journal of Conflict and Violence, 2*(2), 260-272. http://clok.uclan.ac.uk/6824/1/6824_Berry.pdf

Local government workforce. (2021). Local government workforce summary data - November 2021. Local Government Association. https://www.local.gov.uk/local-government-workforce-summary-data-november-2021#labour-turnover

Loiwal, M. (2020, March). 20% increase in patients with mental illness since coronavirus outbreak: Survey. *India Today* https://www.indiatoday.in/india/story/20-per-cent-increase-in-patients-with-mental-illness-since-coronavirus-outbreak-survey-1661584-2020-03-31

Lomas, T., Medina, J. C., Ivtzan, I., Rupprecht, S., Hart, R., & Eiroa-Orosa, F. J. (2017). The impact of mindfulness on well-being and performance in the workplace: an inclusive systematic review of the empirical literature. *European Journal of Work and Organizational Psychology, 26*(4), 492 - 513. https://www.tandfonline.com/doi/abs/10.1080/1359432X.2017.1308924

López-Cabarcos, M. Á, Vázquez-Rodríguez, P., & Quiñoá-Piñeiro, L. M. (2022). An approach to employees' job performance through work environmental variables and leadership behaviours. Journal of Business Research, 140, 361-369. https://www.sciencedirect.com/science/article/pii/S0148296321008110

Loucks, E. B., Crane, R. S., Sanghvi, M. A., Montero-Marin, J., Proulx, J., Brewer, J. A., & Kuyken, W. (2022). Mindfulness-Based programs: why, when, and how to adapt? *Global Advances in Health and Medicine, 11*, 1 - 12. https://journals.sagepub.com/doi/pdf/10.1177/21649561211068805

Lucas, R. E. (2018). *Reevaluating the strengths and weaknesses of self-report measures of subjective well-being. Handbook of well-being*. DEF Publishers.

Lundberg, U. (2006). Stress, subjective and objective health. *International Journal of Social Welfare, 15*, 541 - 548. https://www.academia.edu/download/77778341/j.1468-2397.2006.00443.x20211231-7960-yiw7f.pdf

Magill, N., Kinghr R' McCrone P, Ismail, K., & Landau, S. (2019). A scoping review of the problems and solutions associated with contamination in trials of complex interventions in mental health. *BMC Medical Research Methodology, 19*, 1-13. https://link.springer.com/article/10.1186/s12874-018-0646-z

Mangset, M., Kitzmüller, G., Evju, A. S., Angel, S., Aadal, L., Martinsen, R., Bronken, B. A., Kvigne, K. J., Bragstad, L. K., Hjelle, E. G., & Sveen, U. (2021). Perceived study-induced influence on the control group in a randomized controlled trial evaluating a complex intervention to promote psychosocial well-being after stroke: a process

evaluation. *Trials, 1*(10), 1 - 10. https://trialsjournal.biomedcentral.com/articles/10.1186/s13063-021-05765-w

Masion, S., Tovey, P., & Long, A. F. (2002). Evaluating complementary medicine: methodological challenges of randomised controlled trials. *BMJ, 325*(7368), 832-834. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1124333/

McCown, D., Reibel, D., & Micozzi, M. S. (2010). *Teaching mindfulness. A practical guide for clinicians and educators*. US Springer. 10.1007/978-0-387-09484-7

McDaid, D., Park, A. L., Davidson, G., Knifton, L., S, M. A., Thorpe, L., & Wilson, N. (2022). The economic case for investing in the prevention of mental health conditions in the UK. (). UK: London School of Economics and Political Science. https://eprints.lse.ac.uk/114286/1/McDaid_the_economic_case_for_investing_published.pdf

McKinney, W. (2012). *Python for Data Analysis* (First Edition ed.). O'Reilly Media, Inc.

Medlicott, E., Phillips, A., Crane, C., Hinze, V., Taylor, L., Tickell, A., Montero-Marin, J., & Kuyken, W. (2021). The Mental Health and Wellbeing of University Students: Acceptability, Effectiveness, and Mechanisms of a Mindfulness-Based Course. *International Journal of Environmental Research and Public Health, 18* (11), 6023. https://www.mdpi.com/1660-4601/18/11/6023/pdf?version=1622800928

Medical News. (2023, Sept). What is psychology and what does it involve? www.medicalnewstoday.com. https://www.medicalnewstoday.com/articles/154874

Micklitz, K., Wong, G., & Howick, J. (2021). Mindfulness-based programmes to reduce stress and enhance well-being at work: a realist review. *BMJ Open, 11*(3) https://bmjopen.bmj.com/content/11/3/e043525.abstract

Mikulas, W. L. (1978). Four Noble Truths of Buddhism Related to Behavior Therapy. *The Psychological Record, 28*, 59 - 67. https://link.springer.com/article/10.1007/BF03394510

Milczarek, M., Schneider, E., & González, E. R. (2009). *OSH in figures: stress at work — facts and figures.* European Communities, 2009 https://osha.europa.eu/en/publications/osh-figures-stress-work-facts-and-figures

Mind. (2022) *How and where to learn mindfulness.*www.mind.org.uk. https://www.mind.org.uk/information-support/drugs-and-treatments/mindfulness/how-to-learn-mindfulness/

Mofatteh, M. (2021). Risk factors associated with stress, anxiety, and depression among university undergraduate students. *AIMS Public Health, 5*(1), 36-65. https://www.aimspress.com/article/id/5fe58b79ba35de4f9de2f95a

Moher, D., Hopewell, S., Schulz, K. F., Montori, V., Gøtzsche, P. C., Devereaux, P. J., & Altman, D. G. (2010). CONSORT 2010 Explanation and Elaboration: updated guidelines for reporting parallel group randomised trials. *International Journal of Surgery, 10*(1), 28 - 55. https://www.sciencedirect.com/science/article/pii/S1743919111005656

Moher, D., Liberati, A., Tetzlaff, J., & Altman, D. G. (2009). Preferred reporting items for systematic reviews and meta-analyses: the PRISMA statement. *Annals of Internal Medicine, 151*(4), 264-269. https://www.acpjournals.org/doi/full/10.7326/0003-4819-151-4-200908180-00135

Montero-Marin, J., Taylor, L., Crance, C., Greenberg, M. T., Ford, T. J., Williams, J. M., & Kuyken, W. (2021). Teachers “finding peace in a frantic world”: An experimental study of self-taught and instructor-led mindfulness program formats on acceptability, effectiveness, and mechanisms. *Journal of Educational Psychology, 113*(8), 1689. https://psycnet.apa.org/journals/edu/113/8/1689.pdf

Montero-Marin, K., Allwood, M., Ball, S., Crane, C., De Wilde, K., Hinze, V., Jones, B., Lord, L., Nuthall, E., Raja, A., & Taylor, L. (2022). School-based mindfulness training in early adolescence: what works, for whom and how in the MYRIAD trial. *Evidence-Based Mental Health, 25*, 117 - 124. https://ebmh.bmj.com/content/25/3/117

Moynihan, J. A., Chapman, B. P., Klorman, R., Krasner, M. S., Duberstein, P. R., Brown, K. W., & Talbot, N. L. (2013). Mindfulness-based stress reduction for older adults: effects on executive function, frontal alpha asymmetry and immune function. *Neuropsychobiology, 68*(1), 34 - 43. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3831656/

Munley, A. E. (2011). Culture differences in leadership. IUP Journal of Soft Skills, 5(1) https://search.ebscohost.com/login.aspx?direct=true&profile=ehost&scope=site&authtype=crawler&jrnl=09738479&AN=59948595&h=7JB5hQfIIikb947eEg0hHQWFb%2BVCB32xksqJrA%2FcICAd9TxGxuo1Z6F7MI8eu9s3MiPVJkdLOwZpeWVbFzagnA%3D%3D&crl=c

Nair, B. (2019). Clinical trial designs. Indian Dermatology Online Journal, 10(2), 193. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6434767/

National Institute for Health Research. (2018). *Cost-consequences analysis - an underused method of economic evaluation.* https://www.rds-london.nihr.ac.uk/wpcms/wp-content/uploads/2018/09/Cost-consequences-analysis-an-underused-method.pdf

Nehring, D., & Frawley, A. (2020). *Mindfulness as a self-help fad: The mindfulness industry, popular psychological knowledge, and the sociological imagination* (1st ed.). Routledge.

Neisser, U. (2014). Cognitive psychology: Classic edition (Classic Edition ed.). Psychology press.

Newsome, S., Christopher, J. C., Dahlen, P., & Christopher, S. (2006). Teaching counselors self-care through mindfulness practices. *Teachers College Record, 108*(9), 1881 – 1900 https://www.academia.edu/download/31736755/TCR_(2006)._Teaching_Counselors_Self-Care_Through_Mindfulness_Practices.pdf

NHS. (2013). *The Handbook to the NHS Constitution* https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/170649/Handbook_to_the_NHS_Constitution.pdf

NHS. (2014). *NHS Five Year Forward View.* https://www.england.nhs.uk/publication/nhs-five-year-forward-view/

NHS. (2021). *Record high patient numbers completing NHS treatment for common mental illness.* www.england.nhs.uk. https://www.england.nhs.uk/2021/11/record-high-patient-numbers-completing-nhs-treatment-for-common-mental-illness/

NHS. (2022). *Consultant-led Referral to Treatment Waiting Times Data 2021 – 22* https://www.england.nhs.uk/statistics/statistical-work-areas/rtt-waiting-times/rtt-data-2021-22/#Dec21

NHS Digital. (2013). *Mental Health Bulletin, Annual Report From MHMDS Returns, England - 2012-13.* https://digital.nhs.uk/data-and-information/publications/statistical/mental-health-services-monthly-statistics/performance-october-performance-november-provisional-december-2021

NHS Digital. (2014). *Numbers of Patients Registered at a GP Practice - January 2014.* https://digital.nhs.uk/data-and-information/publications/statistical/patients-registered-at-a-gp-practice/january-2014

NHS Digital. (2015). *Psychological Therapies, Annual Report on the use of IAPT services - England, 2014-15.* NHS Digital. https://digital.nhs.uk/data-and-information/publications/statistical/psychological-therapies-annual-reports-on-the-use-of-iapt-services/annual-report-2014-15

NHS Digital. (2022). *Psychological Therapies, Annual report on the use of IAPT services, 2021-22.* NHS Digital. https://digital.nhs.uk/data-and-information/publications/statistical/psychological-therapies-annual-reports-on-the-use-of-iapt-services/annual-report-2021-22

NHS Digital. (2023a). *Mental Health Services Monthly Statistics, Performance January, Provisional February 2023.* https://digital.nhs.uk/data-and-

information/publications/statistical/mental-health-services-monthly-statistics/performance-january-provisional-february-2023

NHS Digital. (2023b). *Patients Registered at a GP Practice, April 2023.* https://digital.nhs.uk/data-and-information/publications/statistical/patients-registered-at-a-gp-practice/april-2023

NHS England. (2019). *The NHS Long Term Plan.* www.longtermplan.nhs.uk%2Fwp-content%2Fuploads%2F2019%2F08%2Fnhs-long-term-plan-version-1.2.pdf&clen=2225232&chunk=true

NHS England. (2023). *NHS Talking Therapies, for anxiety and depression.* https://www.england.nhs.uk/mental-health/adults/nhs-talking-therapies/

NHS Open Space. (2023). *NHS Open Space.* Retrieved 05.02.23, from https://openspace.nhs.uk/

NHS Providers. (2021, August). *NHS Activity Tracker.* Retrieved 03.02.22, from https://nhsproviders.org/nhs-activity-tracker/august-2021

Niazi, A. K., & Niazi, S. K. (2011). Mindfulness-based stress reduction: a non-pharmacological approach for chronic illnesses. *North American Journal of Medical Sciences, 3*(1), 20-23. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3336928/

NICE. (2008). *National Institute for Health and Care Excellence (NICE).* Guide to the methods of technology appraisal. https://cir.nii.ac.jp/crid/1573950400634102528

NICE. (2009). *NICE Clinical guideline [CG90] - Depression in adults: recognition and management.* https://www.nice.org.uk/guidance/cg90

NICE. (2012). *The guidelines manual.* UK https://www.nice.org.uk/process/pmg6/chapter/assessing-cost-effectiveness

NICE Guideline. (2022). *Mental Wellbeing at Work.* UK: NICE https://www.nice.org.uk/guidance/ng212/resources/mental-wellbeing-at-work-pdf-

66143771841733#:~:text=Agree%20steps%20to%20minimise%20work,risk%20of%20poor%20mental%20health).&text=Offer%20all%20employees%20(or%20help,using%20a%20combination%20of%20both.

NIHR. (2021, Aug 4). *Good Clinical Trials Collaborative launches new guidance consultation.* nihr.ac.uk. https://www.nihr.ac.uk/news/good-clinical-trials-collaborative-launches-new-guidance-consultation/28361

Niinihuhta, M., & Häggman-Laitila, A. (2022). A systematic review of the relationships between nurse leaders' leadership styles and nurses' work-related well-being. *International Journal of Nursing Practice, 28*(5), e13040 https://onlinelibrary.wiley.com/doi/pdf/10.1111/ijn.13040

Noone, C., & Hogan, M. J. (2018). A randomised active-controlled trial to examine the effects of an online mindfulness intervention on executive control, critical thinking and key thinking dispositions in a university student sample. BMC Psychology, 6, 1-8. https://link.springer.com/article/10.1186/s40359-018-0226-3

O'Dowd, A. (2021). NHS waiting list hits 14 year record high of 4.7 million people. *BMJ* https://www.bmj.com/content/373/bmj.n995

O'Dowd, A. (2023). Government should declare "national emergency" over NHS crisis, say peers. *BMJ, 380*, 147. https://www.bmj.com/content/380/bmj.p147

Office for Health Improvement & Disparities. (2021). *Important findings* https://www.gov.uk/government/publications/covid-19-mental-health-and-wellbeing-surveillance-report/2-important-findings-so-far

Office of Public Sector Information. (2005). *The National Institute for Clinical Excellence (Establishment and Constitution) Amendment Order 2005* https://www.legislation.gov.uk/uksi/2005/497/contents/made

O'Hare, D. A., Wiggins, M., Batt, R., & Morrison, D. (1994). Cognitive failure analysis for aircraft accident investigation. *Ergonomics, 37*(11), 1855 -1868 https://www.tandfonline.com/doi/abs/10.1080/00140139408964954

OMF. (2023). *OMF.*https://www.oxfordmindfulness.org/

ONS. (2016). *Public sector employment, UK: March 2016* https://www.ons.gov.uk/employmentandlabourmarket/peopleinwork/publicsectorpersonnel/bulletins/publicsectoremployment/march2016

ONS. (2017). *Sickness absence rate: by public and private sector, UK* https://www.ons.gov.uk/employmentandlabourmarket/peopleinwork/labourproductivity/articles/sicknessabsenceinthelabourmarket/2016

ONS. (2021). *Sickness absence in the UK labour market: 2020.* ONS https://www.ons.gov.uk/employmentandlabourmarket/peopleinwork/labourproductivity/articles/sicknessabsenceinthelabourmarket/2020

ONS. (2022). *Public sector employment, UK: March 2022* https://www.ons.gov.uk/employmentandlabourmarket/peopleinwork/publicsectorpersonnel/bulletins/publicsectoremployment/march2022

ONS. (2023a). *Public sector employment, UK: December 2022* https://www.ons.gov.uk/employmentandlabourmarket/peopleinwork/publicsectorpersonnel/bulletins/publicsectoremployment/december2022

ONS. (2023b). Working age population. Office for National Statistics. Retrieved 30.09.23, from https://www.ethnicity-facts-figures.service.gov.uk/uk-population-by-ethnicity/demographics/working-age-population/latest

O'Reilly, G. A., Cook, L., Spruijt-Metz, D., & Black, D. (2014). Mindfulness-based interventions for obesity-related eating behaviours: a literature review. *Obesity Reviews, 15*(6), 453-461. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4046117/

Oswald, M. E., & Grosjean, S. (2004). *Confirmation bias. In: Pohl RF. Cognitive Illusions: A Handbook on Fallacies and Biases in Thinking, Judgement and Memory*. Psychology Press.

Page, K. M., & Vella-Brodrick, D. A. (2009). The 'what', 'why' and 'how' of employee well-being: A new model. *Social Indicators Research, 90*, 441 -458 https://link.springer.com/article/10.1007/s11205-008-9270-3

Park, Y. M., & Kim, S. Y. (2013). Impacts of job stress and cognitive failure on patient safety incidents among hospital nurses. *Safety and Health at Work, 4*(4), 210-2015. https://www.sciencedirect.com/science/article/pii/S2093791113000462

Parkinson, F., Kent, S., Aldous, C., Oosthuizen, G., & Clarke, D. (2014). The hospital cost of road traffic accidents at a South African regional trauma centre: A micro-costing study. *Injury, 45*(1), 342 -345 https://systematicreviewsjournal.biomedcentral.com/articles/10.1186/2046-4053-3-47?report=reader

Pauly, M. V., Nicholson, S., Polsky, D., Berger, M. L., & Sharda, C. (2008). Valuing reductions in on-the-job illness:'presenteeism' from managerial and economic perspectives. Health Economics, 17(4), 469-485. https://www.researchgate.net/profile/Marc-Berger-3/publication/6209071_Valuing_Reductions_in_On-the-job_Illness_'Presenteeism'_from_Managerial_and_Economic_Perspectives/links/59df8df745851593bea6d371/Valuing-Reductions-in-On-the-job-Illness-Presenteeism-from-Managerial-and-Economic-Perspectives.pdf

Petitta, L., Probst, T., Ghezzi, V., & Barbaranelli, C. (2019). Cognitive failures in response to emotional contagion: Their effects on workplace accidents. *Accident Analysis & Prevention, 125*, 165 -173 https://www.sciencedirect.com/science/article/pii/S0001457518305220

Pfadenhauer, L. M., Gerhardus, A., Lysdahl, K. B., Booth, A., Hofmann, B., Wahlster, P., Polus, Burns, J., Brereton, L., & Rehfuess, E. (2017). Making sense of complexity in context and implementation: the Context and Implementation of Complex Interventions (CICI) framework. *Implementation Science, 12*(1), 1-17.

Phan-Le, N. T., Brennan, L., & Parker, L. (2022). The search for scientific meaning in mindfulness research: Insights from a scoping review. Plos One, 17(5) https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0264924

Phillips, C. J. (2001). *What is a QALY?* Research Gate. https://www.researchgate.net/publication/255655713_What_is_a_QALY

Pierce, M., Hope, H., Ford, T., Hatch, S., Hotopf, M., Johan, A., Kontopantelis, E., Webb, R., Wessley, S., McManus, S., & Abel, K. M. (2020). Mental health before and during the COVID-19 pandemic: a longitudinal probability sample survey of the UK population. *The Lancet, 7*(10), 883 - 892.

https://www.thelancet.com/journals/lanpsy/article/PIIS2215-0366(20)30308-4/fulltext

Polaris Market Research. (2020). *Mindfulness Meditation Apps Market Share, Size, Trends, Industry Analysis Report, By Operating System (Android, iOS, Others); By Service Type (Paid-in App Purchases, Free); By Age Group (6–12 Years Old, 13–18 Years Old, and 19 Above); By Regions; Segment Forecast, 2020 –2027.* https://www.polarismarketresearch.com/industry-analysis/mindfulness-meditation-apps-market#:~:text=The%20global%20Mindfulness%20Meditation%20Apps,41.01%25%20during%202020%2D2027.

Popper, K. (2005). *The Logic of Scientific Discovery*. Routledge.

Public Health England. (2018, Aug 07). *Economic evaluation.* https://www.gov.uk/government/publications/evaluation-in-health-and-well-being-overview/economic-evaluation

Puff, R. (2013). *An Overview of Meditation: Its Origins and Traditions.* https://www.psychologytoday.com/gb/blog/meditation-modern-life/201307/overview-meditation-its-origins-and-traditions

Pulakos, E. D., Mueller-Hanson, R., & Arad, S. (2019). The evolution of performance management: Searching for value. *Annual Review of Organizational Psychology and Organizational Behavior, 6*, 249 -271 https://www.annualreviews.org/doi/full/10.1146/annurev-orgpsych-012218-015009

Purser, R. (2019). McMindfulness: How mindfulness Became the New Capitalist Spirituality. *Journal of Global Buddhism, 22*(1), 251 -258 https://go.gale.com/ps/i.do?id=GALE%7CA667763570&sid=googleScholar&v=2.1&it=r&linkaccess=abs&issn=15276457&p=AONE&sw=w

Rabarison, K. M., Bish, C. L., Massoudi, M. S., & Giles, W. H. (2015). Economic Evaluation Enhances Public Health Decision Making. *Frontiers in Public Health, 3* https://www.frontiersin.org/articles/10.3389/fpubh.2015.00164

Radnor, Z., & Barnes, M. (2007). Historical analysis of performance measurement and management in operations management. *International Journal of Productivity and Performance Management, 56*(5), 384 -396 https://www.academia.edu/download/51190756/Historical_analysis_of_performance_measu20170104-7943-1lnn257.pdf

Raftery, J., Williams, H. C., Clarke, A., Thornton, J., Norrie, J., Snooks, H., & Stein, K. (2020). Not clinically effective but cost-effective'-paradoxical conclusions in randomised controlled trials with 'doubly null' results: a cross-sectional study. *BMJ Open,* 10 (1)

Rapgay, L., & Bystrisky, A. (2009). Classical mindfulness: An introduction to its theory and practice for clinical application. *Annals of the New York Academy of Sciences, 1172*(1), 148 -162 https://www.academia.edu/download/96925794/j.1749-6632.2009.04405.x20230106-1-1xjiuxp.pdf

Rawlins, M. D. (2015). National Institute for clinical excellence: NICE works. *Journal of the Royal Society of Medicine, 108*(6), 211-219. https://journals.sagepub.com/doi/pdf/10.1177/0141076815587658

Reb, J., Narayanan, J., & Chaturvedi, S. (2014). Leading mindfully: Two studies on the influence of supervisor trait mindfulness on employee well-being and performance. *Mindfulness, 5*, 36 – 45 https://ink.library.smu.edu.sg/cgi/viewcontent.cgi?article=4319&context=lkcsb_research

Reidy, A. (1990). Questioning the status quo: Sickness absence research so far claims more than it should! *Social Science & Medicine, 31*(4), 421 -432. https://www.sciencedirect.com/science/article/pii/027795369090037S

Richards, F., Kodjamanova, P., Chen, X., Li, N., Atanasov, P., Bennetts, L., Patterson, B. J., Yektashenas, B., Mesa-Frias, M., Tronczynski, K., & Buyukkaramikli, N. (2022). Economic Burden of COVID-19: A Systematic Review. *Clinicoecon Outcomes Res, 17*, 293-307. https://pubmed.ncbi.nlm.nih.gov/35509962/

Richards, K., Campenni, C., & Muse-Burke, J. (2010). Self-care and well-being in mental health professionals: The mediating effects of self-awareness and mindfulness. *Journal of Mental Health Counseling, 32*(3), 247-264.

https://www.researchgate.net/profile/C-Campenni-2/publication/279741291_Self-care_and_Well-being_in_Mental_Health_Professionals_The_Mediating_Effects_of_Self-awareness_and_Mindfulness/links/5bbb917d299bf1049b74f8d2/Self-care-and-Well-being-in-Mental-Health-Professionals-The-Mediating-Effects-of-Self-awareness-and-Mindfulness.pdf

Richards, M. S., & Wierzbicki, M. (1990). Anchoring errors in clinical-like judgments. *Journal of Clinical Psychology, 46*(3), 358 - 365. https://psycnet.apa.org/record/1990-25358-001

Ridyard, C., & Hughs, D. (2010). Methods for the Collection of Resource Use Data within Clinical Trials: A Systematic Review of Studies Funded by the UK Health Technology Assessment Program. *Value in Health, 13* https://onlinelibrary.wiley.com/doi/pdf/10.1111/j.1524-4733.2010.00788.x

Riggio, R. E. (2013). Advancing the discipline of leadership studies. Journal of Leadership Education, 12(3), 10-14. https://journalofleadershiped.org/wp-content/uploads/2019/02/12_3_Riggio.pdf

Robbins, M. (2018). *Bring your whole self to work: How vulnerability unlocks creativity, connection, and performance*. Hay House, Inc.

Robertson, I. T., Birch, A. J., & Cooper, C. L. (2012). Job and work attitudes, engagement and employee performance: Where does psychological well-being fit in? *Leadership & Organization Development Journal, 33*(3), 224 - 232. https://www.emerald.com/insight/content/doi/10.1108/01437731211216443/full/html?mobileUi=0&fullSc=1&mbSc=1&fullSc=1&fullSc=1&fullSc=1&fullSc=1

Robinson, J., Sinclair, M., Tobias, J., & Choi, E. (2017). More dynamic than you think: Hidden aspects of decision-making. *Administrative Sciences, 7*(3), 23. https://www.mdpi.com/2076-3387/7/3/23/pdf

Roeser, R. W., Schonert-Reichl, K. A., Jha, A., Cullen, M., Wallace, L., Wilensky, R., Oberle, E., Thomson, K., Taylor, C., & Harrison, J. (2013). Mindfulness training and reductions in teacher stress and burnout: Results from two randomized, waitlist-control field trials. *Journal of Educational Psychology, 105*(3), 787. https://www.researchgate.net/profile/Kimberly-Schonert-Reichl/publication/263919667_Mindfulness_Training_and_Reductions_in_Teacher_Stress_and_Burnout_Results_From_Two_Randomized_Waitlist-Control_Field_Trials/links/5435c9590cf2643ab9869a1b/Mindfulness-Training-and-Reductions-in-Teacher-Stress-and-Burnout-Results-From-Two-Randomized-Waitlist-Control-Field-Trials.pdf

Rössler, W. (2012). Stress, burnout, and job dissatisfaction in mental health workers. *European Archives of Psychiatry and Clinical Neuroscience, 262*(2), 65-69. https://www.zora.uzh.ch/id/eprint/64878/10/ZORA_NL_64878.pdf

Röthlin. (2016). Mindfulness promotes the ability to deliver performance in highly demanding situations. Mindfulness, 7(3), 727-733. https://arbor.bfh.ch/10934/1/R%C3%B6thlin_2016_Mindfulness%20Promotes%20the%20Ability%20to%20Deliver%20Performance%20in%20Highly%20Demanding%20Situations.pdf

Rostampour, A., Mohammadi, H., Rahimpoor, R., Sarvi, F., Dortaj, E., Ziaei, M., Safarpoor, S., & Rahmani, A. (2022). The Survey of Relationship between the Sleep Quality with Cognitive Failures and Job Performance among Airport Staff. *Iranian Journal of Ergonomics, 9*(4), 175 - 186. http://journal.iehfs.ir/browse.php?a_id=863&sid=1&slc_lang=en&ftxt=0

Rudaz, M., Twohig, M. P., Ong, C. W., & Levin, M. E. (2017). Mindfulness and acceptance-based trainings for fostering self-care and reducing stress in mental health professionals: A systematic review. *Journal of Contextual Behavioral Science, 6*(4), 380 - 390. https://digitalcommons.usu.edu/cgi/viewcontent.cgi?article=2606&context=psych_facpub

Ruijgrok-Lupton, P. E., Crane, R. S., & Dorjee, D. (2017). Impact of Mindfulness-Based Teacher Training on MBSR Participant Well-Being Outcomes and Course Satisfaction. *Mindfulness.* https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5770494/

Sá, L., Ribeiro, O., Azevedo, L. F., Couto, L., Costa-Pereira, A., Hespanhol, A., Santos, P., & Martins, C. (2016). Patients' estimations of the importance of preventive health services: a nationwide, population-based cross-sectional study. *BMJ Open,* https://bmjopen.bmj.com/content/6/10/e011755.info

Sagner, M., McNeil, A., Puska, P., Auffray, C., Price, N. D., Hood l.L, & Arena, R. (2017). The P4 health spectrum–a predictive, preventive, personalized and participatory continuum for promoting healthspan. *Progress in Cardiovascular Diseases, 59*, 506-521. https://pubmed.ncbi.nlm.nih.gov/27546358/

Sajjad, A., & Shahbaz, W. (2020). Mindfulness and social sustainability: An integrative review. *Social Indicators Research, 150*(1), 73 -94 https://link.springer.com/article/10.1007/s11205-020-02297-9

Sala, M., Rochefort, C., Lui, P. P., & Baldwin, A. S. (2020). Trait mindfulness and health behaviours: a meta-analysis. *Health Psychology Review, 14*(3), 345 -393 https://www.researchgate.net/profile/Margaret-Sala/publication/334810940_Trait_Mindfulness_and_Health_Behaviors_A_Meta-Analysis/links/5d5571dd299bf151bad46a94/Trait-Mindfulness-and-Health-Behaviors-A-Meta-Analysis.pdf

Sancho, M., De Gracia, M., Rodriguez, R. C., Mallorquí-Bagué, N., Sánchez-González, J., & Menchón, J. M. (2018). Mindfulness-based interventions for the treatment of substance and behavioral addictions: a systematic review. *Frontiers in Psychiatry, 95* https://www.frontiersin.org/articles/10.3389/fpsyt.2018.00095/full?source=post_page

Sandra, K., Montero-Marin, J., Alda Diez, M., Pérez-Yus, M. C., & Garcia-Campayo, J. (2016). Effects of mindfulness-based interventions on salivary cortisol in healthy adults: a meta-analytical review. *Frontiers in Physiology, 7*(471) https://www.frontiersin.org/articles/10.3389/fphys.2016.00471/full

Santorelli, S. (2014). *Mindfulness-based stress reduction (MBSR): Standards of practice.* Worcester, MA: Center for Mindfulness in Medicine, Health Care & Society, University of Massachusetts Medical School.

Savedoff, W. D. (2004). Kenneth Arrow and the birth of health economics. *World Health Orginisation, 82*, 139-140. https://www.scielosp.org/article/bwho/2004.v82n2/139-140/en/

Schmidt, L. (2002). *The role of general cognitive ability and job performance: Why there cannot be a debate. In Role of General Mental Ability in industrial, Work, and Organizational Psychology*. Psychology Press.

Sculpher, M. J., Pang, F. S., Manca, A., Drummond, M. F., Golder, S., Urdahl, H., Davies, L. M., & Eastwood, A. (2004). Generalisability in economic evaluation studies in healthcare: a review and case studies. *Health Technol Assess, 49*, 1-192. https://pubmed.ncbi.nlm.nih.gov/15544708/

Sethibe, T., & Steyn, R. (2015). The relationship between leadership styles, innovation and organisational performance: A systematic review. *South African Journal of Economic and Management Sciences, 18*(3), 325 -337 http://www.scielo.org.za/scielo.php?script=sci_arttext&pid=S2222-34362015000300003

Sezer, I., Pizzagalli, D. A., & Sacchey, M. D. (2022). Resting-state fMRI functional connectivity and mindfulness in clinical and non-clinical contexts: A review and synthesis. *Neuroscience & Biobehavioral Reviews* https://meditation.mgh.harvard.edu/publication_pdfs/22_Sezer_NBR.pdf

Shahsavari, H., Matourypour, P., Ghiyasvandian, S., & Nejad, M. R. G. (2020). Medical Research Council framework for development and evaluation of complex interventions: A comprehensive guidance. *J Educ Health Promot, 28*(9), 88 https://pubmed.ncbi.nlm.nih.gov/32509896/

Shapiro, S. L., Carlson, L. E., Astin, J. A., & Freedman, B. (2006). Mechanisms of mindfulness. *J. Clin. Psychol, 62*, 373-386. https://doi.org/10.1002/jclp.20237

Shiell, A., Hawe, P., & Gold, L. (2008). Complex interventions or complex systems? Implications for health economic evaluation. *Bmj, 336*(7656), 1281 -1283 https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2413333/

Sigel, R. D., Germer, C. K., & Olendzki, A. (2009). *Mindfulness: What is it? Where did it come from?* Springer, New York.

Simonsson, O., Fisher, S., & Martin, M. (2020). Awareness and Experience of Mindfulness in Britain. *Sociological Research Online, 26*(4), 833 -852 https://doi.org/10.1177/1360780420980761

Simpson, S. A., Wadsworth, E. J., Moss, S. C., & Smith, A. P. (2005). Minor injuries, cognitive failures and accidents at work: incidence and associated features. *Occupational Medicine, 52*(2), 99 -108 https://academic.oup.com/occmed/article-pdf/55/2/99/4370726/kqi035.pdf

Sinclair, M., Ashkanasy, N. M., & Chattopadhyay, P. (2010). Affective antecedents of intuitive decision making. *Journal of Management & Organization, 16*(3), 382-398. https://www.researchgate.net/profile/Prithviraj-Chattopadhyay/publication/305889193_Affective_antecedents_of_intuitive_decision_making/links/57b26d5208ae0101f17a5e01/Affective-antecedents-of-intuitive-decision-making.pdf

Singh, N. N., Lancioni, G. E., Karazsia, B. T., & Myers, R. E. (2016). Caregiver training in Mindfulness-Based Positive Behavior Supports (MBPBS): effects on caregivers and adults with intellectual and developmental disabilities. *Frontiers in Psychology, 7*, 98. https://doi.org/10.3389/fpsyg.2016.00098

Singh, N. N., Lancioni, G. E., Medvedev, O. N., Myers, R. E., Chan, J., McPherson, C. L., Jackman, M. M., & Kim, E. (2020). Comparative effectiveness of caregiver training in mindfulness-based positive behavior support (MBPBS) and positive behavior support (PBS) in a randomized controlled trial. *Mindfulness, 11*(1), 99-111. https://link.springer.com/article/10.1007/s12671-018-0895-2

Skakon, J., Nielsen, K., Borg, V., & Guzman, J. (2010). Are leaders' well-being, behaviours and style associated with the affective well-being of their employees? A systematic review of three decades of research. *Work & Stress, 24*(2), 107-139. http://www.affinityhealthhub.co.uk/d/attachments/6-skakon-et-al-2010-1554905229.pdf

Skelly, A. C., Dettori, J. R., & Brodt, E. D. (2012). Assessing bias: the importance of considering confounding. *Evid Based Spine Care J, 3*(1), 9-12. https://www.thieme-connect.com/products/ejournals/html/10.1055/s-0031-1298595

Skivington, K., Matthews, L., Simpson, S. A., Craig, P., Baird, J., Blazeby, J. M., Boyd, K. A., Craig, N., & French, D. P. (2021). A new framework for developing and evaluating complex interventions: update of Medical Research Council guidance. *BMJj,* https://www.bmj.com/content/374/bmj.n2061

Smith, K. E., Mason, T. B., Schaefer, L. M., Anderson, L. M., Critchley, K., Crosby, R. D., Engel, S. G., Crow, S. J., Wonderlich, S. A., & Peterson, C. B. (2021). Dynamic stress responses and real-time symptoms in binge-eating disorder. *Annals of Behavioral Medicine, 55*(8), 758 – 768 https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8311786/

Sorenson, C., Drummond, M., Kanavos, P. & McGuire, A. (2008). *National Institute for Health and Clinical Excellence (NICE): how does it work and what are the implications for the US?* https://www.npcnow.org/resources/national-institute-health-and-clinical-excellence-nice-how-does-it-work-and-what-are-0

Špacírová, Z., Epstein, D., García-Mochón, L., Rovira J Olry de Labry Lima A, & Espín, J. (2020). A general framework for classifying costing methods for economic evaluation of health care. *The European Journal of Health Economics, 21*(4), 529-542. https://link.springer.com/article/10.1007/s10198-019-01157-9

Specchia, M. L., Cozzolino, M. R., Carini, E., Di Pilla, A., Galletti, C., Ricciardi, W., & Damiani, G. (2021). Leadership styles and nurses' job satisfaction. Results of a systematic review. *International Journal of Environmental Research and Public Health, 18*(4), 1552. https://www.mdpi.com/1660-4601/18/4/1552/pdf

St John, A., & Price, C. P. (2013). Economic evidence and point-of-care testing. *The Clinical Biochemist Reviews, 34*(2), 61 https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3799220/

Stansfeld, S. A., Rasul, F. R., Head, J., & Singleton, N. (2009). Occupation and mental health in a national UK survey. *Soc Psychiatry Psychiatr Epidemiol, 46*, 101-110. https://doi.org/10.1007/s00127-009-0173-7

Statista. (2020). *Share of respondents who reported suffering from a mental health condition in selected European countries as of 2020* https://www.statista.com/statistics/1196047/mental-health-illness-prevalence-in-europe-by-country/

Statista. (2022). *United Kingdom: Employment from 2012 to 2022.* https://www.statista.com/statistics/275311/employment-in-the-united-kingdom/

Stewart, W. F., Ricci, J. A., Chee, E., Hahn, S. R., & Morganstein, D. (2003). Cost of lost productive work time among US workers with depression. *Jama, 289* (23), 3135-3144. https://jamanetwork.com/journals/jama/fullarticle/196767

Studenski, R., & Barczyk, J. (1987). Occupational stressors in mining as related to health, job, attitudes, and accident-making. *Polish Psychological Bulletin, 18*(3), 159-168. https://psycnet.apa.org/record/1989-13898-001

Thanh, N. H., & Quang, N. V. (2022). Transformational, Transactional, Laissez-faire Leadership Styles and Employee Engagement: Evidence From Vietnam's Public Sector. *SAGE Open, 12*(2) https://doi.org/10.1177/21582440221094606

The Health Foundation. (2021). *Spending Review 2021: what it means for health and social care.* https://www.health.org.uk/news-and-comment/charts-and-infographics/spending-review-2021-what-it-means-for-health-and-social-care

The Mindfulness Initiative. (2016). *Building the Case for Mindfulness in the Workplace.* UK: The Mindfulness Initiative https://www.themindfulnessinitiative.org/building-the-case-for-mindfulness-in-the-workplace

The National Institute for Health and Care Excellence. (2022). *Mental wellbeing at work NICE guidelines.* https://www.nice.org.uk/guidance/ng212

THE WHOQOL GROUP. (1998). Development of the World Health Organization WHOQOL-BREF Quality of Life Assessment. *Psychological Medicine, 28*(3), 551-558. https://pubmed.ncbi.nlm.nih.gov/9626712/

Tobias Mortlock, J. (2023). Next-generation mindfulness: A mindfulness matrix to extend the transformative potential of mindfulness for consumer, organizational, and societal wellbeing. *Journal of Consumer Affairs* https://onlinelibrary.wiley.com/doi/pdf/10.1111/joca.12543

Torgerson, D. J. (2001). Contamination in trials: is cluster randomisation the answer? *BMJ, 322*(7282), 355 -357 https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1119583/

Trimboli, C., Parsons, L., Fleay, C., Parsons, D., & Buchanan, A. (2021). A systematic review and meta-analysis of psychosocial interventions for 6–12-year-old children who have been forcibly displaced. *SSM - Mental Health, 1* https://doi.org/10.1016/j.ssmmh.2021.100028

Turner, H. C., Archer, R. A., Downey, L. E., Isaranuwatchai, W., Chalkidou, K., Jit, M., & Teerawattananon, Y. (2021). An introduction to the main types of economic evaluations used for informing priority setting and resource allocation in healthcare: key features, uses, and limitations. *Frontiers in Public Health, 9* https://www.frontiersin.org/articles/10.3389/fpubh.2021.722927/full

Tversky, A., & Kahneman, D. (1974). Judgment under Uncertainty: Heuristics and Biases: Biases in judgments reveal some heuristics of thinking under uncertainty. *Science, 185*, 1124-1131. https://apps.dtic.mil/sti/pdfs/AD0767426.pdf

UK Government. (2022). *Build Back Better: Our Plan for Health and Social Care.* https://www.gov.uk/government/publications/build-back-better-our-plan-for-health-and-social-care/build-back-better-our-plan-for-health-and-social-care

UK Mindfulness All-Party Parliamentary Group. (2015). *Mindful Nation.* UK: The Mindful Initiative. https://www.themindfulnessinitiative.org/mindful-nation-report

UK Parliament Post. (2021). *Mental health impacts of the COVID-19 pandemic on adults.* https://researchbriefings.files.parliament.uk/documents/POST-PN-0648/POST-PN-0648.pdf

United Nations. (2019). *Special Rapporteur on the right to physical and mental health.* https://www.ohchr.org

United Nations Sustainable Development Group. (2020). *Policy Brief: COVID-19 and the Need for Action on Mental Health.* United Nations https://unsdg.un.org/resources/policy-brief-covid-19-and-need-action-mental-health

Van Aalderen, J. R., Breukers, W. J., Reuzel, R. P., & Speckens, A. E. (2014). The role of the teacher in mindfulness-based approaches: A qualitative study. *Mindfulness, 5*, 170 -178 https://www.academia.edu/download/50955421/The_Role_of_the_Teacher_in_Mindfulness-B20161218-8364-1hxo69c.pdf

van Berkel, J., Boot, C. R., Proper, K., Bongers, P. M., & van der Beek, A. J. (2011). Mindful "Vitality in Practice": an intervention to improve the work engagement and energy balance among workers; the development and design of the randomised controlled trial. *BMC Public Health, 11*, 736. https://doi.org/10.1186/1471-2458-11-736

van Dongen, J. M., van Berkel, J., Boot, C. R., Bosmans, J. E., Proper, K. I., Bongers, P. M., Van Der Beek, A. J., van Tulder, M. W., & van Wier, M. F. (2016). Long-term cost-effectiveness and return-on-investment of a mindfulness-based worksite intervention. *Journal of Occupational and Environmental Medicine, 58*(6), 550-560. https://www.jstor.org/stable/48501319

Van Iddekinge, C. H., Aguinis, H., Mackey, J. D., & DeOrtentiis, P. S. (2018). A meta-analysis of the interactive, additive, and relative effects of cognitive ability and motivation on performance. *Journal of Management, 44*(1), 249 -279 http://www.hermanaguinis.com/JOMmeta.pdf

Vich. (2015). The emerging role of mindfulness research in the workplace and its challenges. *Central European Business Review, 4*(3), 35 -47 https://pdfs.semanticscholar.org/5d9e/2d8e7ee747292cdbcd678d05f64e95cd38d0.pdf

Victora, C. G., Habicht, J. P., & Bryce, J. (2004). Evidence-based public health: moving beyond randomized trials. *American Journal of Public Health, 94*(3), 400 -405 https://ajph.aphapublications.org/doi/pdf/10.2105/AJPH.94.3.400

Vonderlin, R., Biermann, M., Bohus, M., & Lyssenko, L. (2020). Mindfulness-based programs in the workplace: a meta-analysis of randomized controlled trials. Mindfulness, 11, 1579-1598. https://link.springer.com/article/10.1007/s12671-020-01328-3

Wadsworth, E. J., Simpson, S. A., Moss, S. C., & Smith, A. P. (2003). The Bristol Stress and Health Study: accidents, minor injuries and cognitive failures at work. *Occupational Medicine, 53*(6), 392 -397 https://academic.oup.com/occmed/article-pdf/53/6/392/4175725/kqg088.pdf

Waffenschmidt, S., Knelangen, M., Sieben, W., W, B. S., & Pieper, D. (2019). Single screening versus conventional double screening for study selection in systematic reviews: a methodological systematic review. *BMC Medical Research Methodology, 19*(1), 1-9 https://bmcmedresmethodol.biomedcentral.com/articles/10.1186/s12874-019-0782-0

Wallace, D. D., Boynton, M. H., & Lytle, L. A. (2017). Multilevel analysis exploring the links between stress, depression, and sleep problems among two-year college students. *Journal of American College Health, 65*(3), 187 – 196 https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5373919/

Wallace, G. C., & Chen, G. (2005). Development and validation of a work-specific measure of cognitive failure: Implications for occupational safety. *Journal of Occupational and Organizational Psychology, 7, 78*(4), 615 -632 https://bpspsychub.onlinelibrary.wiley.com/doi/abs/10.1348/096317905X37442

Wallace, J. C., & Vodanovich, S. J. (2003a). Can accidents and industrial mishaps be predicted? Further investigation into the relationship between cognitive failure and reports of accidents. *Journal of Business and Psychology, 17*, 503 -541 https://www.researchgate.net/profile/Stephen-

Vodanovich/publication/226271266_Can_Accidents_and_Industrial_Mishaps_Be_Predicted_Further_Investigation_into_the_Relationship_Between_Cognitive_Failure_and_Reports_of_Accidents/links/594b30ab458515225a8320c4/Can-Accidents-and-Industrial-Mishaps-Be-Predicted-Further-Investigation-into-the-Relationship-Between-Cognitive-Failure-and-Reports-of-Accidents.pdf

Wallace, J. C., & Vodanovich, S. J. (2003b). Workplace safety performance: Conscientiousness, cognitive failure, and their interaction. *Journal of Occupational Health Psychology, 8*(4), 316-327. https://doi.org/10.1037/1076-8998.8.4.316

Walsh, R., & Shapiro, S. L. (2006). The meeting of meditative disciplines and Western psychology: a mutually enriching dialogue. *American Psychologist, 61*(3), 227. https://doi.apa.org/doiLanding?doi=10.1037%2F0003-066X.61.3.227

Wang, J., & Adams, J. (2016, Bringing mindfulness to your workplace. *Association for Talent Development, 63*, 5. https://www.td.org/books

Watson, M., Kendrick, D., Woods, A., & Dewey, M. (2005). Measuring contamination in an injury prevention randomized controlled trial. *International Journal of Injury Control and Safety Promotion, 12*(3), 197-199. https://www.tandfonline.com/doi/full/10.1080/17457300500088949

Watts, G. (2017). *Kenneth Joseph Arrow.* The Lancet. https://doi.org/10.1016/S0140-6736(17)31070-X

Weatherly, H., Drummond, M., Claxton, K., Cookson, R., Ferguson, B., Godfrey, C., Rice, N., Sculpher, M., & Sowden, A. (2009). Methods for assessing the cost-effectiveness of public health interventions: Key challenges and recommendations. *Health Policy, 93*(2-3), 85-92. https://www.sciencedirect.com/science/article/abs/pii/S0168851009002048?via%3Dihub

Weick, K. E., & Sutcliffe, K. M. (2006). Mindfulness and the quality of organizational attention. *Organization Science, 17*(4), 514 -524 https://www.researchgate.net/profile/Kathleen-Sutcliffe/publication/240293902_Mindfulness_and_the_Quality_of_Organizational_Attention/links/00b7d531e2075de03c000000/Mindfulness-and-the-Quality-of-Organizational-Attention.pdf

White, I. R., Royston, P., & Wood, A. M. (2011). Multiple imputation using chained equations: Issues and guidance for practice. *Stat Med, 4*, 377 - 399 https://pubmed.ncbi.nlm.nih.gov/21225900/

WHO. (2017). *Mental health of older adults.* www.who.in

Wiese, D. S., & Buckley, M. R. (1998). The evolution of the performance appraisal process. *Journal of Management History, 4*(4), 233 -249 https://www.emerald.com/insight/content/doi/10.1108/13552529810231003/full/html?fullSc=1&mbSc=1

Willard, C. (2020). How You Can Help Others by Practicing Mindfulness. *Mindful.* https://www.mindful.org/how-you-can-help-others-by-practicing-mindfulness/#:~:text=Research%20shows%20that%20meditating%20benefits,same%20household%20or%20connecting%20virtually.&text=A%20great%20meditation%20teacher%20once,end%20of%20the%20Vietnam%20war.

Williams. (2020). *Mobile Users Spent $195 Million in Meditation Apps Last Year, Up 52% Over 2018.* Sensor Tower.https://sensortower.com/blog/meditation-apps-2019-revenue-downloads

Williams, A. (1974). Measuring the effectiveness of health care systems. In The economics of health and medical care. *British Journal of Preventive and Social Medicine,* 361 – 376 https://www.ncbi.nlm.nih.gov/pmc/articles/PMC478862/pdf/brjprevsmed00015-0048.pdf

Williams, M., & Penman, D. (2020). *Mindfulness: An Eight-Week Plan for Finding Peace in a Frantic World.* Piatkus Books.

Wolever, R. Q., Schwartz, E. R., & Schoenberg, P. L. (2018). Mindfulness in corporate America: Is the Trojan horse ethical? The Journal of Alternative and Complementary Medicine, 24(5), 403-406. https://www.liebertpub.com/doi/full/10.1089/acm.2018.0171

World Economic Forum. (2020). *5 things to know about mental health across the world*. https://www.weforum.org/agenda/2020/10/mental-health-day-covid19-coronavirus-global/

World Health Organization. (2004). *Promoting mental health: concepts, emerging evidence, practice (Summary Report).* https://apps.who.int/iris/bitstream/handle/10665/42940/9241591595.pdf

World Health Organization. (2017). *Human rights and health.* https://www.who.int/news-room/fact-sheets/detail/human-rights-and-health

World Health Organization. (2018, March 30). *Mental health: strengthening our response.* https://www.who.int/news-room/fact-sheets/detail/mental-health-strengthening-our-response

World Health Organization. (2021). Mental Health. https://www.who.int/health-topics/mental-health#tab=tab_1

worldpopulationreview. (2022). *Best Healthcare in the World 2022.* https://worldpopulationreview.com/country-rankings/best-healthcare-in-the-world

Wulsin, L., Alterman, T., Timothy Bushnell, P., Li, J., & Shen, R. (2014). Prevalence rates for depression by industry: a claims database analysis. *Soc Psychiatry Psychiatr Epidemio, 49*(11), 1805 -1821 https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4557731/

Wyatt, J. (2004). *The history of NICE.* The National Institute for Health and Care Excellence. https://indepth.nice.org.uk/20-years-of-

NICE/index.html#:~:text=With%20new%20responsibility%2C%20came%20a,if%20recommended%20by%20NICE%20where

Xu, X., Grossetta Nardini, H. K., & Ruger, J. P. (2014). Micro-costing studies in the health and medical literature: protocol for a systematic review. *Pmcid.* https://doi.org/10.1186%2F2046-4053-3-47

Yahaya, R., & Ebrahim, F. (2016). Leadership styles and organizational commitment: literature review. *Journal of Management Development, 35*(2), 190 -216 https://www.academia.edu/download/79600137/ce6b36a77b9977d3aa6259e236ea1b0624a7.pdf

Yang, J., Tang, S., & Zhou, W. (2018). Effect of mindfulness-based stress reduction therapy on work stress and mental health of psychiatric nurses. *Psychiatria Danubina, 30*(2), 189-196. https://hrcak.srce.hr/file/297446

Zangaro, G. A., & Soeken, K. L. (2007). A meta-analysis of studies of nurses' job satisfaction. *Research in Nursing & Health, 30*, 445 – 458 https://onlinelibrary.wiley.com/doi/10.1002/nur.20202

Zenner, C., Herrnleben-Kurz, S., & Walach, H. (2014). Mindfulness-based interventions in schools—a systematic review and meta-analysis. *Frontiers in Psychology, 5*, 603. https://www.frontiersin.org/articles/10.3389/fpsyg.2014.00603/full

Zhang, D., Lee, E. K., Mak, E. C., Ho, C. Y., & Wong, S. Y. (2021). Mindfulness-based interventions: an overall review. *British Medical Bulletin, 138*(1), 41-57. https://doi.org/10.1093/bmb/ldab005

Zollars, I., Poirier, T. I., & Pailden, J. (2019). Effects of mindfulness meditation on mindfulness, mental well-being, and perceived stress. *Currents in Pharmacy Teaching and Learning, 11*(11), 1022 -1028 https://www.sciencedirect.com/science/article/pii/S1877129718304568

Zoom. (2023). *Plans & Pricing for Business - Zoom.* www.us02web.zoom.us. Retrieved 05.02.23, from https://us02web.zoom.us/pricing

Appendix 1 - The Drummond et al. (2015) ten-item checklist

#	Question	Long-term cost-effectiveness and return-on-investment of a Mindfulness-based worksite intervention. Van Dongen et, al. (2016)	Score	Comparative Effectiveness of Caregiver Training in Mindfulness-Based Positive Behavior Support (MBPBS) and Positive Behavior Support (PBS) in a Randomized Controlled Trial. Singh, N.N et, al. (2020)	Score
Research question well defined?					
1.1	Did the study examine both costs and effects of the service(s) or programme(s)?	Examined costs effectiveness, general vitality, work engagement, job satisfaction and costs	10	Costs were compared via comparison costs not via an established health economic model	7
1.2	Did the study involve a comparison of alternatives?	Control group were also offered intranet access to health promotion activities, not offered the 8-week Mindfulness course	10	Active control group was offered Positive-Behaviour Support without the Mindfulness element	10
1.3	Was a viewpoint for the analysis stated and was the study placed in any particular decision-making context?	Context of Government Research employees. Cost-effectiveness was conducted from the societal and employer perspective and return on investment from the employer perspective	10	Context of community group homes. Employer costs evaluated, no clarity offered on the viewpoint	6
		Overall	**Good**	**Overall**	**Average**
Comprehensive description of alternatives?					
2.1	Were there any important alternatives omitted?	Numerous occupational health interventions mentioned, existing and reference to limited resources but no further detail	3	Discussions on previous interventions used for this group and the impacts evaluated and clearly discussed. Link to why this intervention chosen but not direct detail on why alternatives are omitted	8
2.2	Was (should) a do-nothing alternative be considered?	No	0	No	0
		Overall	**Poor**	**Overall**	**Good**
Effectiveness of program established?					
3.1	Was this done through a randomised, controlled clinical trial? If so, did the trial protocol reflect what would happen in regular practice?	RCT in a non-clinical setting. Not all secondary measures in the protocol were not reported, mainly health measures such as BMI, height, Energy Balance-Related Behaviours	4	RCT in a clinical healthcare setting (care homes). Earlier protocol signposted to, reporting did not specifically reference all elements of reporting frequency but no indication there was not adherence	4

3.2	Was effectiveness established through an overview of clinical studies?	Reference is made to studies but no reference to a systematic review of evidence. Search strategy, inclusion and exclusion criteria etc not clearly described. No. Effectiveness is based on data from a single RCT	2	Reference is made to studies however there, effectiveness is based on data from this single RCT. Inclusion and exclusion criteria is not fully referenced	8
3.3	Were observational data or assumptions used to establish effectiveness? If so, what are the potential biases in results?	No, self-report data and employee records used. Employee records used for sickness monitoring to reduce recall bias.	8	According to protocol observational data was used, not clearly referenced in paper. Biases not discussed. Reference in protocol re no reliability data was available for the first 28 weeks but unclear if same study	4
		Overall	**Average**	**Overall**	**Average**
Important & relevant costs & consequences for each alternative identified?					
4.1	Was the range wide enough for the research question at hand?	12-month period of evaluation. Longer term is possible however 12-months in this field is generally considered wide enough	8	30-week period of evaluation. Longer term is possible.	6
4.2	Did it cover all relevant viewpoints?	Employer and societal viewpoints are covered with the self-report general vitality considering the employee viewpoint.	10	The impact on those being cared for was evaluated from 'client variables' no viewpoint of client. No viewpoint was specifically mentioned, economic results were from employer perspective but not specifically addressed as so, evaluation of carer impact was covered – societal viewpoint not discussed	2
4.3	Were the capital costs, as well as operating costs, included?	Detailed breakdown of costs not presented. Headings indicate an inclusive review. Capital costs associated in developing the programme are considered but no mention of training the trainer.	7	Headings indicate a review of delivery. Capital costs associated in developing the programme are specifically mentioned as considered, no mention of training the trainer or materials etc	3
		Overall	**Average**	**Overall**	**Poor**

Costs & consequences measured accurately & appropriately?					
5.1	Were any of the identified items omitted from measurement? If so, does this mean that they carried no weight in the subsequent analysis?	Detailed breakdown available. There is nothing to suggest that identified items were omitted from measurement	10	Detailed breakdown not available. There is nothing to suggest that development or venue costs were included	5
5.2	Were there any special circumstances (e.g., joint use of resources) that made measurement difficult? Were these circumstances handled appropriately?	For the purposes of the study it was assumed that all the Mindfulness teachers involved had received appropriate training and any relevant equipment required was provided. The cost in terms of Mindfulness teacher training and venue space for delivery are not made explicit and therefore conclusion of appropriate handling is difficult to achieve	6	For the purposes of the study it was assumed that all the Mindfulness teachers involved had received appropriate training and any relevant equipment required was provided. The cost in terms of Mindfulness teacher training and venue space for delivery are not made explicit and therefore conclusion of appropriate handling is difficult to achieve	6
		Overall	**Good**	**Overall**	**Average**
Costs & consequences valued credibly?					
6.1	Were the sources of all values clearly identified? (Possible sources include market values, patient or client preferences and views, policymakers' views and health professionals' judgements).	Labour and development costs included. Where values are mentioned sources are referenced	9	Labour costs were included although it was unclear if this included trainer and development costs. Where values are mentioned sources are referenced	8
6.2	Were market values employed for changes involving resources gained or depleted?	Costs were valued using market prices (ie, the amount of money employers have to pay when implementing the intervention)	8	Costs were valued using information from the employer (ie the amount of money employers have to pay when implementing the intervention). No market value comparison discussed	0
6.3	Where market values were absent (e.g. volunteer labour), or market values did not reflect actual values (such as clinic space donated at a reduced rate), were adjustments made to approximate market values?	Not Applicable	10	No reference to adjustments to market values	0
6.4	Was the valuation of consequences appropriate for the question posed (i.e. has the appropriate type or types of analysis – cost-effectiveness, cost-benefit, cost-utility – been selected)?	Cost-effectiveness and Return on Investment analysis conducted. Robustness of results explored with six sensitivity analysis conducted	10	Psychosocial analysis using appropriate analysis. Cost-effectiveness not detailed using cost-effectiveness, cost-benefit, cost-utility calculations but a tabular comparison based on financial costs	5

		Overall	Good	Overall	Poor
Costs & consequences adjusted for differential timing?					
7.1	Were costs and consequences that occur in the future 'discounted' to their present values?	Reported that as the follow-up of the trial was one year, discounting of costs and effects was not necessary	10	Less than 12-month trial, reference controlling for time and the impact on measures	10
7.2	Was there any justification given for the discount rate used?	Not Applicable	10	N/A	10
		Overall	**Good**	**Overall**	**Good**
Incremental analysis of costs & consequences performed?					
8.1	Were the additional (incremental) costs generated by one alternative over another compared to the additional effects, benefits, or utilities generated?	Costs were provided for both intervention and control group from both the societal and employer perspective and impacts reported for intervention group vs control. Mean cost differences reported	10	Costs were provided for both intervention and active control group and impacts reported for intervention group vs active control	8
		Overall	**Good**	**Overall**	**Good**
Allowance made for uncertainty in estimates?					
9.1	If data on costs and consequences were stochastic (randomly determined sequence of observations), were appropriate statistical analyses performed?	Cost-effectiveness acceptability curves (CEACs were performed to indicate the intervention's probability of cost-effectiveness at different values of willingness-to-pay	10	Data on costs was not statically analysed rather a review of direct cost comparison for each group undertaken and comparative costs reviewed	0
9.2	If a sensitivity analysis was employed, was justification provided for the range of values (or for key study parameters)?	Yes. Six sensitivity analyses were performed.	10	No sensitivity analysis discussed	0
9.3	Were the study results sensitive to changes in the values (within the assumed range for sensitivity analysis, or within the confidence interval around the ratio of costs to consequences)?	The outcomes of the sensitivity analyses differed in some aspects from those of the main analysis (i.e., value sensitivity) – this is explored	10	No discussion on uncertainty or sensitivity	0
		Overall	**Good**	**Overall**	**Poor**
Presentation & discussion of study results include all issues of concern to users?					
10.1	Were the conclusions of the analysis based on some overall index or ratio of costs to consequences (e.g. cost-effectiveness ratio)? If so, was the index interpreted intelligently or in a mechanistic fashion?	Cost-effectiveness and return-on-investment analysis were carried out and detailed in a logical fashion	10	No index or ratio of costs used	0
10.2	Were the results compared with those of others who have investigated the same question? If so, were allowances made for potential differences in study methodology?	Results and limitations were compared with other studies	10	In specific relation to cost-effectiveness, no comparisons were discussed. Reference to other research in the same area outside of cost-effectiveness	4

10.3	Did the study discuss the generalisability of the results to other settings and patient/client groups?	Discussion re context of delivery and the consideration of the findings in a broader context	10	Reference to similar studies in different contexts given	10
10.4	Did the study allude to, or take account of, other important factors in the choice or decision under consideration (e.g. distribution of costs and consequences, or relevant ethical issues)?	Discussion about choice of interventions, a main offering with access to other services for both groups. Not measuring the uptake of other offerings such as healthy lifestyle advise etc could limit the ability to credit variance to intervention which is not explored but is mentioned.	6	No discussion linked to choice of decision, referral made by employer. Not clear if mandatory	0
10.5	Did the study discuss issues of implementation, such as the feasibility of adopting the 'preferred' programme given existing financial or other constraints, and whether any freed resources could be redeployed to other worthwhile programmes?	Implementation is discussed but not the redeployment to other worthwhile programmes or the feasibility of this	8	Discussion around implementation areas, review of other areas. Feasibility not discussed	8
		Overall	**Good**	**Overall**	**Average**

Appendix 2 - CHEERS 2022 Checklist for van Dongen et, al 2016

Long-Term Cost-Effectiveness and Return-on-Investment of a Mindfulness-Based Worksite Intervention Results of a Randomized Controlled Trial van Dongen et al., (2016)

Topic	No.	Item	Location where item is reported
Title			
	1	Identify the study as an economic evaluation and specify the interventions being compared.	Title, Objectives
Abstract			
	2	Provide a structured summary that highlights context, key methods, results, and alternative analyses.	Abstract, Page 1
Introduction			
Background and objectives	3	Give the context for the study, the study question, and its practical relevance for decision making in policy or practice.	Abstract, Introduction, Line 52
Methods			
Health economic analysis plan	4	Indicate whether a health economic analysis plan was developed and where available.	Not Reported
Study population	5	Describe characteristics of the study population (such as age range, demographics, socioeconomic, or clinical characteristics).	Table 1 - Baseline Characteristics
Setting and location	6	Provide relevant contextual information that may influence findings.	Methods, First Paragraph
Comparators	7	Describe the interventions or strategies being compared and why chosen.	Introduction, line 31 for intervention and why not reported as to why compared to usual practice and not another intervention
Perspective	8	State the perspective(s) adopted by the study and why chosen.	Introduction, last paragraph
Time horizon	9	State the time horizon for the study and why appropriate.	Methods, first paragraph details time but not reported why appropriate
Discount rate	10	Report the discount rate(s) and reason chosen.	Resource use and allocation, last paragraph

Topic	No.	Item	Location where item is reported
Selection of outcomes	11	Describe what outcomes were used as the measure(s) of benefit(s) and harm(s).	Effect measures, first paragraph
Measurement of outcomes	12	Describe how outcomes used to capture benefit(s) and harm(s) were measured.	Effect measures, second to fourth paragraph
Valuation of outcomes	13	Describe the population and methods used to measure and value outcomes.	Study population and design
Measurement and valuation of resources and costs	14	Describe how costs were valued.	Resource use and valuation
Currency, price date, and conversion	15	Report the dates of the estimated resource quantities and unit costs, plus the currency and year of conversion.	Resource use and valuation, last paragraph
Rationale and description of model	16	If modelling is used, describe in detail and why used. Report if the model is publicly available and where it can be accessed.	Not reported
Analytics and assumptions	17	Describe any methods for analysing or statistically transforming data, any extrapolation methods, and approaches for validating any model used.	In each of the analysis sections
Characterising heterogeneity	18	Describe any methods used for estimating how the results of the study vary for subgroups.	Not reported
Characterising distributional effects	19	Describe how impacts are distributed across different individuals or adjustments made to reflect priority populations.	Not reported
Characterising uncertainty	20	Describe methods to characterise any sources of uncertainty in the analysis.	Uncertainty reported in findings but not in methods
Approach to engagement with patients and others affected by the study	21	Describe any approaches to engage patients or service recipients, the general public, communities, or stakeholders (such as clinicians or payers) in the design of the study.	Not reported
Results			
Study parameters	22	Report all analytic inputs (such as values, ranges, references) including uncertainty or distributional assumptions.	Results and tables

Topic	No.	Item	Location where item is reported
Summary of main results	23	Report the mean values for the main categories of costs and outcomes of interest and summarise them in the most appropriate overall measure.	Results, second paragraph
Effect of uncertainty	24	Describe how uncertainty about analytic judgments, inputs, or projections affect findings. Report the effect of choice of discount rate and time horizon, if applicable.	Cost-Effectiveness Analysis, last paragraph. Societal Perspective: Cost-Effectiveness. Strengths and Limitations
Effect of engagement with patients and others affected by the study	25	Report on any difference patient/service recipient, general public, community, or stakeholder involvement made to the approach or findings of the study	Not reported
Discussion			
Study findings, limitations, generalisability, and current knowledge	26	Report key findings, limitations, ethical or equity considerations not captured, and how these could affect patients, policy, or practice.	Key findings in Discussion. Limitations and reference to policy in Strength and Limitations section. Ethical or Equity not reported. 'Patients' in this instance are the employees and impact is reported in results sections
Other relevant information			
Source of funding	27	Describe how the study was funded and any role of the funder in the identification, design, conduct, and reporting of the analysis	Not reported
Conflicts of interest	28	Report authors conflicts of interest according to journal or International Committee of Medical Journal Editors requirements.	Bottom of first page reports no conflicts of interest

From: Husereau D, Drummond M, Augustovski F, et al. Consolidated Health Economic Evaluation Reporting Standards 2022 (CHEERS 2022) Explanation and Elaboration: A Report of the ISPOR CHEERS II Good Practices Task Force. Value Health 2022;25. doi:10.1016/j.jval.2021.10.008

Appendix 3 - CHEERS 2022 Checklist for Singh 2018

Comparative Effectiveness of Caregiver Training in Mindfulness-Based Positive Behavior Support (MBPBS) and Positive Behavior Support (PBS) in a Randomized Controlled Trial. Nirbhay N. Singh et al., (2020)

Topic	No.	Item	Location where item is reported
Title			
	1	Identify the study as an economic evaluation and specify the interventions being compared.	Title. Economic evaluation as study not explicitly reported
Abstract			
	2	Provide a structured summary that highlights context, key methods, results, and alternative analyses.	Abstract, Page 1
Introduction			
Background and objectives	3	Give the context for the study, the study question, and its practical relevance for decision making in policy or practice.	Context in introduction. Study question - introduction page 2 past paragraph. Relevance not reported in introduction
Methods			
Health economic analysis plan	4	Indicate whether a health economic analysis plan was developed and where available.	Not reported
Study population	5	Describe characteristics of the study population (such as age range, demographics, socioeconomic, or clinical characteristics).	Method - Participants, first paragraph
Setting and location	6	Provide relevant contextual information that may influence findings.	Method - Participants, first paragraph
Comparators	7	Describe the interventions or strategies being compared and why chosen.	Method - Experiential Conditions
Perspective	8	State the perspective(s) adopted by the study and why chosen.	Not reported
Time horizon	9	State the time horizon for the study and why appropriate.	Measures - time scale detailed at end of each variable info
Discount rate	10	Report the discount rate(s) and reason chosen.	Not reported
Selection of outcomes	11	Describe what outcomes were used as the measure(s) of benefit(s) and harm(s).	Measures - variables listed

Topic	No.	Item	Location where item is reported
Measurement of outcomes	12	Describe how outcomes used to capture benefit(s) and harm(s) were measured.	Measures. Harms not reported.
Valuation of outcomes	13	Describe the population and methods used to measure and value outcomes.	Methods - Participants and Experiential Conditions
Measurement and valuation of resources and costs	14	Describe how costs were valued.	Agency Variables - Cost Effectiveness
Currency, price date, and conversion	15	Report the dates of the estimated resource quantities and unit costs, plus the currency and year of conversion.	Not reported
Rationale and description of model	16	If modelling is used, describe in detail and why used. Report if the model is publicly available and where it can be accessed.	Model of intervention reported - Experemental design PBS. Economic modelling not reported
Analytics and assumptions	17	Describe any methods for analysing or statistically transforming data, any extrapolation methods, and approaches for validating any model used.	Data Analyses. Validated approaches reported in discussion section
Characterising heterogeneity	18	Describe any methods used for estimating how the results of the study vary for subgroups.	Subgroups within the two groups being compared were not reported
Characterising distributional effects	19	Describe how impacts are distributed across different individuals or adjustments made to reflect priority populations.	Not reported
Characterising uncertainty	20	Describe methods to characterise any sources of uncertainty in the analysis.	Not reported
Approach to engagement with patients and others affected by the study	21	Describe any approaches to engage patients or service recipients, the general public, communities, or stakeholders (such as clinicians or payers) in the design of the study.	Introduction - Reported previous research informed study
Results			
Study parameters	22	Report all analytic inputs (such as values, ranges, references) including uncertainty or distributional assumptions.	Data Analysis. Table 3, 4. Assumptions & uncertainty not reported
Summary of main results	23	Report the mean values for the main categories of costs and outcomes of interest and summarise them in the most appropriate overall measure.	Mean values not reported

Topic	No.	Item	Location where item is reported
Effect of uncertainty	24	Describe how uncertainty about analytic judgments, inputs, or projections affect findings. Report the effect of choice of discount rate and time horizon, if applicable.	Not reported
Effect of engagement with patients and others affected by the study	25	Report on any difference patient/service recipient, general public, community, or stakeholder involvement made to the approach or findings of the study	Not reported
Discussion			
Study findings, limitations, generalisability, and current knowledge	26	Report key findings, limitations, ethical or equity considerations not captured, and how these could affect patients, policy, or practice.	Discussion reported key findings. Ethical, equity considerations not reported.
Other relevant information			
Source of funding	27	Describe how the study was funded and any role of the funder in the identification, design, conduct, and reporting of the analysis	End of report details funding. Compliance with Ethical Standards at end or report details programme design origins
Conflicts of interest	28	Report authors conflicts of interest according to journal or International Committee of Medical Journal Editors requirements.	Compliance with Ethical Standards reports authors conflicts

From: Husereau D, Drummond M, Augustovski F, et al. Consolidated Health Economic Evaluation Reporting Standards 2022 (CHEERS 2022) Explanation and Elaboration: A Report of the ISPOR CHEERS II Good Practices Task Force. Value Health 2022;25. doi:10.1016/j.jval.2021.10.008

Appendix 4: Participant consent form

Ysgol Seicoleg
Canolfan Ymchwil ac Ymarfer Ymwybyddiaeth Ofalgar
Adeilad Stryd y Deon
Prifysgol Bangor
Bangor Gwynedd LL57 1UT
Ffon 01248-383663
Ebost: Sharon.hadley@bangor.ac.uk

School of Psychology
Centre for Mindfulness Research & **Practice**
Dean Street Building
Bangor University
Bangor, Gwynedd
Phone 01248 383663
Email Sharon.hadley@bangor.ac.uk

Participant Consent Form

Longitudinal evaluation of cost effectiveness and wellbeing related variables of mindfulness training in the workplace

Investigators: Sharon Grace Hadley, PhD Student
Rhiannon Tudor-Edwards, Professor of Health Economics, IMSCaR
Dr Dusana Dorjee, Lecturer and Research Lead, CMRP

Admin Support: Katherine Betteridge, Research Assistant, CMRP

I confirm that I have read and understand the information sheet for the above research study. I have had the opportunity to consider the information, ask questions and where appropriate and have had these answered satisfactorily. [tick box]

I agree to take part in the above study and understand that all data will be stored, analysed and published in a completely confidential manner with regard to my identy. [tick box]

I undertsnd by taking part in this study I give consent for South East Comissioning Unit to share my previous and future sickness statistics with the research team (up to December 2016). [tick box]

I understand that my participation is voluntary and that I am free to withdraw at any time without giving any reason. [tick box]

I understand that I am free to skip over any questions I do not want to answer. [tick box]

I also understand that at the end of the study I can request a summary of information and findings regarding the research project however I will not receive any individual data. [tick box]

Full name (participant): [electronically type in here]

Signature provided in electronic format by way of ticking box (participant): [tick box here]

Date: [electronically type in here]

[Submit form back to research team in Bangor University] – there will be an electronic 'submit button here for it to come back to Bangor.

Appendix 5 - Participant de-briefing information

Ysgol Seicoleg
Canolfan Ymchwil ac Ymarfer Ymwybyddiaeth Ofalgar
Adeilad Stryd y Deon
Prifysgol Bangor
Bangor Gwynedd LL57 1UT
Ffon 01248-383663
Ebost: Sharon.hadley@bangor.ac.uk

School of Psychology
Centre for Mindfulness Research & **Practice**
Dean Street Building
Bangor University
Bangor, Gwynedd
Phone 01248 383663
Email Sharon.hadley@bangor.ac.uk

Participant De-briefing Information

Longitudinal evaluation of cost effectiveness and wellbeing related variables of mindfulness training in the workplace

Investigators: Sharon Grace Hadley, PhD Student
Rhiannon Tudor-Edwards, Professor of Health Economics, IMSCaR
Dr Dusana Dorjee, Lecturer and Research Lead, CMRP

Admin Support: Katherine Betteridge, Research Assistant, CMRP

Thank you for taking part in the above research study. This study aims to evaluate the impact and cost effectiveness of mindfulness training in the workplace.

The sickness statistical data South East Commissioning Support Unit has shared with us will support us to evaluate if there was a reduction in reported sickness as a result of mindfulness training.

The questionnaires you have completed will help us to evaluate if mindfulness training results in an a change to perceived stress levels, additionally and where appropriate we will use the data you have provided to analyse the impact of mindfulness training on leadership style and organisational culture.

Furthermore there will be economic evaluation measures evaluating impact on finances.

If you have any further questions or would like to see a summary paper of the results please contact Sharon Grace Hadley, Centre for Mindfulness Research and Practice, Bangor University, Dean Street, Bangor, Gwynedd, LL57 1U 01248 383663 / Sharon.hadley@bangor.ac.uk

Again, many thanks for your participation in this research study. We hope to use the research findings to analyse organisational culture, employee wellbeing and pave the way for future training implementation and further research.

Warmest regards

Sharon Grace Hadley

Appendix 6 - List of measures used

The Perceived Stress Scale (PSS) (Cohen 1983) - how stressed the participants perceives their lives.

The Five Facet Mindfulness Questionnaire (FFMQ-SF) (Baer at el., 2008) - 5 Mindfulness characteristics

WHOQOL-Brief (World Health Organization 1991) - Quality of life using assessment of 5 main domains.

The Cognitive Failures Questionnaire (Broadbent, et al., 1982) - failures in perception, memory, and motor function.

Multifactor Leadership Questionnaire (Avolio & Bass, 2004)– Leadership traits

A bespoke **Service Use Measure** developed by Professor Dyfrig Hughes, School of Medical and Health Sciences at Bangor University

ICECAP-A (Al-Janabi et al., 2012) - calculation of wellbeing from an individual perspective for an economic evaluation.

The EQ-5D measures health state - comparison to other cost effectiveness studies and is a NICE recommended measure.

Appendix 7 - Full Micro costing calculations

Employee teacher training - Micro-costing					
Type of cost	**Units**	**Unit cost (£)**		**Total cost (£)**	**Source of cost**
Course fees - mindfulness teacher training experiential pre-requisite - stage 1:	1 x 8 week, 2.5 hours per week course plus 5 hour 'all-day' experiential	£275 per course	275	£275	Oxford Mindfulness Centre – one of the UK's leading training centres
8-week personal course fee					
Staff attendance - mindfulness teacher training – stage 1:	25 hours	£31 per hour (including on-costs)	775	£775	*Personal Social Services Research Unit (PSSRU) Costs of Health and Social Care 2020
8-week personal course – staff wages for teacher to attend course					
Course fees - mindfulness teacher training - stage 2:	1 x 12month, 27 days over 12 months teacher training	£4,260 per programme	4260	£4,260	** Oxford Mindfulness Centre – one of the UK's leading training centres
12-month teacher training programme					
Staff attendance - mindfulness teacher training - stage 2:	1 x 12month, 27 days over 12 months (7.5 hours per day) = 202.5 hours	£31 per hour (including on-costs)	6277.5	£6,277.50	*Personal Social Services Research Unit (PSSRU) Costs of Health and
12-month teacher training programme					
Supervision – stage 3	20 hours (BAMBA guidance)	£55 per hour	1100	£1,100	*** Mindfulness Network – one of UK's leading mindfulness supervision centres
Supervisor costs					
Development of materials	22.5 hours	£31 per hour (including on-costs)		£697.50	****Researcher knowledge on this process
Adaptation of training centre materials for future teaching bespoke to teacher setting. Designing application form and template emails for assessment and recruitment:			697.5		
14 hours of staff time					
Total:			**13385**	**£13,385**	

In person - employee led Micro-Costing					
Type of cost	**Units**	**Unit cost (£)**	**Total course cost (£)**	**Total cost (£) per person based on 24 per course**	**Source of cost**
Recruitment – Planning: Employee costs - Scheduling of session and booking of venue to deliver course	2.5 hours	£31 per hour (inc on-costs)	£77.50	£3.23	*PSSRU Costs plus researcher knowledge on time required
Recruitment - Design of promotional materials: Employee costs - Preparing emails and other promotional materials	2 hours	£31 per hour (inc on-costs)	£62	£2.59	*PSSRU Costs plus researcher knowledge on time required
Recruitment – Assessment of participants applications: Employee costs - Reviewing applications, responding to queries etc	6.5 hours - 15 mins per application. 2 applications	£31 per hour (inc on-costs)	£201.50	£7.75	*PSSRU Costs plus researcher knowledge on time required
Course planning: Employee costs – reviewing session plans, preparing for teaching	18 hours - 2 hours per session to include the day of practice	£31 per hour (inc on-costs)	£558	£23.25	*PSSRU Costs plus researcher knowledge on time required
Course supervision – direct costs: Supervisor costs – to meet Good Practice Guidance	9 hours based on 1 hour per session to include the day of practice	£55 per hour	£495	£20.63	*** Mindfulness Network – one of UK's leading mindfulness supervision centres
Course supervision – employee costs: Employee costs – to meet Good Practice Guidance	10 hours - 1 hr per session to include the 'day of practice and feedback review	£31 per hour (inc on-costs)	£310	£12.92	*PSSRU Costs plus researcher knowledge on time required
Course delivery – venue costs: If delivering in person - room hire for full course including day of practice	8 x half day and 1 x full day required	£162.50 per half day	£1,625	£67.71	***** Venue space costs obtained from NHS Open Space - offers rooms in NHS properties
Course delivery – employee costs: Actual teaching time to include 30 mins each additional session to arrive early and remain for questions	8 x 3 hour sessions plus 5.5 hours for all day = 29.5 hours	£31 per hour (inc on-costs)	£914.50	£38.10	*PSSRU Costs plus researcher knowledge on time required
Course delivery – employee costs: Salary costs of 24 attendees at mean gross salary costs of £31 per hour	8 x 2.5 hours x 24 employees = 480 hours	£31 per hour (inc on-costs	£14,880.00	£620.00	*PSSRU Costs plus researcher knowledge on time required
Course delivery – employee costs: Emails to participants after each session	8 x 30 mins plus 30 mins for all day = 4.5 hours	£31 per hour (inc on-costs)	£139.50	£5.81	*PSSRU Costs plus researcher knowledge on time required
Course delivery – employee costs: Emails to participants in between sessions to respond to queries	1 hour per week for the 8 weeks	£31 per hour (including on-costs)	£218	£10.33	*PSSRU Costs plus researcher knowledge on time required
Post Course delivery, certification – employee costs: Emails to participants to complete course and send feedback and certificate	2 hours	£31 per hour (including on-costs)	£62	£2.58	*PSSRU Costs plus researcher knowledge on time required
Post Course delivery feedback review – employee costs: Review feedback – lessons learnt	2 hours	£31 per hour (including on-costs)	£62	£2.58	*PSSRU Costs plus researcher knowledge on time required
			£19,605		

Online - employee led - Micro-costing					
Type of cost	**Units**	**Unit cost (£)**	**Total course cost (£)**	**Total cost (£) per person based on 24 per course**	**Source of cost**
Recruitment – Planning: Employee costs - Scheduling of session and booking of venue to deliver course	2.5 hours	£31 per hour (inc on-costs)	£77.50	£3.23	*PSSRU Costs plus researcher knowledge on time required
Recruitment - Design of promotional materials: Employee costs - Preparing emails and other promotional materials	2 hours	£31 per hour (inc on-costs)	£62	£2.59	*PSSRU Costs plus researcher knowledge on time required
Recruitment – Assessment of participants applications: Employee costs - Reviewing applications, responding to queries etc	6.5 hours - 15 mins per application. 2	£31 per hour (inc on-costs)	£201.50	£7.75	*PSSRU Costs plus researcher knowledge on time required
Course planning: Employee costs – reviewing session plans, preparing for teaching	18 hours - 2 hours per session to	£31 per hour (inc on-costs)	£558	£23.25	*PSSRU Costs plus researcher knowledge on time required
Course supervision – direct costs: Supervisor costs – to meet Good Practice Guidance	9 hours based on 1 hour per	£55 per hour	£495	£20.63	*** Mindfulness Network – one of UK's leading mindfulness
Course supervision – employee costs: Employee costs – to meet Good Practice Guidance	10 hours - 1 hr per session to	£31 per hour (inc on-costs)	£310	£12.92	*PSSRU Costs plus researcher knowledge on time required
Course delivery – online teaching costs: If delivering online - zoom professional membership for 9 weeks	9 weeks – 3 months of zoom professional	£9.92 per month	£29.75	£1.24	Zoom
Course delivery – employee costs: Actual teaching time to include 30 mins each additional session to arrive early and remain for questions	8 x 3 hour sessions plus 5.5 hours for all day = 29.5 hours	£31 per hour (inc on-costs)	£914.50	£38.10	*PSSRU Costs plus researcher knowledge on time required
Course delivery – employee costs: Salary costs of 24 attendees at mean gross salary costs of £31 per hour	8 x 2.5 hours x 24 employees = 480 hours	£31 per hour (inc on-costs	£14,880.00	£620.00	*PSSRU Costs plus researcher knowledge on time required
Course delivery – employee costs: Emails to participants after each session	8 x 30 mins plus 30 mins for all day = 4.5 hours	£31 per hour (inc on-costs)	£139.50	£5.81	*PSSRU Costs plus researcher knowledge on time required
Course delivery – employee costs: Emails to participants in between sessions to respond to queries	1 hour per week for the 8 weeks	£31 per hour (including on-costs)	£218	£10.33	*PSSRU Costs plus researcher knowledge on time required
Post Course delivery, certification – employee costs: Emails to participants to complete course and send feedback and certificate	2 hours	£31 per hour (including on-costs)	£62	£2.58	*PSSRU Costs plus researcher knowledge on time required
Post Course delivery feedback review – employee costs: Review feedback – lessons learnt	2 hours	£31 per hour (including on-costs)	£62	£2.58	*PSSRU Costs plus researcher knowledge on time required
			£18,010	£751.01	

In person - commissioning - Micro-costings					
Type of cost	**Units**	**Unit cost (£)**	**Total course cost (£)**	**Total cost (£) per person based on 24 per course**	**Source of cost**
External teacher fees					
Commissioning a teacher from an external mindfulness centre	1		£5,000.00	£208.33	OMF / OMC
Recruitment – Planning: Employee costs - Scheduling of session and booking of venue to deliver course	2.5 hours	£31 per hour (inc on-costs)	£77.50	£3.23	*PSSRU Costs plus researcher knowledge on time required
Recruitment - Design of promotional materials: Employee costs - Preparing emails and other promotional materials	2 hours	£31 per hour (inc on-costs)	£62	£2.59	*PSSRU Costs plus researcher knowledge on time required
Course delivery – venue costs: If delivering in person - room hire for full course including day of practice	8 x half day and 1 x full day required	£162.50 per half day	£1,625	£67.71	***** Venue space costs obtained from NHS Open Space - offers rooms in NHS properties
Course delivery – employee costs: Salary costs of 24 attendees at mean gross salary costs of £31 per hour	8 x 2.5 hours x 24 employees = 480 hours	£31 per hour (inc on-costs	£14,880.00	£620.00	*PSSRU Costs plus researcher knowledge on time required
Post Course delivery, certification – employee costs: Emails to participants to complete course and send feedback and certificate	2 hours	£31 per hour (including on-costs)	£62	£2.58	*PSSRU Costs plus researcher knowledge on time required
Post Course delivery feedback review – employee costs: Review feedback – lessons learnt	2 hours	£31 per hour (including on-costs)	£62	£2.58	*PSSRU Costs plus researcher knowledge on time required
			£21,769	£907.02	

Online - commissioning - Micro-costing					
Type of cost	**Units**	**Unit cost (£)**	**Total course cost (£)**	**Total cost (£) per person based on 24 per course**	**Source of cost**
External teacher fees					
Commissioning a teacher from an external mindfulness centre	1		£5,000.00	£208.33	OMF / OMC
Recruitment – Planning: Employee costs - Scheduling of session and booking of venue to deliver course	2.5 hours	£31 per hour (inc on-costs)	£77.50	£3.23	*PSSRU Costs plus researcher knowledge on time required
Recruitment - Design of promotional materials: Employee costs - Preparing emails and other promotional materials	2 hours	£31 per hour (inc on-costs)	£62	£2.59	*PSSRU Costs plus researcher knowledge on time required
Course delivery – employee costs: Salary costs of 24 attendees at mean gross salary costs of £31 per hour	8 x 2.5 hours x 24 employees = 480 hours	£31 per hour (inc on-costs	£14,880.00	£620.00	*PSSRU Costs plus researcher knowledge on time required
Post Course delivery, certification – employee costs: Emails to participants to complete course and send feedback and certificate	2 hours	£31 per hour (including on-costs)	£62	£2.58	*PSSRU Costs plus researcher knowledge on time required
Post Course delivery feedback review – employee costs: Review feedback – lessons learnt	2 hours	£31 per hour (including on-costs)	£62	£2.58	*PSSRU Costs plus researcher knowledge on time required
			£20,144	£839.31	

Appendix 8 - Mindfulness Curriculum used in trial

Provided separately as pdf